

UDC 338.43:63

ISSN 0352-3462



**ЕКОНОМИКА  
ПОЉОПРИВРЕДЕ  
ECONOMICS OF  
AGRICULTURE**



Vol. LXIII, №2 (353-740), 2016

BELGRADE

UDC 338.43:63

ISSN 0352-3462



# ЕКОНОМИКА ПОЉОПРИВРЕДЕ ECONOMICS OF AGRICULTURE

63.

“Сагласно одлуци из члана 27. став 1. тачка 4), Закона о научноистраживачкој делатности („Службени гласник РС”, бр. 110/05, 50/06-испр. и 18/10), утврђена је категоризација домаћих научних часописа

**Листа часописа за друштвене науке**

**5. Економика пољопривреде М24”**

(Часопис међународног значаја)

<http://www.nauka.gov.rs> (28. Jun 2010)

*Београд, април-јун 2016. године*  
*Belgrade, April-June, 2016*

*Часопис*  
◇ ЕКОНОМИКА ПОЉОПРИВРЕДЕ ◇

*Journal*  
◇ ECONOMICS OF AGRICULTURE ◇

---

Основан 1954. године / Established 1954

**ИЗДАВАЧИ / PUBLISHERS**

Научно друштво аграрних економиста Балкана, Београд  
The Balkan Scientific Association of Agrarian Economists, Belgrade

Институт за економику пољопривреде, Београд (Србија)  
Institute of Agricultural Economics, Belgrade, (Serbia)

Академија економских наука, Букурешт (Румунија)  
Academy of Economic Studies, Bucharest (Romania)

**EDITOR-IN-CHIEF**

*Prof. Drago Cvijanovic, Ph.D.*, Univesity of Kragujevac,  
Faculty of Hotel Management and Tourism, Vrnjci Spa, Serbia

**Адреса уредништва / Editorial office**

Београд, Волгина 15; тел/факс (+381)11/6972-848; E-mail: [economicsofagriculture@ea.bg.ac.rs](mailto:economicsofagriculture@ea.bg.ac.rs)  
Belgrade, Volgina 15; phone/fax (+381)11/6972-858; E-mail: [epoljoprivrede@gmail.com](mailto:epoljoprivrede@gmail.com)

<http://ea.bg.ac.rs>

## INTERNATIONAL EDITORIAL BOARD

*Prof. Radovan Pejanovic, Ph.D.*, Faculty of Agriculture, Novi Sad, Serbia,

*Prof. Zorica Vasiljevic, Ph.D.*, Faculty of Agriculture, Belgrade, Serbia,

*Prof. Vladimir I. Trukhachev, Ph.D.*, Stavropol State Agrarian University, Stavropol, Russian Federation,

*Prof. Alan Randall, Ph.D.*, Faculty of Agriculture, Food and Natural Resources, University of Sydney, Sydney, Australia,

*Prof. Vincent Dolle, Ph.D.*, Mediterranean Agronomic Institute Montpellier (IAMM-CIHEAM), Montpellier, France,

*Prof. Andras Nabradi, Ph.D.*, University of Debrecen, Debrecen, Hungary,

*Prof. Eirik Romstad, Ph.D.*, Norwegian University of Life Sciences, Aas, Norway,

*Prof. Wim Heijman, Ph.D.*, Wageningen University, Wageningen, The Netherlands,

*Prof. Nicolae Istudor, Ph.D.*, Academy of Economic Studies, Bucharest, Romania,

*Prof. Andrzej Kowalski, Ph.D.*, Institute of Agricultural and Food Economics, Warsaw, Poland,

*Prof. William H. Meyers, Ph.D.*, College of Agriculture, Food and Natural Resources, Columbia, Missouri, USA,

*Prof. Thomas Glaubien, Ph.D.*, Leibniz – IAMO Institute, Halle, Germany,

*Tomas Doucha, Ph.D.*, Institute of Agricultural Economics and Information, Prague, Czech Republic,

*Prof. Margaret Loseby, Ph.D.*, State University of Tuscia, Viterbo, Italy,

*Prof. Aleksandar Ostojic, Ph.D.*, Faculty of Agriculture Banja Luka, Republika Srpska, Bosnia and Herzegovina,

*Prof. Toma Dinu, Ph.D.*, University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania,

*Prof. Natalia Nikolaevna Balashova, Ph.D.*, Faculty of Economy, Volgograd State Agricultural Academy, Volgograd, Russian Federation,

*Prof. Masahiko Gemma, Ph.D.*, Waseda University, Tokyo, Japan.

## EXECUTIVE EDITORS

*Prof. Dragic Zivkovic, Ph.D.*, Faculty of Agriculture, Belgrade, Serbia,

*Prof. Branislav Vlahovic, Ph.D.*, Faculty of Agriculture, Novi Sad, Serbia,

*Prof. Dorel Dusmanescu, Ph.D.*, Petroleum Gas University, Faculty of Economy, Ploiesti, Romania,

## ASSOCIATE EDITORS

*Prof. Zoran Rajic, Ph.D.*, Faculty of Agriculture, Belgrade, Serbia,

*Prof. Zoran Njegovan, Ph.D.*, Faculty of Agriculture, Novi Sad, Serbia,

*Prof. Jonel Subic, Ph.D.*, Institute of Agricultural Economics, Belgrade, Serbia,

*Jean Vasile Andrei, Ph.D.*, Petroleum Gas University, Faculty of Economy, Ploiesti, Romania,

*Ferhat Cejvanovic, Ph.D.*, Government of Brcko District, Bosnia and Herzegovina.

## INTERNATIONAL EDITORIAL REVIEW BOARD

*Prof. Koviljko Lovre, Ph.D.*, Faculty of Economy, Subotica, Serbia,

*Prof. Snezana Djekic, Ph.D.*, Faculty of Economy, Nis, Serbia,

*Prof. Veljko Radojevic, Ph.D.*, Azotara Pancevo, Serbia,

*Prof. Pero Petrovic, Ph.D.*, Institute of International Politics and Economics, Belgrade, Serbia,

*Prof. Vlade Zaric, Ph.D.*, Faculty of Agriculture, Belgrade, Serbia,

*Prof. Nedeljko Tica, Ph.D.*, Faculty of Agriculture, Novi Sad, Serbia,

*Prof. Vesna Rodic, Ph.D.*, Faculty of Agriculture, Novi Sad, Serbia,

*Vesna Popovic, Ph.D.*, Institute of Agricultural Economics, Belgrade, Serbia,

*Prof. Milan R. Milanovic*, Megatrend University, Belgrade, Serbia,

*Prof. Ivan Milojevic, Ph.D.*, Military Academy, University of Defence, Belgrade, Serbia,

*Prof. Nikolai I Kuznetsov, Ph.D.*, Saratov State Agrarian University – N.I. Vavilov, Saratov, Russian Federation,

*Prof. Kenneth Thomson, Ph.D.*, University of Aberdeen, Aberdeen, Scotland, UK,

*Dan Marius Voicilas, Ph.D.*, Romanian Academy of Science, Institute of Agricultural Economics, Bucharest, Romania,

*Prof. Claudiu Cicea, Ph.D.*, Academy of Economic Studies, Bucharest, Romania,

*Prof. Adrian Turek Rahoveanu, Ph.D.*, University of Agricultural Sciences and Veterinary Medicine of Bucharest, Romania,

*Marek Wigier, Ph.D.*, Institute of Agricultural and Food Economics, Warsaw, Poland,

*Prof. Mile Pesevski, Ph.D.*, University “Ss Cyril and Methodius”, Faculty of Agricultural Sciences and Food, Institute of Agroecoeconomics, Skopje, Republic of Macedonia,

*Prof. Blagica Sekovska, Ph.D.*, Faculty of Veterinary Medicine, Skopje, Republic of Macedonia,

*Prof. Aleksandra Despotovic, Ph.D.*, Biotechnical Faculty, Podgorica, Montenegro,

*Prof. Marko Ivankovic, Ph.D.*, Federal Agro-Mediterranean Institute, Mostar, Bosnia and Herzegovina,

*Prof. Bahrija Umihanic, Ph.D.*, Faculty of Economy, Tuzla, Bosnia and Herzegovina,

*Prof. Alexandru Stratan, Ph.D.*, Institute of Economy, Finance and Statistics, Chisinau, Moldova,

*Prof. Mihael Toman, Ph.D.*, Biotechnical faculty, University of Ljubljana, Domzale, Slovenia,

*Klaus Wagner, Ph.D.*, Federal Institute of Agricultural Economics, Vienna, Austria,

*Prof. Andrea Segre, Ph.D.*, Faculty of Agriculture, Bologna, Italy,

*Prof. Raluca Ion, Ph.D.*, Academy of Economic Studies, Bucharest, Romania,

*Zbigniew Florianczyk, Ph.D.*, Institute of Agricultural and Food Economics, Warsaw, Poland,

*Crina Turtoi, Ph.D.*, Romanian Academy of Science, Institute of Agricultural Economics, Bucharest, Romania,

*Vasily Erokhin, Ph.D.*, Stavropol State Agrarian University, Stavropol, Russian Federation,

*Prof. Ivo Grgic, Ph.D.*, Faculty of Economy, Zagreb, Croatia,

*Prof. Stane Kavcic, Ph.D.*, University of Ljubljana, Biotechnical Faculty, Ljubljana, Slovenia,

**Prof. Anatoli Saiganov Semenovich, Ph.D.**, Institute of System Research in the Agro-industrial Complex of National Academy of Sciences of Belarus, Minsk, Republic of Belarus,

**Prof. Natalia Sergeevna Morozjuk, Ph.D.**, Odessa State Agrarian University, Odessa, Ukraine,

**Goran Maksimovic, Ph.D.**, Faculty of Agriculture Lesak, Serbia,

**Bahrija Kacar, Ph.D.**, Government Office for the Sustainable Development of Underdeveloped Areas of the Republic of Serbia, Novi Pazar, Serbia,

**Prof. Kadrija Hodzic, Ph.D.**, Faculty of Economics, University of Tuzla, Tuzla, Bosnia and Herzegovina,

**Rumen Popov, Ph.D.**, Institute of Agricultural Economics, Sofia, Bulgaria,

**Prof. Carlos Saborio Viquez, Ph.D.**, University of Costa Rica, San Jose, Costa Rica,

**Prof. Miguel Moreno Millan, Ph.D.**, University of Cordoba, Cordoba, Spain,

**Prof. Ion Iarca, Ph.D.**, Petroleum and Gas University, Economic Sciences Faculty, Ploiesti, Romania,

**Prof. Done Ioan, Ph.D.**, Petroleum and Gas University, Economic Sciences Faculty, Ploiesti, Romania,

**Prof. Riza Avcioglu, Ph.D.**, Aegean University, Faculty of Agriculture, Izmir, Turkey,

**Prof. Diran Akinleye, Ph.D.**, University of Lagos, Akoka, Nigeria,

**Prof. Zorica Sredojevic, Ph.D.**, Faculty of Agriculture, Belgrade, Serbia,

**Prof. Natalija Bogdanov, Ph.D.**, Faculty of Agriculture, Belgrade, Serbia,

**Prof. Elena Stoian, Ph.D.**, University of Agricultural Sciences and Veterinary Medicine, Bucharest, Romania,

**Prof. Victor Manole, Ph.D.**, Academy of Economic Studies, Bucharest, Romania,

**Prof. Gabriel Popescu, Ph.D.**, Academy of Economic Studies, Bucharest, Romania,

**Prof. Dan Boboc, Ph.D.**, Academy of Economic Studies, Bucharest, Romania,

**Prof. Aurelia Felicia Stancioiu, Ph.D.**, Academy of Economic Sciences, Bucharest, Romania,

**Prof. Constantinos Alexiou, Ph.D.**, Polytechnic School, Aristotle University, Thessaloniki, Greece,

**Prof. Nicholas Apergis, Ph.D.**, University of Piraeus, Piraeus, Greece,

**Prof. Zaklina Stojanovic, Ph.D.**, Faculty of Economics, Belgrade, Serbia,

**Prof. Snezana Stetic, Ph.D.**, The College of Tourism, Belgrade, Serbia,

**Prof. Dusko Jovanovic, Ph.D.**, Business Economics Academy, Cacak, Serbia,

**Prof. Sait Engindeniz, Ph.D.**, Ege University, Faculty of Agriculture, Department of Agricultural Economics, Izmir, Turkey,

**Prof. Tetyana Mostenska, Ph.D.**, National University of Food Technologies, Kyiv, Ukraine,

**Corina Ene, Ph.D.**, Petroleum and Gas University, Economic Sciences Faculty, Ploiesti, Romania,

**Anna Ivolga, Ph.D.**, Stavropol State Agrarian University, Stavropol, Russian Federation,

**Prof. Andreja Borec, Ph.D.**, University of Maribor, Faculty of Agriculture and Life Sciences, Hoce, Slovenia,

**Prof. Mihai Mieila, Ph.D.**, Faculty of Economic Sciences, Valahia University, Targoviste, Romania,

**Prof. Donatella Privitera, Ph.D.**, Department of Educational Sciences, University of Catania, Catania, Italy,

**Prof. Marco Platania, Ph.D.**, Department of Formational Sciences, University of Catania, Catania, Italy,

**Adrian Stancu, Ph.D.**, Petroleum and Gas University, Economic Sciences Faculty, Ploiesti, Romania,

**Prof. Natalya Bannikova Vladimirovna, Ph.D.**, Stavropol State Agrarian University, Russian Federation,

**Prof. Darina Zaimova, Ph.D.**, Trakia University, Stara Zagora, Bulgaria,  
**Prof. Matteo Vittuari, Ph.D.**, Faculty of Agriculture, Bologna, Italy,  
**Prof. Zoran Grgic, Ph.D.**, Faculty of Agriculture, Zagreb, Croatia,  
**Vesna Milicic, Ph.D.**, University of Ljubljana, Biotechnical Faculty, Ljubljana, Slovenia,  
**Alexandr Trukhachev, Ph.D.**, Stavropol State Agrarian University, Russian Federation,  
**Prof. Dimitre Nikolov, Ph.D.**, Institute of Agricultural Economics, Sofia, Bulgaria,  
**Prof. Christina Yancheva, Ph.D.**, Agricultural University, Plovdiv, Bulgaria,  
**Dario Simicevic, Ph.D.**, College of Tourism, Belgrade, Serbia,  
**Prof. Vladislav Zekic, Ph.D.**, Faculty of Agriculture, Novi Sad, Serbia,  
**Aleksandar Rodic, Ph.D.**, Institute Mihailo Pupin, Belgrade, Serbia,  
**Prof. Sanjin Ivanovic, Ph.D.**, Faculty of Agriculture, Belgrade, Serbia,  
**Prof. Milan Pocuca, Ph.D.**, Business Academy, Faculty of Law, Novi Sad, Serbia,  
**Prof. Dragana Gnjatovic, Ph.D.**, Faculty of Hotel Management and Tourism, Vrnjci Spa, Serbia,  
**István Kapronczai, Ph.D.**, Research Institute of Agricultural Economics, Budapest, Hungary,  
**Branko Mihailovic, Ph.D.**, Institute of Agricultural Economics, Belgrade, Serbia,  
**Vesna Parausic, Ph.D.**, Institute of Agricultural Economics, Belgrade, Serbia,  
**Vlado Kovacevic, Ph.D.**, Ministry of Agriculture, Belgrade, Serbia,  
**Natasa Kljajic, Ph.D.**, Institute of Agricultural Economics, Belgrade, Serbia,  
**Vladimir Zakic, Ph.D.**, Faculty of Agriculture, Belgrade, Serbia,  
**Boris Kuzman, Ph.D.**, Institute of Agricultural Economics, Belgrade, Serbia,  
**Prof. Jovan Zubovic, Ph.D.**, Institute of Economic Sciences, Belgrade, Serbia,  
**Zoran Simonovic, Ph.D.**, Institute of Agricultural Economics, Belgrade, Serbia,  
**Prof. Zeljko Vojinovic, Ph.D.**, Independent university, Economic faculty, Banja Luka, Republika Srpska, Bosnia and Herzegovina,  
**Svetlana Roljevic, Ph.D.**, Institute of Agricultural Economics, Belgrade, Serbia.

1. Camelia Burja, Vasile Burja  
**FARMS SIZE AND EFFICIENCY OF THE PRODUCTION  
FACTORS IN ROMANIAN AGRICULTURE . . . . . 361**
2. Ljiljana Jelenković, Predrag Jelenković, Ljubo Pejanović  
**THE ECONOMIC POSSIBILITIES AND PERSPECTIVES OF  
AROMATIC AND MEDICINAL HERBS (SATUREJA KITAIBELII) . 375**
3. Bojan Krstić, Vladimir Radivojević, Tanja Stanišić  
**MEASURING AND ANALYSIS OF COMPETITION INTENSITY  
IN THE SUGAR MARKET IN SERBIA. . . . . 389**
4. Ivan Mičić, Dragana Urošević, Radosav Vujić, Ivana Mičić,  
Marko Mičić, Marija Mičić  
**OPERATING COSTS OF AGRICULTURAL HOLDINGS  
WITH EQUAL PRODUCTION POSSIBILITIES . . . . . 407**
5. Slavoljub Milovanovic  
**POTENTIALS OF ELECTRONIC BUSINESS  
DEVELOPMENT IN SERBIA . . . . . 429**
6. Slobodan Nešković, Žaklina Jovanović Miroslav Čavlin  
**ECONOMIC INTELLIGENCE AND INTELLECTUAL CAPITAL IN  
AGRICULTURE COMPETITIVENESS - CASE STUDY . . . . . 445**
7. Ivana Petrović, Milena Marjanović, Marija Ćosić, Slađana Savić,  
Gorica Cvijanović  
**INFRA-RED THERMOGRAPHY FOR DETECTING DROUGHT IN  
AGRICULTURAL CROPS AND SCHEDULING IRRIGATION . . . . 461**
8. Blaženka Piuković Babičković, Željko Vojinović, Predrag Vukadinović  
**INNOVATIVE WASTEWATER TREATMENT AS A  
PREREQUISITE FOR THE USE OF SLUDGE IN AGRICULTURE . 471**
9. Stanislav Zekić, Kristina Mijić, Dejan Jakšić, Ivan Milenković  
**PROFITABILITY GAP IN THE MILK PRODUCTION CHAIN:  
EVIDENCE FROM SERBIA . . . . . 485**
10. Tomislav Brzaković, Aleksandar Brzaković, Jelena Petrović  
**APPLICATION OF SCENARIO ANALYSIS IN THE INVESTMENT  
PROJECTS EVALUATION. . . . . 501**
11. Miroljub Đenadić, Bela Muhi, Dušan V. Jovanović  
**RURAL TOURISM – SERBIA’S MISSED CHANCE . . . . . 515**



12. Dejan Đurić, Jelena Ristić Dragana Đurić	
<b>FOREIGN DIRECT INVESTMENTS IN THE ROLE OF STRENGTHENING THE EXPORT COMPETITIVENESS OF THE SERBIAN ECONOMY . . . . .</b>	<b>531</b>
13. Dragana Draganac	
<b>COMPARATIVE ANALYSIS OF FUNCTIONAL FOOD PRODUCERS' PROFITABILITY IN SERBIA - A LEADER-FOLLOWER RELATION. . .</b>	<b>547</b>
14. Marina Jovičević Simin, Predrag Jovičević, Srđan Novaković	
<b>APPELATIONS OF GEOGRAPHICAL ORIGIN AS A GENERATOR OF NATIONAL COMPETITIVENESS . . . . .</b>	<b>567</b>
15. Nataša Kljajić, Vesna Popović, Biljana Grujić	
<b>PROTECTION AGAINST DETRIMENTAL EFFECTS FROM WATERS IN THE REPUBLIC OF SERBIA . . . . .</b>	<b>585</b>
16. Živana Krejić, Slobodan Čerović, Snežana Miličević	
<b>IMPACT OF SOCIO-DEMOGRAPHIC CHARACTERISTICS ON TRAVEL EXPENDITURES OF HUNGARIAN TOURISTS IN THE VILLAGE OF SKORENOVAC. . . . .</b>	<b>601</b>
17. Aleksandar Majstorović, Vesna Petrović, Slavko Vukša	
<b>ESTIMATING VALUE WHEN BALANCING REAL ESTATE OF AGRICULTURAL ENTERPRISES IN THE REPUBLIC OF SERBIA. . .</b>	<b>617</b>
18. Jelena Premović	
<b>CHARACTERISTICS OF HUMAN RESOURCES IN SERBIAN RURAL TOURISM . . . . .</b>	<b>633</b>
19. Božidar Raičević, Svetlana Ignjatijević, Ivan Milojević	
<b>FINANCIAL ANALYSIS OF FOREIGN DIRECT INVESTMENT ON ECONOMIC GROWTH OF DEVELOPING COUNTRIES. . . . .</b>	<b>649</b>
20. Lela Ristić, Milan Vujičić, Miljan Leković	
<b>TOURISM AS A FACTOR OF SUSTAINABLE DEVELOPMENT OF RURAL AREAS BELONGING TO RUDNIČKA MORAVA. . . . .</b>	<b>665</b>
21. Maja Samardžić, Dragić Živković, Zoran Rajić, Sreten Jelić	
<b>HUMAN RESOURCE MANAGEMENT AT "AD IMLEK BELGRADE" . . .</b>	<b>681</b>
22. Zoran Simonović, Branko Mihailović, Zoran Milovanović	
<b>COPERATIVES AND FARMERS ASSOCIATION AS A MODEL OF ENTREPRENEURSHIP IN SERBIAN AGRICULTURE REGARDING THE CASE OF NISAVA DISTRICT . . . . .</b>	<b>699</b>
23. Dušan Vasiljević	
<b>TAXATION OF AGRICULTURAL AND FOREST LAND: COMPARATIVE PERSPECTIVE AND PRACTICE IN SERBIA . . .</b>	<b>713</b>

## FARMS SIZE AND EFFICIENCY OF THE PRODUCTION FACTORS IN ROMANIAN AGRICULTURE

*Camelia Burja<sup>1</sup>, Vasile Burja<sup>2</sup>*

### Summary

*Romania has favourable conditions to develop the agriculture thanks to its significant agricultural land, climate conditions and labour force employed in this sector. In the last decades, the economic transition has determined major structural transformations within the agriculture sector, which generated certain disparities between the performance of Romania's agriculture and that of the EU's developed countries. This paper deals with the relationship between the size of agricultural holdings and the performance of the agricultural production factors in Romania. In order to achieve the paper's goal, we used the Data Envelopment Analysis and the comparative analysis, taking into account the features of the other EU countries. The research findings revealed that the efficiency of production factors used in agriculture is low and, therefore, a new organisation of holdings is required. This can lead to an optimal sizing of the holdings, so that the differences in performance compared to the EU's developed countries to be minimised or even eliminated.*

**Key words:** farm size, production factors, efficiency, DEA

**JEL:** Q12, Q15

### Introduction

The relationship between the farm size and efficiency plays an important role in the economic research because of its implication in the agricultural and rural development policies. The research results are contradictory. Some studies show a positive relationship (Bojnec, Latruffe, 2007), others sustain that the relationship is reversed (Verma, Bromley, 1987), and other studies show a linear relationship. The researchers' contradictory conclusions show that there are more factors influencing the farm

---

1 Camelia Burja, Ph.D., Full Professor, "1 Decembrie 1918" University of Alba Iulia, Faculty of Economic Science, Unirii Street no. 15-16, 510009 Alba Iulia, Romania, Phone: +40 0258 806 263, E-mail: [cameliaburja@yahoo.com](mailto:cameliaburja@yahoo.com)

2 Vasile Burja, Ph.D., Full Professor, "1 Decembrie 1918" University of Alba Iulia, Faculty of Economic Science Unirii Street no. 15-16. , 510009 Alba Iulia, Romania, Phone: +40 0258 806 263, E-mail: [vasileburja@yahoo.com](mailto:vasileburja@yahoo.com)

efficiency, not only the size.

Helfand and Levine (2004) analyse the relationship between the farm size and efficiency in the Brazilian Central-West and show that there is no linear relationship between the two variables, because the farm efficiency is influenced by the type of land tenure, access to institutions and markets, use of technologies and production factors (Helfand, Levine, 2004). The nonlinear relationship between the farm size and efficiency has been also demonstrated by Hanson (2008), who shows that there is a U-shaped relationship, because it is firstly decreasing and then increasing with the farm size. The efficiency of the specialized dairy farms in Sweden depends on how the knowledge is used for the optimal combination of the production factors.

A study conducted by Latruffe et al. (2004) for a panel of individual farms in Poland, specialised in crop and livestock, shows that the livestock farms are more technically efficient than the crop farms. The results of the study show a positive relationship between the farm size and efficiency. The large farms are more efficient, while the small farms of subsistence and semi-subsistence will remain in the vicious circle of low technical efficiency in the absence of appropriate economic policies.

The reverse relationship that the small farms are more efficient was supported by the research on developing countries (Bharadwaj, 1974; Johnson, Ruttan, 1994). The explanation for this relationship is based on the assumption of intensive use of the land and the opportunity cost of labour. The small farms use the family labour, which is not remunerated.

The complexity of relationship between the farm size and efficiency is given by two variables, which in turn depend on a lot of economic and social factors, as follows: the soil type, agro-climatic conditions, the transaction costs of production factors, the technology involved, the available labour force, and so on. The cheapening of capital may lead to farm size increase, if it is complementary to the land, or to farm size decrease, if the capital can substitute the land. Of course, the disadvantages of small farms on practicing a performance management, possibilities of processing and marketing of products, introduction of technological process, etc. can be removed by providing specific agricultural services (Gordon, Davidova, 2014).

Between the levels of education of the farmers, the farm size, structure and efficiency there is a significant relationship. The individual farms generally use low-skilled workers. Also, the specialization of farms helps increase their efficiency (Mathijs, Vranken, 2000).

The Common Agricultural Policy (CAP) for the Horizon 2020 envisages the implementation of the EU 2020 Strategy to achieve a smart, sustainable and inclusive growth. The main objectives for the future CAP are: viable food production, sustainable management of natural resources and climate action, and balanced territorial development (COM, 2010). Achieving these objectives requires adjusting the size of farms to achieve maximum efficiency in terms of environmental protection and

appropriate risk management.

The land consolidation and development of efficient agrarian structures is a global problem, whose resolution aims the food security of the population, which is in a continuous growth, and the needs of agricultural products for food are increasingly growing. Therefore, the concentration of agricultural production in farms of a certain size has been a major objective of the agricultural policy for all the countries. The role of this objective was to reduce the land fragmentation and to increase the farm size to a level that allows efficient use of the production factors.

The modernisation of agricultural structures by merging the lands is not a simple process, which started after the Second World War and is still going on. The difficulties of the process are objectives, related to the transaction costs, land market operation, but also subjective, related to the attachment to the land, the establishment and enforcement of property rights, taking risks, and so on.

Romania has the largest number of farms (agricultural holdings) of the EU. These holdings are not homogeneous. On the one hand, there are a large number of small farms, and on the other hand there are very large agricultural holdings. This structure is not characteristic to the EU developed countries, but it is specific to the Latin American countries, where the agricultural holdings are very large.

The excessive division of land and the establishment of a large number of farms in Romania have been generated by the restoration of the land ownership rights. Immediately after 1989, this aspect had a positive role, because the agriculture has played a buffer role in the labour market, absorbing a large proportion of the people laid off from other sectors of the national economy. At the same time, this phenomenon has led to a dramatic decrease in agricultural productivity, with negative impact on the supply of agricultural products to the population, the expansion of rural poverty, abandonment of agricultural land, and so on.

The EU integration has created new challenges for the farms in Romania, related to the competition with farmers from other European countries and implementation of CAP (Common Agricultural Policy). The challenges aim in particular the low competitiveness of the farms due to the inefficient use of production factors.

This research aims to analyze the relationship between the farm size and the efficient use of the production factors, as inputs. The utility of research consists of the adoption of appropriate macroeconomic and microeconomic agricultural policies, followed by effective actions to foster the development of competitive agricultural structures able to efficiently use the production factors and to generate a sustainable development of the rural areas.

For this research, we conducted comparative analysis and Data Envelopment Analysis to study the efficiency of using production factors split per size classes for assessing the Romanian farms.

The results of research demonstrate the assumption that the large farms are more efficient in Romania, but the efficiency of using production factors split per size classes follow a U-shaped curve. The research suggests that in Romania should be created competitive agricultural structures, where the large farms have the major role, and the small farms are maintained to economic sizes able to transform them into commercial farms.

### **Material and Methods**

This research uses the descriptive analysis of the data to present the structural disparities of agriculture in Romania compared to other countries and the Data Envelopment Analysis method (DEA) to highlight the relationship between the farm size and the efficiency of production factors in Romania. The comparator countries have an agricultural potential similar to Romania, but a higher level of agricultural development (Germany and France) and others are recently integrated into the EU (Hungary, Bulgaria and Poland).

DEA belongs to the group of the non-parametric linear programming methods and is often used to assess the productivity of decision-making units (companies, institutions, countries, and so on). The economic systems analyzed using DEA (called “decision-making units” - DMUs) have similar operational characteristics, but different size activities, and use different quantities of production factors. To establish the performance of using the production factors, we calculate the relative efficiency rates based on which we make the ranking of DMUs. The efficiency rates characterize the technical aspects of DMUs, based on the ratio of outputs (results) and production factors (utilised factors of production). A high technical efficiency is a condition for achieving a high economic efficiency (Ray, 2004).

The DEA method has been initially used in the variant *the returns to scale are constant* (CRS – proposed by Charnes, Cooper, Rhodes, 1978), and later has been developed the model *variable returns to scale* (VRS – developed by Banker, Charnes, Cooper, 1984). The CRS model considers  $k$  decision-making units, each of them using a number of  $n$  inputs and  $m$  outputs. For the  $k$  decision-making unit, the efficiency is calculated as follows:

$$E_k = \frac{\sum_{j=1}^m v_j y_{kj}}{\sum_{i=1}^n u_i x_{ki}}$$

subject to:

$$\frac{\sum_{j=1}^m v_j y_{kj}}{\sum_{i=1}^n u_i x_{ki}} \leq 1$$

$$\forall u_i, v_j \geq 0$$

where:  $u_i$  represents inputs factors weight ( $x$ );

$v_j$  represents outputs weight ( $y$ ).

This system of relations can be transformed into a linear programming model that includes a set of restrictions and the minimizing objective function (input-oriented models) or maximising objective function (output-oriented models), where the unknown elements are the weights given to the inputs and outputs.

The efficiency relations can be transformed into a linear programming model that uses a set of restrictions and aims to achieve a minimum target (input-oriented models) or maximum target (output-oriented models).

In the *output oriented models* variant, for each  $k$  decision-making unit we have:

$$\begin{aligned} & \max \sum_{j=1}^m v_j y_{kj} \\ & \text{s.t. } \sum_{i=1}^n u_i x_{ki} = 1 \\ & \sum_{j=1}^m v_j y_{kj} - \sum_{i=1}^n u_i x_{ki} \leq 0 \\ & \forall u_i, v_j \geq 0 \end{aligned}$$

By solving the model, we find an efficiency score for all the DMUs, which place them on the efficiency frontier (score 1) or away from it (score <1). The higher the score, the better the analyzed economic system is.

The data we have used were taken from the European Union statistics (Eurostat FADN) and Romania's National Statistics. The economic size of the agricultural holdings is presented according to the FADN methodology, which is based on the Commission Regulation No 1242/2008 (EC, 2008). The regulation proposes the application of the *standard output criterion* for the agricultural holdings classification. It will be expressed in euro and corresponds to the sum of values obtained for each crop and livestock characteristics by multiplying the standard outputs per unit by the number of corresponding units.

### Results and Discussion

Romania is a country with a significant agricultural potential in the European Union. The currently used agricultural area is 13.3 million ha, which ranks Romania on the 6<sup>th</sup> place among the member countries of the EU, after France, Spain, Germany, UK and Poland. The agricultural potential is significant, given other features such as: quality of soil and climate conditions in Romania. According to the Agricultural Census in Romania carried out in 2010 (NIS, 2010), the largest agricultural area consists of arable land (8.3 mil ha, 62.4%), permanent grassland and meadow (4.5 mil. ha, 33.9%), permanent crops (0.3 mil. ha, 2.3%), and kitchen gardens (0.18 mil ha, 1.4%). The labour force employed in agriculture is oversized compared with the situation found in the other European countries.

The Romania's agricultural potential is harnessed, but with low efficiency, as can be seen in Table 1.

**Table 1.** Aspects of agriculture in Romania and EU in 2013

Indicators	U.M	Romania	EU-27	Romania/EU %
Agricultural output (AO)	Mill. euro	16260.61	400436.98	4.1
Net value added (NVA)	Mill. euro	4640.56	103248.15	4.5
Energy, lubricants (EL)	Mill. euro	1925.84	30032.99	6.4
Fixed capital consumption (FCC)	Mill. euro	3017.51	61663.37	4.9
Fertilisers and soil improvers (FSI)	Mill. euro	756.08	19708.35	3.8
Plant protection products, herbicides, insecticides and pesticides (PHIP)	Mill. euro	323.11	11299.72	2.9
Agricultural Labour Input (ALI)	1000 AWU	1564.0	9692.3	16.1

Utilised agricultural area (UAA)(year 2012)	1000 ha	13733	176316	7.8
Number of Farms (year 2010)	1000 holdings	3724	11756	31.7
AO/UAA	Euro/ha	1184	2271	52.1
AO/ALI	Euro/AWU	10396.8	41314.9	25.2

Source: Eurostat [aact\_eaa01]

We see in Table 1 that Romania has about 7.8% of the utilized Agricultural area of EU, and it actually uses 1.1% of the Agricultural labour input. Also, Romania has the highest Number of farms of EU, i.e. approx. 3.7 mills. holdings (31.7%). Nevertheless, the Agricultural output and the Net value added achieved by Romanian agriculture is only 4.1% and 4.5%, respectively. The efficiency of the Utilised agricultural area and Agricultural labour input are significantly lower than the EU average (52.1% and 25.2%).

The low efficiency of the two production factors is related to the use of capital (energy, fixed capital, plant protection, insecticides and pesticides), but also, according to our opinion, to the existence of numerous workforce used in agriculture and the large number of farms which mostly practice a subsistence agriculture. Therefore, it is required a more detailed analysis of the relationship between the production factors efficiency and the agrarian structure in Romania, i.e. the size of the farms.

A spatial analysis of the farms in Romania, compared with the developed countries (Germany and France), or with the countries which joined later the EU (Bulgaria, Hungary and Poland), shows disparities in the physical farm size and distribution (Table 2).

**Table 2.** Average physical farm size and distribution, 2010

Country	Farms, No	Utilized Agricultural Area	Average size, Ha/farm	% of farms in different size classes		
				<5ha	≥ 5Ha <50 Ha	≥ 50 Ha
EU-27	<a href="#">12014570</a>	<a href="#">171604320</a>	<a href="#">14.3</a>	<a href="#">69.2</a>	<a href="#">24.8</a>	<a href="#">6.0</a>
Bulgaria	<a href="#">370490</a>	<a href="#">4475530</a>	<a href="#">12.1</a>	<a href="#">91.4</a>	<a href="#">6.4</a>	<a href="#">2.3</a>
Germany	<a href="#">299130</a>	<a href="#">16107040</a>	<a href="#">53.8</a>	<a href="#">9.1</a>	<a href="#">62.4</a>	<a href="#">28.5</a>
France	<a href="#">516100</a>	<a href="#">27837290</a>	<a href="#">53.9</a>	<a href="#">26.9</a>	<a href="#">35.9</a>	<a href="#">37.2</a>
Hungary	<a href="#">576810</a>	<a href="#">4686340</a>	<a href="#">8.1</a>	<a href="#">87.0</a>	<a href="#">10.6</a>	<a href="#">2.4</a>
Poland	<a href="#">1506620</a>	<a href="#">14447290</a>	<a href="#">9.6</a>	<a href="#">55.2</a>	<a href="#">43.1</a>	<a href="#">1.8</a>
Romania	<a href="#">3859040</a>	<a href="#">13306130</a>	<a href="#">3.4</a>	<a href="#">93.1</a>	<a href="#">6.3</a>	<a href="#">0.5</a>

Source: E.C., DG Agri, Rural Development in the EU Statistical and Economic Information Report 2013

We see in Table 2 that Romania has the lowest average farm size of the countries shown in Table 2, almost 4 times less than the EU-27 average. Moreover, in Romania, 93.1% of the farms are using an area less than 5 ha. The average farm size of 3.4 ha is highly



dispersed in Romania. On the one hand, there are 3.45 million farms (93%) having an area of land less than 5 ha, and on the other hand 13656 farms (0.36%) have an area of land larger than 100 ha (NIS, 2012). The causes of excessive fragmentation of land in Romania are related to the establishment of ownership of land after 1989.

In Germany, the farm average size is 53.8%, and most farms (62.4%) are using between 5 and 50 ha of agricultural land. The land structure in Germany was heavily influenced by the unification of the two countries. In Western Germany, the agriculture is carried out mostly in small-scale family farms. Before the unification, the agriculture in the Eastern Germany was organised in large-scale farms, which were maintained after the unification and adapted to the specific mechanism of market economy. There were of course huge transfers of capital from the Western Germany to the Eastern Germany's agriculture, to increase the economic performance.

In France, we notice an average size of the agricultural holdings, similar to Germany. The distribution of farms by size classes is more balanced, i.e. there are still 26.9% of farms using 5 hectares of land. The concerns about the land consolidation and reduction in the number of small farms began in France after 1950, by economic and social measures aimed to offset the incomes from the farming activities carried out by the small or elderly farmers who were leaving the land (Bullard, 2007). The land consolidation is a continuous process in France. Certain measures have been taken to improve the land management structures by building adequate infrastructure, encouraging the land exchanges, adopting appropriate legislation which sets a minimum area/farm, and so on.

Considering the number of farms, Poland is the second country in the EU. Also in this country the small farms that use less than 5 hectares are majority (55.2%). They have a long tradition and have resisted the government attempts of collectivization in the communist era. The transition to a market economy has had a strong impact on the Polish agriculture. The small farms have absorbed much of the labour force laid off from the state farms and other sectors of the economy. But, in recent years, there has been a trend of farm consolidation in Poland, i.e. increase in the share of medium-size and large farms, but the small farms can contribute to the sustainable rural development.

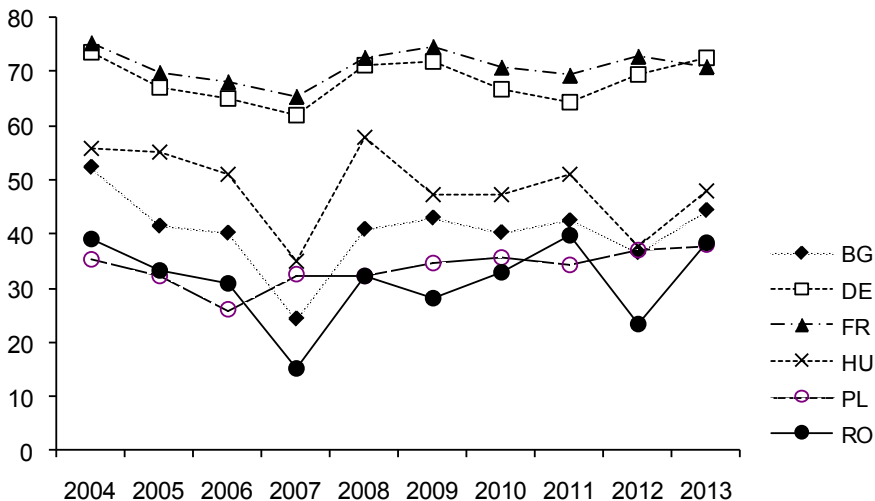
The land reform, which started in Bulgaria in 1991, has created major problems such as: non-rational personification of the land ownership; the land use is characterized by a strong polarization in the size of land farms; fragmentation and dispersion of the land estates, often in different areas or settlements (Yanakieva, 2013). This situation leads to low efficiency of the agriculture in Bulgaria, difficulties in the implementation of CAP and assimilation of the EU funds.

In Hungary, the average farm size is well below the European average, because the farms with land areas less than 5 ha are numerous. In recent years, there is a process of concentration of the agricultural lands imposed by the competitiveness with the other EU countries, the implementation of CAP and adoption of the European Model of Multifunctional Agriculture to Hungary (Czimbalmos et al., 2013).

Besides the size of the farms, there are more factors that generate performance disparities among the analysed countries. Romania uses 3.5 times less agricultural production factors in the intermediate consumption than Germany, and about 30 times less than Poland. The consumption of fixed capital is about four times lower than in Germany. Also, the fertilisers & soil improvers and plant protection products are used in lower amounts compared to the most analysed countries, except Bulgaria (Burja, 2014). The farm size and use of production factors in agriculture generates different outputs. We can see in Figure 1 that Romania has the lowest cereal yield of the analysed countries.

The use of production factors, the size of farms and the outcomes are closely connected. But, this connection must be nuancedly interpreted, because there are many causes which determine the certain physical size of the farms. Certainly, the physical size is correlated with the economic size of the farms.

**Figure 1.** Cereal yield, 2004-2013, (100 kg/ha)



Source: Eurostat, Crops products: areas and productions (apro\_cpp\_crop)

The FADN data enable a detailed presentation and analysis of the relationship between the farm size and the input use efficiency. Only the commercial farms are included in FADN, i.e. the farms which are large enough to provide a main activity for the farmer and a level of income sufficient to support his or her family. For the purpose of this analysis, we grouped the production factors according to the theory of classical political economy at work (Labour input), nature (Utilized agricultural area) and capital (Average farm capital).

**Table 3.** The use of production factors on farm size classes in Romania (2010-2012)

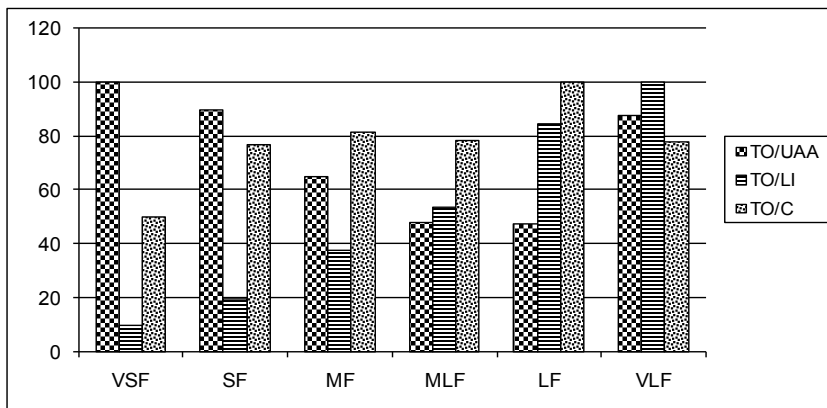
Economic Size Classes	Typology	Symbol	Total output, Euro	Utilized Agricultural Area, ha	Labour input, AWU	Average farm capital, Euro
2 000 - < 8 000	Very small farms	VSF	7192	4.41	1.23	20606
8 000 - < 25 000	Small farms	SF	18727	12.79	1.60	34768
25 000 - < 50 000	Medium-low farms	MLF	54602	51.44	2.44	95574
50 000 - < 100 000	Medium-large farms	MHF	105794	134.62	3.29	193200
100 000 - < 500000	Large farms	HF	340463	439.25	6.73	486403
>= 500 000 EUR	Very-large farms	VHF	1887337	1315.86	31.59	3459322
<b>Total</b>	-	-	13134	10.25	1.35	29841

Source: Own calculations based on the FADN public database

We can see in Table 3 that the Very-large farms with an economic size of more than €500,000 are using an agricultural area of almost 300 times higher than the Very small farms. Moreover, the Labour input is about 25 times higher and, in its turn, the Average farm capital 168 times higher. According to FADN, the Average farm capital includes the Average value of the Working capital, i.e. Livestock + Permanent crops + Land improvements + Buildings + Machinery and equipment + Circulating capital.

The Very-large farms use large quantities of production factors and, naturally, they achieve higher productions, but the efficiency is generally considered as the ratio between effect and effort, i.e. the ratio between the total output and input used in the production process.

**Figure 2.** The relative efficiency of the production factors on farm size classes in Romania (2010-2012)



Source: Our own calculations based on the FADN public database

We can see in Figure 2 that the Very small farms are using the agricultural area with maximum efficiency, the Large farms have maximum efficiency for the capital employed and the Very-large farms are using the Labour input with maximum efficiency. The Very-large farms are balanced in terms of relative efficiency of the production factors.

We can get an overview on the efficiency of using the production factors in the agricultural holdings in Romania, for the period taken into account, by applying the DEA method. The results are shown in Table 4.

**Table 4.** The efficiency of using production factors in the Romanian farms - Results from DEA

Typology	Technical efficiency CRS	Technical efficiency VRS	Scale efficiency CRS/VRS
Very small farms	0.964	1.00	0.964
Small farms	0.950	0.969	0.980
Medium-low farms	0.898	0.903	0.994
Medium-large farms	0.814	0.869	0.937
Large farms	0.938	0.941	0.997
Very-large farms	1.00	1.00	1.000
Mean	0.927	0.947	0.979

Source: Our elaboration on data from FADN using DEA Software 2.1

From the data shown in the table, we note that in the *constant returns to scale* variant (CRS) only the Very-large farms are efficient, and in the *variable returns to scale* variant, the Very small farms seems to be efficient, too. The analysis results suggest a U-shaped distribution of the efficiency of using the production factors in Romania's agricultural holdings. The fact that the Very small farms appear close to the efficiency curve should not surprise, because they use the workforce efficiently and can contribute to the development of multifunctional agriculture, developed on sustainable principles (Gallutio, 2013). The Very small farms must achieve economic sizes, which transform them into commercial farms, able to exploit their relative advantages available. The large farms are of course the most efficient because of the possibilities to exploit the production factors and the obtained results, and therefore their competitiveness in the EU countries is obviousness.

### Conclusions

Romania has a significant agricultural potential which would allow it to be one of the representative players on the EU market in terms of production and trade with agricultural products. However, the relatively low efficiency of the production factors used in the agricultural holdings in Romania leads to poor results compared to other EU countries that have similar agricultural potential. This is due to poor agrarian structure, but has also other causes related to the changes occurred in Romania's agriculture in the process of transition to a market economy and implementation of CAP.

This research investigates the relationship between the size of Romanian farms and the efficiency of using the production factors. The results show that Romania has the highest number of agricultural holdings in the EU, most of which are small and practice subsistence agriculture. This agrarian structure must be improved by strengthening, for the subsistence farms to become commercial farms.

The results obtained through DEA confirm the superiority of the Very-large farms in terms of input use efficiency. The evolution of efficiency is a U-shaped curve showing that even the Very small farms can reach the efficiency frontier through an optimal combination of production factors, if operating on commercial principles.

The Small farms have an important role in the rural sustainable development through multifunctional agriculture, by ensuring the biodiversity, rural population stability, agritourism development, and so on. At the same time, the large farms provide superior efficiency when using the production factors.

The CAP objectives “Towards 2020” are pursuing viable food production, sustainable management of the natural resources & climate action, and balanced territorial development. To achieve these objectives, a simple and certain support scheme for the small farmers will be implemented.

The direct payments will be granted only to the active farmers, and will be a real support for the better use of the production factors.

The research results suggest an approach of the agricultural development policies in Romania able to pursue the achievement of an adequate agrarian structure, leading to increased efficiency of the production factors and sustainable rural development.

### Literature

1. Banker, R.D., Charnes, A., Cooper, W.W. (1984): *Some Models for Estimating Technical and Scale Inefficiencies in Data Envelopment Analysis*, Management science, vol. 30, no. 9, pp. 108-1092.
2. Bharadwaj, K. (1974): *Production Conditions and Indian Agriculture*. Cambridge University Press, Cambridge.
3. Bojnec, S., Latruffe, L. (2007): *Farm size and efficiency: the case of Slovenia*. 100th Jubilee Seminar of European Association of Agricultural Economists “Development of Agriculture and Rural Areas in Central and Eastern Europe”. Novi Sad, 21st-23rd June 2007.
4. Bullard, R. (2007): *Land Consolidation and Rural Development*, Papers in Land management, No. 10, October 2007, Anglia Ruskin University.
5. Burja V. (2014): *Performance Disparities Between Agricultural Holdings Of Romania And Of The European Union*, Annals - Economy Series, Constantin Brancusi University, Faculty of Economics, vol. 0, pp. 97-102, May.
6. Charnes, A, Cooper, W.W, Rhodes, E.L. (1978): *Measuring the efficiency of decision*

- making units*, European Journal of operational Research, no. 2.
7. COM (2010) 672 final, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of The Regions, *The CAP towards 2020: Meeting the food, natural resources and territorial challenges of the future*, Brussels, 18 November 2010, (available at: [http://ec.europa.eu/agriculture/cap-post-2013/communication/com2010-672\\_en.pdf](http://ec.europa.eu/agriculture/cap-post-2013/communication/com2010-672_en.pdf)).
  8. Czimbalmos, R., Kovács, G., Fehér, A. (2013): *Multifunctionality and farm concentration in Hungary*, Research Journal of Agricultural Science, vol. 45, no. 2, pp. 52-60.
  9. E.C., DG Agri (2013): *Rural Development in the EU Statistical and Economic Information Report 2013*, (available at: [http://ec.europa.eu/agriculture/statistics/rural-development/2013/full-text\\_en.pdf](http://ec.europa.eu/agriculture/statistics/rural-development/2013/full-text_en.pdf)).
  10. European Commission, (EC), (2008): *Commission Regulation (EC) No 1242/2008 of 8 December 2008 establishing a Community typology for agricultural holdings*, Official Journal of the European Union, 13.12.2008, Brussels.
  11. Gallutzzo, N. (2013): *Farm Dimension and Efficiency in Italian Agriculture: A Quantitative Approach*, American Journal of Rural Development, vol. 1, no. 2, pp. 26-32.
  12. Gorton, M., Davidova, S. (2004): *Farm productivity and efficiency in the CEE applicant countries: a synthesis of results*, AgricEcon, no. 30, pp. 1–16.
  13. Hansson, H. (2008): *Are larger farms more efficient? A farm level study of the relationships between efficiency and size on specialized dairy farms in Sweden*, Agricultural and Food Science, no. 17, pp. 325-337.
  14. Helfand, S. M., Levine, E. S. (2004): *Farm size and the determinants of productive efficiency in the Brazilian Center-West*, Agricultural Economics, vol. 31, no. 2-3, pp. 241-249.
  15. Johnson, N. Ruttan, V. (1994): *Why Are Farms So Small?*, World Development no. 22, pp. 691–706.
  16. Latruffe, L., Balcombe, K., Davidova, S., Zawalinska, K. (2004): *Determinants of Technical Efficiency of Crop and Livestock Farms in Poland*, Applied Economics vol. 36, no. 12, pp. 1255-1263.
  17. Koester, U. (2000): *The Evolving Farm Structure in East Germany*, in C. Csaki and Z. Lerman, eds., *Structural Change in the Farming Sectors in Central and Eastern Europe*, ECSSD Environmentally and Socially Sustainable Development, Working Paper, no. 23, Washington, DC, pp. 49–66.
  18. Mathijs E., Vranken, L. (2000): *Farm restructuring and efficiency in transition: Evidence from Bulgaria and Hungary*, Selected Paper, American Agricultural Economics Association Annual Meeting, Tampa, Florida, July 30- August 2.
  19. National Institute of Statistics (NIS), (2012): *General Agricultural Census 2010*,

National results, Bucharest.

20. Ray, S.C. (2004): *Data Envelopment Analysis Theory and Techniques for Economics and Operations Research*, Cambridge University Press, UK.
21. Szumelda, A. (2013): *Is Small Beautiful? The Debate on the Future of Small Individual Farms in Poland*, Eastern European Countryside, vol 19.
22. Verma, B., Bromley, D. (1987): *The political economy of farm size in India: The elusive quest*, Economic Development of Cultural Change, vol. 35, no. 4, pp. 791-808.
23. Yanakieva, I. (2007): *The agricultural land problems in Bulgaria and implementation of the Common Agricultural Policy*, Agricultural Economics, no. 53, pp. 189-193.

## THE ECONOMIC POSSIBILITIES AND PERSPECTIVES OF AROMATIC AND MEDICINAL HERBS (SATUREJA KITAIBELII)

*Ljiljana Jelenković<sup>1</sup>, Predrag Jelenković<sup>2</sup>, Ljubo Pejanović<sup>3</sup>*

### Abstract

*The economy in Serbia has not been working at its full capacity for a long time, which had left a great mark in economic stability of the country. The good side is that the environment pollution is less than in case of its full capacity. Therefore there shouldn't try to achieve the developed technologies at all costs, but it should orient to the utmost to agriculture and food production. Economically high developed countries pay a lot of attention to the healthy way of life and nutrition, and therefore the market, on which would sell the food products from Serbia, are with characteristic brand and undoubtable quality. Owing to the expressed trend for the healthy way of living, more and more people in high developed countries turn to aromatic and medicinal herbs which they use as spices, for therapeutic or medicinal purposes. Such trend shows also various industry branches, and they increasingly base their production on natural products. Hereof the aromatic and medicinal herbs start being more and more important economic resource of those countries which have them.*

**Key words:** *economy, aromatic and medicinal herbs, essential oils, health and protection.*

**JEL:** Q57

### Introduction

The agriculture is the oldest economic branch people have been engaged from times immemorial. Most of humanity is still engaged in agriculture, and that is why it should be observed through double aspects: on the one hand, the agriculture is important as

- 1 Ljiljana Jelenković M.Sc., Professor of Medical Biochemistry, Medical School „Dr Milenko Hadžić“, Zetska street no. 55, 18000 Nis, Serbia, Phone: +381 63 11 65 987, E-mail: [jelenko410@gmail.com](mailto:jelenko410@gmail.com)
- 2 Predrag Jelenković Ph.D., Visiting Lecturer, University Union, Faculty of Legal and Business Studies „Dr Lazar Vrkatić“ Novi Sad, VŠJ Niš, Generala Milojka Lešjanina street no. 17, 18.000 Nis, Serbia, Phone: +381 69 27 06 992, E-mail: [jelenko224@yahoo.com](mailto:jelenko224@yahoo.com)
- 3 Ljubo Pejanović PhD, Associate Professor, University Union, Faculty of Legal and Business Studies „Dr Lazar Vrkatić“ Novi Sad, Bulevar oslobođenja no. 76, 21000 Novi Sad, Serbia, Phone: +391 63 438 649, E-mail: [pejanovicljubo@gmail.com](mailto:pejanovicljubo@gmail.com)



the primary food and other animal and herbal products manufacturer, and on the other hand, the agriculture is a base for starting the economic development, and how much it would be fast depends not only on a natural base the agriculture has, but also on the social, economic and political and other circumstances (Simonović, 2014). The modern agriculture implies the process of building a new economic activity based on efficiency, competitiveness, intensity and marketability (Vehapi, Šabotić, 2015).

The economic position of agriculture, according to the economic science, determines in accordance to four indicators, by which the significance of agriculture in the economy is determined. Based on these indicators, the role of agriculture in economic development is measured:

- Share of agricultural population in the total population,
- Share of agricultural population in the total active population,
- Share of agriculture in creation of the national income, and
- Share of agriculture in creation of foreign-trade balance (Stipetić, 1968).

Agrarian policy is the essential part of the economic policy, which applies in agriculture and it cannot be created either out of the economic policy principles, or can the intentions and the agrarian policy concept be different from the economic policy concept. If we observe the agrarian policy transformation, the main goals of reforming in Serbia would refer to the radical reconstruction and modernisation of agro sector. On the way of redefining a base for conducting the agricultural policy, the agricultural sector was enforced several goals, and among them the following can be singled out as the most important:

- Building sustainable and efficient agro economy which can compete on the world market,
- providing healthy-safe and high quality food,
- support to life standard for people who depend on agriculture, and they are not able to follow the economic reforms by their development, support to sustainable rural development,
- The environment preservation from impact of the effects of agricultural production intensification (Simonović, 2014).

What connects the indicators of agriculture significance in the economy and the agrarian policy goals are the aromatic and medicinal herbs (AMH) and their products. In support of this claim is the data that the world market of AMH is evaluated to 400-500,000 tons of dried herb material, which value annually ranges between 1.1 and 1.3 milliard USD. On the AMH market is also present a permanent growth of 5-15% annually. The European Union (UN) represents the biggest individual commercial market in the world for AMH. The biggest world AMH markets are: China, India, France, Germany,

Italy, Japan, Spain, Great Britain and the United States of America (USA). The most important world exporters of this economic resource are China and India (Shengji, 2001). With increasing popularization and demand for AMH, there is expected that in 2050 turnover of this economic resource will be around five billion USD per a year (FLRHT, 1996).

As for Serbia, the export raises of AMH from Serbia to other countries, the same as the trend in the world - the export was increased from 7 million USD in 2005 to around 13.5 million USD in 2008, when spice plants and aromatic herbs were participating with 63% (ground spicy pepper), medicinal herbs with 34%, and teas with 3%. The countries, Serbia exports the most in, are: Austria, Bosnia and Herzegovina, Croatia, Hungary and Macedonia. However, after the year 2008, the export, i.e. income has stagnated or has a slight decline, which is no good and it should be changed (Jelenković, 2014).

### **Possibilities and perspectives for growing AMH in Serbia**

As it is well-known, thanks to its favourable climate, land and relatively unpolluted environment, Serbia represents a very suitable space for intensive growing of AMH. Serbia, by its biodiversity, has been classified into one of 158 the best world centres, i.e. one out of six in Europe. It is aligned with due to a fact that over 700 species of AMH were determined in the rich flora, of which 420 were officially registered, and 279 were in turnover as an industrial raw material, used by its further processing for the production of drugs, cosmetic and hygiene products, spices, different extracts and other products.

Biodiversity requires today a full attention, as regarding flora, as well as regarding fauna. If we want to exploit the natural wealth we have as the economic resource, among other things also the AMH, than we have to treat them as the renewable resource. It implies systematically and long-term arrangement, management, planning and investment into this field, which is primarily the state's obligation. Interested individuals or groups can involve in all segments of the natural wealth treatment, but a leading part plays the government, owing to the resources recovery. All other ways of the AMH exploitation, or any other natural resource, sooner or later, will lead to disturbances in biological diversity, which violates the natural balance (Jelenković, 2014).

The production by itself, i.e. growing the AMH requires, especially at the beginning, also the specific financial support. As for the necessary financial resources, except the favourable agricultural credits which have to be provided by the government (by including the banks which support the agricultural production), there are also the EU funds today (now we are the member-candidate for the EU membership) for which can be applied. These funds are, first of all, the IPA (IPA I-V - Instrumental for Pre-Accession Assistance) programs, especially the IPA V program, which refers to rural development. These programs, with the total fund of 11,468 milliard euro for 7 years, aim to help the countries-candidates in adjustment and implementing the EU regulations, and in that way to prepare the countries for using the structural EU funds (Jelenković, Jelenković,

2012). What speaks in favour of the fact that using these funds today is inevitable, in a segment of organic manufacturers is increased demand for the financial resources than the supply, i.e. that business banks and other financial institutions do not want or cannot to satisfy the financial needs in a value chain (Ljumović et al., 2015).

More intensive cultivation of the AMH in Serbia has started in the middle of the past century, although growing these plant species in Vojvodina has its tradition before the II World War. For other parts of Serbia, e.g. east and south-east, is more characteristic gathering and purchase of indigenous AMHs. Compared to the previous period, in our country produces more intensive larger quantities of raw materials for around 30-50 of these plant species.

As regards to the plantation (large-scale) production, i.e. growing the AMHs, it is significant that it is possible to preserve, along with seeds production, the most vulnerable or rare species, significant for different industry branches which use them. In that way, there makes pre-conditions for the preservation of the AMH in natural habitats. It is very important because of the fact that increased interest for the indigenous AMH has led to the irrational use of the natural resources, so some of the AMH has been protected by law with different measures, as: prohibition of gathering, picking and destruction, complete prohibition of their use and sale, control of use and sale and the necessary permission for gathering.

The second advantage in growing these plant species, in regard to indigenous plants, is that by their growing provide the unchangeable conditions for plant, i.e. the conditions that is possible to influence to, so in that way there provides, as the permanent qualitative and quantitative chemical composition of the essential oils, as well as the increased amounts of the essential oils (Adamović, Danojević, 2006) as the most significant AMH products. It is very important because the permanent chemical composition enables a continuous sale of a plant raw material.

### **Threatening-possibilities of the environment pollution**

The ecological issue of using land resources had predominantly the local character by mid-century. Nowadays, by using the land resources, it has mostly the global and regional implications. Combustion of fossil fuels and deforestation in a much greater extent than they renew increase the amount of a carbon-dioxide in atmosphere, which together with other gases have an effect to the global climatic changes. The combustion of fossil fuels is the largest source of air pollution that affects trees, crops, lakes, humans and causes certain soil damages (Milenović, 2000). Owing to the environment pollution resources, it is especially spoken on the “emission” phenomenon. Under this phenomenon is meant the discharge of pollutants or energy from individual and diffuse sources into the environment and its doers (Todić, 2008).

Air pollution is one of the most important consequences of the environment degradation and it represents at the same time the problem in high developed and under-developed countries, although depending on a country’s economic development differ a lot

the main sources of air pollution, as well as the dominant pollutants. In the whole world, high concentrations of potentially harmful gases and particles which emit in the air bring not only to health damage, but also to the aggravation of the environment quality in general, which harms all resources necessary for the long-term sustainable development of Earth (LEAP, 2001).

As the biggest polluter, taking into consideration the research localities (high altitudes), is traffic, especially in air traffic (for the plant species *Satureja kitaibelii*, the subject of the implemented research). Aerospace is very encumbered and saturated with various substances of particles, smoke, soot, dust and gases made by the combustion of solid and liquid fuels, which is one of the indicators of air quality. The Republic of Serbia is one of the more polluted states in the region, by chemical and biological means containing metals. The mentioned dangerous materials is concentrated in this space via the CHEMTRAIL system, while the threat of radiation represents the HAARP system, through which manages and controls the climatic changes in the narrower and wider area (Pejanović, 2016). Via the HAARP system can be directed the energetic impulses of 3.6 MW through the frequency range between 2.8 and 10 MHz into ionosphere ([www.willthomasonline.net](http://www.willthomasonline.net)).

There develops the awareness of the impact of the environment pollution to agricultural products, confirmed by numerous data lately; there intensifies increasingly the issues of active substances content, micro-biological correctness, and the amounts of the chemical remnants in the produced raw material which use further for human and animal nutrition or for food preparation. There are the regulations on maximum permitted quantities of remnants of plant protection means in our country (OG RS), micro-biological correctness of foods in traffic (OG RS), sanitary-Hygiene and general sanitary conditions (Law on Sanitary Inspection). The environment protection in public and in business world still encounters scepticism, but also obstructions, because it entails the additional costs, higher prices and the changes of entrenched habits. However, the economy of future is unbreakably linked to the ecology, and the environment by itself represents a new economic branch which provides also the possibility of making money, which can be achieved by plantation cultivation of the AMH, too (Jelenković, Jelenković, 2012).

### Materials and methods

Habitats in which was gathered the plant material of the tested plant species were: Devojacki Grob, on Suva Mountain (1,300 m of altitude), Visocka Rzana, on Stara Mountain (750 m of altitude), and Sicevacka klisura in the vicinity of Nis (Sicevac Gorge – 280 m of altitude). Flora in these habitats doesn't stop to surprise us and it provides the possibilities to discover new, so this part of Nis and Bela Palanka Valley also calls the "Serbian biological laboratory under open sky". Ecological factors of the environment, or mountain land, surface water, i.e. the river Nisava and its gorge, as well as the sub-Mediterranean climate provides a wide ecological atomicity, which provides conditions for life to many plant and animal species, so there often meet the endemic species such as

the tested species *Satureja kitaibelii* Wierzb. et Heuff (Jelenković, 2014).

In the vicinity of Nis, there are canyons and gorges, which are characterized by very rich and diverse flora, and which is caused by the special geo-morphological and climatic factors. According to the available data (report on the strategic evaluation of environmental impact) on the Sicevac Gorge area, there were concluded 1,138 species within 441 genus and 96 families of higher plants. The flora of Sicevac Gorge with its 1,138 species makes 34.8% of the total number of all species recorded in Serbia. Originality of the Sicevac Gorge flora reflects, first of all, in the existence of endemic representatives, especially those characterized by extremely small areals. There dominates in flora the species of Mediterranean-sub-Mediterranean diffusion. Highly presence of these species explains by the existence of large areas of thermophilic rocky grounds and shrubberies. The Sicevac Gorge represents also the northernmost finding place of sage (*Salvia officinalis*). The Sicevac Gorge, with 20-40 endemic plants per 10 km<sup>2</sup>, represents a significant region of endemism in Serbia.

In this area the production of AMH is not developed, except some in Leskovac, Nis and Gadzin Han. Gathering and processing (first of all drying) of the specific species of medicinal herbs and spice plants is more developed in the neighbouring municipality Svrljig, where there are certain processing capacities which have their subcontractors they negotiate the production with. Although most are in the “grey” zone, i.e. in places where the AMHs are represented, there are gatherers, who deliver picked herbs or process them and sell. Generally, as it is assessed, around 4000 organized gatherers or gathering household in Serbia are engaged in gathering of AMH. Seeing that the household members are also engaged in business, there evaluates that a number of gatherers is in fact around 12,000. Besides, there are those who gather herbs for their own use or market sale, so a number of gatherers in last two groups are hard to assess (Živanović, 2010).

Of all AMHs, which are present in this area, two of them single out that can be turned into the local brand: sage (*Salvia officinalis* L.) and Rtanj tea (*Satureja montana* L.). Sage is the most popular medicinal herb since ancient times. Rtanj tea (winter savory) doesn't lag behind by its popularity, which can be raised in the rank of Nis brand in a short time. The plant species researched in this study represents the variety of Rtanj tea and there is necessary to have permission for its gathering (Rulebook on Proclamation and Protection of Strictly Protected and Protected Wild Species of Plants, Animals and Fungi). As both species (*Satureja montana* L. and *Satureja kitaibelii*) are sufficiently researched in bio-chemical and taxonomical sense, in laboratories of the Department for Chemistry at the Faculty of Natural Sciences – University in Nis, are created conditions to move on with their planned plantation cultivation.

Anyhow, *Satureja kitaibelii* (Illustration no. 1) is a perennial plant, and the most used synonyms for this plant species are *Satureja montana* L. var. *kitaibelii* (Wierzb.) and *Satureja montana* L. subsp. *kitaibelii* (Wierzb.) (Bal, 1972). It grows as semi-bush, height of about 30-70 cm, with well-developed root system. There are numerous sprouts,

lignified, especially at the bottom. Leaves are elongated lanceolate, stiff and leathery. Flowers are dense, placed in 3-7 floral bifurcations, on a short or long vertical stem. Calyx is cylindrical; corona is pink-purple, twice longer than calyx. It blossoms from July to September. It grows on open limestone rocky grounds in mountain belt on 500 to over 1000 m of altitude. It appears as a member of open communities in the east of our country. It can also be found in south Romania and west Bulgaria (Palić, Gašić, 1993).

**Illustration 1.** *Satureja kitaibelii* Wierzb. et Heuff.



Source: Jelenković, 2014.

The ecological or living factors have an effect on the plant growth, which means on its chemical composition, and the amount of oil. They are multitudinous, miscellaneous and changeable both in space and time. It is practically impossible to find two places on Earth in which the life conditions would be identical and at the same time invariable in function of time.

As for climatic conditions, they differ from one habitat to another, but those differences are not significant. The warmest is in Sicevac Gorge, where the average summer temperature is 21.37 °C; the temperature is for half a degree lower in Visocka Rzana, and for one degree and a half in Devojacki Grob; in other words, it decreases with altitude increase. Water, as the next basic ecological factor of the environment, represents by the average annual rainfall, which amount is approximately the same in

all three habitats, and it amounts from 551 to 586 mm of atmospheric residue annually and it is evenly disposed during a year. Sunny weather is from 45 to 55% annually. A type of land, as the third basic ecological factor of the environment is very similar, i.e. the plant material has been gathered from a limestone area-limestone rocky ground and the rocky slopes. Essentially, we might say for all these three habitats that the ecological parameters and seasonal variations changes with the changes in altitude; at lower altitudes, the climatic conditions are slightly milder, i.e. more favourable for plant growth, and thereby the amount and composition of the essential oils.

The essential oils were insulated from fresh and dry plant material (above-ground part of the plant, non-ligneous part of tree, leaves and flowers) by steam distillation. The representative samples of plants in this research are in herbarium of the Faculty of Natural Sciences – University in Nis, the laboratory for organic analysis and synthesis, no. NR 0709. For dry herbal drugs, the herb material was dried 10 days at a draft. Insulation was done by steam distillation in the appliance of the type Clevenger, in duration of 2.5 hours, from comminuted plant material. The oils were extracted then by diethyl-ether, and then diethyl-ether extracts of the essential oils were dried by anhydrous sodium-sulfate ( $\text{Na}_2\text{SO}_4$ ). After separating the desiccant by filtration, diethyl-ether was removed by the rotary vacuum evaporator at room temperature, by which was obtained pure essential oils.

The essential oils were highly prevalent in flora – there were insulated around 2,500 plant species classified in 60 families (Gašić, 1992). They are also called the fragrances. They represent the complex mixtures of volatile compounds, which are the products of a secondary plant metabolism. The most important characteristics of plants secondary metabolites are that they don't have the energetic significance, they are chemically heterogeneous, as well as that they show high biological and pharmacological activity. To the group of active secondary metabolites of plants belong: alkaloids, heterosides, saponosides, tannins and essential oils. The essential oils, so called fragrances, represent a very complicated mixture of tithe to several hundred compounds, although there are also the essential oils of practically just one compound (Gašić, 1985). It is well-known that the essential oil composition is genetically conditioned and it represents a specific characteristic of a certain species. Differences in quantitative composition and the ratio of components are the consequence of the ecological factors impact, as well as the ontogenetic stage of plant development (Heffendehl, Murray, 1976), as well as some other factors.

## Results and discussion

The output of essential oils of tested population of *Satureja kitaibelii* Wierzb et Heuff from fresh and dry herb material from all mentioned habitats, altitude of the habitats, developmental stage, as well as the dates of gathering was shown in the Table 1.

Aromatic plants contain in average 0.05-20% of essential oil, so according to their quantity the plants classify in the ones rich in essential oils, and the ones poor in essential

oils. *Satureja kitaibelii* Wierzb. et Heuff contains different amounts of the essential oil depending on habitats and the stage of plant development, as well as of whether oil was insulated from dry or fresh vegetable raw material.

The largest amount of oil in the two habitats (Visocka Rzana and Devojački Grob) obtained from the fresh vegetable raw material in the pre-blossoming stage, while in the habitat Sicevac Gorge, the oil content is highest in dry vegetable oil raw material in blossoming stage.

**Table 1.** Content of essential oils of the tested populations *Satureja kitaibelii* by a habitat and a growth stage

Habitat	Altitude (m)	Growth stage	Date of gathering	% (w/w)
<b>Devojački grob</b>	1.300	<b>Pre-blossoming</b>	07.07.	<b>0,220</b>
Devojački grob	1.300	In bloom	30.08.	0,060
Devojački grob	1.300	Forming fruit	06.11.	0,015
Devojački grob	1.300	Dry above-ground part of the flower	30.08.	0,150
<b>Visočka Ržana</b>	750	<b>Pre-blossoming</b>	09.07.	<b>0,180</b>
Visočka Ržana	750	In bloom	02.09.	0,060
Visočka Ržana	750	Forming fruit	22.10.	0,062
Visočka Ržana	750	Dry above-ground part of the flower	02.09.	0,088
<b>Šičevačka klisura (Sicevac Gorge)</b>	280	Pre-blossoming	09.07.	0,150
Šičevačka klisura	280	In bloom	02.09.	0,060
Šičevačka klisura	280	Forming fruit	22.10.	0,065
Šičevačka klisura	280	Dry above-ground part of the flower	02.09.	<b>0,216</b>

Source Jelenković, 2014.

*Note:* In the Table 1 the maximum amount of essential oil for every habitat and the appropriate stage of plant growth are shown in bold

As for the ecological factors, there is evident the difference among these habitats only regarding altitude. In accordance to it, it can be concluded that the highest yield of the essential oils in lower areas (280 m of altitude) is expected from dry vegetable raw material in the blossoming stage, while in higher areas (over 750 m of altitude) there is a higher yield of the essential oils from fresh vegetable raw material in the pre-blossoming stage. This data is surely very important for the plantation cultivation of these plants.

If we observe the amount of the essential oils only in fresh above-ground part of the plant drug through the stages of plant growth in all three habitats, it is characteristic that the oil amount is the highest in the pre-blossoming stage, while in the blossoming stage and in the stage of forming fruit is less in regard to the pre-blossoming stage.

For the habitats Sicevac Gorge and Visocka Rzana, the areas under 1000 m of altitude,



it is characteristic that the amounts of the essential oils are about the same in the blossoming stage and the stage of forming fruit, and they are three times (V.Rzana), i.e. 2.3 times (S.Gorge) less in regard to the pre-blossoming stage. On the site D.Grob, the habitat above 1000 m of altitude, the amount of the essential oils is four times less in the stage of forming fruit in regard to the blossoming stage. If we compare these amounts with the amounts of oils in the pre-blossoming stage, it is evident that there is decreased amounts of oil of 3.5 in the blossoming stage to even 14.5 times in the stage of forming fruit, which shows clearly the tendency of a greater decline of the essential oil amounts with the increase in altitude in regard to the plant growth stage, as it is especially obvious above 1000 m of altitude.

If we observe the habitats individually, the amounts of the essential oils in fresh plant drug in regard to the plant growth stage has decreased the most on the habitat Devojacki Grob, approximately 14.5 times, in the habitat Visocka Rzana 3 times, and the least on the habitat Sicevac Gorge, approximately for 2.3 times. These perceptions are in accordance with Thieme's (Thieme, Tam, 1972) and Biggs' (Biggs, Leopold, 1955) perceptions, i.e. with the fact that the synthesis of monoterpenes is much faster in young than in old tissues, which implicates that the young tissues have the higher amount of oil/g of tissue, and this is what the obtained results unambiguously confirm. They also lead to the conclusion that the amount of oil in the plant growth stage have a much faster decline at higher altitudes (difference in altitude between the habitats Devojacki Grob and Sicevac Gorge is 1020 m), i.e. that the ecological factors have an effect on the essential oil amount in fresh plant material.

The results of obtained essential oil amounts in dry plant material in the blossoming stage show that the amount of essential oil is higher in dry plant material than in fresh plant material in the same stage of plant growth. On the site Devojacki Grob, the amount of oil is approximately 2.5 times higher, on the site Visocka Rzana around 0.5 times, while on the site Sicevac Gorge the amount of oil is around 3.6 times higher. On average, the mean value of the essential oils amount in dry plant material in the blossoming stage for all three habitats is 0.15%, which lines up the population *Satureja kitaibelii* Wierzb. et Heuff. in poor oil types of the genus *Satureja*, especially if one takes into account that *S. viminea* contains even 9.4% of the essential oil, according to some researches (Suarez, Echandi et al., 2008).

If we compare the highest amounts of oil obtained from the plant material on all three habitats, regardless to whether they were obtained from fresh or dry plant material, we can see that it is the same in the highest (Devojacki Grob) and the lowest altitude (Sicevac Gorge) and it amounted 0.22%. However, in the habitat of higher altitude, the oil amount was obtained from the fresh plant material, while in the habitat with the lowest altitude that oil amount was obtained from the dry plant material. As in this research was identified also the complete chemical composition of the essential oil in all three sites, and fresh (95.52-99.81% depending on the habitat, as well as the plant growth stage) and dry (94.55-97.20% depending on the habitat) plant material, there could say that the chemical composition of oil of fresh and dry plant material is very

similar, so there were not chemical reasons that the essential oil insulates from dry plant material, what has been common practice.

The obtained oil amount of the genus *Satureja kitaibelii* Wierzb. et Heuff. is in accordance with the results of Palić and associates (Palić, Kapor et al., 1982), as well as Chalchat and the associates (Chalchat, Gorunović et al., 1999). Unlike them, Zivanovic and the associates (Živanović, Jančić et al., 1987) stated that the population *Satureja kitaibelii* Wierzb. et Heuff. in the habitat Lepenski Vir contains even 0.65% of the essential oil in the dry plant material in the blossoming stage, which is around three times higher amount in regard to this research. However, the habitat Lepenski Vir is very characteristic by its climate, which is caused by very fast change of altitude (50-800 m), and which is the consequence of a characteristic mountain relief and the vicinity of the river Danube, while the content of the soil is limestone, and very similar to the content on the tested habitats. In other words, the ecological factors, i.e. altitude and climatic conditions in the habitat Lepenski Vir differ significantly in regard to the same factors from the habitats observed in this study. This proves that the different ecological factors can, and evidently cause the difference which appears in the amount of essential oils in the habitat Lepenski Vir in regard to all other studied habitats of this plant species.

The research of Adamovic and Danojevic in 2006 follows cultivated, plantation species *Satureja* L. in the period of 10 years. The highest percentage of essential oil, as well as dry plant per a hectare, was obtained in the stage of full plant development, i.e. in the pre-blossoming stage, which is in accordance with this research. Likewise, it showed that under the controlled (in sense of irrigation) ecological conditions can economically cultivate this aromatic plant in longer time interval, with the lowest yield of the essential oil in the first year, and which is subsequently considerably increased.

### Conclusion

The amount of the essential oil in plant material differs and it depends on ecological, and on the stage plant growth, i.e. it depends on the age of a plant tissue, as well as on the type of plant material. The largest quantities of the essential oil obtained from a fresh plant material in the pre-blossoming stage on sites of greater altitude, i.e. Devojacki Grob (1300 m – 0.220%) and V.Rzana (750 m – 0.180%), while in the habitats of the lowest altitude, S.klisura (280 m – 0.216%) the largest amount of oil obtains from a dry plant material in the blossoming stage. There comes to decreasing amount of oil in the plant material in the stage of the plant tissue development, i.e. in regard to the age of plant tissue, and it is greater at higher altitudes, while it decreases even 14.5 times in regard to the amount of oil/g of a young tissue. The results that were obtained are completely coincident with the other authors' results also in regard to the amount of obtained oil, the stage of plant growth, as well as in regard to the type of plant material the oil was insulated from, when there compare the obtained results from the habitats of similar ecological characteristics. The results got in the habitats (sites) of different ecological characteristics were given different amounts of the essential oils

of the same plant species in the same stages of plant growth and from the same types of plant material, which undoubtedly point out to the impact of ecological factors to the amount of plant essential oil. These scientific evidences have invaluable significance for planned plantation cultivation of AMH, while with the adjustment of conditions in which plants cultivate we make an influence to the amount and composition of the essential oil, as the one of the main derivative from AMH. The AMH manufacturers ensure and make safe the steady customers for their products, by the permanent composition and amount of the essential oil. As the market of AMH grows each year, there the manufacturers' income increases, by the guaranteed quality of AMH.

### References

1. Adamović, D., Danojević, D. (2006): *Effect of year harvest time upon yield and essential oil content of mountain savory cultivated in Serbia*, Proceedings from the Third Conference on Medicinal and Aromatic Plants of Southeast European Countries, Belgrad, Serbia, pp. 155–158.
2. Bal, P.W. (1972): *Flora Europaea*, Notulae Systematicae 13, Bot. Jour. Linn. Soc., London, no 65, pp. 352.
3. Biggs, R.H., Leopold, A.C. (1955): *The effect of temperature of peppermint*, Proc. Am. Sci., No 66, pp. 315-321.
4. Chalchat, J.C., Gorunović, M.S., Maksimović, Z.A. (1999): *Essential oil of *Satureja kitaibelii* Wierzb. f. *aristata* (Vand.) Hayek, Lamiaceae from eastern Serbia*, Journal of Essential Oil Research, vol. 11, no. 6, pp. 691-692.
5. Foundation for Revitalization of Local Health Tradition (FLRHT) (1996): *Encyclopedia of Indian Medicinal Plants*, FLRHT, Bangalore, India.
6. Gašić, M. (1985): *Etarska ulja*, IHTM, Beograd, Srbija.
7. Gašić, O. (1992): *Biohemija biljaka*, Naučna knjiga, Beograd, Srbija.
8. Grupa autora. (2001). *Lokalni ekološki akcioni plan opštine Niš (LEAP)*, opština Niš, Srbija.
9. Heffendehl, F.W., Murray, M.J. (1976): *Genetic aspects of the biosynthesis of natural odors*, Lloydia, vol. 3, pp. 39-51.
10. Izveštaj o strateškoj proceni uticaja na životnu sredinu-Prostorni plan administrativnog područja Grada Niša 2021.
11. Izvor: [www.willthomasonline.net](http://www.willthomasonline.net)
12. Jelenković, Lj. (2014): *Terpeni i metabolizam (Satureja kitaibelii Wierzb. et Heuff.)*, Zadužbina Andrejević, Beograd, Srbija.
13. Jelenković, P., Jelenković Lj. (2012): *Životna sredina u dokumentima EU*, Medija i Reform centar, Niš, Srbija.
14. Jelenković, P., Jelenković, Lj. (2012): *Danas ekologija, sutra ekonomija*, Ekonomika, vol. 58, no. 4, pp. 171–177.

15. Ljumović, I., Viduka, B., Cvijanović, J.M. (2015): *Pristup finansijskim resursima organskih proizvođača u Srbiji: analiza tražnje*, Ekonomika poljoprivrede, vol. 62, no. 4, pp. 989-1002.
16. Milenović, B. (2000): *Ekološka ekonomija*, Univerzitet u Nišu, Fakultet zaštite na radu, Niš, Srbija.
17. Palić, R., Kapor, S., Gašić, M. (1982): *The chemical composition of the essential oil obtained from Satureja kitaibelii Wierzb. et Heuff*, Aromatic Plants, Basic and applied aspects, The Hague (Boston) London, UK.
18. Palić, R., Gašić, M. (1993): *Hemijski sastav etarskog ulja biljaka roda Satureja L.*, Farmaceutsko-hemijska industrija „Zdravlje“, Leskovac, Srbija.
19. Pejanović, Lj. (2016): *Osnovi životne sredine i ekologije*, Fakultet za pravne i poslovne studije „Dr Lazar Vrkatić“, Novi Sad, Srbija.
20. Pravilnik o maksimalno dozvoljenim količinama ostataka sredstava za zaštitu bilja, SG RS no. 29/14 and 39/14.
21. Pravilnik o mikrobiološkoj ispravnosti namirnica u prometu, SG RS br. 26/93, 53/95 i 46/02.
22. Pravilnik o proglašenju i zaštiti strogo zaštićenih i zaštićenih divljih vrsta biljaka, životinja i gljiva Službeni glasnik Republike Srbije - SG RS br. 5/10
23. Shengji, P. (2001): *Ethnobotanical approaches of traditional medicine studies: some experiences from Asia*, Pharmaceutical Botany, vol. 39, pp. 74–79.
24. Simonović, Z. (2014): *Upravljanje agrarom Srbije u tranziciji*, Institut za ekonomiku poljoprivrede, Beograd, Srbija.
25. Stipetić, V. (1968): *Ekonomika Jugoslavije, II deo*, Informator, Zagreb, Jugoslavija
26. Suarez, A., Echandi, M.M., Ulate, G., Ciccio, J.F. (2003): *Pharmacological activity of the essential oil of Satureja viminea (Lamiaceae)*, Rev. Biol. Trop., vol. 51, no. 1, pp. 247-252.
27. Thieme, H., Tam, N.T. (1972): *Dnterehungen über akkumulation und die zusammensetzung der atherischen öle von Satureja hortensis L., Satureja montana L. und Artemisia dracunculoides L.*, Pharmazie, vol. 27, no. 4, pp. 255-265, and vol. 27, no. 5, pp. 324-331.
28. Todić, D. (2008): *Ekološki menadžment u uslovima globalizacije*, Megatrend univerzitet, Beograd, Srbija.
29. Vehapi, S., Šabotić, Z. (2015): *Stanje i problemi poljoprivrede Srbije*, Ekonomika poljoprivrede, vol. 62, no. 1, pp. 245-25.
30. Zakon o sanitarnom nadzoru SG RS br. 125/04.
31. Živanović, P., Jančić, R., Ševarda, A.L., Kuznjecova, A.G., Pavlović, S., Todorović, B. (1987): *Rezultati proučavanja morfološko-anatomskih osobina i etarskog ulja biljaka vrste Satureja kitaibelii Wierzb. et Heuff. (Lamiaceae)*, Arhiv za farmaciju,

vol. 37, no. 6, pp.297-308.

32. Živanović, S.T. (2010): *Trendovi srpskog tržišta lekovitog i aromatičnog bilja*, Lek. sirov., vol. 30, no. 1, pp. 3-14.

## PRIVREDNE MOGUĆNOSTI I PERSPEKTIVE AROMATIČNIH I LEKOVITIH BILJAKA (SATUREJA KITAIBELII)

*Ljiljana Jelenković<sup>4</sup>, Predrag Jelenković<sup>5</sup>, Ljubo Pejanović<sup>6</sup>*

### Rezime

*Privreda u Srbiji ne radi punim kapacitetom dugi niz godina, što je ostavilo veliki trag u ekonomskoj stabilnosti zemlje. Dobra strana toga je da je zagađenje životne sredine mnogo manje nego što bi bilo da je radila punim kapacitetom. Zato ne treba pokušavati da se pošto poto dostignu razvijene tehnologije, već se treba maksimalno okrenuti poljoprivredi i proizvodnji hrane. Privredno razvijene zemlje, mnogo polažu na zdrav način ishrane i života, pa su zato tržište na kome će se plasirati prehrambeni proizvodi iz Srbije, sa karakterističnom robnom markom i nesumljivim kvalitetom. Zbog izraženog trenda za zdravim načinom života, u razvijenom svetu se sve više ljudi okreće aromatičnim i lekovitim biljkama koje koriste kao začine, u terapijske ili medicinske svrhe. Takav trend pokazuju i različite grane industrije, pa svoju proizvodnju sve više baziraju na prirodnim proizvodima. Zbog toga aromatične i lekovite biljke postaju sve važniji privredni resurs onih država koje njima raspolažu.*

**Ključne reči:** *privreda, aromatične i lekovite biljke, etarska ulja, zdravlje i zaštita.*

---

4 Profesor medicinske biohemije, mr Ljiljana Jelenković, Medicinska škola „Dr Milenko Hadžić“, Zetska ulica br. 55, 18.000 Niš, Srbija, Telefon: +381 63 11 65 987, E-mail: [jelenko410@gmail.com](mailto:jelenko410@gmail.com)

5 Gostujući predavač, dr Predrag Jelenković, Univerzitet Union, Fakultet za pravne i poslovne studije „Dr Lazar Vrkatić“ Novi Sad, VŠJ Niš, Ulica Generala Milojka Lešjanina br. 17, 18.000 Niš, Srbija, Telefon: +381 69 27 06 992, E-mail: [jelenko224@yahoo.com](mailto:jelenko224@yahoo.com)

6 Vanredni profesor, dr Ljubo Pejanović, Univerzitet Union, Fakultet za pravne i poslovne studije „Dr Lazar Vrkatić“ Novi Sad, Bulevar oslobođenja br. 76, 21.000 Novi Sad, Srbija, Telefon: +391 63 438 649, E-mail: [pejanovicljubo@gmail.com](mailto:pejanovicljubo@gmail.com)

## MEASURING AND ANALYSIS OF COMPETITION INTENSITY IN THE SUGAR MARKET IN SERBIA

*Bojan Krstić<sup>1</sup>, Vladimir Radivojević<sup>2</sup>, Tanja Stanišić<sup>3</sup>*

### Summary

*Competition intensity is an important factor of social welfare in all market economies. The purpose of this paper is to establish a methodological framework for measuring and analyzing competition intensity in the sugar market in Serbia. There are several indicators of competition intensity that are used in market analysis. Results obtained by these indicators provide a good basis for objective, unbiased, and to some extent standardized reasoning and identification of anti-competitive behavior. The study is made by using descriptive statistics, comparative and correlation analysis. The results of the measurement of competition intensity in the sugar market in Serbia show significant problems in the process of establishing an efficient market economy in the Republic of Serbia. The paper is useful to the competition authority, providing significant findings of competitive conditions in the sugar market in Serbia, but also to the researchers in the field of market analysis, by providing them with an applicable methodological framework for measuring and analyzing competition intensity in the markets of other products in complex process industries.*

**Key words:** *competition, market concentration, market power, sugar market, Serbia*

**JEL:** *L11, L66, Q11*

### Introduction

There is generally accepted and deeply rooted belief in economic theory that intensifying competition increases efficiency of economy and social welfare. Efficiency is the goal, and the competition is a process that leads to achieving this goal, it became almost final conclusion on the matter. Under the influence of economic theory and practice, through the formulation

- 1 Bojan Krstić Ph.D., Associate Professor, University of Niš, Faculty of Economics, Trg Kralja Aleksandra Ujedinitelja no. 11, 18000 Niš, Serbia, Phone: +381 18 528 685, E-mail: [bojan.krstic@eknfak.ni.ac.rs](mailto:bojan.krstic@eknfak.ni.ac.rs)
- 2 Vladimir Radivojević, Ph.D., Head of Financial Services, Ministry of Defense of the Republic of Serbia, Serbian Armed Forces, Čegarska street, 18000 Niš, Serbia, Phone: +381 18 456 1926, E-mail: [vladimir.radivojevic@gmail.com](mailto:vladimir.radivojevic@gmail.com)
- 3 Tanja Stanišić, Ph.D., Assistant Professor, University of Kragujevac, Faculty of Hotel Management and Tourism in Vrnjačka Banja, Vojvođanska street, 36210 Vrnjačka Banja, Serbia, Phone: +381 64 494 15 42, E-mail: [tanja.stanistic@kg.ac.rs](mailto:tanja.stanistic@kg.ac.rs)

and implementation of economic and legal solutions for intervention in the market, almost all governments tend to intensify competition, restrict or prohibit the abuse of a dominant position in the market and any other behavior that distorts competition.

The goal of the governments is to maintain or create a competitive market that will encourage effective competition of economic entities. Intensive competition creates competitive pressure, i.e. the pressure that one market participant feels from all others. Each firm in a competitive environment tends to produce what consumers want, to reduce production costs and improve quality of their products and services, i.e. to be more efficient and effective than its competitors. Such behavior of market participants is the main stimulus of economic growth and a prerequisite for social welfare increase. Therefore, competition is seen as a desirable state of each market economy, and its intensity as a dynamic category which is reflected in the free entry into the market, the character of the price and the number of buyers and sellers.

The biggest problems for the establishing of competition is reflected in the identification of market structure and behavior that lead to restriction of competition. Due to the complexity, and in some cases even contradictions, the process of establishing of the competition is accompanied by many subjective and arbitrary assessments in different segments of the market analysis. Consequently, the existence of appropriate econometric apparatus for quantifying competition intensity between enterprises is an important prerequisite for the efficient implementation of competition policy which corresponds to the actual situation in the market.

The aim of this research is to provide an adequate methodological framework that can be applied in measuring and analyzing competition intensity in the sugar market in Serbia. The paper is structured in two segments: theoretical and empirical. Indicators of market concentration are shortly presented in theoretical background. Their practical application is made into the sugar market in Serbia, along with a set of other indicators of competition intensity in the empirical segment of the study. The research findings suggest recommendations to Serbian competition policy makers and represent a good basis for market analysis of other food products in complex process industries such as oil, milk, etc.

### **Theoretical background – indicators of market concentration**

The importance of market concentration in the analysis of market performance has its foundation in structure-conduct-performance (SCP) paradigm. According to this paradigm, which source can be found in the theory of the Harvard economist Edward Mason in the 1930s, market structure determines market conduct and market conduct determines market performance (Lee, 2007). Although this paradigm has been sharply criticized in the past, indicators of market concentration are used to represent some performance of the market even today. Market structure cannot be the only indicator of market performance, but it certainly should be the first step in market analysis.

The importance of concentration indicators stems from their ability to demonstrate structural characteristics of the observed market (Bikker, Haaf, 2002). In early economic theory, it was developed set of concentration indicators that were immediately encountered wide

application in empirical research (Marfels, 1971). Also, most contemporary textbooks of industrial economics provide a broad theoretical overview of the concentration indicators and methods of their calculation, including numerous illustrations of different market share distributions between firms (Ferguson, Ferguson, 1994; Lipczynski, Wilson, Goddard, 2009).

All indicators of market concentration could be classified as discrete (partial) and cumulative (aggregate). Discrete indicators observe only certain large companies, while cumulative indicators take into account all companies in the relevant market (Bikker et al., 2002; Stojanović, Radivojević, 2010). For the purposes of this paper, the following indicators from both categories were applied in the empirical research: the n-firm concentration ratio, the Herfindahl-Hirschman index, the Entropy index, the Relative entropy index, the Hall-Tideman index, the Rosenbluth index, the Hannah-Kay index, the Comprehensive concentration index, the Gini coefficient and the Lorenz curve.

Discrete indicators of market concentration, such as the n-firm concentration ratio, due to its properties (refer only to certain companies) has limited practical use. Furthermore, the Gini coefficient and the Lorenz curve measure the equality in the total market share distribution. This means that in a duopoly with 50% market share of each participant, these indicators show the ideal market structure, whereby it neglects the extremely high concentration. These are the reasons why above indicators some authors call “unreliable” indicators of the market structure (Pisanie, 2013).

One of the most accurate and consequently the most commonly used indicator of market concentration is the Herfindahl-Hirschman index, which is defined as the sum of the squares of the market share of all firms in the relevant market (Davis, Garcés, 2010). This indicator has at least two advantages over the previously described discrete indices. First, it belongs to a group of cumulative indicators, and therefore provides more reliable result than discrete indicators. Second, due to the procedure of squaring market shares, firms with larger market share have special importance (higher weight).

The fact that the application of the Herfindahl-Hirschman index (HHI) in the market analysis is incorporated into the legal framework of the developed antitrust systems provides its superiority over other indicators. In the long-standing practice of controlling horizontal mergers between companies in the European Union (EU) and United States of America (USA) it was established market classification based on the value of HHI (European Commission, 2004; U.S. Department of Justice, Federal Trade Commission 2010). According to these classifications, there are three market categories:

1. Unconcentrated (EU: HHI below 0.10; USA: HHI below 0.15);
2. Moderately concentrated (EU: HHI between 0.10 and 0.20; USA: HHI between 0.15 and 0.25);
3. Highly concentrated (EU: HHI above 0.20; USA: HHI above 0.25).

Although Serbia has recently adopted a European system of market classification in merger control (Vlada Republike Srbije, 2016), both systems of classification EU and USA will be used to determine the category of sugar market in Serbia.



## Research methodology and hypothesis

The subject of this research is the use of indicators of competition intensity in order to evaluate competitive conditions in the sugar market in Serbia. The purpose of this paper is to establish a methodological framework for measuring and analyzing competition intensity in the sugar market in Serbia. In accordance with the purpose of research, the authors tested the following hypotheses:

H1: *Sugar market in Serbia is characterized by a high degree of concentration with a dominant participant.*

H2: *Merger between two sugar producers leads to the formation of a duopoly with great market share of dominant participant.*

H3: *Sugar producers have significant market power in the primary agricultural market and final sugar market.*

Information basis of this research consists of the official publications of the following authorities in Serbia: Ministry of Agriculture and Environmental Protection; Ministry of Trade, Tourism and Telecommunications; Statistical Office; Business Registers Agency; and Commission for the Protection of Competition.

The following research methods are used in the paper: descriptive statistics, comparative and correlation analysis. Comparative analysis is used to present relative position of each sugar producer in the market and to compare the degree of sugar market concentration mutually (in five-year period and a hypothetical situation) and with the thresholds set by developed antitrust systems in EU and USA. Correlation analysis is used to examine the interdependence between price aggregates in the sugar market.

## Research results and discussion

Sugar is a strategically important food product and important raw material in almost all branches of the food industry. Therefore, sugar has a great impact on the standard of living of the population and on total costs of production in other branches of the food industry. Its participation in the average consumer basket for three-member's household is 3.5 kilograms per month, while average annual sugar consumption per capita is about 14 kilograms (Ministarstvo trgovine, turizma i telekomunikacija Republike Srbije, Potrošačka korpa).

The largest "consumer" of sugar is confectionery industry. There are more than 200 active confectionery companies in Serbia, and several of them are great exporters with strong market position in the CEFTA region (Lončar, Rajić, 2011). Consequently, the high price of sugar directly decreases the purchasing power of the population and increases production costs of other food products which are also part of the consumer basket, but also affects on the market position of domestic food producers in foreign markets.

Total sugar production in Serbia varies in the range from 404,000 to 591,000 tons in the period 2010-2015 (Ministarstvo poljoprivrede i zaštite životne sredine Republike Srbije, 2010-2015). Domestic consumption of sugar is at a constant level of about 250,000 tons per year: about 100,000 tons consumed in the human nutrition and about 150,000 tons used in

further industrial processing. The remaining quantities are intended for export: 180,000 tons in EU countries in accordance with quota regime and the rest in CEFTA region countries. All these data indicate the importance of the sugar industry in economic development.

Due to absence of substitutes, sugar is a product with non-elastic demand and stable consumption. Because of customs and other barriers in Serbia, sugar import is negligibly low. In such circumstances, population and food industry are limited to consuming sugar from domestic producers. High import barriers and absence of substitutes provide the proper environment for abuse of market power by domestic producers. Therefore, an important task of competition authorities is to provide a stable supply of population and industry with sugar at competitive prices.

In the purpose of realizing the research goal and testing hypotheses, the empirical research of the sugar market in Serbia is structured in the following sections:

1. Market concentration of sugar market;
2. Market power of sugar producers.

### **Market concentration of sugar market**

Sugar market in Serbia consists of six active sugar factories owned by the three large companies: Sunoko D.O.O., Hellenic Sugar Industry S.A. and Finanziaria Saccarifera Italo-Iberica S.P.A. All sugar factories are located in Vojvodina: domestic company Sunoko has three active sugar factories in Vrbaš, Pećinci and Kovačica; Greek company Hellenic Sugar has two factories in Crvenka and Žabalj; while factory in Senta is owned by Italian company Finanziaria S.I.I. Sugar market in Serbia has the character of the oligopoly market structure.

Measuring the concentration of sugar market is based on market share indicator. This indicator is calculated as the quotient of the revenue realized by the participant and total revenue of all participants in the relevant market (Krstić, Sekulić, 2013).

Sugar factories which are majority owned by a single company are regarded as related market participants (Table 1). Consequently, total annual revenue for forms of association represents the total annual revenue of associated participants.

**Table 1.** Total realized revenue (in thousands of RSD) and market share of sugar producers in Serbia; 2010-2014

Year	Indicator	Sunoko D.O.O.	Hellenic Sugar Industry S.A.	Finanziaria S.I.I.	Total
2010	Revenue	17,465,564	11,303,784	6,196,027	34,965,375
	Market share	0.4995	0.3233	0.1772	1
2011	Revenue	21,349,224	11,963,688	8,326,247	41,639,159
	Market share	0.5127	0.2873	0.2	1
2012	Revenue	20,705,865	10,449,428	8,242,295	39,397,588
	Market share	0.5256	0.2652	0.2092	1
2013	Revenue	23,252,853	11,520,417	8,652,616	43,425,886
	Market share	0.5355	0.2653	0.1993	1

Year	Indicator	Sunoko D.O.O.	Hellenic Sugar Industry S.A.	Finanziaria S.I.I.	Total
2014	Revenue	18,093,037	11,134,645	6,897,305	36,124,987
	Market share	0.5008	0.3082	0.1909	1

Source: Agencija za privredne registre R. Srbije, 2010-2014

Sunoko has the largest market share in each of the observed years in the period 2010-2014, which is about half of the entire market (see Table1). Due to the fact that the market share indicator is not sufficient in the analysis of market concentration, the authors of this research use all indicators of competition intensity mentioned in theoretical background.

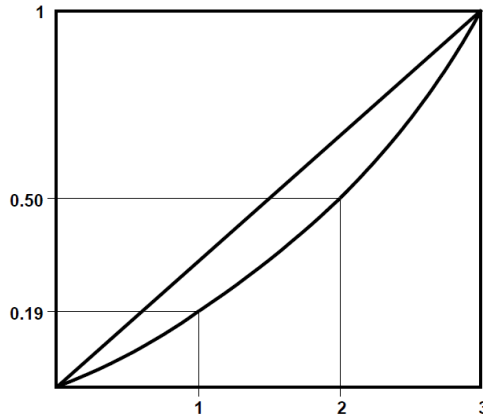
Analysis refers to the period 2010-2014 and the hypothetical market structure that would be formed after Sunoko/Hellenic Sugar merger. Commission for the Protection of Competition of the Republic of Serbia conditionally approved the merger between companies Sunoko and Hellenic Sugar on 13 February 2013 (Komisija za zaštitu konkurencije Republike Srbije, 2013). However, the merger, which is required by Sunoko, has not been implemented till today. Since there is a real possibility that this formally approved merger be implemented in practice, hypothetical market structure that would be formed after that merger is integral part of the analysis.

The values of concentration indicators of sugar market in Serbia in the period 2010-2014 are presented in Table 2 and Figure 1.

**Table 2.** The values of concentration indicators of the sugar market in Serbia; 2010-2014

Concentration indicator	Range	Value				
		2010	2011	2012	2013	2014
Concentration ratio of two largest firms	$0 < CR_n \leq 1$	0.82	0.80	0.79	0.80	0.81
Herfindahl-Hirschman index	$\frac{1}{n} \leq HHI \leq 1$	0.39	0.39	0.39	0.40	0.38
Entropy index	$0 \leq EI \leq \log n$	1.02	1.02	1.02	1.01	1.03
Relative entropy index	$0 \leq REI \leq 1$	0.93	0.93	0.93	0.92	0.94
Hall-Tideman index	$0 < HTI \leq 1$	0.40	0.42	0.42	0.43	0.42
Rosenbluth index	$0 < RI \leq 1$	0.27	0.28	0.27	0.27	0.28
Hannah-Kay index ( $\alpha = 2,5$ )	$\frac{1}{s_1} \leq HKI \leq n$	0.25	0.25	0.25	0.24	0.25
Comprehensive concentration index	$0 < CCI \leq 1$	0.73	0.73	0.73	0.73	0.73
Gini coefficient	$0 \leq GC \leq 1$	0.16	0.16	0.16	0.17	0.15

Source: Author's calculation

**Figure 1.** The Lorenz curve of the sugar market in Serbia; 2014<sup>4</sup>

*Source: Author's presentation*

All results of market concentration for the period 2010-2014 substantiate the existence of a stable oligopolistic market structure in the sugar market in Serbia (see Table 2 and Figure 1). According to the previously mentioned thresholds set by the European Commission, which Serbia has adopted recently, but also to those prescribed by the United States Department of Justice and the Federal Trade Commission, that are shown in the theoretical background of this paper, the sugar market in Serbia is located in the zone of high concentration. It should be noted that the degree of concentration is significantly above the lower limit of the high concentration zone. Results obtained using the HHI clearly indicates this conclusion. This index shows that the level of sugar market concentration exceeds the lower limit of the high concentration zone by more than 0.18 index points according to the European classification system, i.e. 0.13 index points according to the American classification system.

Analysis of the results obtained by n-firm concentration ratio, Hall-Tideman index, Rosenbluth index, Hannah-Kay index and Comprehensive concentration index leads to almost the same conclusion as well as in the case of HHI (see Table 2 and Figure 1). However, due to the small number of participants in the relevant market, the results obtained by Entropy index, Relative entropy index, Gini coefficient and to some extent Lorenz curve should be accepted only in part.

It is especially important to note that the degree of (already) extremely high concentration will be significantly increased if the merger between first and second participant by market share (Sunoko/Hellenic Sugar) be conducted, i.e. if the hypothetical market structure be established. The values of concentration indicators of sugar market in Serbia in the hypothetical market structure are presented in Table 3 and Figure 2.

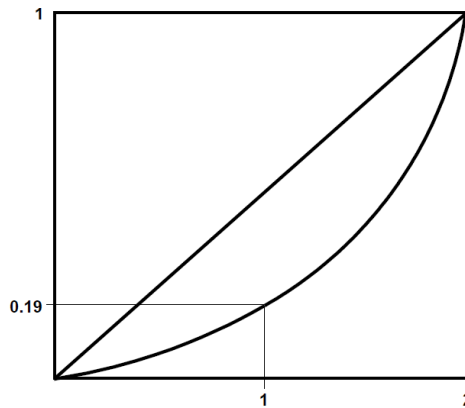
<sup>4</sup> Due to approximately equal dispersion of market shares between companies in the period 2010-2014, Lorenz curves for each year in this period are almost the same. Thus, Figure 1 presents graphical views of the Lorenz curve for 2014, as a represent year for period 2010-2014.

**Table 3.** The values of concentration indicators of the sugar market in Serbia in the hypothetical market structure

Concentration indicator	Value in the hypothetical market structure*
Concentration ratio of two largest firms	1
Herfindahl-Hirschman index	0.69
Entropy index	0.53
Relative entropy index	0.48
Hall-Tideman index	0.72
Rosenbluth index	0.38
Hannah-Kay index ( $\alpha = 2,5$ )	0.60
Comprehensive concentration index	0.87
Gini coefficient	0.21
*It is assumed that all market participants keep their market share from 2014	

Source: Author's calculation

**Figure 2.** The Lorenz curve of the sugar market in Serbia in the hypothetical market structure



Source: Author's presentation

Differences between values of all indicators of market concentration in Table 2 and Table 3, but also the difference between Lorenz curves in Figure 1 and Figure 2 confirm a significant increase of market concentration in the case of the hypothetical market structure compared to the market concentration in the period 2010-2014.

Comparison of the HHI value in 2014 (Table 2) and in hypothetical market structure (Table 3) indicates an increase of 0.31 points. How much is it increasing actually and how attention is given to such mergers in developed antitrust systems, clearly indicates EU and USA antitrust practice. All horizontal mergers in the market that is classified in the high concentration zone, which lead to increase the value of HHI more than 0.01 points in the US, and 0.015 in the European and Serbian antitrust system, raises “great concern” to the regulators (European Commission, 2004; U.S. Department of Justice et al., 2010; Vlada Republike Srbije, 2016).

The threshold of a great concern in the EU and Serbia is more than twenty times smaller, and in the USA more than thirty times smaller than the value change of HHI that will be reached after hypothetical merger between companies Sunoko and Hellenic Sugar.

Table 4 presents the results of descriptive statistics for values of concentration indicators of the sugar market in Serbia in the period 2010-2014.

**Table 4.** Results of descriptive statistics for values of concentration indicators of sugar market in Serbia; 2010-2014

Concentration indicator	N	Minimum	Maximum	Mean	Standard deviation	Coefficient of variation
Concentration ratio of two largest firms	5	0.79	0.82	0.8040	0.01140	0.014
Herfindahl-Hirschman index	5	0.38	0.40	0.3900	0.00707	0.018
Entropy index	5	1.01	1.03	1.0200	0.00707	0.007
Relative entropy index	5	0.92	0.94	0.9300	0.00707	0.008
Hall-Tideman index	5	0.40	0.43	0.4180	0.01095	0.026
Rosenbluth index	5	0.27	0.28	0.2740	0.00548	0.020
Hannah-Kay index	5	0.24	0.25	0.2480	0.00447	0.018
Comprehensive concentration index	5	0.73	0.73	0.7300	0	0
Gini coefficient	5	0.15	0.17	0.1600	0.00707	0.044

Source: Author's calculation (SPSS 22)

Due to the fact that the values of all concentration indicators observed in Table 4 are close to the mean, the standard deviation for each concentration indicator is very low. Such value of standard deviation implies that there is very low variability and heterogeneity of values of concentration indicators. This is also confirmed by calculation of the coefficient of variation (see Table 4). The highest value of the coefficient of variation is recorded in the case of the Gini coefficient (0.044), and the lowest in the case of the Comprehensive concentration index, where variation is not observed. Results of descriptive statistics confirm that there was a stable oligopolistic market structure in the sugar market in Serbia in the period 2010-2014, with a minor change of values of concentration indicators.

### Market power of sugar producers

It would be completely wrong only on the basis of high values of almost all concentration indicators conclude that prevention of sugar market concentration is socially desirable. Sugar production belongs to the group of process industries with the tendency of concentration in almost all EU countries. In such circumstances, concentration is often a necessary precondition for efficiency increase, modernization and competitiveness of domestic products. Therefore, if competition policy *a priori* prevents any change that leads to increase market concentration, it opens a space for wrong decisions.

The market structure is a useful first step in the analysis of competition, but it should not be

the only. The behavior of market participants should be the focus of regulatory authorities. Therefore, the following analysis examines the behavior of sugar producers, especially in the area of impact on primary producers and final consumers.

Sugar industry represents a complex and mutually-conditioned system of food production, from agricultural raw materials (sugar beet) to final food products (sugar). In such industries it is very important to observe relationships and parity of prices by stages of reproduction, because it provides insight into the status of each sub-industrial sector, i.e. allows analysis of position and mutual dependence of each segment in the agricultural and food production.

Relations between the prices into different stages of reproduction are clear indications of the competition state within the entire production system. Parity exchange of products occurs in an ideal market structure of perfect competition. Unfortunately, such exchange is almost impossible in practice, so disparities are reality of economic relations between market participants. Nevertheless, large price deviation and instability between different stages of same industry indicate a lack of competition.

Comparative review of average annual purchase prices of sugar beet and average annual retail prices of sugar for the period from 2000/2001 to 2014/2015 is presented in Table 5. It should be noted that retail food prices (in this case: the prices of sugar) in the current year adapt to the purchase prices of primary agricultural products (in this case: the prices of sugar beet) from the previous year. It should also be noted that the retail price of sugar includes trading margin and value added tax.

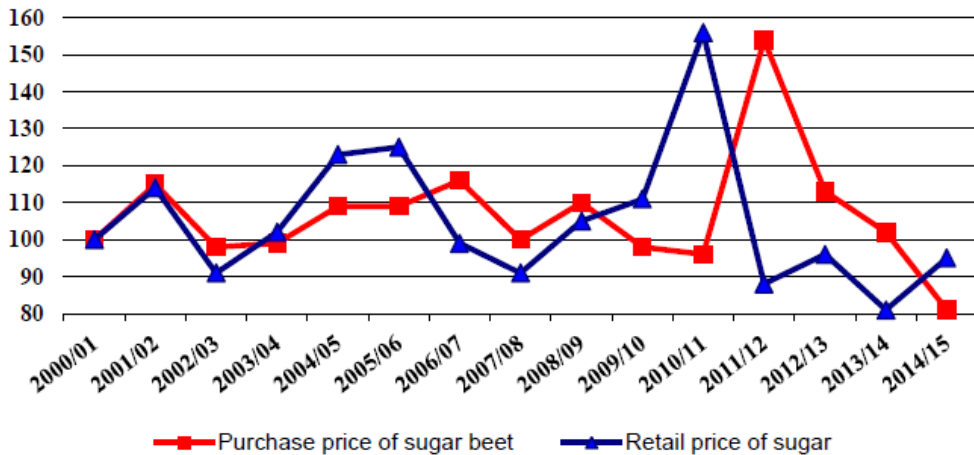
**Table 5.** Comparative review of sugar beet purchase prices and sugar retail prices (chain indices); 2000/2001-2014/2015

Purchase price of sugar beet			Retail price of sugar		
Year	RSD/kg	Index	Year	RSD/kg	Index
2000	1.56	100	2001	40.15	100
2001	1.79	115	2002	45.60	114
2002	1.76	98	2003	41.36	91
2003	1.75	99	2004	42.02	102
2004	1.90	109	2005	51.87	123
2005	2.07	109	2006	65.05	125
2006	2.41	116	2007	64.40	99
2007	2.42	100	2008	58.65	91
2008	2.67	110	2009	61.40	105
2009	2.61	98	2010	68.22	111
2010	2.51	96	2011	106.28	156
2011	3.87	154	2012	93.82	88
2012	4.38	113	2013	89.64	96
2013	4.45	102	2014	72.41	81
2014	3.62	81	2015	68.42	95

Source: Author's calculation based on data of Statistical Office of the Republic of Serbia, 2000-2014; Ministarstvo trgovine, turizma i telekomunikacija R. Srbije, 2010-2015;

Comparison of the change in chain indices derived in Table 5 indicates the instability and the spread of parity range between the price of raw materials and price of the final product in the last fifteen years. It is particularly unusual that there is noticed an atypical and unexpected deviation of these reproductive-conditioned categories in certain years. The fact that these deviations have a cyclic character is especially unusual. It is evident in Figure 3.

**Figure 3.** The movement of chain indices presented in Table 5



Source: Work of authors

During the period from 2000/01 to 2003/04 there is a fairly uniform ratio of the movement of sugar beet purchase prices and retail prices of the final product (see Figure 3), almost like in an ideal market structure of perfect competition. However, since 2004/05 parity range grows and culminates in 2010/11 and 2011/12. It is particularly indicative that since 2004/05 there is a cyclical movement of parity ranges. In other words, there is a cyclic rotation of parity positions between primary producers and processors of sugar beets. This fact suggests the conclusion that sugar beet purchase price has influenced the formation of sugar retail price as much as sugar retail price has influenced the formation of sugar beet purchase price. Such unusual relationship is the most visible in the period from 2009/10 to 2014/15.

After reducing the price of sugar beet by 2% in 2009, there was an increase in the price of sugar by 11% in 2010 (see Table 5 and Figure 3). Sugar beet price continued to fall in 2010, this time for 4%, but the sugar price has increased in 2011 for the whole 56%. The high price of sugar in 2011 enabled the processors to purchase sugar beet crop from the 2011 at a price 54% higher than the price in 2010. The disparity is significantly reduced after that period, but far from being negligible. Finally, there is another rotation of parity positions between primary producers and processors of sugar beet in 2014/15.

Analysis of market power in the sugar industry using the vertical parity of prices indicates that the production and purchase prices of raw materials depend a lot on the price of the final product. This confirms that a key role in the formation of sugar beet



purchase price have the processors (sugar producers), regardless of the movement of its production and the total quantity supplied. The potential for a casual increase of primary products purchase prices lies in the relatively high prices of the final products in which there is always space for relatively higher prices of raw materials.<sup>5</sup> This can be clearly indicated in the analysis of parity of prices in which it will be taken into consideration technological coefficients of industrial processing. Table 6 shows parity of sugar beet purchase prices and sugar production prices in the period from 2000/2001 to 2014/2015.

**Table 6.** Parity of sugar beet purchase prices and sugar production prices; 2000/2001-2014/2015

Year	Purchase price of sugar beet (RSD/kg)	Production price of sugar (RSD/kg)*	Parity of prices
1	2	3	3:2
2000/2001	1.56	28.10	18.01
2001/2002	1.79	31.92	17.82
2002/2003	1.76	28.95	16.45
2003/2004	1.75	29.41	16.81
2004/2005	1.90	36.25	19.08
2005/2006	2.07	45.54	22.00
2006/2007	2.41	45.08	18.71
2007/2008	2.42	41.06	16.97
2008/2009	2.67	42.98	16.10
2009/2010	2.61	47.75	18.30
2010/2011	2.51	74.40	29.64
2011/2012	3.87	65.67	16.97
2012/2013	4.38	62.75	14.33
2013/2014	4.45	50.69	11.39
2014/2015	3.62	47.90	13.23

\*The retail price of sugar decreased for 30% (trading margin and value added tax)

Source: Author's calculation based on data of Statistical Office of the Republic of Serbia, 2000-2014; *Ministarstvo trgovine, turizma i telekomunikacija R. Srbije, 2010-2015*

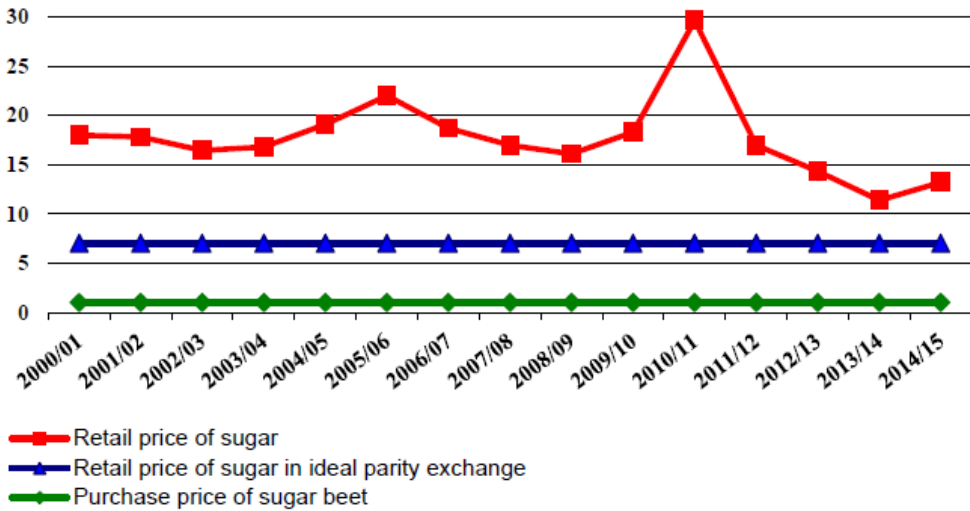
Technological coefficient of industrial processing of sugar beet in Serbian conditions orders that production of one kilogram of sugar requires about seven kilograms of sugar beet.<sup>6</sup> Theoretically, the ideal price-parity exchange between primary producers and processors, i.e. exchange which allows processors to cover costs of purchase raw

5 Very similar research results on the relationship between primary producers and processors were obtained in the analysis of Serbian oil industry (Milanović, 2011). Also, the situation is similar in the milk and dairy products market (Stojanović, Radivojević, 2011).

6 The average digestion (quantity of sucrose) of processed sugar beet in Serbia in ranges between 13% and 16% (Ministarstvo poljoprivrede i zaštite životne sredine Republike Srbije, 2010-2015).

materials, can be presented as follows: sugar beet:sugar=1:7. Due to the fact that the industrial process, except costs of purchase raw materials, generates other costs, as well as the pursuit of making a profit, it is quite understandable that in practice this ratio will be higher, i.e. that the price of sugar must be above 7. However, large deviation ratio can be an indicator of violation of the competitive conditions. Graphical presentation of the parity of prices is shown in Figure 4, whereby it is assumed that purchase price of sugar beet = 1.

**Figure 4.** Parity of prices calculated in Table 6 (purchase price of sugar beet = 1)



Source: Work of authors

During the observed period, the average price disparity is 17.72 (see Table 6). Nevertheless, it is a noticeable sharp expansion and the narrowing of parity ranges (see Figure 4). The parity in 2010/11 amounted its maximum to even 29.64, and already three years after that was reduced to 11.39. This leads to the conclusion that the price of raw materials did not significantly affect the price of the final products.

In order to examine the interdependence between sugar beet purchase prices and sugar retail prices, the method of Pearson’s correlation analysis is applied (see Table 7).

**Table 7.** Pearson’s correlation coefficient between sugar beet purchase prices and sugar retail prices, 2010-2014

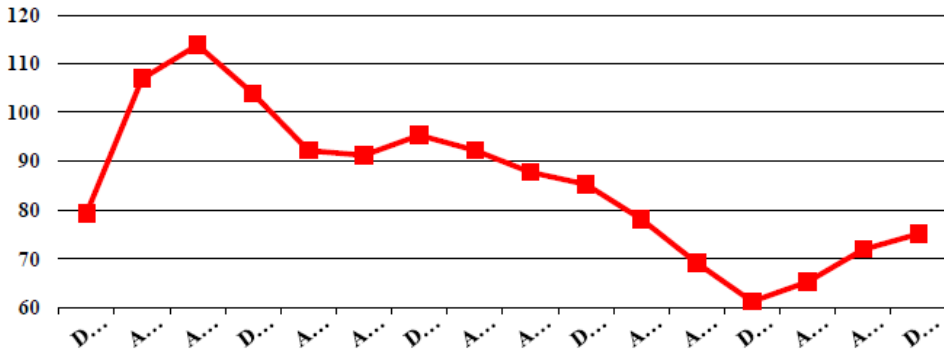
		Sugar retail prices
Sugar beet purchase prices	Pearson’s Correlation	0.686(**)
	Sig. (2-tailed)	0.005
	N	15
** Correlation is significant at the 0.01 level (2-tailed)		

Source: Author’s calculation (SPSS 22)

The determined value of the Pearson's correlation coefficient between sugar beet purchase prices and sugar retail prices of 0.686 indicates a moderate positive correlation. In this way, it can be concluded that the sugar beet purchase prices have moderate (but not significant) impact on sugar retail prices in the period 2010-2014.

All previous findings focus further analysis onto sugar producers and retail sugar prices. Figure 5 shows trends in the domestic retail price of sugar in the period from December 2010 to December 2015, with the intersection of four months.

**Figure 5.** Retail prices of sugar (RSD/kg) in Serbia; December 2010-December 2015



Source: *Ministarstvo trgovine, turizma i telekomunikacija R. Srbije, 2010-2015*

The average retail price in December 2010 was 79 din/kg (see Figure 5). After three months the price was increased to nearly 107 din/kg (an increase of almost 35%). Next months the price continued to grow, and in August reached its maximum of 114 din/kg, which is an increase of about 45% compared to the price in December 2010. The fact that the sugar price has not reflected the real production costs in this period was confirmed by a sudden decrease of price to 91 RSD/kg in April 2012. Practically, manufacturers have been forced to reduce the price more than 20 RSD/kg after intervention of the Directorate for Commodity Reserves, which sold 12,000 tons of sugar at the price of 95 RSD/kg.

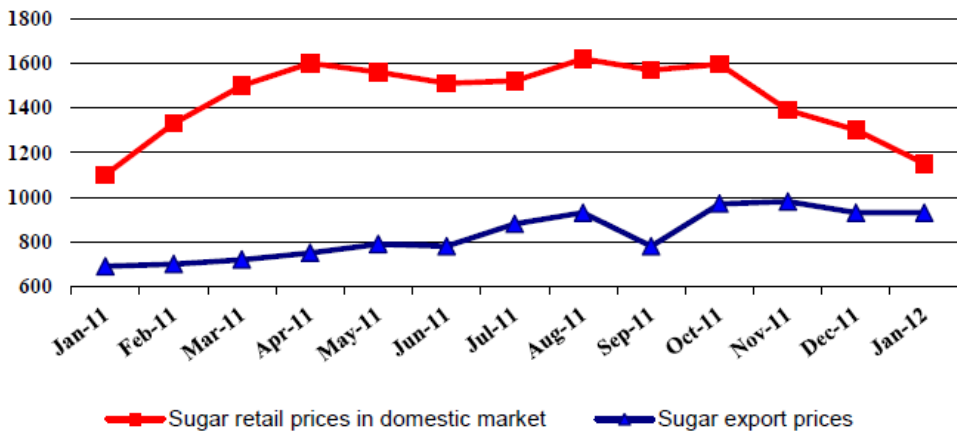
Price stability during 2012 and a part of 2013 was provided through state interventionism. After that there was a continuous reduction of sugar prices up to December 2014, when the price reaches its minimum of 61 RSD/kg (see Figure 5). Next year the price has risen to 75 RSD/kg. This analysis enforces a question of what are the reasons that the price of sugar in one year (from December 2010 to December 2011), first rises sharply by as much as 45%, and then rapidly declines of around 20%? Also, what are the reasons that the price of sugar in December 2014 is almost halfway lower than the price from August 2011?

Due to the fact that this market is specific, because sugar is a homogeneous product with non-elastic demand and stable consumption without seasonal variations, the answer can only be found in the absence of competition. This assumption can be tested by analyzing the movement of domestic and export prices of sugar, because this way

it can be compared the behavior of domestic producers in the domestic market, which is characterized by “lack of competition” with the behavior of domestic producers in foreign markets, mainly characterized by a high degree of competition.

Figure 6 shows trends in domestic and export prices of sugar from January 2011 to January 2012. This period was chosen because the previous analysis has shown that there were great changes during the year. The movement of price aggregates shows variations of parity relations between domestic and export prices of sugar.

**Figure 6.** Comparative review of sugar prices in domestic market and sugar export prices (USD/t)<sup>7</sup>



Source: *Ministarstvo poljoprivrede i zaštite životne sredine R. Srbije, Izveštaj o šećeru, Februar 2012*

The domestic prices of sugar were 57% higher than export prices in January 2011. Due to the rapid growth of domestic prices in the next two months, the range of parity in April reached a record of even 120%. Next nine months (from May 2011 to January 2012) parity range decreased from 120% to only 25%. From Figure 6 it can be concluded that the sharp rise and then a sudden drop of domestic retail prices are not accompanied by any such changes of export prices. On the contrary, the analysis showed that sugar producers during the setting domestic and export prices do not have the same or even similar criteria.

## Conclusions

The calculation of concentration indicators of the sugar market in Serbia showed a significant information capacity of the findings in terms of market structure characteristics. It is shown that these findings, together with results obtained by using the set of indicators for measuring market power provide clear insight into the

<sup>7</sup> Export prices include the retail and wholesale prices, while domestic prices include only retail prices. However, it has no influence on the ratio of these two categories, i.e. these differences will not affect the validity of the analysis. The ratio of these prices in the competitive market must be constant or with small deviations.

competitive conditions and allow identification of anti-competitive conduct.

It is important to note the fact that each of used indicators of competition intensity carries with itself certain limitations, so comprehensibility and the applicability of the results often depend on the analytical and subjective assessment of researchers. In other words, each market presents a “case for itself”. Therefore, taking into account the specifics of the case and the analysis period is an important principle in choosing the most appropriate technique or set of techniques that will be used to measure competition intensity.

Empirical analysis conducted in the sugar market in Serbia suggests verification of all hypotheses. It is shown that the sugar market is characterized by an extremely high degree of concentration of supply, i.e. the existence of pure oligopoly with a dominant participant and two followers (confirmed H1). It was also pointed the existence of strong tendencies of further market concentration, which would lead to the formation of duopoly with 80% market share of the dominant participant (confirmed H2). Beside indicators of market concentration, the authors applied a range of additional indications and techniques in order to present a complete overview of the market, the dynamics of its structure and competition intensity. Their focus was onto the behavior of companies, i.e. onto the market power of the sugar producers. Consequently, particular attention was paid to analysis of product prices correlation between different stages of industrial production. All research findings indicate the existence of significant market power of sugar producers in the primary and final market. The main conclusion is that sugar producers have significant market share and market power in both markets in terms of impact onto the sugar beet prices, as well as onto the final product prices (confirmed H3).

Empirical research suggests complex problems facing Serbia in the competition policy area, where the sugar market has served only as a good example to research and demonstrate consequences of these problems. The conclusions of this study can contribute to better understanding of the application of quantitative methods in competitive conditions analysis, but also applied methodological framework can be used in market analysis of any other food product in process industries.

## References

1. Agencija za privredne registre Republike Srbije (2010-2014): *Godišnji finansijski izveštaji privrednih društava*. (Retrieved from <http://pretraga2.apr.gov.rs/ObjedinjenePretrage/Search/Search> 2016 Feb 10).
2. Bikker, J., Haaf, K. (2002): *Measures of competition and concentration in banking industry: A review of literature*. Economic and Financial Modelling, Vol. 9, No. 2, pp. 53-98.
3. Davis, P., Garcés, E. (2010): *Quantitative techniques for competition and antitrust analysis* (ISBN: 978-0-691-14257-9). Princeton University Press, Princeton, New Jersey.
4. Ferguson, P.R., Ferguson, G.J. (1994): *Industrial economics: Issues and perspectives* (ISBN: 978-0-814-72625-9). Macmillan, London, United Kingdom.

5. Komisija za zaštitu konkurencije Republike Srbije (2013): *Rešenje broj 6/0-02-3/2013-15*. (Retrieved from <http://www.kzk.gov.rs/kzk/wp-content/uploads/2013/02/Microsoft-Word-.pdf> 2016 Jan 10).
6. Krstić, B., Sekulić, V. (2013): *Upravljanje poslovnim performansama* (ISBN: 978-86-6139-066-1). Ekonomski fakultet, Niš, Srbija.
7. Lee, C. (2007): *SCP, NEIO and beyond*. Working Paper, The International Centre for the Study of East Asian Development, No. 5, Kitakyushu, Japan.
8. Lipczyński, J., Wilson, J., Goddard, J. (2009): *Industrial organization: Competition, strategy, policy* (ISBN: 978-0-273-71038-7). Prentice Hall, Harlow, United Kingdom.
9. European Commission (2004): *Guidelines on the assessment of horizontal mergers under the council regulation on the control of concentrations between undertakings*. Official Journal of the European Union (C 31), pp. 5-18. (Retrieved from [http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52004XC0205\(02\)&from=EN](http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52004XC0205(02)&from=EN) 2016 Jan 17).
10. Vlada Republike Srbije (2016): *Uredba o sadržini i načinu podnošenja prijave koncentracije*. Službeni glasnik Republike Srbije, Br. 5/2016. (Retrieved from <http://www.kzk.gov.rs/kzk/wp-content/uploads/2016/02/Uredba-o-sadr%C5%BEini-i-na%C4%8Dinu-podno%C5%A1enja-prijave-koncentracije-Sl.-gl.-RS-br.-5-2016.pdf> 2016 Mar 17).
11. Lončar, D., Rajić, V. (2011): *Analysis of competition and concentration in the confectionery products market in Serbia*. Ekonomika preduzeća, Savez ekonomista Srbije, Vol. 58, No. 7-8, pp. 367-378, Beograd, Srbija.
12. Marfels, C. (1971): *Absolute and relative measures of concentration reconsidered*. Kyklos, Wiley-Blackwell, Vol. 24, No. 4, pp. 753-766, Hoboken, New Jersey.
13. Milanović, M. (2011): *Ekonomске промене у репродукционој вертикали индустрије уља у Србији – дугорочни трендови*. Industrija, Ekonomski institut, Vol. 39, No. 4, pp. 107-126, Beograd, Srbija.
14. Ministarstvo poljoprivrede i zaštite životne sredine Republike Srbije (2010-2015): *Izveštaji o šećeru*. (Retrieved from <http://www.mpzss.gov.rs/dokumenti/> 2016 Feb 29).
15. Ministarstvo trgovine, turizma i telekomunikacija Republike Srbije (2010-2015): *Kupovna moć stanovništva: Potrošačka korpa*. Mesečni izveštaji. (Retrieved from <http://mtt.gov.rs/informacije/potrosacka-korpa/> 2016 Feb 25).
16. Pisanie, J. (2013): *Concentration measures as an element in testing the structure-conduct-performance paradigm*. ERSA Working Paper, National Treasury of South Africa, No. 345, South Africa.
17. Statistical Office of the Republic of Serbia (2000-2014): *Monthly statistical bulletin*. (Retrieved from <http://webrzs.stat.gov.rs/WebSite/Public/PageView.aspx?pKey=140> 2016 Feb 28).
18. Stojanović, B., Radivojević, V. (2010): *Koncentracija ponude kao izraz nesavršenosti tržišta: Primer nespecijalizovane trgovine na malo na tržištu grada Niša*. Ekonomika

- preduzeća, Savez ekonomista Srbije, Vol. 58, No. 7-8, pp. 327-338, Beograd, Srbija.
19. Stojanović, B., Radivojević, V. (2011): *Economic glance at antitrust legislation in Serbia and others Western Balkan countries: Case study – dairy products market*. Journal for Business and Economics, Academic Star Publishing Company, Vol. 2, No. 6, pp. 472-487, New York.
  20. U.S. Department of Justice, Federal Trade Commission (2010): *Horizontal merger guidelines*. Washington, U.S.A. (Retrieved from <https://www.ftc.gov/sites/default/files/attachments/merger-review/100819hmg.pdf> 2016 Jan 17).

## MERENJE I ANALIZA INTENZITETA KONKURENCIJE NA TRŽIŠTU ŠEĆERA U SRBIJI

*Bojan Krstić<sup>8</sup>, Vladimir Radivojević<sup>9</sup>, Tanja Stanišić<sup>10</sup>*

### Rezime

*Intenzitet konkurencije je važan faktor društvenog blagostanja u svim tržišnim privredama. Svrha ovog rada jeste utvrđivanje metodološkog okvira za merenje i analiziranje intenziteta konkurencije na tržištu šećera u Srbiji. Postoji više indikatora intenziteta konkurencije koji se koriste u analizi tržišta. Rezultati dobijeni primenom ovih indikatora pružaju dobru osnovu za objektivno, nepristrasno i u određenoj meri standardizovano rasuđivanje i identifikaciju nekonkurentnog ponašanja. Istraživanje je realizovano primenom deskriptivne statistike, komparativne i korelacione analize. Rezultati dobijeni merenjem intenziteta konkurencije na tržištu šećera u Srbiji ukazuju na značajne probleme u procesu izgradnje efikasne tržišne privrede u Republici Srbiji. Rad je koristan organu za zaštitu konkurencije, jer pruža značajne rezultate konkurentskih uslova na tržištu šećera u Srbiji, ali i istraživačima u oblasti analize tržišta, jer im pruža primenljivi metodološki okvir za merenje i analiziranje intenziteta konkurencije na tržištima drugih proizvoda u okviru kompleksnih procesnih industrija.*

**Ključne reči:** konkurencija, tržišna koncentracija, tržišna moć, tržište šećera, Srbija

---

8 Vanredni profesor, dr Bojan Krstić, Univerzitet u Nišu, Ekonomski fakultet, Trg Kralja Aleksandra Ujedinitelja br. 11, 18000 Niš, Srbija, Telefon: +381 18 528 685, E-mail: [bojan.krstic@eknfak.ni.ac.rs](mailto:bojan.krstic@eknfak.ni.ac.rs)

9 Dr Vladimir Radivojević, Načelnik finansijske službe, Ministarstvo odbrane Republike Srbije, Vojska Srbije, Čegarska ulica, 18000 Niš, Srbija, Telefon: +381 18 456 1926, E-mail: [vladimir.radivojevic@ymail.com](mailto:vladimir.radivojevic@ymail.com)

10 Docent, dr Tanja Stanišić, Univerzitet u Kragujevcu, Fakultet za hotelijerstvo i turizam u Vrnjačkoj Banji, Vojvođanska ulica, 36210 Vrnjačka Banja, Srbija, Telefon: +381 64 494 15 42, E-mail: [tanja.stanistic@kg.ac.rs](mailto:tanja.stanistic@kg.ac.rs)

## OPERATING COSTS OF AGRICULTURAL HOLDINGS WITH EQUAL PRODUCTION POSSIBILITIES

*Ivan Mičić<sup>1</sup>, Dragana Urošević<sup>2</sup>, Radosav Vujić<sup>3</sup>, Ivana Mičić<sup>4</sup>, Marko Mičić<sup>5</sup>,  
Marija Mičić<sup>6</sup>*

### *Abstract*

*Research subject is the analysis of state and basic problems in farm production of pork, as well as economic analysis of fattening pigs. Research included specific case studies on a family farm, pig farm in Gračanica, found in central Kosovo and Metohija and a cooperative farm, a pig farm in Žitorađa located in Toplica district. During a time period in 2012, the volume and applied technology of producing fattened pigs was monitored on both farms and given economic results were analyzed. In the observed period it was determined that the number of fattened livestock on the private farm was 40, while on the cooperative farm it was 30,000. Produced fattened pig on the private farm costs 87 € and pork meat side is 1.16 €/kg. The price of a fattened pig on a cooperative farm is 142 € and pork meat side is 1.94 €/kg. Average weight of a fattened pig on both farms is 100 kg, while the share of pork meat sides varies from 78% -79%.*

**Key words:** *Production of fattened pigs, pork meat – pork sides, price, quality, economic results.*

**JEL:** *Q12, Q13*

- 
- 1 Ivan Mičić M.A., PhD student, University in Belgrade, Faculty of Agriculture, Nemanjina street no. 6, 11080 Zemun, Srbija, Phone: +381 11 261 53 15, E-mail: [divanlav@gmail.com](mailto:divanlav@gmail.com)
  - 2 DraganaUrošević M.A., University in Belgrade, Faculty of Agriculture, Nemanjina street no. 6, 11080 Zemun, Srbija, Phone: +381 63 881 49 35, E-mail: [dragana.urosevic91@yahoo.com](mailto:dragana.urosevic91@yahoo.com)
  - 3 Radosav Vujić, P.hD., Agricultural expert and extension service Valjevo, Birčaninova street no. 128A, 14000 Valjevo, E-mail: [pssvaljevo@mts.rs](mailto:pssvaljevo@mts.rs)
  - 4 IvanaMičić, M.A, PhD student, FacultyofEconomics, University of Niš, Trgkralja Aleksandra Ujedinitelja 11 Niš,Srbija, Phone: +381 63 233 603, E-mail: [ivancica@gmail.com](mailto:ivancica@gmail.com)
  - 5 Marko Mičić, Dipl. ecc., Facultyof Economics, University of Niš, Trgkralja Aleksandra Ujedinitelja 11 Niš,Srbija, Phone: +381 63 680 040, E-mail: [markomicic89@gmail.com](mailto:markomicic89@gmail.com)
  - 6 MarijaMičić, M.A, PhD student, Faculty of Technology in Leskovac, University of Niš, BulevarOslobođenja 124 Leskovac, Serbia, Phone: +381 62 867 45 98, E-mail: [marija84micic@gmail.com](mailto:marija84micic@gmail.com)



## Introduction

Production of pork meat is one of the activities in agriculture which secures a source of income to all participants in the production chain, conducted in several technological, mutually organization-dependent phases (from care, breeding and feeding of sows and gilts, farrowing, upbringing of piglets and fattening, through feeding, etc.). Regardless of what the natural indicators in intensive, market oriented production of pigs are, it is very difficult to provide a detailed insight into the production cost of fattened pigs, which represents the research basis of the paper and proof that the pig production process is cost effective. Tešanović (1969) determines that with an increase in the number of piglets per sow from 10 to 20, the production cost per piglet reduced by 79.09%, while cost per sow increased by 11.67% per annum. Increase in the genetic basis of pigs represents a necessary precondition for the achievement of greater intensity in this branch of livestock production. So Vidović et al. (2012) report that the annual genetic progress for average daily growth was 8-11 gr, food conversion from 0.03 – 0.05 kg as well as 0.35 – 1.00% for the content of meat in sides. Based on previous research and results in practice there is opinion that better results can be expected in due time as follows: 30 fattened pigs per sow per year, conversion of food below 2 kg, less than 120 days of life to reach 100 kg of body weight, daily gain of live weight of about 2 kg. Rahelić (1984) states that the characteristic of breeds of pigs as well as individual characteristics of livestock to achieve greater daily weight gain, greater amount of meat and better carcass yield in same growing conditions are of great significance to successful and cost-effective pork meat production. By better use of these properties the fattening period is reduced and at the same time total production is increased. Živković, Perunović, (2012) state that pork meat production in Serbia is characterized by the increasing participation of large farms (10,000 to 30,000, and more fattened pigs per year), and quality of pigs has significantly increased, especially on farms, and it can be said it is approaching the European average. Pork meat production is carried out by determining production cost of 1 kg, produced pork meat sides in first and second phase. Research of the economic parameters of producing fattened pigs deals with costs in the first phase of the production process and determining total cost of producing pork meat sides in the second phase, by the division calculation method. Tomović et al. (2005) state that there is a possibility of using the two point method for grading pork meat sides in slaughterhouses whose weekly capacity is less than 200 pigs. Orović et al. (2015) analyze in their paper the business of three groups of 20 individual farms with different primary production, crop, fruit growing and livestock production. Necessary data for production of a basic model was collected by a survey on 60 agricultural holdings on the territory of Toplica. Research in the paper has the goal to provide with application with the given results in relation to both farms. This allows for the given results to have common, rather than only local significance (Andrić, 1998; Jovanović et al., 1998).

### Research goal

This paper represents data given by research results, both during research and procedure analysis. During research and proving, primarily a scientific method is used, whose basic application enables explanation and prediction of relations between individual relevant inputs, and results of achieved effects in production of pork meat. In accordance with the development strategy of producing pork meat, the research goal is to improve the quality of pork meat production which originate from noble pure breed, raised on farms A and B, by a large number of analyzed and realized economic parameters. The representation of the given results of plant production on farm A and pig production on both farms will be given. During preparation of this work, data from multiple sources was used. The data used were the production quantity, analysis of pig production and pork meat in long time period. The analysis of this data wouldn't be possible if it weren't approved by both farms and the data was processed by mathematical-statistical methods. This data source was especially important when determining average values, loss, food conversion etc.

### Materials and methods

The research conducted included family agricultural holding on farm A in Gračanica whose owner is Bojan Jovanović, address Kosovske Devojke 417 and a cooperative farm B, "1 Decembar" in Žitorada. Both farms have a closed production cycle that includes pig production fattening. Farm A produces 40 fattened pigs and farm B around 30,000 a year. Within farm A 2 persons and 4 minors are employed and in farm B 80 people with corresponding qualifications are employed. Costs of producing fattened pigs on both farms are based on natural indicators determined based on research done in 2012 and all variable categories of costs in accordance with the production process. Material costs relate to consumption of nutrients and medicine used in the production process. Amortization costs are covering 2012 based on norms of necessary space and equipment, we approach the investment estimate, estimate of amortization costs based on which the fixed costs categories are calculated (Šegrt, Kolarski, 2015). When determining costs of producing costs we start from the price of a pig, weight of a pork meat side obtained by slaughter, variable costs of slaughter service and freezing. Results of plant production of farm A and fattened pig production on both farms relates to one year period (2012). In order to make a conclusion, the production parameters were monitored: grain on farm A and food consumption of farms A and B per 1 kg of growth, total growth and cost of food on both farms:

$$\text{food consumption per kilogram of growth} = \frac{\text{Total food consumption}}{\text{Total growth}}$$

$$\text{Total growth} = \text{number of feeding days} \times \text{growth per feeding day}$$

$$\text{production efficiency} = \frac{\text{Total revenue}}{\text{Total expenses}}$$

$$\text{production profitability} = \frac{\text{Gain}}{\text{Investment}} \cdot 100$$

$$\text{Profit rate (profitability)} = \frac{\text{Gain}}{\text{Total revenue}} \cdot 100$$

Significance of results in production of fattened pigs and pork meat in 2012 was followed independently on farms A and B during one research year.

### Research results and discussion

Starting from the previously pointed facts and characteristics of pork meat side production strategy, we analyzed on both farms:

- Plant production on 10 ha on farm A,
- Pork meat side production on farms A and B,
- Characteristics of pork meat side quality on both farms.

We analyzed in the paper:

1. Production of meat with special emphasis on pork meat production on the province Kosovo and Metohija in Gračanica on a pig farm A of the owner Bojan Jovanović, Kosovke Devojke street no. 417 and a cooperative farm B “1 Decembar” in Žitorađa in Toplica county in Serbia.

2. Production efficiency of pork meat on farms A and B by using achieved economic indicators of production.

Next to theoretical explanation and application on general examples, we showed efficiency of optimal feeding on an example of feeding mixture for fattened pigs on farm A. Production costs of fattened pigs on both farms are based on naturally determined indicators. Calculation of fixed and variable costs was calculated on both farms in accordance with the production process. Also costs are related to consumption of nutrients and medicine which are used in the production process, as well as amortization of the livestock, existing space and equipment which is done based on norms.

Natural and financial indicators of agricultural production on the farm shown in 2012 were: corn (*Table1*), triticale (*Table2*), wheat (*Table3*) and barley (*Table4*).

**Table 1.** Achieved economic indicators of corn production on 2 ha

No.	Production year: 2012	Amount	Unit of measure	Price	Unit of measure	Amount of EUR on 2 ha
<b>I</b>	<b>Revenue</b>					
1.	Corn from 2 ha	6.5	t/ha	130.00	EUR/t	1,690.00 EUR
2.	Cornstalks from 2 ha	9	t/ha	17.98	EUR/t	323.70 EUR
A)	<b>Total revenue (1 to 2) for 2 ha</b>					<b>2,013.70 EUR</b>
<b>3</b>	<b>Expenses</b>					
4.	Seed for 2 ha	50	kg	1.50	EUR/kg	75.00 EUR
5.	Fertilizer					
6.	Manure for 2 ha	10	t	4.00	EUR/t	40.00 EUR
7.	KAN (29%N)	400	kg	0.30	EUR/kg	120.00 EUR
8.	Pesticides					
9.	Guardian	6	L	3.00	EUR/L	18.00 EUR
10.	Tezis	6	L	2.50	EUR/L	15.00 EUR
11.	Irrigation					
12.	Energy source for 2 ha	15	L	1.40	EUR/L	42.00 EUR
13.	Diesel fuel	60	L	1.40	EUR/L	84.00 EUR
14.	Maintaining mechanics	2	ha	15.00	EUR/ha	30.00 EUR
15.	Paid services					
16.	Plowing	2	ha		EUR/ha	0 EUR
17.	Land preparation	2	ha		EUR/ha	0 EUR
18.	Sowing	2	ha	35.00	EUR/ha	70.00 EUR
19.	Harvest	2	ha	65.00	EUR/ha	130.00 EUR
20.	Paid seasonal work force	40	working hours	1.50	EUR/working hour	60.00 EUR
21.	Other variable costs					
B)	<b>Total costs (3 to 21)</b>					<b>684.00 EUR</b>
<b>II</b>	<b>GAIN/LOSS</b>					
22.	<b>Total without incentive (A – B)</b>					<b>1,329.70 EUR</b>
23.	<b>Per ha without incentive (22 : 17)</b>					<b>664.85 EUR</b>
24.	<b>Costs of grain in kg (22 : 1)</b>					<b>0.10 EUR</b>
25.	<b>Production efficiency (A : B)</b>					<b>2.94</b>
26.	<b>Revenue profitability (22:A)h100</b>					<b>66.03%</b>

Source: Authors' calculation based on data from Mičić, 2012

From Table 1 we can see that the average corn yield on the farm in 2012 was 6.5 t/ha and in the observed period in 2012 moved in the span from 6.0 t/ha to 7.0 t/ha. Total realized profit on 2 ha is 1,329.70 €, production efficiency is 2.94 and revenue profitability is 66.03 %.

**Table 2.** Achieved economic indicators of triticale production on 3 ha

No.	Production year: 2012.	Amount	Unit of measure	Price	Unit of measure	Amount of EUR for 3 ha
<b>I</b>	<b>Revenue</b>					
1.	Triticale for 3 ha	5.0	t/ha	150.00	EUR/t	2,250.00 EUR
2.	Straw from 3 ha	5	t/ha	19.50	EUR/t	292.50 EUR
<b>A)</b>	<b>Total revenue (1 to 2) for 3 ha</b>					<b>2,542.50 EUR</b>
<b>3.</b>	<b>Expenses</b>					
4.	Seed for 3 ha	750	kg	0.20	EUR/kg	150 EUR
5.	Fertilizer					
6.	Manure for 3 ha	15.0	t	4.00	EUR/t	60.00 EUR
7.	Urea	600	kg	0.30	EUR/kg	180.00 EUR
8.	Foliar fertilization	6	kg	3.00	EUR/kg	18.00 EUR
9.	Pesticides					
10.	Meteor	30	g	0.15	EUR/L	4.50 EUR
11.	<b>Irrigation</b>					
12.	Energy source for 3 ha	15	L	1.40	EUR/L	63.00 EUR
13.	Diesel fuel	90	L	1.40	EUR/L	126.00 EUR
14.	Maintenance of mechanization	3	ha	19.00	EUR/ha	57.00 EUR
15.	<b>Paid Services</b>					
16.	Sowing	3	ha	30.50	EUR/ha	91.50 EUR
17.	Harvest	3	ha	52.00	EUR/ha	156.00 EUR
18.	Paid season work force	50	working hour	1.50	EUR/working hour	75.00 EUR
19.	<b>Other variable costs</b>					
<b>B)</b>	<b>Total costs(3 to 19)</b>					<b>981.00 EUR</b>
<b>II</b>	<b>GAIN/LOSS</b>					
<b>20.</b>	<b>Total without incentive (A – B)</b>					<b>1,561.50 EUR</b>
<b>21.</b>	<b>Per ha without incentive (20 : 17)</b>					<b>520.50 EUR</b>
<b>22.</b>	<b>Cost of grain in kg (20 : 1)</b>					<b>0.10 EUR</b>
<b>23.</b>	<b>Production efficiency (A : B)</b>					<b>2.59</b>
<b>24.</b>	<b>Revenue profitability (20 : A) h 100</b>					<b>61.42%</b>

Source: Authors' calculation based on data from Mičić, 2012

From Table 2 we can see that the average yield from triticale is 5.0 t/ha on the examined farm A and that it ranged from 4.5 t/ha to 5.5 t/ha. Total realized gain on 3 ha is 1,561.50 EUR, profitability of revenue is 61.42 %.

**Table 3.** Achieved economic indicators of wheat production on 2 ha

No.	Production year: 2012	Amount	Unit of measure	Price	Unit of measure	Amount of EUR for 2 ha
<b>I</b>	<b>Revenue</b>					
1.	Wheat from 2 ha	5	t/ha	170.00	EUR/t	1,700.00 EUR
2.	Straw from 2 ha	5	t/ha	16.90	EUR/t	169.00 EUR
<b>A)</b>	<b>Total revenue(1 to 2)for 2 ha</b>					<b>1,869.00 EUR</b>
<b>3</b>	<b>Expenses</b>					
4.	Seed for 2 ha	500	kg	0.20	EUR/kg	100.00 EUR
5.	Fertilizer					
6.	Manure for 2 ha	10	t	4.00	EUR/ t	40.00 EUR
7.	Urea	400	kg	0.30	EUR/kg	120.00 EUR
8.	Foliar fertilization	4	kg	3.00	EUR/kg	12.00 EUR
9.	Pesticides					
10.	Meteor	20	g	0.15	EUR/L	3.00 EUR
11.	Irrigation					
12.	Energy source for 2 ha	15	L	1.40	EUR/L	42.00 EUR
13.	Diesel fuel	60	L	1.40	EUR/L	84.00 EUR
14.	Maintenance of mechanization	2	ha	19.00	EUR/ha	38.00 EUR
15.	Paid services		ha			
16.	Plowing	2	ha		EUR/ha	0 EUR
17.	Preparing the ground	2	ha		EUR/ha	0 EUR
18.	Sowing	2	ha	30.00	EUR/ha	60.00 EUR
19.	Harvest	2	ha	55.00	EUR/ha	110.00 EUR
20.	Paid season work force	30	working hours	1.50	EUR/ working hour	45.00 EUR
21.	Other variable costs					
<b>B)</b>	<b>Total costs(3 to 21)</b>					<b>654.00 EUR</b>
<b>II</b>	<b>GAIN/LOSS</b>					
<b>22.</b>	<b>Total without incentive ( A – B )</b>					<b>1,215.00 EUR</b>
<b>23.</b>	<b>Per ha without incentive(22 : 17)</b>					<b>607.50 EUR</b>
<b>24.</b>	<b>Cost of grain kg (22: 1)</b>					<b>0.12 EUR</b>
<b>25.</b>	<b>Production efficiency (A : B)</b>					<b>2.86</b>
<b>26.</b>	<b>Revenue profitability (22 : A) h 100</b>					<b>65.00 %</b>

Source: Authors' calculation based on data from Mičić, 2012

From Table 3 we can see that the average yield of wheat is 5.0 t/ha on the examined farm and that it ranged from 4.5 t/ha to 5.5 t/ha. Total profit on 2 ha is 1,215.00 EUR and revenue profitability is 65.00 %.

**Table 4.** Achieved economic indicators of barley production on 3 ha

No.	Production year: 2012	Amount	Unit of measure	Price	Unit of Measure	Amount of EUR for 3 ha
<b>I</b>	<b>Revenue</b>					
1.	Barley from 3 ha	4	t/ha	170.00	EUR/t	2,040.00 EUR
2.	Straw from 3 ha	5	t/ha	17.04	EUR/t	255.60 EUR
<b>A)</b>	<b>Total revenue(1 to 2) for 3 ha</b>					<b>2,295.60 EUR</b>
<b>3.</b>	<b>Expenses</b>					
4.	Seed for 3 ha	750	kg	0.20	EUR/kg	150.00 EUR
5.	Fertilizer					
6.	Manure for 3 ha	15.0	t	4.00	EUR/t	60.00 EUR
7.	Urea	600	kg	0.30	EUR/kg	180.00 EUR
8.	Foliar fertilization	6	kg	3.00	EUR/kg	18.00 EUR
9.	Pesticides					
10.	Meteor	30	g	0.15	EUR/L	4.50 EUR
11.	Irrigation					
12.	Energy source for 3 ha	15	L	1.40	EUR/L	63.00 EUR
13.	Diesel fuel	90	L	1.40	EUR/L	126.00 EUR
14.	Maintenance of mechanization	3	ha	19.00	EUR/ha	57.00 EUR
15.	Paid services					
16.	Plowing		ha		EUR/ha	0 EUR
17.	Preparation of ground	3	ha		EUR/ha	0 EUR
18.	Sowing	3	ha	30.50	EUR/ha	91.50 EUR
19.	Harvest	3	ha	55.00	EUR/ha	165.00 EUR
20.	Paid season work force	44	r. hours	1.50	EUR/r.s.	66.00 EUR
21.	Other variable costs					
<b>B)</b>	<b>Total costs(3 to 21)</b>					<b>981.00 EUR</b>
<b>II</b>	<b>GAIN/LOSS</b>					
<b>22.</b>	<b>Total without incentive ( A – B )</b>					<b>1,314.60 EUR</b>
<b>23.</b>	<b>Per ha without incentive (22 : 17)</b>					<b>438.20 EUR</b>
<b>24.</b>	<b>Cost of grain kg (22: 1)</b>					<b>0.11 EUR</b>
<b>25.</b>	<b>Production efficiency ( A : B )</b>					<b>2.34</b>
<b>26.</b>	<b>Revenue profitability (22 : A) h 100</b>					<b>57.26%</b>

Source: Authors' calculation based on data from Mičić, 2012

From Table 4 we can see that the average yield of barley on the farm was 4.0 t/ha and that it ranged from 3.5 t/ha to 4.5 t/ha. Total gain on 3 ha is 1,314.60 EUR, production efficiency is 2.34 and revenue profitability is 57.26 %. It can also be seen that revenue from grain on farm A is 50 t, it moved from 3.5 t/ha to 7.5 t/ha and from total amounts of plant production farm A used 1/3 to feed the herd while 2/3 was sold on the market.

### Pricelist of mixture for feeding pigs on farm A

During price calculation of the mixture from own produced grain for breeding pigs on farm, price of all products was taken into consideration, calculated in tons (t). More data about it is shown in Table 5.

**Table 5.** Prices of concentrate mixtures on farm A

PRICELIST OF FEED MIXTURE FOR PIGS ON A FARM IN KOSOVO AND METOHIJA IN GRAČANICA IN 2012	Price EUR/kg
Pre-starter mixture for feeding pigs up to 10kg (PS)	0.27
Grover mixture for feeding pigs from 15 to 25 kg (SS)	0.22
Starter mixture for feeding pigs up to 15 kg (SG)	0.24
Mixture for feeding fattened pigs from 25 to 60 kg (TS-1)	0.20
Mixture for feeding fattened pigs from 60 to 100 kg (TS-2)	0.19
Mixture for feeding pregnant gilts and sows (SK)	0.17
Mixture feeding lactating sows and boars (SKD)	0.16

Source: Authors' calculation based on data from Mičić, 2012

From Table 5 we can see that the feeding mixture for all categories of pigs farm A produces by itself in powder form in their blenders at producers prices.

Price of the concentrate mixture on the farm was calculated by average exchange rate of the National Bank of Serbia in EUR/kg/116 RSD in 2012.

### Productivity of sows and raising piglets on farm A

Farm had ten sows of landrace breed which had two farrowing a year with an average of ten piglets per brood, i.e. 20 piglets per sow a year and one boar of the Yorkshire breed.

Piglets were weaned after 21 days with an average body weight of 5.24 kg. Their breeding lasted 38 days after that until they reached 25 kg, with the achieved daily growth of 0.52 kg/day (Table 6).

**Table 6.** Productivity of sows and raising piglets up to 25 kg in 2012 on farm A

Livestock number on farm 10	<i>Lowland region</i>
Racial composition Landrace + Yorkshire	Input weight
Time for fattening in years (two rounds)	Exiting weight 25 kg
Average 20 piglets/sow a year	Weight of a piglet after weaning 5.24 kg
Age of piglets when weaning 21 day	Raising piglets 38 days x 0.52 kg/day



I	Revenue	Amount			Price per unit EUR	Total EUR
		Number of pigs	kg/ livestock	Total kg		
1	Raising piglets	200	25	5.000	2.80	14,000.00
2	Incentive RS	200	-	-	-	-
3	Incentive RS (sow)	10	-	-	-	-
4	Insurance reimbursement					-
<b>A)</b>	<b>Total( 1 to 4)</b>					<b>14,000.00</b>
<b>II</b>	<b>EXPENSES</b>					
5	Feeding piglets					
6	-pre-starter (0.2 kg/day x10days x200 livestock)	200	2	400	0.2695	107.80
7	-SS (to 15 kg) (0.5 kg/day x 13days x200 livestock)	200	6.5	1.300	0.2415	313.95
8	-SG (15-25 kg) (1.56 kg/day x15days x200 livestock)	200	23.4	4.680	0.2190	1,024.92
9	Feeding sows (2.5 kg/day x365days x10 livestock)	10	912.5	9.125	0.1666	1,520.23
10	Feeding boars (2.2 kg/day x 365days x 1livestock)	1	803	803	0.1616	129.76
<b>B)</b>	<b>Total feed( 5 to 10)</b>					<b>3,096.66</b>
11	Losses in feeding 1%		50		2.40	120.00
12	Water and medicine – sow	10	-	-	10.00	100.00
13	Human labor (personal or someone else's)	working day		40	10.00	400.00
14	Amortization of the heard (400-100=300x20%)	10	-	-	60.00	600.00
15	Amortization of the facility and equipment			8.000	2.5%	200.00
16	Total direct costs( 5 to 15)					<b>4,906.66</b>
17	Indirect costs of the farm					490.00
<b>C)</b>	<b>Total costs( 5 to 17)</b>					<b>5,006.66</b>
<b>III</b>	<b>GAIN/LOSS</b>					
<b>18</b>	<b>On a farm without r incentive (A – C)</b>					<b>8,993.34</b>
<b>19</b>	<b>Per pig without incentive (18 : 3)</b>					<b>899.33</b>
<b>20</b>	<b>Price of a kg (C : 1)</b>					<b>1.00</b>
<b>21</b>	<b>Production efficiency (A : C)</b>					<b>2.79</b>
<b>22</b>	<b>Revenue profitability (18 : A) h 100</b>					<b>64.24%</b>

Source: Authors' calculation based on data from Mičić, 2012

From Table 6 we can see that the average weight of piglets on the farm in Gračanica is 25 kg/livestock and that it ranged from 24 to 26 kg/ livestock, with the achieved average price of 1 €/kg and the value of 1 pig was 25.00 €. Total achieved gain for 200

piglets was 8,993.34 €, production efficiency 2.79 and revenue profitability 64.24 %.

In Table 7 there are 40 fattened livestock in 2012 on a family farm A.

### Fattened pigs on farm A

Farm A fattens 40 pigs a year in 4 turns and sells them ex-loaded on the farm as well as excess piglets. Farm A breeds around 200 piglets a year of average weight of 25 kg and raises gilts for themselves. Farm A sells 80% of piglets free loaded after they have achieved 25 kg of mass at the price of 2.8 euros, in 2012 (Table 7), as well as total achieved economic indicators (Table 8).

**Table 7.** Achieved economic indicators in fattened pigs on farm A for 2012

No.	Production year: 2012.	Amount	Stopa konverzije kg hrane:			2.68	kg growth
1.	Fattening period: <b>Jan-Dec</b>	-	Unit of Measure	Mortality rate in feeding:	2.43%		
2.	Number of pigs placed in fattening:	<b>41</b>	livestock				
3.	Average weight of fattened:	<b>100</b>	kg/ livestock				
4.	Fattening time:	<b>87</b>	days				
<b>I</b>	<b>Revenue</b>	-	-	<b>Price</b>	<b>Unit of Measure</b>	<b>Amount/€</b>	<b>Amount (€/livestock)</b>
5.	<b>Fattened pigs (3 x 5)</b>	40.00	livestock	1.58	EUR/kg	6.320.00	158.00 EUR
6.	<b>Manure</b>	20.00	t	4.00	EUR/t	80.00	2.00 EUR
7.	<b>Subventions per pig</b>	40.00	livestock	8.70	EUR/ livestock	348.00	8.70 EUR
A)	<b>Total revenue (1 to 7)</b>	-				<b>6.748.00</b>	<b>168.70 EUR</b>
<b>II</b>	<b>Expenses</b>	-	Unit of measure	Price	Unit of measure	Amount/€	(EUR/ livestock)
8.	Piglets (average livestock)	25.00	kg / livestock				
9.	Piglets (2 x 8)	1,025.00	kg / livestock	1.00	EUR/kg	1,025.00	25.00 EUR
10.	Own mixture of concentrate						
11.	TS1 (from 25-60 kg) (2.15kg/day x 41days x40 g.) 3.526			0.20	EUR/kg	705.00	17.63 EUR
12.	TS2 (from 60-100 kg) (2.45kg/day x46days x40 g.) 4.508			0.19	EUR/kg	856.50	21.41 EUR
13.	Average daily per pig	<b>2.31</b>	kg/EUR				
14.	Mechanical work (7 h14)		kg/EUR	2.00	EUR/kg	80.00	2.00 EUR
15.	Water per pig(15x4) x 8:1.000	10	L/day	1.25	EUR/m <sup>3</sup>	43.50	1.08 EUR
16.	Veterinary services and medicine(7x16)			1.00	EUR/ livestock	40.00	1.00 EUR

No.	Production year: 2012.	Amount	Stopa konverzije kg hrane:		2.68	kg growth
17.	Human labor(3 x 5) x 17		0.15	EUR/ livestock	600.00	15.00 EUR
18.	Indirect costs( 7 x 18)		1.40	EUR/ livestock	56.00	1.40 EUR
19.	Amortization of facilities and equipment (7 x 19)		2.00	EUR/ livestock	80.00	2.00 EUR
<b>B)</b>	<b>Total costs(9 to 30)</b>				<b>3,486.00</b>	<b>86.52EUR</b>
<b>III</b>	<b>GAIN/LOSS</b>					
20.	On farm with incentive(A – B)				3.262.00	<b>81.55EUR</b>
21.	Price in kg B : (3 x 5)				0.87	
22.	Production efficiency (A : B)				1.94	
23.	Revenue profitability (20 : A) x 100				48.34%	

Source: Authors' calculation based on data from Mičić, 2012

From Table 7 we can see that the value of one fattened pig was 87.00 EUR/pig. Total achieved gain for 40 fattened pigs is 3,262.00 EUR, production efficiency 1.94 and revenue profitability 48.34 %.

**Table 8.** Total achieved economic results in agricultural and livestock production on farm A

No.	Farm in Gračanica Production year: 2012		Revenue	Amount	Unit of measure	Price	Unit of measure	Amount in EUR for 2 ha
<b>I</b>	<b>REVENUES</b>	For			<b>e</b>			
1.	Corn from 2 ha	2	6.5	7.1844	t/ha	130.00	EUR/t	933.97 EUR
2.	Cornstalks from 2ha	2	9	18	t/ha	17.98	EUR/t	323.70 EUR
3.	Triticale from 3 ha	3	5	11.618	t/ha	150.00	EUR/t	1,742.70 EUR
4.	Straw from 3 ha	3	5	15	t/ha	19.50	EUR/t	292.50 EUR
5.	Wheat from 2 ha	2	5	8.6036	t/ha	170.00	EUR/t	1,462.61 EUR
6.	Straw from 2 ha	2	5	10	t/ha	16.90	EUR/t	169.00 EUR
7.	Barley from 3 ha	3	4	6.141	t/ha	170.00	EUR/t	1,043.97 EUR
8.	Straw from 3 ha	3	5	15	t/ha	17.04	EUR/t	255.60 EUR
9.	Piglets livestock	159	25	3.975	kg	2.80	EUR/kg	11,130.00 EUR
10.	Fattened pigs	40	100	4.000	kg	1.58	EUR/kg	6,320.00 EUR

11.	Manure per livestock	0.5	40	20	t	4.00	EUR/t	80.00 EUR
12.	Subventions livestock		40		livestock	8.70	EUR/ livestock	348.00 EUR
A)	<b>Total revenue (1 to 12)</b>							<b>24,102.05 EUR</b>
II	<b>Expenses</b>							
13.	Corn from 2 ha							<b>684.00 EUR</b>
14.	Triticale for 3 ha							<b>981.00 EUR</b>
15.	Wheat for 2 ha							<b>654.00 EUR</b>
16.	Barley for 3 ha							<b>981.00 EUR</b>
17.	Upbringing piglets							<b>3,300.72 EUR</b>
18.	Fattening pigs <sup>40</sup> livestock							<b>900.00 EUR</b>
B)	<b>Total expenses (13 to 18)</b>							<b>7,500.72 EUR</b>
II	<b>GAIN/LOSS</b>							
19.	<b>Total with incentive (A – B)</b>							<b>16,601.33 EUR</b>
20.	<b>Production efficiency (A:B)</b>							<b>3.21</b>
21.	<b>Revenue profitability (19 : A)h100</b>							<b>68.88%</b>

Source: Authors' calculation based on data from Mičić, 2012

From Table 8 we can see that in 2012 the farm achieved total revenue of 24,102.05 EUR; expenses in the amount of 7,500.72 EUR; gain in the amount of 16,601.33 EUR; in agriculture and livestock production and sale production efficiency 3.21; a d revenue profitability 68.88 %.

Pricelist of concentrate mixtures on farm B for feeding pigs of all categories is shown in Table 9.

**Table 9.** Price of concentrate mixture on farm B

PRICELEST OF MIXTURE FOR FEEDING PIGS ON A FARM ON KOSOVO AND METOHIJA IN GRAČANICA IN 2012	PRICE EUR/kg
Pre-starter mixture for feeding piglets to 10 kg (PS)	0.48
Grover mixture for feeding piglets from 15 to 25 kg (SS)	0.34
Starter mixture for feeding piglets to 15 kg (SG)	0.33
Mixture for feeding fattened pigs from 25 to 60 kg (TS-1)	0.28
Mixture for feeding fattened pigs from 60 to 100 kg (TS-2)	0.26
Mixture for feeding pregnant gilts and sows (SK)	0.25
Mixture for feeding lactating sows and boars (SKD)	0.29

Source: Authors' calculation based on data from Mičić, 2012

The Farm has its own blenders that operates independently and is located by the entrance gate and by the above mentioned pricelist of mixture entrusts farm B.

### Productivity of sows and upbringing of piglets on farm B

Farm B has 1,500 sows Landrace + Yorkshire which had two farrowing a year in the average of 10.3 raised piglets per breed, i.e. 20.6 piglets a year. Piglets are weaning after 28 days with the average body weight of 6.6 kg. Their upbringing lasted 34 days after that up to body weight of 25 kg, with the achieved daily growth of 0.54 kg a day.

More data on productivity of sows and raising piglets on farm B is given in Table 10.

**Table 10.** Productivity of sows and raising piglets up to 25 kg on farm B in 2012

Livestock Number on farm 1,500	<i>Lowland region</i>
Racial composition Landrace +Yorkshire	Entrance weight
Fattening weight in years (two cycles)	Exiting weight 25 kg
Average 20.6 piglets/pig a year	Weight of a piglet after weaning 6.6 kg
Age of piglets after weaning 28 days	Raising piglets 34 days x 0.54 kg/day

I	REVENUE	Number of livestock	kg/ livestock	Total kg	Price unit	Total €
1	Raising piglets put for fattening:	30,600				
2	Average end weight of piglets:	30,000	25	750,000	2.39	1,792,500.00
3	Manure (sows)total	1,500	500	750,000	0.01	7,500.00
<b>A</b>	<b>T o t a l (1 t o 3)</b>					1,800,000.00
<b>II</b>	<b>EXPENSES</b>					
5	Feeding piglets/ mixture according to pricelist Table 8.					
6	-pre-starter (0.2 kg /day x10days x30,000 pigs)	30,000	2	60,000	0.48	28,800.00
7	-SP1 (to 15 kg) (0.6kg /day x11days x30,000 pigs)	30,000	6.6	198,000	0.34	67,320.00
8	-SP2 (15-25kg) (1.8 kg /day x13days x30,000 pigs)	30,000	23.4	702,000	0.32	224,640.00
9	Feed to sow (4.5kg/day x46days x1,500 pigs)	1,500	207	310,500	0.28	86,940.00
10	Feeding a sow (4.5 kg/day x365days x1,500 pigs)	1,500	1,642.5	2,463,750	0.26	640,575.00
11	Feeding a boar (4 kg/day x365days x25 pigs)	25	1,460	36,500	0.26	9,490.00
<b>B)</b>	<b>Total feed (5 to 11)</b>		3,341.5	3,770,750		<b>1,057,765.00</b>
12	Loss in fattening piglets 2%		-	-		36,000.00
13	Under vacuum	30,000			1.00	30,000.00
14	Water and medicine – sow and boars	1,525	-	-	20.00	30,500.00

OPERATING COSTS OF AGRICULTURAL HOLDINGS WITH EQUAL PRODUCTION POSSIBILITIES

15	Human labor (personal someone else's)	working day		365	400.00	146,000.00
16	Amortization of pigs (450 -150=300x20%)	1,525	-	-	60.00	91,500.00
17	Amortization of facilities and equipment			1,449,275	3%	43,478.00
18	Total direct costs(5 to 18)					1,494,718.00
19	Indirect costs of the farm					93,559.00
<b>C)</b>	<b>Total costs(18 + 19)</b>					<b>1,528,802.00</b>
<b>III</b>	<b>GAIN/LOSS</b>					
20	On a farm without incentive(A – C)					271,198.00
21	Per pig without incentive (20 : 3)					180.79
22	Price for kg (C : 2)					2.04
23	Production efficiency (A : C)					1.18
24.	Revenue profitability (20 : A) x 100					15.07%

Source: Authors' calculation based on data from Mičić, 2012

From Table 10 it is visible that breeding sows-piglets on farm B has the gain from 271,198 EUR, efficiency is 1.18 and revenue profitability is 15.07 %.

Table 11 shows achieved economic indicators in fattened pigs on farm B in 2012.

**Table 11.** Achieved economic indicators in fattened pigs on farm B

1.	Production year: <b>2012</b>	Amount	Conversion rate of feed in kg:			<b>3.21</b>	kg/growth
2.	Fattening period: <b>Jan-Dec</b>	Unit of Measure	Mortality rate of fattened:			<b>2.0%</b>	
3.	Number of pigs put for fattening:	30,600	livestock				
4.	Average weight of a fattened pig:	<b>100</b>	kg / livestock				
5.	Length of fattening:	<b>98</b>	Days				
<b>I</b>	<b>Revenue</b>	-	<b>Unit of measure</b>	<b>Price</b>	<b>Unit of measure</b>	<b>Amount total</b>	<b>Amount €/livestock</b>
6.	<b>Fattened pigs( 4 x 6)</b>	30,000	livestock	1,58	EUR/kg	4,740,000.00	1,158.00 EUR
7.	<b>Manure</b>	15,000	t	4,00	EUR/t	60,000.00	2.00 EUR
8.	<b>Subventions per pig</b>	30,000	livestock	8,70	EUR/livestock	261,000.00	8,70 EUR
<b>A)</b>	<b>Total revenue (I do 8)</b>	-				<b>5,061,000.00</b>	<b>168.70 EUR</b>
<b>II</b>	<b>Expenses</b>	-					

9.	Piglets (average/ pig)	25.0	kg / livestock				
10.	Piglets(3 x 9)	765,000	kg/ livestock	2,04	EUR/kg	1,560,600.00	52.02 EUR
11.	Farm is has the mixture according to pricelist						
12.	TS1 (from 25- 60 kg) 2.35kg/ dayx46days x30,000 pigs			0,28	EUR/kg	908,040.00	30.27 EUR
13.	TS2 (from 60-100 kg) 2.55kg/ dayx52days x30,000 pigs			0,26	EUR/kg	1,034,280.00	34.48 EUR
14.	Average daily per livestock	<b>2.46</b>	kg/EUR				
15.	Mechanical work (6 x 15)	-	kg/EUR	1,4967	EUR/kg	44,901.00	1.50 EUR
16.	Water per livestock (16 x 5) x 6:1.000	10	L /day	1,15	EUR/m <sup>3</sup>	33,810.00	1.12 EUR
17.	Veterinary services and medicine(6 x 17)			0,80	EUR/ livestock	24,000.00	0.80 EUR
18.	Human labor(4x6) x 18		kg/EUR	0,18	EUR/ livestock	540,000.00	18.00 EUR
19.	Indirect costs (6 x 19)		kg/EUR	1,00	EUR/ livestock	30,000.00	1.00 EUR
20.	Amortization of facilities and equipment (6 x 20)			3,53	EUR/ livestock	105,900.00	3.53 EUR
<b>B)</b>	<b>Total costs(9 to 20)</b>					4,281,531.00	<b>142.72 EUR</b>
<b>III</b>	<b>GAIN/LOSS</b>						
<b>21.</b>	On farm with incentive (A – B)					779,469.00	<b>25.98 EUR</b>
<b>22.</b>	Cost per kg B :(4 x 6)					1.42	
<b>23.</b>	Production efficiency(A : B)					1.18	
<b>24.</b>	Revenue profitability (21 : A) x 100				%	15.40	

Source: Authors' calculation based on data from Mičić, 2012

From Table 11 we can see that total achieved gain for 30,000 fattened pigs is 779,469.00 EUR, production efficiency 1.18 and revenue profitability is 15.40 %.

Table 12 shows total achieved economic indicators in pig fattening on farm B in 2012.

**Table 12.** Total achieved economic indicators in pig fattening on farm B

No.	Production year:	2012	Amount	Amount	Unit of measure	Price	Unit of measure	Amount EUR
<b>I</b>	<b>REVENUE</b>	Livestock						
2.	Manure(sow)	1,500	500	750,000	kg	0.01	€ /kg	7,500.00EUR
3.	Fattened pigs	30,000	100	3,000,000	kg	1.58	€ /kg	4,740,000.00EUR
4.	Manure (fattened pig)	30,000	0.5	15,000	t	4.00	€ /t	60,000.00EUR

5.	Subventions	30,000	livestock	8.70	€/livestock	261,000,00EUR
<b>A)</b>	Total revenue (1 to 5)					<b>5,068,500,00EUR</b>
<b>II</b>	<b>EXPENSES</b>					
6.	Fattened pigs	<b>30,000</b>	livestock		€	4,281,531,00EUR
<b>B)</b>	Total expenses					4,281,531,00EUR
<b>III</b>	<b>GAIN/LOSS</b>					
8.	Total with incentive (A – B)					<b>786,969.00EUR</b>
9.	Production efficiency (A : B)					<b>1.18</b>
10.	Revenue profitability (8 : A) x 100				%	<b>15.53</b>

Source: Authors' calculation based on data from Mičić, 2012

From Table 12 we can see that total realized gain on farm B was 786,969.00 €, production efficiency 1.18 and revenue profitability 15.53 %.

### Production efficiency of fattened pigs on both farms in 2012

In order to research production efficiency in fattening pigs, two farms from Serbia and Kosovo and Metohija were taken into consideration since they have the necessary conditions for such production. We researched farm A which has 40 fattened pigs and farm B which has 30,000 livestock. Average entrance weight of piglets for fattening was 25 kg and achieved exit weight was 100 kg. On farm B average fattening period of pigs was 98 days with the daily gain of 0.76 kg/livestock/day, while on farm A it lasted 87 days, with an average daily growth of 0.86 kg/livestock/day. Our results are in accordance with the results stated (Vidović et al., 2012) in the performance test of pure breeds of pigs, landrace and Yorkshire. Calculation of income includes only the revenue from selling pigs while potential revenue from pig meat wasn't taken into consideration (Table 13).

**Table 13.** Economic indicators of pork meat production – pork meat side on farm A and B in 2012

I	Indicator	Unit of measure	FarmA/	FarmB/
<b>A.</b>	<b>Fresh pork meat sides</b>	livestock	<b>40.00</b>	<b>30,000.00</b>
<b>B.</b>	<b>Livestock weight of live pig weight</b>	<b>kg</b>	<b>100.00</b>	<b>100.00</b>
1.	<b>Total weight, pig (A x B)</b>	<b>kg</b>	4,000.00	3,000,000.00
2.	Pork sides/livestock	%	79.00	78.00
3.	Total pork/side <b>kg</b> (1 x 2) : 100	<b>kg</b>	3,160.00	2,340,000.00
4.	Price of pork sides	€/kg	2.82	2.82
<b>V.</b>	<b>Total revenue (3 x 4)</b>	€	8,911.20	6,598,800.00
<b>II</b>	<b>EXPENSES</b>			
5.	Price of the slaughter service	€/livestock	8.70	8.70



6.	Direct costs of live pig weight	€	3,480.00	4,281,531.00
7.	Total pig slaughter service (Ax 5)	€	348.00	261,000.00
<b>G.</b>	<b>Total expenses( 6 + 7 )</b>	€	<b>3,828.00</b>	<b>4,542,531.00</b>
<b>III</b>	<b>GAIN/LOSS</b>	€		
8.	Pork sides from farms (V - G)	€	<b>5,083.20</b>	<b>2,056,269.00</b>
9.	Pork side livestock/EUR (8 : A)	€	127.08	68.54
10.	Pork side price kg (G : 3)	€	1.21	1.94
11.	Meat production efficiency (V : G)		2.33	1.45
12.	Revenue profitability (8 : V) x 100	%	57.04	31.16

Source: Authors' calculation based on data from Mičić, 2012

From the shown data it can be seen that pork meat side price on farm A is 1.21 EUR/kg and that this production has the efficiency of 2.33 and revenue profitability of 57.04 %, while on farm B pork meat side price is 1.94 EUR/kg and that this production has the efficiency of 1.45 and revenue profitability of 31.16 %. It can further be seen that on both farms the calculation of slaughter expenses, cooling and processing of sides amounts to 8.70 EUR per fattened pig.

Calculation was conducted in accordance with the achieved yield of slaughtered pigs, value of fattened pig with the mass of 100 kg with the price of 87.00 EUR + 8.70 EUR slaughter expenses, which amounts to 85.70 EUR on farm A.

Slaughtered pigs have amounted to 79 kg of cooled side x 2.82 EUR price of a side, giving the value of 222.78 EUR, and when we take the price of pork meat (side) 95.70 EUR, we get the gain per livestock of 127.08 EUR/kg. It can be easily concluded that the price of a cooled side is 132.79 % bigger than the price of a fattened pig, which doesn't represent an usual relation on the market. Farm A achieved gain in the amount of 5,083.20 EUR.

A calculation was also conducted of farm B in accordance with the yield of slaughtered pigs and the value of a fattened pig with the weight of 100 kg is 142 EUR + slaughter costs 8.7 EUR which amounts to 150.70 EUR, and since cooled pork meat side weighing 78 kg with the price of 2.82 EUR per kg, the value of the livestock (side) is 219.96 EUR.

Slaughtering pigs they obtained pork meat sides with uniform mass, an average of 78 kg per livestock. Farm B realized a profit in the amount of 2,056,047 EUR.

It can easily be concluded that the price of a cooled side is 45.96% bigger than the price of a fattened pig.

We came to new scientific findings in the paper on the practical application of quality feeding in fattening pigs. Advantages of such a method of raising pigs was examined and the scientific contribution to promoting development of producing quality pork

meat, for which Serbia with its pig raising tradition has great geographic-ecological potentials, especially in its agricultural and livestock production. As a final conclusion of the research it can be recommended to pig breeding farms to organize production groups, cooperatives, clusters and franchises so they could more easily open pig raising-repro-center and perfect their products so they could be placed on the market faster.

### Conclusion

Based on the analysis of the state in agricultural-food production, specifically pork meat, we came to a conclusion when the approach in this type of production is in question. Another argument in the request for determining fattened pig price on the slaughter line is the given quality according to the share of meat, which is shown in the research on farm A, that it's best to close the entire production cycle from a field to fork. We primarily think on the market of fattened pigs, piglets and pork meat in Serbia in 2012. After the research, we answered a few very important questions in the paper, which are: the price level is not such that it stimulates pig breeders and the price influences production level. One of the reasons there is a reduction and stoppage of slaughtering of big industries in the Republic of Serbia (facilities in Sombor, Subotica and Čoka). There is an expansion of big private slaughterhouses at the same time, which are far more flexible than the industries, therefore their production is far more efficient. Pork meat consumption cyclically reduces due to relatively high prices and a decline in life standard. An increase in price of these products leads to lower demand and meat consumption. The abovementioned indicator shows very significant economic effects of the stated technology in feeding pigs, high strategic efficiency in production development. Pork meat production on both farms is economically justified and development of intensive production of goods can be expected in farm conditions in Serbia.

### Literature

1. Andrić, J. (1998): *Troškovi kalkulacije u poljoprivrednoj proizvodnji*, Poljoprivredni fakultet – Zemun, Beograd; Council Regulation (EEC) No 3220/84 of 13 November 1984 determining the Community scale for grading pig carcass, 1984. Official Journal of the European Communities No L 301, 20/11/1984, No. 1 – 3.
2. Džinić, N., Petrović, Lj., Tomović, V., Manojlović, D., Timanović, S., Trišić-Ilić, S., Mrdjanov, J. (2003): *Uticaj višerasnog ukrštanja i godišnjeg doba na kvalitet polutke i mesa svinja*, Savremena poljoprivreda, Vol. 52, No. 3-4, pp. 335-337.
3. Džinić, N., Petrović, Lj., Tomović, V., Manojlović, D., Timanović, S., Vidanrić, D., Kurjakov, N. (2004): *Ocena kvaliteta polutke i mesa svinja rasa veliki jorkšir i švedski ladras*. Biotehnologija u stočarstvu, Vol. 20, No. 1-2, pp. 67-73.
4. Fisher, A.V., Green, D.M., Whittemore, C.T., Wood, J.D., Schofield, C.P. (2003): *Growth of carcass components and its relation with conformation in pigs of three types*, Meat Science, Vol. 65, No. 1, pp. 639-650.

5. Kosovac, O., Josipović, S., Živković, B., Radović, Č., Marinkov, G., Tomašević, D. (2007): *Comparable presentation of carcass and meat quality of different pig genotypes using modern evaluation methods*, . 2<sup>nd</sup> International Congress on animal husbandry „New perspectives and challenges of sustainable livestock farming” , Belgrade, Serbia, Biotechnology In Animal Husbandry, Vol. 23, No. 5-6, pp 291-301.
6. Jovanović, M., Tica, N. (1998): *Kalkulacije u poljoprivredi*, Poljoprivredni fakultet, Novi Sad.
7. Jukna, V., Jukna, C. (2005): *The comparable estimation of meat quality of pigs breeds and their combinations in Lithuania*, Biotechnology in Animal Husbandry, Vol. 21, No. 5-6, pp. 175-179
8. Manojlović, D., Petrović, Lj., Džinić, N., Kurjakov, N. (1999): *Kvalitet trupa i mesa svinja –osnova kvaliteta proizvoda*, Monografija: Tehnologijaproizvodnje i kvalitet konzervi od mesa u komadima, No. 67-90, Tehnološkifakultet u NovomSadu.
9. Orović, D., LjubanovićRalević, I., Anokić, A.(2015): *Assessment ofbusiness efficiency of agriculturalholdings withdifferent productions*, Economics of Agriculture Belgrade Serbia, Vol. 62, No. 3, pp. 781-799.
10. Pravilnik o načinuostvarivanjaprananapodstisceaje u stočarstvupokošnicipčela– Published in „Official gazete of the RS”, no. 60 /13 from 10. July 2013.
11. Rahelić, S. (1984): *Uzgoj svinje i meso*, Školskakanjiga, Zagreb.
12. Šegrt, S., Kolarski, I. (2015): *Uslovi egzistencije preduzeća*, Oditor, Belgrade, no. 11, pp. 32-41
13. Tešanović, D. (1969): *Uticao starosti pri prašenju na finansiski rezultat proizvodnje*, Ekonomika poljoprivrede, No. 7 - 8, Belgrade.
14. Timanović, S., Vidanić, D., Kurjakov, N. (2003): *Ocena kvaliteta polutki i mesa svinja rasa veliki jorkšir i švedski landras*, Biotehnologija u stočarstvu Vol. 19, No. 5-6, p. 500
15. Tomović, V., Petrović, Lj., Džinić, N., Manojlović, D., Timanović, S., Trišić-Ilić, S. (2005): *Meat yield in primal cuts and sides of pigs determined by partial dissection*, International 5<sup>3rd</sup> meat industryconference “New integral approach to meat and products safety”, Vrnjačkabanja, I-15, No. 31-34.
16. Vidović, V., Krnjaić, J., Lukač, D., Višnjić, V., Stupar, M. (2012): *Growth intensity of the giltsfertile breedpigs in the Nucleusfarm*, Biotech, Anim. Hus., Vol. 28, No. 4, pp. 787-796.
17. Živković, D., Perunović, M. (2012): *Poznavanje mesa*, praktikum, Poljoprivredni fakultet, Univerzitetu Beogradu.
18. Okanović, Đ., Zekić, V., Petrović, L. S., Tomović, V., Džinić, N. R. (2006): *Ekonomičnost proizvodnj esvinjskog mesa u polutkama*, Tehnologija mesa, Vol. 47, No. 5-6, pp. 237-241.
19. Zekić, V., Tomović, V., Milić, D., Vidović, V., Lukač, D. (2013): *Ekonomska obeležja proizvodnje svinja rase landras i mangulica*, Letopis naučnih radova Poljoprivrednog fakulteta, Vol. 37, No. 1, pp. 191-199
20. Zekić, V., Tomović, V., Milić, D., Lukač, D. (2012): *Poređenje ekonomskih*

*obeležja tova svinja mangulica i svinja rase jorkšir*, Ekonomika poljoprivrede, Vol. 59, No. 4, pp. 649-656.

21. Zekić, V., OKANOVIĆ, Đ. (2007): *Prudence of fatty pigs production*, I International Congress: „FOOD TECHNOLOGY, QUALITY AND SAFETY“, XI Symposium NODA: „Technology, quality and safety in pork production and meat Processing“, Proceedings No. 33-37.

## TROŠKOVI POLJOPRIVREDNIH GAZDINSTAVA (FARMA, POLJ. PREDUZEĆA, SELJAČKO GAZDINSTVO) SA JEDNAKIM MOGUĆNOSTIMA PROIZVODNJE

*Ivan Mičić<sup>7</sup>, Dragana Urošević<sup>8</sup>, Radosav Vujić<sup>9</sup>, Ivana Mičić<sup>10</sup>, Marko Mičić<sup>11</sup>, Marija Mičić<sup>12</sup>*

### Rezime

*Predmet istraživanja u radu je analiza stanja i osnovnih problema u farmskoj proizvodnji svinjskog mesa, kao i ekonomska analiza tova svinja. Istraživanja su obuhvatila konkretne studije slučaja na porodičnom poljoprivrednom gazdinstvu, svinjogojskoj farmi u Gračanici, u centralnom delu Kosova i Metohije i na zadružnom poljoprivrednom gazdinstvu, svinjogojsku farmu u Žitorađi u Topličkom okrugu. U periodu u 2012. godini praćen je obim i primenjena tehnologija proizvodnje tovnih svinja na obe farme i analizirani su dobijeni ekonomski rezultati. U posmatranom periodu utvrđeno je da na privatnoj farmi ukupan broj tovljenika iznosi 40 grla, dok na zadružnoj farmi, broj tovljenika iznosi 30.000 grla. Proizvedeni tovljenik na privatno jfarmikošta 87 €, i svinjsko meso u polutki 1,16 €/kg. Na zadružnoj farmi cena tovljenika iznosi 142 €, i svinjsko meso u polutki 1,94 €/kg. Prosečna masa tovljenika na obe farme je 100 kg, dok je udeo svinjskih polutki varirao od 78%-79%.*

**Ključne reči:** *Proizvodnja tovljenika, svinjskog mesa - polutki, cena, kvalitet, ekonomski rezultati.*

- 
- 7 Mr Ivan Mičić, doktorand, Univerzitet u Beogradu, Poljoprivredni fakultet, Nemanjina ulica br. 6, 11080 Zemun, Srbija, Telefon: +381 11 261 53 15, E-mail: [divanlav@gmail.com](mailto:divanlav@gmail.com)
  - 8 Master Dragana Urošević, Univerzitet u Beogradu, Poljoprivredni fakultet, Nemanjina ulica br. 6, 11080 Zemun, Srbija, Telefon: +381 63 881 49 35, E-mail: [dragana.urosevic91@yahoo.com](mailto:dragana.urosevic91@yahoo.com)
  - 9 Dr Radosav Vujić, Poljoprivredno stručna i savetodavna služba Valjevo, Birčaninova br. 128 A, 14000 Valjevo, Srbija, Telefon: +381 64 843 54 58 E-mail: [pssvaljevo@mts.rs](mailto:pssvaljevo@mts.rs)
  - 10 Master Ivana Mičić, doktorand, Ekonomski fakultet, Univerzitet u Nišu, Trg Kralja Aleksandra Ujedinitelja 11, 18000 Nišu, Srbija, Telefon: +381 63 233 603, E-mail: [ivancica@gmail.com](mailto:ivancica@gmail.com)
  - 11 Marko Mičić, Dipl. ecc, Univerzitet u Nišu, Ekonomski fakultet, Trg Kralja Aleksandra Ujedinitelja 11, 18000 Nišu, Srbija, Telefon: +381 63 680 040, E-mail: [markomicic89@gmail.com](mailto:markomicic89@gmail.com)
  - 12 Master Marija Mičić, doktorand, Univerzitet u Nišu, Tehnološki fakultet u Leskovcu, Bulevar Oslobođenja 124, 16000 Leskovac, Srbija, Telefon: +381 62 867 45 98, E-mail: [marija84micic@gmail.com](mailto:marija84micic@gmail.com)

## POTENTIALS OF ELECTRONIC BUSINESS DEVELOPMENT IN SERBIA

*Slavoljub Milovanovic*<sup>1</sup>

### Summary

*Intensive application of information and communication technology (ICT), particularly Internet in selling and buying business processes have caused development of electronic business (e-business) concept. Numerous organizations in the world and in Serbia as well have implemented the concept. The basic aim of the paper is to analyse level of internet technology and e-business implementation in Serbia. The paper has theoretical background explaining concept of e-business and ICT which supports the implementation of this concept. However, empirical or practical contribution of the paper is articulated through analysis of data considering application of ICT and e-business concept in Serbia. The data considering application of ICT and e-business concept in Serbia is collected by Statistical Office of the Republic of Serbia and encompasses households/individuals and enterprises in Serbia. Results of the research presented in the paper can help executives in Serbian organizations in planning e-business concept implementation as well as researchers in deeper study of this theme.*

**Key words:** *Electronic business, electronic commerce, Internet, Serbia*

**JEL:** *M15, Q13*

### Introduction

The great number of people in the world use Internet for various purposes particularly for buying products and services. Also, numerous organizations in the world and in Serbia as well have implemented concept of electronic business (e-business) that supports online buying and selling. The basic aim of the paper is to analyse level of internet technology and e-business implementation and potentials in Serbia.

There are many theoretical researches in Serbia that deals with analysis of e-business concept, information and communication technology (ICT) application in e-business, advantages of this concept and challenges in its implementation (Ivkovic, Radenkovic, 1998), (Jovanovic, Milovanovic, 2010), (Koncar, 2003), (Radenkovic, 2007). Empirical researches are very rare and this paper tries to study and analyse this theme

---

<sup>1</sup> Slavoljub Milovanovic Ph.D., Full Professor, University of Nis, The Faculty of Economics in Nis, Trg Kralja Aleksandra 11, 18000 Nis, Phone: +381 18 528 644, E-mail: [smilovan@eknfak.ni.ac.rs](mailto:smilovan@eknfak.ni.ac.rs)

from empirical and practical view. Intent of author of this paper is to present results of the research to academic and business community in Serbia and the other countries. Results of this research can be used by managers in enterprises, researchers in academic institutions and policy makers on national and local level.

In addition, the research has theoretical background explaining concept of e-business and ICT which supports the concept. Theoretical themes briefly explained after the section of methodology are: forms and models of e-business, internet technologies supporting e-business and e-business integration solutions.

### **Methodology and data sources**

Empirical contribution of the paper is articulated through analysis of data considering application of Internet and e-business in Serbia. Data for this research is collected by Statistical Office of the Republic of Serbia. Therefore, author of the paper is not engaged in collection of the data but only uses it for analysis and making conclusions.

The investigation of the Statistical Office (SORS, 2014) about use of Internet in Serbia includes households (individuals) and enterprises. The investigation is made by interview method on the sample of 2400 households and 1400 enterprises. The research is conducted in 2014 year, but collected data is related to 2013 year.

Research of households and individuals made by telephone interview is conducted from 17. to 31. march in 2014. Target population for households is all households with at least one member with age between 16 and 74. Type of this sample is two-phased and stratified. Scope of this research is territory of Republic of Serbia without the Autonomous Province of Kosovo. Individuals are divided by gender, level of education, level of households' income and employment or unemployment status.

On the other side, the research of enterprises made by telephone interview is conducted from 17. to 30. April in 2014. Target sample was 1200 enterprises with 10 and more employees and this sample is stratified and representative encompassing territory of Republic of Serbia without the Autonomous Province of Kosovo.

### **Theoretical background**

As that is previously mentioned, theoretical themes briefly explained in the next few sections are related to forms and models of e-business (for example, wired and mobile e-business, Business-to-Consumer and Business-to-Business model of e-commerce, etc.), internet technologies supporting e-business (broadband networks, web, intranet, extranet etc.) and e-business integration solutions (Supply Chain Management, Customer Relationship Management and Enterprise Resources Planning).

### **Forms and models of e-business**

A common definition of e-business and e-commerce is difficult to give because of many different and inconsistent approaches. Depending on these approaches electronic

business has different definitions, particularly with regard to communications, business process, service and online necessity. Many definitions do not strictly separate e-commerce and e-business. However, the definition of e-business is more complex and in this paper, e-business is viewed as a superset of e-commerce. E-business are those business activities that are a part of a value network; address the customer process; and use information and communication technologies (ICT) in an integrative way based on the organizational and cultural rules of the networked economy. On the other hand, e-commerce is narrower concept than e-business that encompasses buying and selling over digital media, so that e-commerce is the trade (sales, commerce, distribution) of goods and services by electronic means (Yoo et al., 2011).

Most definitions assume that e-business is enabled by the development and implementation of electronic media such as the Internet. Internet is viewed as a global computer network that enables communication and e-business transactions on global basis. In this paper, we accepted definition of e-commerce as doing business electronically, particularly via Internet that enables a dynamic set of technologies, applications and business processes that link enterprises, consumers and communities.

E-business has many forms. Traditional form of e-business is conducted through wired communication media while mobile form of e-business (mobile business or m-business) is enabled by wireless media and networks. Wireless and mobile technologies enable users of mobile devices (mobile phones, smartphones, tablets etc.) to use many information and services. Also, these technologies create a base for wireless local area networks (WLAN) which companies may use for supporting internal business processes.

Regardless of communication medium and technology through which business is doing, there are following basic e-business models: business-to-consumer (B2C) and business-to-business (B2B) model. (Kumar, 2010)

B2C model is used by companies which sell their products and services to consumers through Internet. B2C model involves a service or product exchange from a company to a consumer, whereby merchants sell products to consumers. Although the core of the model is e-commerce transactions, it encompasses wide range of marketing activities supporting the transactions. In other words, a business that sells online merchandise to individual consumers is categorized as B2C model. Many experts have argued that online B2C activities played a critical role in shaping modern Internet. Companies took advantage of this by creating electronic storefronts after discovering they could sell larger volumes of merchandise through B2C models.

B2B model refers to transactions between enterprises, taking place electronically through Internet, internal networks or private networks. Key factors influencing B2B model expansion are: possibility of secure communication through Internet infrastructure, emergence of private and public B2B markets, requirement for collaboration between suppliers and buyers and technology improvement for internal and external organization integration. Key advantages of B2B model are: eliminate use of paper documents and reduce administrative costs, reduce time cycle of business processes, reduce cost of



searching appropriate products and services, increase employees productivity in buying and/or sale, reduce errors and improve service quality, reduce cost of researching, increase manufacturing flexibility enabling just in time delivery and increase possibility for collaboration.

Very specific form of e-business we can find in public administration and that form is called electronic government (e-government). E-government could be defined as the creation and delivery of government services through ICT which are used to improve transactions between governments and citizens, governments and businesses, as well as between government agencies itself. Primary technology for creation and delivery of these services is Internet. E-government enables simple and efficient interaction between government and citizens (G2C - Government-to-Citizen), government and business organizations (G2B - Government-to-Business) and between state agencies and organs itself (G2G - Government-to-Government). According these entities participating in e-government interactions there are three basic models of e-government: G2C, G2B, G2G. (Siau, Yuan, 2009)

### **Internet technologies supporting e-business**

Today's consumers have a wide variety of commerce choices: traditional businesses, mega discount stores, catalogs or direct market mail, and Internet. As we can see through explanation of various e-business form and models, Internet, taken as a whole, is a powerful medium where consumers browse, research, compare, and then buy online or, after doing their online collection of information, make the purchase at physical stores. Therefore the backbone of e-commerce is the Internet. The Internet is a collection of millions of computers and networks of all sizes. (Guah, Currie. 2006)

Home and business users as well have following alternatives regarding Internet connection: classical modem, DSL (Digital Subscriber Line) technology, cable technology and mobile technology. Internet connection through classical modem is old technology that is largely abandoned by the most users because it does not obtain satisfied bandwidth. New technologies which provide satisfied bandwidth for data communication and web applications execution are DSL, cable and mobile technology. Common name for these technologies is broadband.

Information on Internet is formatted and transmitted in form of web pages where collection of these pages describing some person or organization is known as web site. Home and business users browse through Internet and visit web sites in order to find information and achieve some interactions referring to buying, education, entertainment etc. There are following categories of web sites: information web sites, interactive web sites and transactional web sites. Information web site obtains users with information on a company and its products and services and serves as a information brochureware. Interactive web site besides information gives possibility to users to be in online interaction and communication with the company. Transactional web site supporting selling of products and services includes shopping card, catalog of products, shopping

calculator and possibility to accept number of credit card for paying purchased products (Zhenhui et al., 2010).

Companies that know consumers' desires and needs very well and integrate into their web site the appropriate means for customer interactions, will succeed. Web technology opens vast new markets for every company and extends a significant degree of power to companies that recognize how to leverage the efficiencies of this new technology.

Finally, web technology can be used for building internal computer networks of companies. In that case, a company develops internal web site that meets information requirements of the company's employees. Therefore, intranet is private network of an organization that uses Internet standard protocols enabling simple communication, collaboration and information access. Whereas that intranet is based on web technology, it is often called corporate web. Intranet is private network in ownership of some organization, while Internet is public network that is not property of any organization and institution. Internet can be accessed by every person who has technical capabilities for access while intranet can be accessed only by persons who have authorization for access. Intranet can be connected to public Internet, but it is not necessary (Molly et al., 2011).

Access to intranet is limited to users inside an organization. On the other side, there is extranet (extended intranet) enabling access to authorized users outside the organization such as suppliers, buyers, business partners etc. Main problem related to extranet is security and protection of data and resources from unauthorized persons who want to access to the network without permission. Presently, many security methods are used for data protection. The well known methods and technologies are firewall and IP (Internet Protocol) tunneling applications allowing that data is accessed only by authorized users. (O'Brien, Marakas, 2011)

### **E-business from integrative view**

E-business is more effective if a company achieves high level of integration of its resources including technological resources. There are three most important organizational and technological approaches or concepts that enable such integration: Supply Chain Management (SCM), Customer Relationship Management (CRM) and Enterprise Resources Planning (ERP). (Legner, Schemm, 2008)

**Supply Chain Management.** In order to timely deliver products to customers, enterprises intend to accelerate business processes in supply chain management (SCM). SCM integrates logistical requirements of suppliers, distributors and customers in cohesive process which enables reduction of delivery time and inventory costs. There are many ICT and software solutions supporting integration, optimization and management of supply chains (Steinfeld et al., 2011).

SCM is placed in context of unique business process and material and information flow. The flow goes through whole distribution channel and every individual company as a participant in the supply channel is only one shackle in supply chain where

interorganizational boundaries are blurring. Every logistic process in an enterprise is part of wider and greater process taking place in whole supply chain. Therefore every managerial logistic decision should be suitable to principles of specific management in whole supply chain. (Klein, Rai, 2009)

Every participant in supply chain, from suppliers to retailers, has possibility to manage its own segment of the supply chain by support of ICT. ICT, particularly internet technology, enables connection of all participants in supply chain. ICT makes SCM more efficient by integration of demand planning, forecasting of manufacturing, material procurement, order processing, inventory allocation, order fulfillment, transport services, receiving of goods, invoicing and payment. ICT enables free flow of material, financial and information resources in supply chain. ICT supports SCM in three different segments: purchase side of supply chain, internal part of supply chain and sell side of supply chain (Cohen, Roussel, 2005).

**Enterprise Resources Planning.** Beside SCM software solutions, many companies use Enterprise Resources Planning (ERP) software for management of internal part of supply chain. Intent of ERP is to integrate all business processes in organization and to use this integration for performance improvement in relations to customers (Subramanian, Peslak, 2010).

First attempt of enterprises to manage their resources and requirements on integral manner was development and use of Material Requirements Planning (MRP) systems. These were computerized systems for improvement of inventory control and manufacturing planning. In second phase, Manufacturing Resource Planning II (MRP II) system is developed. ERP system practically represents extension of MRP II concept with additional functions for finance, distribution, human resources management which are integrated so that can meet overall requirements of networked enterprise. (Bhardwaj, 2013)

ERP is set of software modules enabling an organization to automatize transactions included in the organization business processes. ERP system enables greater data integration, use of available database and consolidation of great number of various incompatible systems. ERP system usually include finance, order tracking, forecasting, sale analysis, local and global distribution and quality control. ERP systems have powerful tools for monitoring and reporting, but they are quite rigid and their use requires well defined data.

**Customer relationship management.** CRM is technological and organizational concept for managing a company's interactions with existing and future customers. In order to organize, automate, synchronize and integrate sales, marketing, customer service, and technical support the company can use various technologies where the most significant is web technology. The company should have software and usually Internet capabilities that support management of customer relationships in an organized way. For example, the company can develop a database about its customers. The database is used by management, salespeople, people providing service and customers.

Relationships with customers in the database should be well described so these users could directly access information, match customer needs with product offerings, remind customers of service requirements, know what other products a customer had purchased, and so forth.

Therefore these capabilities of CRM allow the users to: analyze information about customers taken from one or multiple systems operating online; understand customer needs, differentiating between customers via market segmentation; predict the likelihood of customer loyalty, and profitability through rigorous analysis; evaluate channel effectiveness, campaign performance, sales results, and other critical factors (Shanks et al., 2009).

The synergy between ERP, CRM, and SCM is evident if we put the entire issue into perspective. CRM deals with more issues in the front-end processes and applications than ERP. ERP, to a considerable extent, targets back-end processes and applications, and provides a central focus for the entire business that is integrated with the internet-oriented supply chain. Also we must take into account new technical requirements expected in the near future such as mobile access to ERP systems and use of cloud technology to create environment for ERP, CRM, and SCM. (Demirkan et al., 2010)

### **Research of Internet use and potential of e-business in Serbia**

Using opportunities and potentials of e-business depends on level of acceptance and application of Internet. This is why we need empirical investigations presenting the level of Internet acceptance and application by individual consumers and organizations in Serbia. The level of Internet acceptance of individual consumers is significant for estimation of B2C e-business while the level of Internet acceptance and use in organizations is significant for analysis and forecasting of B2B e-business potential. In addition, if a modern organization tries to have clear view to potential of B2B e-business, it needs data on current and forecasted level of Internet acceptance and use by its buyers and suppliers

### **Materials and methods**

As we mentioned previously, information considering application of Internet and e-business in Serbia is collected by Statistical Office of the Republic of Serbia on the sample of 2400 households and 1400 enterprises in 2013 (SORS, 2013). The author of the paper is only using it for making analysis and conclusions and try to give brief review of some interesting and most important information relating to Internet use and e-business concept acceptance on individual and organizational level in Serbia.

Research of households and individuals made by telephone interview is conducted from 17. to 31. march in 2014. Target population for households is all households with at least one member with age between 16 and 74. Target population on individual level is all the people with age between 16 and 74. Type of this sample is two-phased and stratified. Scope of this research is territory of Republic of Serbia without the

Autonomous Province of Kosovo. Individuals are divided by gender, level of education, level of households' income and employment or unemployment status.

From this comprehensive interview we derive some interesting questions important for our research:

- Do you and any other person from your household have Internet access from home no matter that is used or not?
- When did you use Internet last time?
- Which activities did you achieve through Internet for private purpose in last three months?
- Which type of goods and services did you buy or order through Internet in last 12 months?

On the other side, the research of enterprises made by telephone interview is conducted from 17. to 30. April in 2014. Target sample was 1200 enterprises with 10 and more employees from following industries: manufacturing production; supply of electric power, gas and water; construction; wholesale and retail; traffic, transport and warehousing; hospitality industry services; information and communication, real estate industry and scientific and technical sector; administrative services and computer repair; banking and insurance industry.

Also this sample is stratified and representative and it encompasses territory of Republic of Serbia without the Autonomous Province of Kosovo. Response rate on this telephone interview was 92,7% (1112 enterprises).

From this interview regarding our enterprises we derive some interesting questions important for our research:

- Does your enterprise have Internet connection?
- Does your enterprise use DSL or the other broadband Internet connection?
- Does your enterprise have web site?
- Did your enterprise use services of public administration by Internet during 2013?
- Does your enterprise exchange information regularly and electronically in supply orders management with its suppliers and customers?
- Did your enterprise receive orders or deliver services through web site (except e-mail orders) during 2013?
- Did your enterprise order products and services through web site or EDI technology during 2013?

### **Analysis of results**

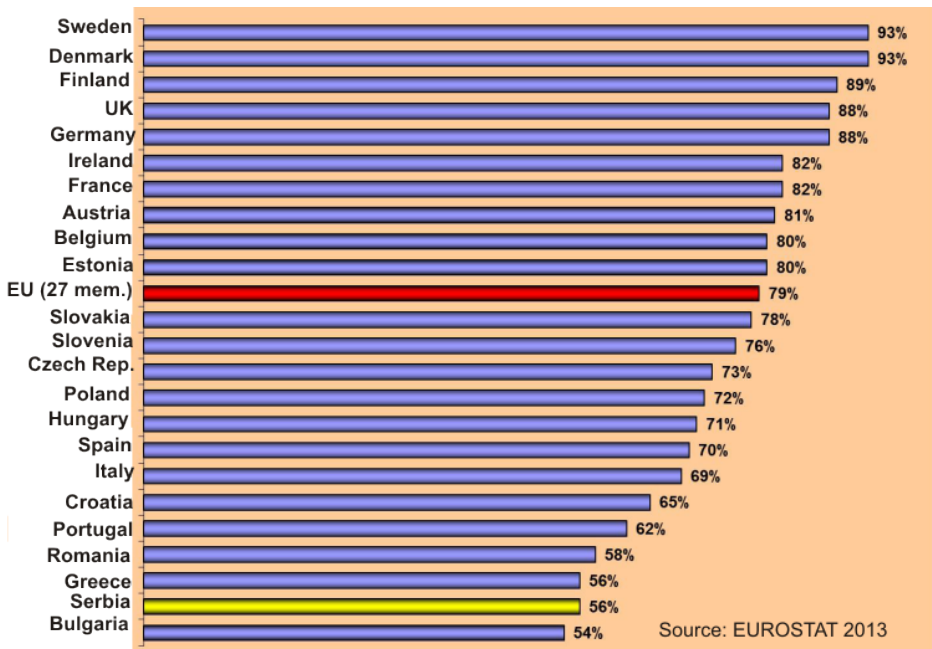
This section of the paper presents responses to mentioned questions from interview and analyses data considering Internet use by individuals and enterprises for purpose of e-business. Although this analysis seems superficial it can give some useful insight to potentials of e-business in Serbia.

Some relevant facts on Internet use considering households are that 62.8% of households in Serbia have Internet connection in 2014 (increasing for 7% in comparison with

2014), and 55.1% of households with Internet connection have broadband Internet. If we view to type of used broadband technology, we can see that DSL technology is used by 54.6% of households, cable Internet is used by 35.3% households and mobile 3G network is used by 24.1%. Relevant fact for mobile commerce is that 90.6% of Serbian citizens use mobile phones, and it is great potential for m-commerce development that is not fully used in Serbia.

If we compare Serbia with countries of European Union, we can conclude that relatively small number of households have Internet connection. This is shown on figure 1 where the graphic presents relative position of Serbia when we consider percentage of households in Serbia with Internet connection. Interesting fact is that the other Balkan countries (Greece, Bulgaria and Romania) which are EU members also have low position on the graph in comparison to the other EU members.

**Figure 1.** Percentage of households with Internet connection in EU and Serbia



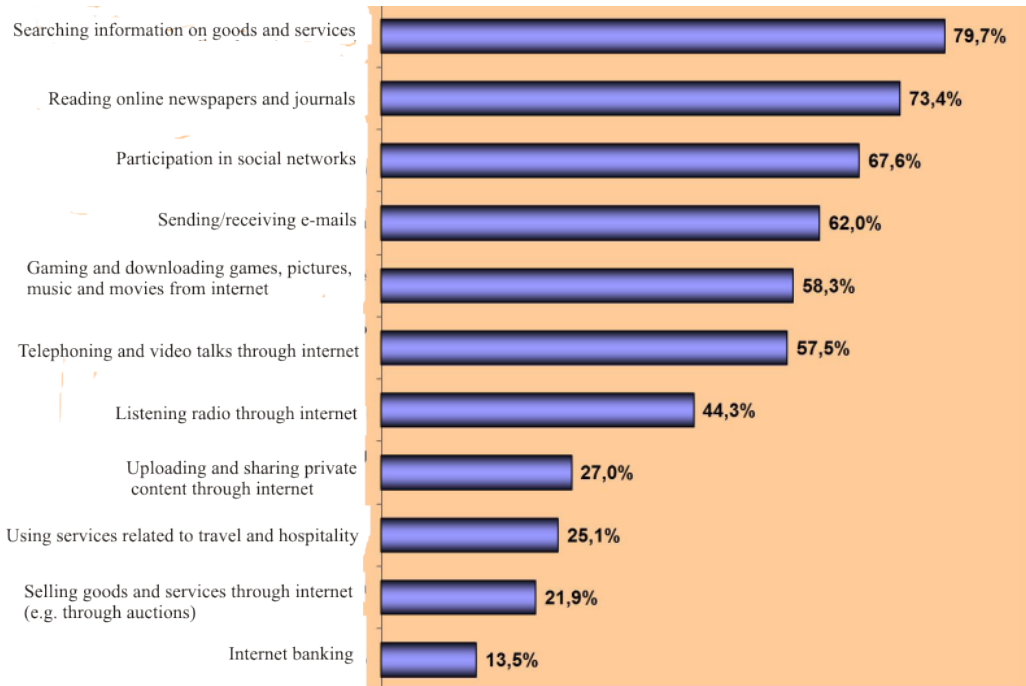
Source: SORS (Statistical Office of the Republic of Serbia), 2014.

When we consider Internet use in Serbia on individual level, collected data shows that 62.1% of interviewed individuals used Internet in last three months, 1.9% of interviewed individuals used Internet before more than 3 months and 2.9% used Internet before more than one year. Even 33.1% of interviewed individuals never used Internet that is very high level if we start with premise that we live in Internet era. Nevertheless number of Internet users was increased for 8.4% in comparison with 2013.

Relevant information for development and potential of e-business in Serbia is purpose of Internet use. From that point of view, 37.4% of interviewed Internet users use services

of electronic government. Collected data shows that 36% of interviewed Internet users use Internet tools for getting information from web sites of public institutions or public administration organs, 20.6% of interviewed Internet users download official forms from the web sites and 13.1% of interviewed Internet users send filled forms. Purpose of Internet use in Serbia according to collected information is also presented in figure 2.

**Figure 2.** Purpose of Internet use in Serbia



Source: SORS, 2014.

Considering online buying or ordering goods and services 21.6% of Internet users in Serbia bought/ordered products and services online in last three months, 10.2% of users bought online before more than three months, and 8.8% before more than one year. Very high percent (59.5%) of Internet users in Serbia never used Internet for buying and ordering products and services. Figure 3 presents products and services that are most frequently bought and ordered through Internet.

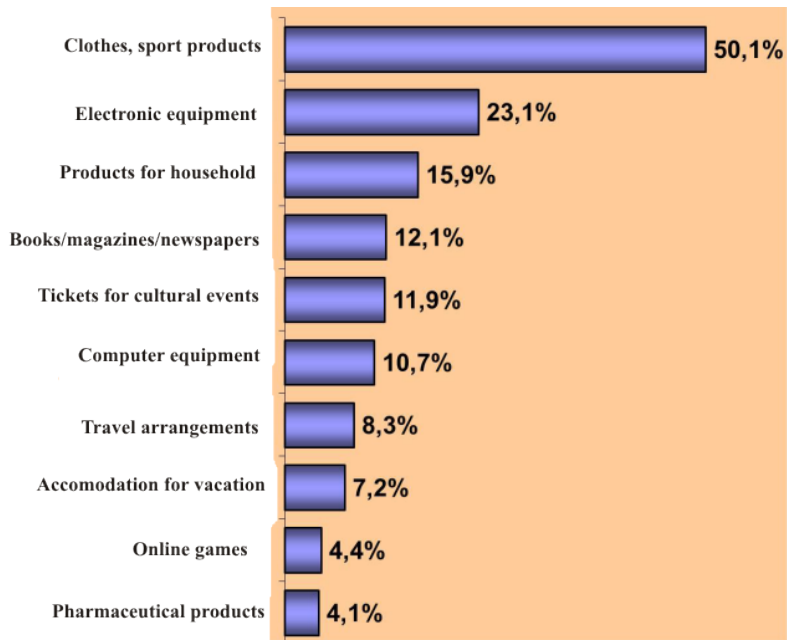
If we compare Serbia with countries of European Union, we can conclude that relatively small number of people used Internet in last three months. This is shown on figure 4 where relative position of Serbia is very low in comparison with EU countries.

Data on Internet use on enterprise level can be used for analysis and making conclusions mainly about B2B e-commerce as well as about B2C e-commerce. So we present some basic facts on Internet implementation and internet technologies used in e-business of Serbian enterprises. Therefore, some relevant facts on Internet use in the enterprises

show that 100% of examined enterprises in Serbia have Internet connection and 74% of enterprises with Internet connection have web sites. Considering type of Internet connection, broadband technology is prevalent: 98% of examined enterprises use this kind of connection.

We may say that high percentage of enterprises in Serbia with Internet connection have web sites, but we can see right picture of web site implementation if we consider services offered by these sites. Namely, prevalent services (83%) offered by these sites are dedicated to presenting static content adjusted to regular visitors of the sites. Only 21% of services enable online ordering of products/services and 11% of services enable online payment. Conclusion from these facts is that great number of these web sites do not support the most important online buying activities.

**Figure 3.** Products and services that are most frequently bought and ordered through Internet

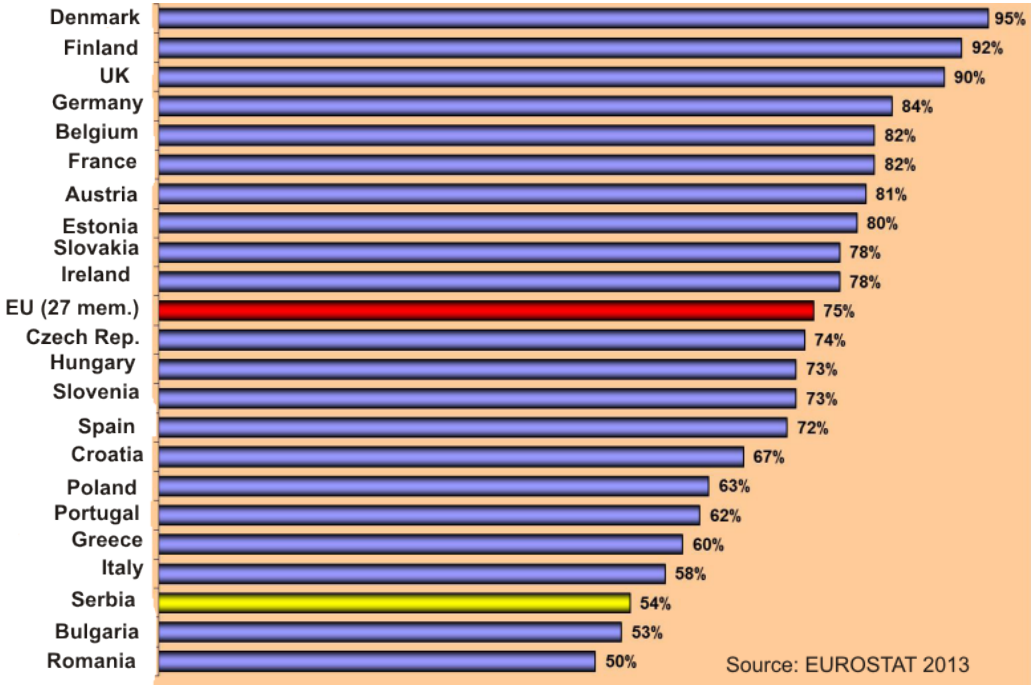


Source: SORS, 2014.

Finally, some relevant facts on e-business of Serbian enterprises shows that 88% of examined enterprises with Internet connection use services of electronic government, 40.4% of enterprises with Internet connection ordered products/services via Internet during 2013 and 21.2% of enterprises with Internet connection was receiving online orders during 2012 (orders by email are not included). Conclusion that can be derived from these facts is that Internet is more used for e-procurement than for online selling, but overall development level of enterprises' e-business in Serbia is very low.



**Figure 4.** Percentage of people who used Internet in last three months



Source: SORS, 2014.

### Discussion of results

The results of research presented in the paper undoubtedly shows that there are good technical potentials for implementation of e-business concept in Serbia, because almost all organizations have Internet connection and use internet technology. However, potentials of internet technology are not used enough for building web sites and implementation of e-business concept considering B2C and B2B model of e-commerce as well (74% of enterprises with Internet connection have web sites). This is also shown by data about services that enterprises deliver through the web sites because visitors of the sites mainly collect information on products and services but very seldom buy and pay through Internet (only 21% of web sites enable online ordering of products/services and 11% of the sites enable online payment). The web sites are more used as electronic brochureware than for accomplishment of selling transactions. Not only that electronic selling is very small but internet technology is used for electronic procurement to relatively small extent. That is presented by small percent of enterprises (40,4%) which ordered products and services through Internet. However, encouraging fact is that number of enterprises which are ordered products/services via Internet is increased almost by 50% in comparison to 2012.

Technologies enabling integration of e-business are used to very low extent in our enterprises, because 9.9% of all examined enterprises used ERP technology, and 14%

of enterprises used CRM technology. Applications of e-business are fragmented and encompasses some activities in business functions, but they are not connected and logically integrated.

Percent of households in Serbia having Internet connection is very small in comparison with developed European countries. Situation is similar when we take into account percent of individuals who used Internet in last three month of examined period. According to all these parameters, Serbia is on the bottom of the list of European countries. However fact of increasing number of Internet users in Serbia is encouraging.

The results of research show that level of development of e-business in Serbia is relatively low. This level is low because fact that our Internet users visit web sites for searching entertainment and social relations but buying goods and services is not usual activity of our Internet users. However trend of Internet expanding in Serbia shows that we may expect increasing number of Internet users and increasing number of potential Internet buyers that will be incentive for development of B2C electronic commerce.

Information from this research can help managers in our enterprises when they plan implementation or expanding e-business. The information shows present state and potentials for e-business implementation as well. For example, products and services which are mainly ordered by Internet shows present demand of users for e-shopping. We can expect that demand for these products and services will keep in the future so it is potential for development of e-business in industries that produce these products. However if buyers have not interest for products of an enterprise, managers of the enterprise should think of Internet campaigns by which actualize this interest.

Except managers in organizations, results of this research can be used by researchers for deeper analysis of specific themes which are opened and searching answers on questions derived from presented data. One of the most important question is, which are the reasons for inappropriate implementation of ICT in e-business concept of realization. Future researches will also encompass organizations and populations. Opinion of managers about reasons for poor acceptance of e-business concept would be examined in organizations. The same reasons would be examined in the case of citizens as individual users of Internet. Very important questions are: Why users of Internet do not use this communication channel in greater extent for buying of goods and services? Why organizations which have Internet connection did not build web site for selling its products and services? Do the organizations plan to do it and in which period of time? Why organizations do not use Internet for procurement of materials in more extent?

Finally, policy makers in Serbia may identify problems in the future development of ICT infrastructure, on the base of the research. The greatest problem is how to make Internet infrastructure accessible to more number of people and organizations by acceptable prices and how to decrease inequality between regions, social groups and the other categories of population considering ability to use Internet. Some measures for development and improvement of ICT infrastructure which are in responsibility of public administration are undertaken. For example, measures for deregulation of

telecommunication services market are undertaken. Deregulation, free market and strong competition in this area contribute to improvement of the services offering by acceptable prices. The best example for that is market of mobile communication services so to that direction should plan future polices.

### Conclusion

In conclusion we may say that level of Internet use and adoption of e-business concept is very low in Serbia, when we compare our country with EU countries. However, potential for Internet expansion in Serbia is very high in comparison with developed countries of EU. For example, in Denmark, 93% of households have Internet connection, and potential for expansion is very limited. Potential for development of all e-business models, particularly B2C e-commerce is also high. For example, 59.5% of Internet users in Serbia never used Internet for buying and ordering products. They are potential online shoppers, but they should be encouraged to buy online. Idea for future research is just to examine why Serbian Internet users do not buy online. When we find factors influencing readiness for online shopping we can act on these factors.

### Literature

1. Bhardwaj, A. (2013): *Transforming business: Integrating ERP with E-business*, International Journal of Advanced Research in Computer Science and Software Engineering, vol. 3, no. 7, pp. 653-656. IJARCCCE, India.
2. Cohen, S., Roussel, J. (2005): *Strategic supply chain management: The five disciplines for top performance*. McGraw-Hill Companies, Inc., New York, United States of America (USA)
3. Demirkan, H., Cheng, H. K., Bandyopadhyay, S. (2010): *Coordination strategies in an SaaS supply chain*, Journal of Management Information Systems, vol. 26, no. 4, pp. 119-143. Taylor & Francis Group, Abingdon, United Kingdom (UK).
4. Guah, M. W., Currie, W. L. (2006): *Internet strategy: The road to web services solutions*, Idea Group Inc., Hershey, USA.
5. Ivković, M., Radenković, B. (1998): *Internet i savremeno poslovanje: Osnovni koncepti poslovanja na Internetu*, Tehnicki fakultet M. Pupin, Zrenjanin, Srbija.
6. Jovanović, R., Milovanović, S. (2010): *Elektronsko poslovanje*, Ekonomski fakultet u Nišu, Niš, Srbija.
7. Klein, R., Rai, A. (2009): *Interfirm strategic information flows in logistics supply chain Relationships*, MIS Quarterly, vol. 33, no. 4, pp. 735-762. Carlson School of Management, University of Minnesota, Minneapolis, USA
8. Končar, J. (2003): *Elektronska trgovina*, Ekonomski fakultet u Subotici, Subotica, Srbija.
9. Kumar, P. (2010): *Integration of E-business with ERP systems*, International Journal of Engineering Science and Technology, vol. 2, no. 5, pp. 768-772. Elsevier B.V.,

Amsterdam, The Netherlands

10. Legner, C., Schemm, J. (2008): *Toward the Inter-organizational Product Information Supply Chain - Evidence from the Retail and Consumer Goods Industries*, Journal of the Association for Information Systems, vol. 9, no. 4, pp. 119-150. Association for Information Systems, Atlanta, USA.
11. O'Brien, J. A., Marakas, G. M. (2011): *Management information systems*, McGraw-Hill, New York, USA.
12. Radenković, B., (2007): *Elektronsko poslovanje – stanje i perspektive*. FON, Beograd, Srbija.
13. Shanks, G. Jagielska, I., Malini, J. (2009): *A framework for understanding customer relationship management systems benefits*, Communications of AIS, vol. 2009, no. 25, pp. 263-287. Association for Information Systems, Atlanta, USA.
14. Siau, K., Long, Y. (2009): *Factors impacting e-government development*, Journal of Computer Information Systems, vol. 50, no. 1, pp. 98-107. Taylor & Francis Group, Abingdon, UK.
15. SORS (Statistical Office of the Republic of Serbia) (2014): *Use of information and communication technologies in Republic of Serbia*, Available at: <http://webzrs.stat.gov.rs/WebSite/repository/documents/00/01/50/47/PREZIKT2014.pdf>. SORS, Belgrade, Serbia
16. Steinfield, C. Markus, M. L., Rolf, T. W. (2011): *Through a glass clearly: Standards, architecture, and process transparency in global supply chains*, Journal of Management Information Systems, vol. 28, no. 2, pp. 75-108. Taylor & Francis Group, Abingdon, UK.
17. Subramanian, G., Peslak, A.R. (2010): *User perception differences in enterprise resource planning implementations*, Journal of Computer Information Systems, Vol. 50, No. 3, pp. 130-138. Taylor & Francis Group, Abingdon, UK.
18. Wasko, M. Teigland, R., Leidner, D., Sirkka, J. (2011): *Stepping into the Internet: New ventures in virtual worlds*, MIS Quarterly, vol. 35, no. 3, pp. 645-652. Carlson School of Management, University of Minnesota, Minneapolis, USA.
19. Yoo, B. Choudhary, V., Tridas, M. (2011): *A study of sourcing channels for electronic business transactions*, Journal of Management Information Systems, vol. 28, no. 2, pp. 145-170. Taylor & Francis Group, Abingdon, UK.
20. Zhenhui, J., Chan, J., Tan, B. C. Y., Chua Wei Siong (2010): *Effects of interactivity on website involvement and purchase intention*, Journal of the Association for Information Systems, vol. 11, no. 1, pp. 34-59. Association for Information Systems, Atlanta, USA.

## MOGUĆNOSTI RAZVOJA ELEKTRONSKOG POSLOVANJA U SRBIJI

*Slavoljub Milovanović*<sup>2</sup>

### Rezime

*Intenzivno korišćenje informacionih i komunikacionih tehnologija (IKT), naročito interneta, u poslovnim procesima prodaje i kupovine je prouzrokovalo razvoj koncepta elektronskog poslovanja (e-poslovanja). Brojne organizacije u svetu, kao i u Srbiji, su implementirale ovaj koncept. Osnovni cilj ovog rada je da analizira nivo implementacije internet tehnologije i e-poslovanja u Srbiji. Ovaj rad ima teorijsku pozadinu koja objašnjava koncept e-poslovanja i IKT koje podržavaju implementaciju ovog koncepta. Međutim, empirijski ili praktični doprinos ovog rada je izražen kroz analizu podataka koji se odnose na primenu IKT i koncepta e-poslovanja u Srbiji. Ove podatke je prikupio Republički zavod za statistiku Srbije, a obuhvataju domaćinstva/pojedince i preduzeća u Srbiji. Rezultati istraživanja prezentirani u ovom radu mogu pomoći rukovodiocima u srpskim organizacijama u planiranju implementacije koncepta e-poslovanja, kao i istraživačima u dubljem proučavanju ove teme.*

**Ključne reči:** *Elektronsko poslovanje, elektronska trgovina, Internet, Srbija*

---

2 Profesor, dr Slavoljub Milovanović, Univerzitet u Nišu, Ekonomski fakultet, Trg Kralja Aleksandra br. 11, 18000 Niš, Telefon: +381 18 528 644, E-mail: [smilovan@eknfak.ni.ac.rs](mailto:smilovan@eknfak.ni.ac.rs)

## ECONOMIC INTELLIGENCE AND INTELLECTUAL CAPITAL IN AGRICULTURE COMPETITIVENESS - CASE STUDY

*Slobodan Nešković<sup>1</sup>, Žaklina Jovanović<sup>2</sup>, Miroslav Čavlin<sup>3</sup>*

### Summary

*The process of globalization in the last few decades conditioned the many technological, economic and social changes which have transformed the world market of agricultural products and the impact on the competitive environment. In the modern world, creating material value in agricultural production more and more the result of the intangible factors and production is increasingly based on knowledge, skills and innovation of employees. In the industrial age the necessary resources to achieve competitive advantages were capital, natural resources and work, while in today's knowledge-based economy the importance is on the information, innovation, knowledge, intellectual capital and intellectual property - that have become the foundation of creating all other values. These values are, because of their great importance in achieving the modern competitive advantages, very often the target of economic intelligence and therefore require all available forms of protection. The sector of agricultural production can make a significant contribution to improving the overall national competitiveness if it is based on intellectual capital as evidenced by the country with highly developed agriculture. However, by observing global changes can be concluded that Serbia in this sector has unused potential for growth and development.*

**Key words:** *competitiveness, intellectual capital, intellectual property, agricultural production, economic intelligence*

**JEL:** *O34, F60, D83, Q17*

---

1 Slobodan Nešković Ph.D., Full Professor, University Business Academy, Faculty of Economics and Engineering Management, Novi Sad, Cvečarska street no. 2, 21000 Novi Sad, Serbia, Phone: +381 63 39 16 59, E-mail: [slobneskovic@gmail.com](mailto:slobneskovic@gmail.com)

2 Žaklina Jovanović M. A., Associate in Science Association Center for Strategic Research of National Security-CESNA B, Vojvode Vlahovića street no. 35d/1.2, Belgrade, Serbia, +381 63 53 13 93, E-mail: [zaklinajovanovic.021@gmail.com](mailto:zaklinajovanovic.021@gmail.com)

3 Miroslav Čavlin Ph.D., Associate Professor, University Business Academy in Novi Sad, FIMEK, Cvečarska street no. 2, 21000 Novi Sad, Serbia, Phone: +381 21 400 484, E-mail: [cmiros@gmail.com](mailto:cmiros@gmail.com)

## Introduction

The last decade of the twentieth century testifies that began a period of globalization, which is characterized by global competition, the standards of the world market and international orientation of organizations. In such a globalized environment, no company or country can't ignore the need to be competitive, because today only competition ensures survival. Material values are now more and more the result of intangible factors and the foundation of any successful agricultural production are specific knowledge, skills and innovation of employees. The manufacturing process is converted from working in the scientific process, which is the main characteristic of the new economy of the 21st century.

For this reason this economy is called "knowledge economy". The strength, size and power companies in today's economy is characterized by the formation of intangible assets (knowledge and information) or more precisely - intellectual capital (Jovanović et al., 2010). The greater intellectual capital in the agricultural sector increases its ability to create some superior performance and value compared to the competition. Therefore, many countries with highly developed agriculture use own intellectual capital and intellectual property to improve its competitive position and increase profits. The most developed countries of the world are aware of the great importance of this capital and they are increasingly investing in intellectual resources, so the fight for global prestige transferred to the field of scientific and technological development. Intellectual capital in modern business conditions represents an extremely important resource and it is therefore very often the subject of economic intelligence. Economic espionage involves the activities of the individual institutions using which they are coming into the possession of knowledge and information in other countries that are used in science, technology and production. The most common targets of economic espionage are companies and countries that are at the top of developing new technologies and new knowledge in agricultural production. The ultimate goal is to get to business secrets, saving on the cost of research and development, as quickly as possible to make a profit, survive in the market and achieve competitive advantage.

It is indisputable that agricultural production in the modern world has a special significance for the stability of the overall economic development. However, in order to maximize the use of potentials of this sector is necessary to: 1.) take advantage of the positive characteristics of natural resources; 2.) take advantage of unused resources (available knowledge in the agricultural sector); 3.) implement the relevant competitive strategy in the sphere of agriculture through the permanent investment in intellectual capital. In addition to changes and innovation "visible" resources (in the domain of engineering and technology), it is very important and constantly develop, improve and implement the so-called. "invisible" resources (knowledge, education, science and research and development work). This is the only way to positively change the profile of agriculture and to achieve competitive position in the global market.

## Methodology and data sources

The main problem of this study is the study of the process of globalization, intellectual capital

and intellectual property as unavoidable factors and sources of competitive advantage in the modern “knowledge economy”, as well as the issue of endangerment and protection of these very important resources.

The subject of this research is conjunctive relationship between the process of globalization, technological innovation, intellectual capital, intellectual property and their protection and the creation and maintenance of competitive advantages of agricultural production in the modern world.

The goal of this study is to show the direct correlation and conditionality of the competitiveness of agriculture, intellectual capital, innovation and properly protected intellectual property rights.

The purpose of this paper is to point to importance of intellectual capital, innovation and protected intellectual property in achieving competitive advantages in the sphere of agricultural production in the globalized market conditions and problems that may arise if these resources are not managed strategically.

The importance of intellectual capital to prove facts in practice, which confirm that the companies and countries that encourage and protect this important source of competitiveness today among the strongest in the world (Jovanović et al., 2011). Without these resources, today it is almost impossible to achieve and sustain a competitive advantage in a highly globalized business environment.

The basic hypothesis which we will try to prove is that achieving a competitive advantage in the modern world is completely determined by the process of globalization, strategic management and protection of intellectual capital. In accordance with the problem, the research objectives and the available information formulated the following hypotheses, which read:

**The main hypothesis:**

**H1** - *Countries that own the resources of intellectual capital and intellectual property, strategically manage to these resources and protect them adequately achieve global competitive advantage.*

**Auxiliary hypothesis:**

**H2** - *Efficient and effective competitive strategy of agricultural production must involve intellectual capital and intellectual property protection.*

**H3** - *Country which owns the quantity and / or quality in terms of specific knowledge or patent in agricultural production has a great competitive advantage compared to the competition.*



## Intellectual capital, intellectual property and “Knowledge economy”

Modern globalization brought with it a many changes in various areas. Thanks to new technology, communication and new economy she is imposed new rules, new content, new dimensions and new knowledge. It is not possible to apply the previous paradigms of comparative advantages based on the available natural resources, labor and capital. The industrial age has been replaced by the postindustrial age - age of the new economy, which is also known as the “age of knowledge”. Today, the process of globalization is “downplayed world” and imposed new challenges in the process of creating and maintaining competitiveness. In fact, globalization has shaped the new business conditions which must be adjusted anyone who wants to be successful. She has specific requirements - constantly investing in knowledge, technology, research and development (Dedijer, 2013). Anyone who is lagging behind in the globalization process or it isn't included in the modern processes, significantly lagging behind.

Competitive advantage today is the basis for the success of any company in the global, highly competitive market. In modern economy foundations competitiveness are located in the high technologies, knowledge and innovation, global connectivity and strategic pooling. All companies, including the ones in the sphere of agriculture today are struggling to find such sources of competitive advantage, which will make better financial and other performance. The goal is to be better than others, and this can be achieved only by knowledge and innovation. The market value of every modern company consists of: 1.) The Financial Capital - “Tangible Assets” (means of production and money capital); 2.) Intellectual Capital - “Intangible Assets” (knowledge and skills of employees in the company, procedures, processes, organizational structure and relations with all stakeholders).

Competitive advantage of agricultural production today is based on intellectual capital (on knowledge, on abilities, on skills and innovation), on standards, on the design, on the patents, on the trademarks and brands (as forms of intellectual property rights) on the reputation, on the image, on the investing in research and development (innovation), as well as on overall (internal and external) relations, which can't be bought and are therefore a valuable source of competitive advantage.

**Table 1.** Sources of competitive advantage “Old Economy” vs. “Knowledge Economy”

SOURCES OF COMPETITIVE ADVANTAGE IN THE “OLD ECONOMY”	SOURCES OF COMPETITIVE ADVANTAGE IN THE “KNOWLEDGE ECONOMY”
<ul style="list-style-type: none"> <li>- Price</li> <li>- Lower production costs</li> <li>- Simple differentiation</li> </ul>	<ul style="list-style-type: none"> <li>- Intellectual capital</li> <li>- Intellectual property</li> <li>- Image, identity, reputation</li> <li>- Innovation, research, development</li> <li>- Relations with stakeholders (internal / external)</li> </ul>

*Source:* The table is the result of the autor's research

So, in the new conditions the main goal is to also profit, but he creates in different ways: 1.) With the strategic planning; 2.) Creating added value using the knowledge, using intellectual capital; 3.) By increasing the value of brand names; 4.) By protecting intellectual property rights and other relevant forms of intellectual capital; 5.) Using the internal knowledge and skills; 6.) By encouraging and supporting creativity and innovation of all employees, etc. From all the above it can be concluded that in the knowledge-based economy completely changed a way of creating value in companies.

History has shown and proved that every economic development was essentially determined by scientific and technological developments. In the course of historical development of human society has been changing role of science but also the role of man as the main drivers of change. "During the first scientific-technological revolution, man - worker was the main driver of change, and to produce important was the experience. The main role of science in this period was to analyze what happened and how something works. During the second scientific and technological revolution, the experience has been replaced by knowledge. At this stage, science is the driving force, and the bearer of development is man-expert.

Today, during the third scientific-technological revolution, the key to development is a science. Science is the leader, because the progress achieved by the results of scientific research" (Sundać, Švast, 2009).

From all the above it can be concluded that the economy of the 21st century based on knowledge, or more precisely, on the intellectual capital. In a competitive global economy, where factors of production can be copied, people with their knowledge become the most important resource and a source of competitive advantage. The added value which is created in the business process derives primarily from the knowledge, abilities and skills of people working in the company or who cooperate with her. Investing in human capital is a key factor of value creation in modern business. As part of business and technical information, intellectual capital is often the only advantage over the competition. Therefore, every modern agricultural production can rely on the human intellect if he wants to reach high standards in today's highly competitive global market (Kolaković, 2003).

Although the intellectual property is very complex legal term, most generally can be said that it is ownership on the immaterial, intellectual possessions which are a result of human intellectual creativity. Today, many countries which have a highly developed agricultural production use own intellectual property in different ways, in order to improve own competitive position and achieve higher profits. Agricultural companies which own strengths and competitiveness based on intellectual property create herself the possibilities of exploiting of these resources and thus make a profit and competitive advantage in two ways (Porter, 2007): 1.) by implementation patented inventions into new products or production processes; 2.) by selling and licensing patented inventions to other companies and organizations. The Global Competitiveness reports published by the World Economic Forum the last few decades indicate to the correlation between protection of intellectual property rights and national competitiveness.

About this topic will be discussed in the further course of this study. The examples from practice show that the new agricultural technology has the additional market value if it is protected by a patent, agricultural product is more valuable on the market if has a recognizable, registered trademark and among the many agricultural products consumers always prefer a product with an attractive industrial design which is legally protected from the imitation.

The process of globalization and all its effects led to the fact that it is intellectual property has become a powerful tool in today's business. "An efficient and equitable intellectual property system can help all countries to realize their own potential in the intellectual property as a powerful tool for economic development and social and cultural well-being... providing the an environment in which creativity and inventiveness can develop for the benefit of everyone. Intellectual property rights reward creativity and human mind, which are prerequisites advancement of humankind" (Intellectual Property Office of Serbia). In that context, it is of great importance education on the rights of intellectual property in the field of agricultural production, especially young people. In the near future they will become productive citizens who will by their own work, innovation and new knowledge to be able to contribute this branch of economy (Kristić, 2003).

The higher education institutions from this field must educate students about intellectual capital and intellectual property rights and their significance. It is very important because agricultural colleges are increasingly coming into contact with intellectual property, through the creation of inventions in research activities and transfers of technology.

Unfortunately, everyday examples from practice suggest that Serbia hasn't strategy for the development and application of knowledge in agricultural production. Although there are positive developments (mainly conditioned by the EU and other international institutions) in Serbia intellectual capital and intellectual property aren't sufficiently protected. This is especially evident in the irresponsible and indifferent relation with regard to protection of geographical indications and industrial designs of agricultural products. Also, the financial investment in science and scientific research are very small, almost insignificant. The result of such an attitude is a very small number of innovations and protected rights in the area of agricultural production and reduced incomes that could be achieved.

### **Economic intelligence - a significant form of endangerment of intellectual capital in agricultural production**

In today's business conditions, knowledge has become the most important potential of each company and the development of information technology has contributed to the global economy more and more relies on intangible resources. The result is that the a man and his intellect became the center of the target of economic intelligence. "In today's international environment Economic espionage represents an instrument for achieving competitive advantages of the company, improving the national economy and the realization of national interests of each country" (Nešković, 2011). By applying legal

and illegal methods which are often incompatible with the ethical standards of business, the goal is to eliminate competitors. The ultimate goal of economic intelligence is to get to business secrets. Activities of international economic intelligence are directed, primarily, to companies that are part of the national economy (Cvetković et al., 2008).

This kind of intelligence represents the sum of delicate, planned and professionally implemented activities on detecting classified information of competitors. Data that obtain this kind of intelligence are highly valuable because they reduce the costs of research and development, because it follows the technological development of a competitor without engaging a large number of experts and specialists. It is understood that the activities of economic intelligence are incompatible with the ethical and business standards, fair competition and regular economic competition. In global business conditions, intellectual capital and intellectual property of every successful agricultural companies have great value and everyone they want them for themselves. The intellectual capital of agriculture companies (knowledge, protected ideas, licences or patents) is often the target of economic intelligence.

Rapid changes that determine the process of globalization have caused big changes in the market. Traditionally agricultural markets replaced by a new market, which is dynamic, changeable and abundant with information. In those business conditions agricultural company must constantly scrutinize their competition and all around to find sources of competitive advantage. In today's world, every country or company who wants to take the global market of agricultural products has to rely on economic intelligence, because without it, is doomed to failure. This activity is an essential part of monitoring all developments on the world market and, also, must be a part of business strategy in domestic or foreign markets (Nešković, 2013). Regarding this, economic intelligence involves the collection, selection, processing and analysis of economic information on the markets for agricultural products, world agricultural exchanges, competitors, customers, competitive products etc.

Today's economic competitiveness became an economic warfare and a global phenomenon. This warfare represents the struggle for the placement agricultural products in abroad. Anglo-Saxons call it know-how and the French call it savoir-faire. Anyway, economic warfare aims to improve the national economy and overall national prosperity. It is obvious that each company in this field should protect and secure resources in the form of intellectual capital and intellectual property in order to conserve and enhance own businesses. Also, it is necessary to come into the possession of significant economic information and data, and convert them to economic knowledge - and thus achieve competitive advantage.

### **Global Competitiveness Index (GCI)**

Global competitiveness of all the countries examines and evaluates the World Economic Forum (WEF) and its Global Competitiveness Index (GCI) which represent a set of institutions, policies and factors that together determine the level of productivity of a country. This index is based on twelve pillars of competitiveness, which are organized into three groups: Group I - Basic requirements; Group II - Factors

that increase efficiency; Group III - Innovation and sophistication factors. Pillars include micro and macro economic factors and factors of development institutions, which together determine the competitiveness of a national economy. All data is evaluated on a scale from 1 to 7 (1 - the worst score, 7 - the best score). It is also the range of possible values for all indicators, pillars of competitiveness and GCI.

**Table 2.** Comparative overview of the global competitiveness report for 2013/14 and 2014/15

2013/14 148 countries	Country	(GCI)	2014/2015 144 countries	Country	(GCI)
1.	Switzerland	5.7	1.	Switzerland	5.7
2.	Singapore	5.6	2.	Singapore	5.6
3.	Finland	5.5	3.	United States	5.5
4.	Germany	5.5	4.	Finland	5.5
5.	United States	5.5	5.	Germany	5.5
6.	Sweden	5.5	6.	Japan	5.5
7.	Hong Kong	5.5	7.	Hong Kong	5.5
8.	Netherlands	5.4	8.	Netherlands	5.5
9.	Japan	5.4	9.	United Kingdom	5.4
10.	United Kingdom	5.4	10.	Sweden	5.4
.....	.....	.....	.....	.....	.....
101.	<b>Serbia</b>	<b>3.8</b>	94.	<b>Serbia</b>	<b>3.9</b>
.....	.....	.....	.....	.....	.....
148.	Chad	2.9	144.	Guinea	2.8

*Source:* World Economic Forum, 20 and 21 (Read more on the: <http://reports.weforum.org/global-competitiveness-report-2014-2015/rankings>)

According to the WEF report on global competitiveness for 2014/15 Serbia is at position 94 of the 144 countries that have entered into the analysis - with the value of GCI of 3.9 out of a possible 7.

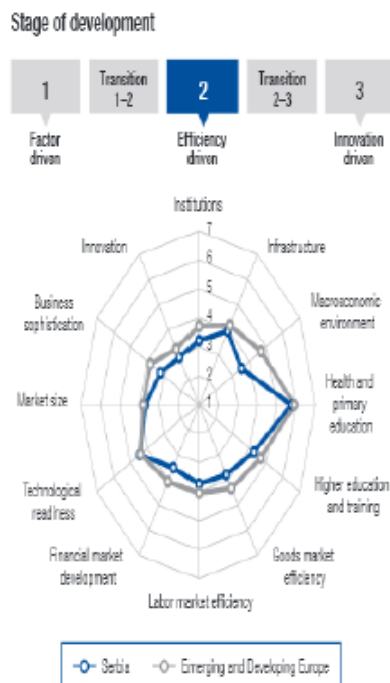
In contrast to the reports for the 2013/14 when in the analysis of the WEF were 148 countries and when Serbia took the 101 positions with a value of GCI of 3.8 out of a possible 7.

In comparison to the previous year, GCI value for Serbia is increased for 0.13, which resulted in to a positive displacement Serbia for 7 positions - from 101 to 94 positions on the list.

**Table 3.** Global Competitiveness Index (GCI) - Serbia**Global Competitiveness Index (GCI) - Serbia**

	Rank	Score
GCI 2011–2012 (out of 142)	95	3.9
GCI 2012–2013 (out of 144)	95	3.9
GCI 2013–2014 (out of 148)	101	3.8
<b>GCI 2014–2015</b>	<b>94</b>	<b>3.9</b>
	Rank (out of 144)	Score (1-7)
<b>Basic requirements</b> (40.0%)		
	<b>101</b>	<b>4.1</b>
Institutions	122	3.2
Infrastructure	77	3.9
Macroec. environment	129	3.5
Health and primary educ.	68	5.8
<b>Efficiency enhancers</b> (50.0%)		
	<b>80</b>	<b>3.9</b>
Higher educ. and training	74	4.3
Goods market efficiency	128	3.8
Labor market develop.	119	3.7
Financial market develop.	109	3.5
Tehnological readiness	49	4.4
Market size	71	3.7
<b>Innovation and sophistication factors</b>		
	<b>121</b>	<b>3.1</b>
Business sophistication	132	3.2
Innovation	108	2.0

Source: World Economic Forum [23]

**Figure 1.** Stage of development - Serbia vs. Europe

Source: World Economic Forum [23]

Table 4. The Global Competitiveness Index in detail

INDICATOR	VALUE (1-7)	RANK/144		
<b>1st pillar: INSTITUTION</b>				
1.01 Property rights	3.1	127		
1.02 Intellectual property protection	2.9	113		
1.03 Diversion of public funds	2.7	99		
1.04 Public trust in politicians	2.1	118		
1.05 Irregular payments and bribes	3.9	69		
1.06 Judicial independence	2.6	118		
1.07 Favoritism in decisions of governm	2.4	120		
1.08 Wastefulness of gov. spending	2.2	132		
1.09 Burden of gov. regulation	2.2	140		
1.10 Efficiency of leg. fram. in sett. disputes	2.7	128		
1.11 Effic. of leg. fram. in challeng. regs	2.3	129		
1.12 Transparen. of gov. policymaking	3.6	108		
1.13 Business costs of terrorism	5.5	58		
1.14 Business costs of crime and violence	4.2	86		
1.15 Organized crime	4.1	106		
1.16 Reliability of police services	3.8	89		
1.17 Ethical behavior of firms	3.4	119		
1.18 Streng. of auditing and reporting stand.	4.0	109		
1.19 Efficacy of corporate boards	3.8	125		
1.20 Protect. of minor. shareholders int	2.8	138		
1.21 Strength of invest. protection	5.3	68		
<b>2nd pillar: INFRASTRUCTURE</b>				
2.01 Quality of overall infrastructure	3.3	111		
2.02 Quality of roads	2.9	114		
2.03 Quality of railroad infrastructure	2.1	83		
2.04 Quality of port infrastructure	2.6	127		
2.05 Quality of air transport infrastr.	3.5	112		
2.06 Available airline seat	74.0	93		
2.07 Quality of electricity supply	4.7	76		
2.08 Mobile tel. subscriptions/100 pop	119.4	57		
2.09 Fixed telephone line/100 pop	39.3	26		
<b>3rd pillar: MACROECONOMIC ENVIRONMENT</b>				
3.01 Gov. budget balance % GDP	-5.7	117		
3.02 Gross national savings % GDP	11.5	125		
3.03 Inflation, annual % change	7.7	124		
3.04 General government debt, % GDP	65.8	108		
3.05 Country credit rating, 0-100	39.5	81		
<b>4th pillar: HEALTH AND PRIMARY EDUCATION</b>				
4.01 Malaria cases/100000 pop. MF	n			
4.02 Business impact of malaria	N			
4.03 Tuberculosis cases/100000 pop.	23.0	50		
4.04 Business impact of tuberculosis	6.4	31		
4.05 HIV prevalence, % adult pop.	0.1	1		
4.06 Business impact of HIV/AIDS	6.5	14		
4.07 Infant mortality, deaths/1000 live births	5.7	37		
4.08 Life expectancy, years	75.2	52		
4.09 Quality of primary education	3.8	78		
4.10 Primary educ. enrollment, net %	91.4	94		
<b>5th pillar: HIGHER EDUCATION AND TRAINING</b>				
5.01 Second. education enrollment, gross %	91.7	66		
5.02 Tertiary education enrollment, gross %	52.4	52		
5.03 Quality of the education system	3.1	106		
5.04 Quality of math and science education	4.3	53		
5.05 Quality of management schools	3.6	114		
5.06 Internet access in schools	4.2	72		
5.07 Availab. of research and training serv.	3.5	106		
5.08 Extent of staff training	3.1	13		
<b>6th pillar: GOODS MARKET EFFICIENCY</b>				
6.01 Intensity of local competition	4.2	128		
6.02 Extent of market dominance	2.8	136		
6.03 Effectiv. of anti-monopoly policy	3.3	126		
6.04 Effectiv. of tax. on incentives to invest	2.7	136		
6.05 Total tax rate, % profits	36.8	69		
6.06 No. procedures to start a business	6	57		
6.07 No. days to start a business	11.5	61		
6.08 Agricultural policy costs	3.0	128		
6.09 Prevalence of trade barriers	4.3	90		
6.10 Trade tariffs, % duty	5.0	68		
6.11 Prevalence of foreign ownership	4.0	109		
6.12 Business impact of rules on FDI	3.2	130		
6.13 Burden of customs procedures	3.6	96		
6.14 Imports as a percentage of GDP	57.6	46		
6.15 Degree of customer orientation	3.9	116		
6.16 Buyer sophistication	2.4	137		
<b>7th pillar: LABOR MARKET EFFICIENCY</b>				
7.01 Cooperat. in labor-employer relations	3.3	140		
7.02 Flexibility of wage determination	5.4	45		
7.03 Hiring and firing practices	3.3	115		
7.04 Redundancy costs, weeks of salary	7.7	22		
7.05 Effect of tax. on incentives to work	2.6	136		
7.06 Pay and productivity	3.4	116		
7.07 Reliance on professional management	3.2	128		
7.08 Country capacity to retain talent	1.8	141		
7.09 Country capacity to attract talent	1.6	143		
7.10 Women in labor force, ratio to men	0.77	81		
<b>8th pillar: FINANCIAL MARKET DEVELOPMENT</b>				
8.01 Availability of financial services	4.0	98		
8.02 Affordability of financial services	3.7	110		
8.03 Financing trough local equity market	2.2	133		
8.04 Ease of access to loans	2.2	121		
8.05 Venture capital availability	1.9	132		
8.06 Soundness of banks	4.2	106		
8.07 Regulation of securities exchanges	3.3	113		
8.08 Legal rights index, 0/10 (best)	7	43		
<b>9th pillar: TECHNOLOGICAL READINESS</b>				
9.01 Availability of latest technologies	4.2	106		
9.02 Firm-level technology absorption	3.8	127		
9.03 FDI and technology transfer	4.0	108		
9.04 Individ. using Internet subscr./100 pop	51.5	65		
9.05 Fix. broadband Internet subscr./100 pop	13.9	49		
9.06 Int'l Internet bandwidth kb/s per user	108.9	26		
9.07 Mobile broadband subscr./100 pop	54.8	35		
<b>10th pillar: MARKET SIZE</b>				
10.01 Domestic market size Index, 1-7 (best)	3.4	73		
10.02 Foreign market size Index, 1-7 (best)	4.4	74		
10.03 GDP (PPP\$ billions)	81.1	74		
10.04 Exports as a percentage of GDP	44.9	55		
<b>11th pillar: BUSINESS SOPHISTICATION</b>				
11.01 Local supplier quantity	4.1	110		
11.02 Local supplier quality	4.0	98		
11.03 State of cluster development	3.2	115		
11.04 Nature of competitive advantage	2.4	141		
11.05 Value chain breadth	3.1	128		
11.06 Control of international distribution	3.4	122		
11.07 Production process sophistication	2.8	133		
11.08 Extent of marketing	3.1	131		
11.09 Willingness of delegate authority	2.9	13		
<b>12th pillar: INNOVATION</b>				
12.01 Capacity for innovation	3.0	130		
12.02 Quality of scient./research instit.	3.7	69		
12.03 Company spending on R & D	2.5	125		
12.04 Unvers./industry collabor. in R&D	3.2	95		
12.05 Gov't procurem. of adv. tech prod.	2.9	122		
12.06 Availability of scient./engineers	3.9	82		
12.07 PCT patents, application/million pop	2.3	55		

Source: World Economic Forum [22]

## Results and discussion

In Table 4. is presented Global Competitiveness Index in detail Serbia - for 2014/15, by the World Economic Forum. For this research the most important are data from the first, sixth, ninth, eleventh and twelfth pillar which are specially marked.

In the 1st pillar it is clear that Serbia has an extremely low level of intellectual property protection, which was rated very low - only 2.9 out of a possible 7. With this result, our country is located on the 113th position from 144 countries which were included in this study.

The cost of agricultural policy presented in the 6th pillar also rated low - only 3 out of a possible 7. This rating put Serbia on 128th position of 144 countries. Such a low rating proves that Serbian agriculture does business with extremely high costs - which is the consequence of inefficient use of their own intellectual resources and the absence of closer cooperation between academic and research institutes and agricultural production. The result of this situation is high percentage of imports of knowledge, of agricultural technologies, of patents and licenses.

The 9th pillar of the GCI, which includes the availability of modern technology and the ability to absorbed technology - also shows very unsatisfactory results. The availability of modern technology was evaluated by 4.2 out of a possible 7, which puts our country on 106th position of 144 countries. The companies' absorptions of technology are evaluated by 3.8 out of a possible 7. Under this criterion Serbia is located on 127th position out of 144 countries.

The nature of competitive advantages in the pillar 11 is evaluated with 2.4 out of a possible 7 and on this issue Serbia is located on a very bad position (141 out of 144 countries). This result shows the source of our competitive advantages. It's cheap labor rather than skilled labor.

12th pillar which encompasses the area of innovation, also shows very low ratings. The pride of this pillar are only scientists and their institutions, which are the starting point in any research process. For this reason, every country which aims to achieve a competitive advantage should invest significant funds in science and research.

The data in Table 4. show that in a globalized business environment sustainable growth and global competitiveness can't be achieved without the export of knowledge, intellectual capital, intellectual property, innovation and technology. According to the WEF report for 2014/15 Serbia occupies the 94 position out of 144 countries with very low marks on innovation and business sophistication.<sup>4</sup> The results achieved in the field of intellectual property, technology, agriculture, nature of competitive advantages and innovation, which are presented in the detailed view of the GCI for 2014/15 in the 1st, 6th, 9th, 11th and 12th pillar<sup>5</sup>, clearly show that in the Serbian economy has a few innovative products and

---

4 See table 3 on page 10.

5 See table 4 on page 11.



processes. All of the aforementioned leads to a conclusion that Serbia evidently has a significant intellectual resources. However, the impression is that the to these resources is managed by ad hoc, rather than with the strategy. Our current exports are mostly based on price-competition, investment in new equipment, technology and human resources are almost do not exist. If Serbian companies want to develop new products and services and to achieve economic growth and international competitiveness, it is necessary to increase investment in intellectual capital and new technologies.

### **Conclusions**

Modern global market is based on a completely new competition rules, which resulted in changes in the strategies of companies and countries. In order to create and improve competitiveness, today is clearly accentuated orientation of investment in intangible assets. Science and technology are now built into the foundations of any modern society and all aspects of human life. A very fast scientific and technological progress and development in the sphere of information technologies, stand out to the forefront the importance of intellectual capital. Today, human capital is a key factor for improving the competitiveness of the national agriculture. Very often this capital reaches up to 90% of the companies, which is a confirmation that human knowledge and skills are crucial for a positive competitive position.

Protection of intellectual property in the field of agricultural production represents a very important part of the strategy of competitiveness (<http://www.madmarx.rs>). The safest way of protection these values is the registration with relevant institutions, which guarantees the protection of intellectual property rights. It will prevent the competition that easily copies the new agricultural product or service. Trade secrets and specific knowledge, can also be protected through confidentiality agreements and contracts with employees. Licensing of their own intellectual property to others can be a good way of gaining profit and for expanding their own business models with small efforts and at low risk.

Also, through a similar arrangement, can be obtained the right to use the intellectual property of others, which can help to expand and improve the quality of agricultural production without large investments - which confirms the auxiliary hypotheses H2 and H3 presented on page 4.

In the global business environment, economic competitiveness has become an economic warfare and economic intelligence is the primary means of stealing intellectual resources. This form of jeopardizing of business significantly increases the power of new technologies, knowledge and timely possession of important business information. The targets are most often trade secrets, the specific knowledge and intellectual property that is protected by patent rights. This form of intelligence very often doesn't respect the rules and standards of ethics but collects the data and information by illegal means, and after the analysis turns them into a competitive knowledge.

Changes in the globalized, highly competitive world caused the weakening of the comparative advantages of the agrarian sector of Serbia (Đekić, 2005). Although we have

quantity of resources, it is not our competitive advantage compared to the international environment. So, our advantage could be the quality of knowledge embedded into agricultural product and/or service. But, in order to improve the quality of knowledge it is necessary to create an education system that supports the innovative thinking. Improved education system will increase the number of own original agricultural products, processes and technologies, which would increase the global competitiveness of Serbia. At the same time, it is necessary to bridge the huge gap that exists in Serbia between science, research and development sector and agricultural production. For Serbian agribusiness is of utmost importance to stimulate and develops its own intellectual capital because this will enable the more efficient utilization of the physical capital and increasing of financial capital. Only in this way a source of competitive advantages of Serbia will not be cheap labor, but the knowledge, expertise and ability.

In the end, it can be concluded that the global competitiveness can realize only companies and countries which recognize the value of their own knowledge, timely identify the threats and efficiently to protect its own material and intellectual values. This fact prove the most powerful agricultural companies which have become the strongest pillars of their own national economies thanks to patented and protected innovations based on intellectual capital. Countries with these kinds of companies are the leaders in the global market of agricultural products. Also, these countries are at the top of countries according to WEF's Global Competitiveness Index, which confirms the hypothesis H1.

### Literature

1. Cvetković, N., Grk, S., Vidas-Bubanja M. (2008): *Tranzicioni izazovi agroprivrede Srbije u kontekstu međunarodnih integracija*, Ekonomika Poljoprivrede, vol. 55, no. 3, pp. 237-251 Beograd
2. Dedijer, S. (2003): *Development & Intelligence 2003-2053*, (No. 2003/10).
3. Đekić, S. (2005): *Agrarni menadžment*, Ekonomski fakultet, Niš
4. Jovanović, S., Dragutinović, S., Petrović, D.S. (2010): *Značaj vrednovanja i eksploatacije intelektualne svojine*, Industrija, vol. 38, no. 4, pp. 13-28.
5. Jovanović, S., Matović, D., Petrović, D.S. (2011): *Vrednovanje intelektualne svojine*, Industrija, vol. 39, no.2, pp. 93-117.
6. Kolaković, M., (2003): *Teorija intelektualnog kapitala*, Ekonomski pregled, vol. 54, no. 11-12, pp. 925-944 (available at: [hrcak.srce.hr/file/40500](http://hrcak.srce.hr/file/40500)).
7. Kristić, B. (2004): *Uticaj inovacija znanja, proizvoda i procesa na efikasnost preduzeća*, Poslovna politika, Septembar, Beograd
8. Marić, V. (2013): *Zaštita intelektualne svojine u Srbiji* (available at: <http://www.madmarx.rs>).
9. Nešković, S. (2011). *Ekonomska špijunaža u savremenoj međunarodnoj konstelaciji*, Ekonomija teorija i praksa, vol. 4, no. 1, pp. 111-127.
10. Nešković, S. (2013): *Ekonomska špijunaža i nove tehnologije u globalizovanoj*

*međunarodnoj zajednici*, Vojno delo, vol. 65, no. 2, pp. 57-76.

11. Porter, M. E. (2007): *Konkurentna prednost: ostvarivanje i očuvanje vrhunskih poslovnih rezultata*, prevod: Mira i Vera Gligorijević, Asee; Graph style, Novi Sad

12. Petrović, Z. P. (2005): *Ekonomski špijunaža: mali vodič kroz istoriju ekonomske obaveštajnosti, do Desete revolucije čovečanstva*, Beograd, Draslar partner - Centar Jugoistok - Institut za političke studije

13. Skandia, Intellectual Capital-Value Creating Processes, a supplement to Skandia's 1995 Annual Report, page 5 (available at: [http://www.exinfm.com/training/pdf/case\\_study\\_skandia.pdf](http://www.exinfm.com/training/pdf/case_study_skandia.pdf)).

14. Sullivan, P. (2000): *Value-driven Intellectual Capital; How to convert Intangible Corporate Assets into Market Value* (available at: <http://www.sveiby.com/articles/icmovement.htm>).

15. Sundać, D., Švast, N. (2009): *Intelektualni kapital - temeljni čimbenik konkurentnosti poduzeća, Ministarstvo gospodarstva, rada i poduzetništva*, Zagreb (available at: [http://eobrazovanje.mingorp.hr/UserDocsImages/Knjizica\\_intelektualni\\_kapital.pdf](http://eobrazovanje.mingorp.hr/UserDocsImages/Knjizica_intelektualni_kapital.pdf)).

16. Stewart, A. (1997): *Intellectual Capital - The New Wealth of Organizations*, Doubleday, New York

17. Steven, A., Bradley, K. (1995): *The Management of Intellectual Capital*, unpublished monograph, The Business Performance Group Limited, London

18. Zindović, I. (2008): *Multinacionalne kompanije i ekonomska špijunaža*, Alisa Press, Kraljevo

19. Šta je intelektualna svojina? (available at: [http://www.zis.gov.rs/upload/documents/pdf\\_sr/pdf/sta\\_je\\_intelektualna\\_svojina.pdf](http://www.zis.gov.rs/upload/documents/pdf_sr/pdf/sta_je_intelektualna_svojina.pdf)).

20. *WEF global competitiveness report for 2013/14* (available at: [http://www3.weforum.org/docs/WEF\\_GlobalCompetitivenessReport\\_2013-14.pdf](http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2013-14.pdf), p.16, date of accession 4.03.2015).

21. *WEF global competitiveness report for 2014/2015* (available at: <http://reports.weforum.org/global-competitiveness-report-2014-2015/rankings/>, date of accession 4.03.2015).

22. *The Global Competitiveness Index in detail - Serbia* (available at: <http://www3.weforum.org/docs/GCR2014-15/Serbia.pdf>, p. 329, date of accession 5.03.2015).

23. *Global Competitiveness Index (GCI) - Serbia* (available at: <http://www3.weforum.org/docs/GCR2014-15/Serbia.pdf>, p. 328, date of accession 5.03.2015).

## EKONOMSKA ŠPIJUNAŽA I INTELKTUALNI KAPITAL U KONKURENTNOSTI POLJOPRIVREDE-STUDIJA SLUČAJA

*Slobodan Nešković<sup>6</sup>, Žaklina Jovanović<sup>7</sup> Miroslav Čavlin<sup>8</sup>*

### Sažetak

*Pod uticajem procesa globalizacije u poslednjih nekoliko desetina godina došlo je do niza tehnoloških, privrednih i društvenih promena, koje su transformisale svetsko tržište poljoprivrednih proizvoda i uticale na konkurentsko okruženje. U savremenom svetu stvaranje materijalnih vrednosti u poljoprivrednoj proizvodnji sve više je rezultat nematerijalnih faktora, tj. proizvodnja se sve više temelji na znanju, sposobnosti i inovativnosti zaposlenih. U industrijskom dobu neophodni resursi za postizanje konkurentske prednosti bili su kapital, prirodni resursi i rad, dok se u današnjoj ekonomiji zasnovano na znanju ta značajnost pomera ka informacijama, inovacijama i znanju, tj. intelektualnom kapitalu i intelektualnoj svojini - koji su postali temelj kreiranja svih drugih vrednosti. Navedene vrednosti su, zbog svog velikog značaja u ostvarivanju savremene konkurentske prednosti, vrlo često meta ekonomske špijunaže i zbog toga zahtevaju sve raspoložive oblike zaštice. Sektor poljoprivredne proizvodnje može dati značajan doprinos unapređenju celokupne nacionalne konkurentnosti ako se zasniva na intelektualnom kapitalu, što dokazuju zemlje sa visoko razvijenom poljoprivrednom proizvodnjom. Međutim, kada se sagledaju globalne promene može se zaključiti da Srbija u ovom sektoru ima neiskorišćen potencijal za rast i razvoj.*

**Ključne reči:** konkurentnost, intelektualni kapital, intelektualna svojina, poljoprivredna proizvodnja, ekonomska špijunaža

---

6 Redovni profesor, dr Slobodan Nešković, Fakultet za ekonomiju i inženjerski menadžment u Novom Sadu, Ulica Cvećarska br. 2, 21000 Novi Sad, Srbija, Telefon: +381 63 39 16 59, E-mail: [slobneskovic@gmail.com](mailto:slobneskovic@gmail.com)

7 Master Žaklina Jovanović, Saradnik u naučnom udruženju Centar za strateška istraživanja nacionalne bezbednosti CESNA B, Ulica Vojvode Vlahovića br. 35d/1.2, Beograd, Srbija, +381 63 53 13 93, E-mail: [zaklinajovanovic.021@gmail.com](mailto:zaklinajovanovic.021@gmail.com)

8 Vanredni profesor, dr Miroslav Čavlin, Univerzitet Privredna Akademija Novi Sad, FIMEK, Cvećarska ulica br. 2, 21000 Novi Sad, Srbija, Telefon: +381 21 400 484, E-mail: [cmiros@gmail.com](mailto:cmiros@gmail.com)



## INFRA-RED THERMOGRAPHY FOR DETECTING DROUGHT IN AGRICULTURAL CROPS AND SCHEDULING IRRIGATION

*Ivana Petrović<sup>1</sup>, Milena Marjanović<sup>2</sup>, Marija Ćosić<sup>3</sup>, Slađana Savić<sup>4</sup>, Gorica Cvijanović<sup>5</sup>*

### Summary

*The use of thermal imaging is a fast growing and potentially important tool in various fields of agriculture. The technology visually identified the rise of temperature in crop canopy which occurs as a result of drought and allows the precise scheduling of crop irrigation. The aim of presenting paper was to demonstrate the application of these techniques on potato plants and to point out on the necessity of irrigation for potato sustainable and economically justified production.*

**Key words:** *Infra-red thermography, potato, drought, irrigation.*

**JEL:** Q25

### Introduction

Climate change is one of the most serious problems facing the world today. The recent Intergovernmental Panel on Climate Change reports confirmed that climate change will have a significant impact on global surface temperature. The projections of IPCC are that the rise of the mean temperature will be as high as 6.4°C by 2100 and the number

- 1 Ivana Petrović, M.A., Ph.D. student, University of Belgrade, Faculty of agriculture, Belgrade, Nemanjina Street no. 6, Belgrade, Republic of Serbia, Phone: +381 64 951 81 47, E-mail: [ivana.petrovic@agrif.bg.ac.rs](mailto:ivana.petrovic@agrif.bg.ac.rs)
- 2 Milena Marjanović Ph.D., Professor, University of Belgrade, Faculty of agriculture, Belgrade, Zemun, Nemanjina 6, Republic of Serbia, Phone: +381 621 120 447, E-mail: [milena.pauk@agrif.bg.ac.rs](mailto:milena.pauk@agrif.bg.ac.rs)
- 3 Marija Ćosić, Ph.D., Assistant professor, University of Belgrade, Faculty of agriculture, Belgrade, Nemanjina Street no. 6, Belgrade, Republic of Serbia, Phone: +381 69 331 45 53, E-mail: [cosic.marija661@gmail.com](mailto:cosic.marija661@gmail.com)
- 4 Slađana Savić, PhD, Associate professor, John Naisbitt University Belgrade, Faculty of biofarming, Maršala Tita street no. 39, 24300 Bačka Topola, Republic of Serbia, Phone: +381 60 443 46 15, E-mail: [bonita.sladja@gmail.com](mailto:bonita.sladja@gmail.com)
- 5 Gorica Cvijanović, PhD, Full Professor, John Naisbitt University Belgrade, Faculty of biofarming, Bačka Topola, 24300 Bačka Topola, Maršala Tita street no. 39, Republic of Serbia, Phone: +381 69 240 60 36, E-mail: [cvijagor@yahoo.com](mailto:cvijagor@yahoo.com)

of extreme events, including heat waves, storms and flooding will increase (IPCC, 2007). The especially vulnerable for future European summer climate would be the countries in South-East European and Mediterranean areas. Predictions of different scenarios of climate are that due to the expected increase in temperature and decrease in precipitation, drought would start earlier and last longer in these comparing to other European areas (Beniston et al., 2007).

Agriculture is highly sensitive to climate change and especially, to drought. Study for Southern Europe predicted by 2050 a general yield decreases for different crops up to 30%, as well as increases in water demand up to at least 10% (Alcamo et al., 2007). Although drought in South East European region is shorter than in Mediterranean, its impact on agricultural production in South East European region, including Serbia, could be very serious. During summer period growth and productivity of a lot of agricultural plants are in the most sensitive phase to drought, and therefore, the reduction of yield could be significant. In such climatic conditions the economically profitable production could be achieved by irrigation (Jovanović, Stikić, 2012). However, in Serbia similar to other South East European countries, only a small proportion of the arable land (only 3.7%) is equipped for irrigation (Kresović et al., 2014).

Results of Kresović et al. (2014) showed that irrigation increased maize yields by 4.8-48% (average 18.7%) independence of weather conditions. Their economic assessment confirmed higher profitability of irrigated maize (841.79 EUR/ha vs. rain-fed 699.35 EUR/ha). Irrigation increased overall costs by 10.75% and profits by 21.4%, compared to rain-fed conditions. Their calculation also showed that the estimated average annual loss incurred in Serbia due to a lack of irrigation in maize production is 122,161.287 EUR.

Due to the increased competitions for water resources between different sectors (agriculture, industry or domestic consumption) in many countries, the challenge is to increase agricultural productivity per unit of water (“more crop per drop”), and to use optimally irrigation in accordance with the crop’s needs (Luquet et al., 2005).

The current concept of proper irrigation scheduling is based on the use of high technologies as infra red thermography. Infrared (IR) thermal imaging technique (also known as IR thermography or imaging IR radiometry), permits to measure IR radiation emitted by objects at ambient temperature over a large amount of points and processing these measurements to form a thermal map of the target surface (Jones, 2004, Costa et al., 2013). The ITR is a non-invasive, non-contact and non-destructive technique used to determine thermal properties and features of any object of interest and therefore it can be used for identification of plant temperature that rise as a results of drought or heat stress (González-Dugo et al., 2006) and allows the precise scheduling of crop’s irrigation.

In Serbia IRT has not yet been explored for irrigation and the aim of this paper was to demonstrate the application of this technique on potato plants and to point out on the necessity of irrigation for potato sustainable production. The potato was chosen for demonstration as leading vegetable crop and the 4<sup>th</sup> most important food crop (after

rice, wheat and maize) worldwide (FAOSTAT, 2012) and also very important vegetable for Serbian agriculture.

### Material and method

The IRT method was tested in potato (*Solanum tuberosum* L.) cultivar Liseta. The test was done in the vegetative phase of potato plant growth when they were exposed to drought (excluded irrigation) and full irrigation.

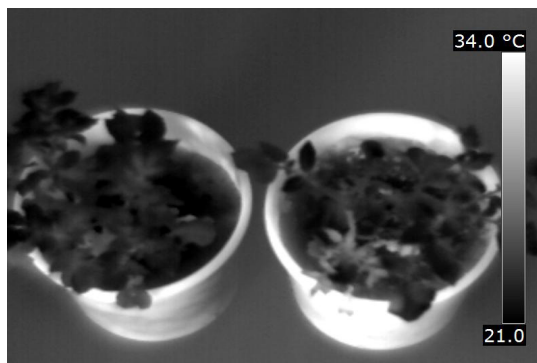
An infrared thermal imaging system comprises of a thermal camera equipped with infrared detectors, a signal processing unit and an image acquisition system. In our experimental system leaf temperature was measured by using a thermal camera (ThermaCAM B20). This camera supplies infrared spectrum images of high quality, allowing accurate temperature measurement, with an infrared pixel resolution of  $320 \times 240$ , and  $\pm 0.2^\circ\text{C}$  thermal resolution. Thermal images were analyzed by using the FLIR Quickreporter image analysis software. Control of plant water status was done by pressure chamber and water potential values were used as control parameters for plant water status.

The statistical analyses were performed with SigmaPlot software (version 11.0) using Student's t-test.

### Results and discussion

False-colored IR thermal images showed differences between leaves of potato plants exposed to drought and optimally irrigated (Fig.1). Visually the leaves differed in a such way that more yellow and red color of the leaves indicated heat stress in the leaves, while more dark color optimal water conditions. Our thermal imaging are presented as black/white photos, and t lighter color leaves indicates a higher temperature of leaves, or a greater degree of drought stress where the leaves are exposed. On the contrary, darker color indicate the optimal leaf water regime.

**Figure 1.** Thermal image of two potato plants irrigated (left) and non-irrigated (right) taken with a ThermaCAM B20



Source: Photographer-Milena Marjanović



The temperature of optimally irrigated plants was 21.7°C and of the leaves in plants exposed to drought about 22.9°C (Table 1). Measurements of leaf water potential, as parameter of water status (Table 1), confirmed that non-irrigated plants were exposed to mild drought stress conditions (-1.0 MPa) compared to the control plants (-0.4 MPa). The thermal imaging confirmed results obtained by measuring plant water regime parameters.

**Table 1.** Leaf temperature and leaf water potential in irrigated and non-irrigated potato plants

Parameters	irrigated	non-irrigated
Leaf temperature (°C)	21.7±0.3	22.9±0.3
Leaf water potential (MPa)	-0.4±0.03	-1.0±0.05

Source: Work of authors based on research results

Thus, obtained results confirmed that IR image, as a simple color identification technique, could be very useful for identification of drought stress in potato. This is of special importance for potato because the potato is grown in different agro-ecological regions, but it is best adapted to temperate climate and frost-free seasons and therefore is very sensitive to both high temperatures and drought. Optimum mean daily temperatures for potato production are 18 to 20°C, while a night temperature of below 15°C is required for tuber initiation. High temperatures and even short periods of drought stress can cause significant reductions in tuber yield and quality (Onder et al., 2005, Jovanović et al., 2012).

In Serbia potato is growing in the area of 76.500 ha, and only 12-15% of this area is irrigated (Bročić, Stefanović, 2012). The yield of potato in Serbia is fourth times lower than this achieved in the leading potato growing countries (Germany 45 t ha<sup>-1</sup>, France 45 t ha<sup>-1</sup>, Belgium 44 t ha<sup>-1</sup>). The low yields are the consequence of inadequate management practices, insufficient amount and unfavorable arrangement of precipitation during the growing season and inappropriate irrigation scheduling applied (Pejić et al., 2015). The results of Pejić et al. (2015) confirmed that potato is moderately sensitive to soil water stress in the climatic conditions of the Southern Serbia where seasonal evapotranspiration were 495.0 mm and 291.2 mm in irrigated and rain-fed conditions and with irrigation the yield could achieve 48.31 t ha<sup>-1</sup> or 88.3% higher than in the rain-fed conditions.

In Table 2 are presented the results of the effects of irrigation and rain-fed conditions on the average yield and profit of potato production in the period between 2008 and 2013. These results also included 2012 year when because of extremely dry conditions in Serbia the rain-fed potato production recorded a loss. They confirmed the importance of irrigation for profitable potato production.

**Table 2.** The average yield (t/ha) and profit (€/ha) for potato production in Serbia for the period between 2008 and 2013 year

Item	Rain-fed condition	Irrigation
Yield	22.5	42.4
Profit	1797	4872

Source: Work of authors based on research results

The profitability of potato irrigation also depends on the irrigation methods. Potatoes are most often irrigated by furrow, sprinkler and drip methods. Worldwide, drip irrigation is preferred because of higher yields and better tuber quality, and because it uses less water than other methods. The results of Ørum *et al.* (2010) and Matović *et al.* (2016) also confirmed that subsurface drip irrigation was more profitable than sprinkler irrigation.

Matović *et al.* (2016) made calculation on the potato production losses in the period between 2011 and 2013. Given that the average area of potato farmland in Serbia was 76,500 ha and that only some 12 - 15% of that farmland was irrigated, the following potato production losses were incurred at the national level: € 131 million under rain-fed conditions, compared to sprinkler irrigation; € 240 million under rain-fed conditions, compared to subsurface drip irrigation and € 62 million with sprinkler irrigation, compared to subsurface drip irrigation.

Another aspect of potato irrigation, similarly to the irrigation of other crops, should be taken into consideration is timing for irrigation. Optimal and economically justified irrigation should be applied in the period when the needs of water for plant growth are maximal and in the period when evapotranspiration is less than optimal for potato. Such approach needs the appropriate indicator of crop water status and needs for irrigation. The current results confirmed that thermal imaging or so called „IR thermometers-IRT“ have bigger advantages over soil water content measurements to schedule irrigation.

However, there is no publish results for the use of IRT as an indicator for irrigation timing of potato. Results for other agricultural plants, including almond orchards (Garcia -Trejo *et al.*, 2012) grapevine (Möller *et al.*, 2007; Grant *et al.*, 2007; Bajula *et al.*, 2012) and olive trees (Ben-Gal *et al.*, 2009) confirmed that infrared thermography is a suitable technique for assessing the crop-water status. These and other similar results confirmed that ITR can be used as an important indicator of the precise time and the amount of water that should be applied for irrigation. IRT also allows detection of any problems in watering - such as missed syphons or incomplete irrigation runs - to be identified which may otherwise not have been detected.

The use of thermal imaging is a fast growing and potentially important tool in various fields of agriculture. Currently, in precise farming production the thermal remote sensing in agriculture includes also nursery and greenhouse monitoring, plant disease detection, estimating fruit yield, evaluating the maturity of fruits and bruise detection

in fruits and vegetables (Ishimwe et al., 2014). Monitoring the fields could be done in different ways, including ground-based remote sensing (attached to the GPS-referenced tractor) or airborne sensors (from satellite, drone, airplane).

Very recently agricultural drones are in the use for precise farming in developed countries (<http://dronelife.com/agriculture-drones/>). With advanced sensors and imaging capabilities they are giving farmers new ways to increase yields and reduce crop damage (induced by drought, salt stress, pathogens, nutrient deficiency etc.). Compared with satellite imagery, they are much cheaper in USA (less than \$1,000 each), they offer higher resolution and can survey a crop every week, every day, or even every hour.

### Conclusion

The use of thermal imaging is a fast growing and potentially important tool in various fields of agricultural management, including irrigation. Application of this high technologies are of special interest in the countries, such as Serbia, facing with the challenges of increased demand for the use of water for agricultural production and the necessity to save existing water resources for other consumers (industry or domestic consumption).

### References

1. Alcamo, J., Moreno, J. M., Nováky, B., Bindi, M., Corobov, R., Devoy, R. J. N., Giannakopoulos, C., Martin, E., Olesen, J. E., Shvidenko, A. (2007): *Europe. Climate Change 2007: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Parry, M. L., Canziani, O. F., Palutikof, J. P., van der Linden, P. J., Hanson, C. E. (Ed.), ISBN 978 0521 88010-7. 541-580, Cambridge University Press, Cambridge, UK.
2. Baluja, J., Diago, M. P., Zorer, R., Meggio, F., Tardaguila, J. (2012): *Assessment of vineyard water status variability by thermal and multispectral imagery using an unmanned aerial vehicle (UAV)*. Irrigation Science, Springer, year 2012, no. 30, pp. 511-522, Netherlands.
3. Ben-Gal, A., Agam, N., Alchanatis, V., Cohen, Y., Yermiyahu, U., Zipori, I., Presnov, E., Sprintsin, M., Dag, A. (2009): *Evaluating water stress in irrigated olives: correlation of soil water status, tree water status, and thermal imagery*. Irrigation Science, Springer, no. 27, pp. 367-376, Netherlands.
4. Beniston, M., Stephenson, D. B., Christensen, O. B., Ferro, C. A. T., Frei, C., Goyette, S., Halsnaes, K., Holt, T., Jylhä, K., Koffi, B., Palutikof, J., Schöll, R., Semmler, T., Woth, K. (2007): *Future extreme events in European climate: an exploration of regional climate model projections*. Climatic Change, Springer, vo. 81, no. 1, pp. 71-95, Netherlands.
5. Bročić, Z., Stefanović, R. (2012): *Potato, production, cost-effectiveness and market (in Serbian)*. University of Belgrade, Faculty of Agriculture, Zemun.

6. Costa, J. M., Grant, O. M., Chaves, M. M. (2013): *Thermography to explore plant-environment interactions*. Journal of Experimental Botany, Oxford University Press, vol. 64, pp. 3937-3949, Oxford, UK.
7. FAOSTAT, (2012): ([www. faostat.fao.org](http://www.faostat.fao.org)).
8. García-Tejero, I., Duràn-Zuazo, V.H., Arriaga, J., Hernández, A., Vélez, L.M., Muriel-Fernández, J.A. (2012): *Approach to assess infrared thermal imaging of almond trees under water-stress conditions*. Fruits, EDP Sciences, vol. 67, pp. 463-474, London, UK.
9. González-Dugo, M.P., Moran, M.S., Mateos, L., Bryant, R. (2006): *Canopy temperature variability as an indicator of crop water stress severity*. Irrigation Science, Springer, vol. 24, pp. 233-240, Netherlands.
10. Grant, O.M., Tronina, L., Jones, H.G., Chaves, M.M. (2007): Exploring thermal imaging variables for the detection of stress responses in grapevine under different irrigation regimes. Journal of Experimental Botany, Oxford University Press, vol. 58, pp. 815-825, Oxford, UK.
11. IPCC (2007): *Climate Change 2007: Impacts, Adaptation, and Vulnerability*. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change. Parry, M. L., Canziani, O. F., Palutikof, J. P., van der Linden, P. J., Hanson, C.E. (Ed.), ISBN 978 0521 88010-7. 976, Cambridge University Press, Cambridge, UK.
12. Ishimwe, R., Abutaleb, K., Ahmed, F. (2014): *Applications of Thermal Imaging in Agriculture-A Review*. Advances in Remote Sensing, Scientific Research Publishing, no. 3, pp. 128-140, Wuhan, China.
13. Jones, H. (2004): *Application of thermal imaging and infrared sensing in plant physiology and ecophysiology*. Advances in Botanical Research, Elsevier Ltd., 2004, no. 41, pp. 107-163, Amsterdam, Netherlands.
14. Jovanović, Z., Stikić, R. (2012): *Strategies for Improving Water Productivity and Quality of Agricultural Crops in an Era of Climate Change*. In book: Irrigation Systems and Practices in Challenging Environments, Ed., ISBN 978-953-51-0420-9. Teang Shui Lee, InTech., pp. 77-102, Rijeka, Croatia.
15. Jovanović, Z., Stikić, R., Bročić, Z., Oljača, J. (2012): *Climate Change: Challenge for Potato Production in South-East Europe*. In: Potatoes: Production, Consumption and Health Benefits, ISBN 978-1-62100-703-6. Ed. Claudio Caprara, Nova Science Publishers, pp. 37-66, New York, USA.
16. Kresović, B., Matović, G., Gregorić, E., Đuričin S., Bodroža, D. (2014): *Irrigation as a climate change impact mitigation measure: An agronomic and economic assessment of maize production in Serbia*. Agricultural Water Management, Elsevier Ltd., 2014 vol. 139, pp. 7-16, Amsterdam, Netherlands.
17. Luquet, D., Vidal, A., Smith, M., Dauzat, J. (2005): *'More crop per drop': how to make it acceptable for farmers?* Agricultural Water Management, Elsevier Ltd., 2005 vol.

- 76, no. 2, pp. 108-119, Amsterdam, Netherlands.
18. Matović, G., Bročić, Z., Đuričin, S., Gregorić, E., Boroža, D. (2016): *Profitability assessment of potato production applying different irrigation methods*. Irrigation and Drainage, Wiley, 2016 (DOI: 10.1002/ird.1983), Hoboken, New York, USA.
  19. Möller, M., Alchanatis, V., Cohen, Y., Meron, M., Tsipris, J., Naor, A., Ostrovsky, V., Sprintsin, M., Cohen, S. (2007): Use of thermal and visible imagery for estimating crop water status of irrigated grapevine. *Journal of Experimental Botany*, Oxford University Press, vol. 58, pp. 827-838, Oxford, UK.
  20. Onder, S., Caliskan, M.E., Onder, D., Caliskan, S. (2005): *Different irrigation methods and water stress effects on potato yield and yield components* *Agricultural Water Management*, Elsevier Ltd., vol. 73, pp. 73-86, Amsterdam, Netherlands.
  21. Ørum, J.E., Boesen, M.V., Jovanović, Z., Pedersen, S.M. (2010): *Farmers' incentives to save water with new irrigation systems and water taxation - A case study of Serbian potato production*. *Agricultural Water Management*, Elsevier Ltd., vol. 98, pp. 465-471, Amsterdam, Netherlands.
  22. Pejić, B., Aksić, M., Mačkić, K., Šekularac, G. (2015): *Response of Potato to Water Stress in Southern Serbia*. *Austin Journal of Irrigation*, Austin Publishing Group, vol. 1, no. 1, pp. 1-4, New Jersey, USA.

## INFRA-CRVENA TERMOGRAFIJA ZA DETEKCIJU SUŠE U POLJOPRIVREDNIM USEVIMA I PLANIRANJU NAVODNJAVANJA

*Ivana Petrović<sup>6</sup>, Milena Marjanović<sup>7</sup>, Marija Ćosić<sup>8</sup>, Slađana Savić<sup>9\*</sup>  
Gorica Cvijanović<sup>10</sup>*

### Sažetak

*Korišćenje termalne infra-crvene termografije je u ekspanziji i sve više nalazi primenu u različitim oblastima poljoprivrede. Ovom tehnologijom se može vizuelno identifikovati porast temperature kod biljaka izloženih suši i to zatim omogućava precizno planiranje i optimalnu primenu navodnjavanja. Cilj ovog rada je da se demonstrira primena ovih tehnologija na biljkama krompira i da se ukaže na neophodnost navodnjavanja u održivoj i ekonomski opravdanoj proizvodnji krompira.*

**Ključne reči:** *Infra-crvena termografija, krompir, suša, navodnjavanje.*

---

6 Master Ivana Petrović, doktorant, Univerzitet u Beograd, Poljoprivredni fakultet, Nemanjina ulica br. 6, Beograd, Srbija, Telefon: +381 64 951 81 47, E-mail: [ivana.petrovic@agrif.bg.ac.rs](mailto:ivana.petrovic@agrif.bg.ac.rs)

7 Profesor, dr Milena Marjanović, Univerzitet u Beograd, Poljoprivredni fakultet, Nemanjina ulica br. 6, Beograd, Srbija, Telefon: +381 621 120 447, E-mail: [milena.pauk@agrif.bg.ac.rs](mailto:milena.pauk@agrif.bg.ac.rs)

8 Docent, dr Marija Ćosić, Univerzitet u Beograd, Poljoprivredni fakultet, Nemanjina ulica br. 6, Beograd, Srbija, Telefon: +381 69 331 45 53, E-mail: [cosic.marija661@gmail.com](mailto:cosic.marija661@gmail.com)

9 Vanredni profesor, dr Slađana Savić, John Naisbitt Univerzitet u Beogradu, Fakultet za biofarming, Ulica Maršala Tita br. 39, 24300 Bačka Topola, Republika Srbija, Telefon: +381 60 443 46 15, E-mail: [bonita.sladjja@gmail.com](mailto:bonita.sladjja@gmail.com)

10 Redovni profesor, dr Gorica Cvijanović, John Naisbitt Univerzitet u Beogradu, Fakultet za biofarming, Ulica Maršala Tita br. 39, 24300 Bačka Topola, Republika Srbija, Telefon: +381 69 240 60 36, E-mail: [cvijagor@yahoo.com](mailto:cvijagor@yahoo.com)



## INNOVATIVE WASTEWATER TREATMENT AS A PREREQUISITE FOR THE USE OF SLUDGE IN AGRICULTURE

*Blaženka Piuković Babičković<sup>1</sup>, Željko Vojinović<sup>2</sup>, Predrag Vukadinović<sup>3</sup>*

### **Summary**

*This paper is based on the research done in water supply companies on the territory of Vojvodina in the Republic of Serbia. The paper presents an innovative model for wastewater treatment, because wastewater treatment and the disposal of sludge, produced during such treatment, are issues to be tackled not only by the Republic of Serbia, but also other countries in the region and elsewhere. The aim of the paper is to point out, how correct wastewater and sludge treatment can produce sludge, which has valuable agronomic properties. The paper seeks to encourage the correct use of sludge in agriculture in line with Directive 86/278/EEC, adopted by the Council of the European Economic Community to promote the use of sludge in agriculture on reasonable grounds, by ensuring its proper use.*

**Keywords:** *waste water treatment, sludge, agriculture.*

**JEL:** *Q19, Q53*

### **Introduction**

It is a generally known fact, that we have less and less drinking water supplies at our disposal due to high consumption and even higher levels of pollution. The fact that the above statement covers a global problem calling for serious attention, is also supported by the data of the UN, according to which, there 1.5 billion people now, who don't have access to clean, drinking water, and in the next 25 years that number will increase to around 5.4 billion.

- 
- 1 Blaženka Piuković Babičković, Ph.D., Tax Administration Subotica, Ministry of Finance, Korzo no. 5, Subotica, Serbia, Phone: +381 24 655 129, E-mail: [piukovic.b@gmail.com](mailto:piukovic.b@gmail.com).
  - 2 Željko Vojinović, Ph.D., Assistant Professor, University Novi Sad, Economic faculty Subotica, Segedinski put Street no. 9-11, Subotica, Serbia, Phone: +381 24 628 030, E-mail: [zeljko.vojinovic@ef.uns.ac.rs](mailto:zeljko.vojinovic@ef.uns.ac.rs).
  - 3 Predrag Vukadinović, Ph.D., Assistant Professor, University Singidunum, Faculty of Business Belgrade, Danilova Street no. 32, Belgrade, Republic of Serbia, Phone: +381 63 216 908, E-mail: [pvukadinovic@singidunim.ac.rs](mailto:pvukadinovic@singidunim.ac.rs)



The production and distribution of water, as well as the drainage and treatment of wastewater, are of crucial significance for life and survival on our planet, therefore it deserves special attention by the society as a whole.

The Republic of Serbia is in a group of European countries that have a series of problems with water supply and wastewater treatment. Thus, there is an obvious need for intensified and more significant investment of resources in the process of developing water supply companies, whereby, beyond equipment and tools, investments should also be made in knowledge, new technologies and innovation in company organization and management, market development, etc. (Ahmetagić, Piuković, Lukić, 2011). The transformation of water supply companies and the improvement of their business operations are vital preconditions of the overall economic development and Serbia's EU accession alike (Bogdanović, 2005; Lukić, 2008).

The aim of this paper is to provide the water supply companies with a justification for introducing process organisation and for its viability, by pointing out the correlation between the implementation of the business process management concept and the quality of achieved performances. Furthermore, the paper seeks to emphasize the importance of process decomposition and to show on a concrete example how to decompose a process into logically relating process parts. It facilitates the understanding of the process flow and the functioning of the process, and, also, the management of the business process. The paper also seeks to call the attention to the potentials of using ecosystem technologies and solving the problem of sewage sludge as a residual product of wastewater treatment plants. Pursuant to the Council Directive on the protection of environment, and in particular of the soil, when sewage sludge is used in agriculture (86/278/EEC), correctly treated sewage sludge can successfully be used in agriculture as well. The aim of the mentioned Directive is to regulate the use of sewage sludge in such a way as to prevent harmful effects on soil, vegetation, animals and man, while encouraging the correct use of sewage sludge (Council Directive, Article 1).

Only achieving significant progress in the implementation of business process management concept can help water supply companies to fulfil and maintain all requirements set by international standards in this area (such as ISO 9000, ISO 14000, HACCP). Compliance with the stipulations of the indicated Directive 86/278/EEC by the Council of the European Economic Community, relating to EU Member States, is one of the necessary steps the Republic of Serbia has to take on its way of EU accession.

### **Accepting Process Approach, as a Precondition for Successful Monitoring and Achieving the Organization's Objectives**

“In the past, organizations have focused their efforts on making effective decisions within a facility. In this case, the various functions of an organization, including assembly, storage, and distribution are generally decoupled into their functional and geographic components through buffers of large inventories. In this way, the complexity of the decisions is reduced since each component is treated independently of the others.

Ignoring these component dependencies, however, can have costly consequences. This becomes increasingly apparent with market globalization. As a result, firms are moving from decoupled decision making processes toward more coordinated and integrated design and control of all of their components in order to provide goods and services to the customer at low cost and high service levels” (Thomas, Griffin, 1996).

The world renowned theorist, Peter Drucker (2002), points out that it is organization, that has to become the key subject of change, because the most effective way to successfully manage changes is that the changes initiate themselves.

Process approach emphasizes the fact that every organization is a set of inter-connected processes, and implementing a process-based organizational structure should be the result of efforts invested by all the individual participants in processes. Thereby, customer awareness is fully included in this approach and it holds a primary place inside it (Anupindi, Chopra, Deshmukh, Mieghem, Zemel, 2012).

Business Process Management (BPM) is one of the vital issues for many organisations, because, if successfully adopted, it can bring about significant advantages to the organization, such as: better understanding of business processes, a higher level of control and significantly better business performance (Buh, Kovačić, Štemberger, 2015).

“Organisation is fully carried out through business processes. The process is a set of interconnected activities with interactions, which are transforming the object (input) into a result (output), in a way that employees (people) are adding to it a certain procedural value, using the resources of the organization” (Radosevic, Baosic, Caric, Jovanovic, Beric, Bojic, Avramovic, 2014).

Business process management as a comprehensive managerial approach of introducing the process-based concept in organization includes the design and modelling of the business processes, implementing the process and measuring its effectiveness.

Porter (1985) called the attention to the demand for process management, as well as the need to measure the realization of the set objectives, both at the level of the entire process and the level of the sub-processes and specific tasks alike.

Appointing a process owner and forming a management team are assumptions for the start of management and development of every key process. The process owner has the task and responsibility to keep the system functioning as a whole (Bosilj, Hernaus, Kovačić, 2008).

A company’s business flow should start from objectives, strategic orientation, and the design of organisation, and, in order to successfully implement its strategy, methods are necessary as well, which should be selected and implemented, likewise an adequate documentation basis, IT support, defining competencies, measuring and specifying performances, and the required communication which closes the circle of a company’s business flow.

Presenting business activities in the order of their appearance immensely facilitates

the understanding of the business flow processes, thus, it significantly eases the way of spotting certain critical activities, so it opens up a space for suggestions and proposals, and alternative ideas for improving the processes.

The modelling of processes serves as a documentation, and also represents a kind of user manual, which describes complex business processes. Business process analysts decide about the level of details to be considered during modelling. The creativity, knowledge and expertise of the business process analysts, as well as of the entire modelling team come to expression. The result achieved by modelling largely depends on the available time, the organization of the system that is analysed, on the communication with the users of the system, as well as on other similar factors.

Modelling has a great significance in the process of creating or setting up an organization's BPM, because setting up process organisation, actually, starts by modelling standard processes. The first things to be identified are business processes, then comes the modelling of process types, and parallel with that, the organisation is redesigned, i.e. accommodated to the business process management concept. The next stage is BP planning which is a key factor in the process of BPM. In this stage the first approach is to identify the process needs, and then the modelling of instances using standard values is performed. Simultaneously, the plan of capacity and the time schedule are being drawn up, and the design of the process flows starts. In the third stage, called BP management and planning, the modelling of process instances using actual values and alternatives is carried out, and instances are optimized by their respective sequences and the model is transformed into a feasible model. Simultaneously, the aggregation and redesigning of the model by instances is performed, and in the final stage come observation and control, which synergistically leads to automatic implementation (Scheer, Feld, Casper, 2012).

Based on the above stated, it can be concluded that the successful implementation of a business process managing concept requires serious, planned and organized approach.

### **Identifying and Defining the Key Business Process**

Process orientation is the main means of process evaluation and learning the ways to create, restructure and lead processes aimed at improving performance. (Anupindi et al., 2012).

Identifying and defining business processes are important questions for every organization, which wants to conduct structural changes from the traditional internal focus on the hierarchy to a structure that is flexibly oriented towards consumers. The initiative for changing business processes should be started by the top management. (Žabjek, Kovačić, Indihar, Štemberger, 2008).

By defining primary (basic) business processes in water supply companies, we actually illustrate the way these companies should meet the needs of their consumers. Exactly for this reason, when we define them, it is absolutely necessary to clearly understand

the core activities of the company and the values it creates for its consumers, and, besides that, it is also essential to understand how the units of the organization approach the major tasks, which are to be solved jointly. Namely, we consider the existence and functions of an organisation, its business ideas, vision and strategy, but, it is also essential to understand the results of the organization's strategic analysis and its business situation.

Companies, dealing with potable water production and supply, and wastewater drainage and treatment, should be, first and foremost, guided by the regulations and Directives relating to environment protection while making decisions about their business mission, vision and strategy. A vision, based on environment protection emphasizes the meaning of work and has the strength to gather all employees around a common vision of the future. Environment protection should be a strategic question, which will be in the focal point in defining business processes in companies for wastewater treatment.

Depending on business factors, as well as the perception, approach, experience, knowledge and creativity of managers, it is fundamental to identify the key business processes in companies, which are, in the opinion of top managers, of critical importance to business, so they shall be managed in the forthcoming period. Thus, it is required to start with the improvement of the key and the most problematic processes (Janićijević, 2010).

### **Presentation and Analysis of the Wastewater Treatment Process**

During the research in companies for water supply, in a particular company, "wastewater drainage and treatment" has been identified as a key business process. The significance of wastewater drainage from households and from industrial companies, as well as the atmospheric waters that are collected through drains, their treatment and purification in accordance with the specified standards, along with the obvious need for capacity increase and improvement of processes, affected the selection of this key business process.

Special attention was paid to the process of wastewater treatment during the implementation of the research in water supply companies, because of the below indicated reasons. The National Waste Management Strategy, valid for the period of 2010-2019 (Official Journal of the Republic of Serbia no. 29/10), adopted by the Government of the Republic of Serbia, calls the attention to a highly alarming situation in the field of wastewater treatment. Namely, according to the data published in the mentioned Strategy, only 46 percent of the households are connected to the sewage system in the Republic of Serbia, while the quantity of communal wastewater is 363,1 million cubic meters/year. Only 5,3 percent of the total wastewater quantity is treated appropriately, while the residual sludge is disposed in landfills. As the quantity of wastewater to be treated and of the residual sludge has been increasing day by day, the National Waste Management Strategy brings forward, that sludge should be treated in line with the EU regulations. The Strategy foresees, that the stabilized residual sludge from wastewater treatment will be used in agriculture, for thermal treatment in incinerators and as a fuel in cement works, while the rest will be disposed.

In the next chapters, the paper will provide the presentation of an innovative wastewater treatment process, which is compliant with international standards.

### Innovative Wastewater Treatment Process

The innovative process of wastewater treatment includes a water line and a sludge line.

*The water line* is a modern and innovative flow of activities in wastewater treatment, because each sub-process has been significantly improved and it includes:

1. Wastewater drainage.
2. Mechanical treatment of wastewater.
3. Biological treatment of wastewater.

*The sludge line* is a flow of activities performed during primary and secondary sludge treatment, i.e. the sludge is separated during wastewater treatment and this process includes:

1. Energy production

**Table 1.** Drainage and wastewater treatment (TO-BE model)

Process limits:	Starting activity:	Drainage of atmospheric and communal wastewater to wastewater plant
	Final activity:	Discharge of treated water according to 91/271 EEC
Process entry		Exit from process
<ul style="list-style-type: none"> <li>- City communal wastewater</li> <li>- SCADA system</li> </ul>		<ul style="list-style-type: none"> <li>- Treated water according to 91/271 EEC</li> <li>- Stabilized sludge</li> <li>- Biogas</li> <li>- Electric energy</li> </ul>
Sub-processes		Description in documents
<ol style="list-style-type: none"> <li>1. WATER LINE- purification of water</li> <li>2. SLUDGE LINE- Energy production</li> </ol>		<ol style="list-style-type: none"> <li>1. sub-process list 2.1, 2.1.1, 2.1.2, 2.1.3</li> <li>2. sub-process list 2.2</li> </ol>
User		Demands/expectations of users
<ul style="list-style-type: none"> <li>- Community</li> <li>- Enterprise</li> </ul>		<ul style="list-style-type: none"> <li>- Treated water according to 91/271 EEC</li> <li>-Production of electric energy that will reduce the costs of plant.</li> <li>-Using stabilized sludge in accordance with its properties.</li> </ul>
Resources		

-Personnel in accordance with the job systematization plan -Infrastructure (Entering pumping station, primary sedimentation tank, biological tank, secondary sedimentation tank, building for press, hoods, silo for sludge, gas reservoir, building gas generator, command building, laboratory) -Machinery (pumps, mixers etc.) -Automatic (switches, fuses, PLC, SCADA) -Laboratory equipment (flow meter, sensors, gauges pressure, temperature gauge, gauges PH value)			
Performances	Unit of measurement	Starting value	Achieved value
1. chemical oxygen demand 2. biological oxygen demand 3. suspended matters 4. total nitrogen 5. total phosphorous	mg/l	511 183 321 45 7	125 25 30 10 1
Measurement/control point	Frequency of measurement	Person responsible for measurement	Document
-Entrance of wastewater into the facility -inlet works -Exit of wastewater from the facility -outlet	Daily	Process engineer	Daily report SCADA note
Process team	Team support	Revision:	Approved by
Process owner	Reliever	Continuous tracking and managing of the business process	Full name:
S u b - process owner	Specialist		Date:
	Documented by:		Signature:

Source: Piukovic, 2013

The innovative business process of wastewater treatment now includes the sub-process of wastewater treatment, called “water line” and the sub-process of producing energy, called “sludge line”. The complete innovative process is monitored by the logs of the SCADA (supervisory control and data acquisition-SCADA) system. Ostroff (1999) stressed the importance of information technology and its use in process-oriented organizations, because it makes process monitoring and implementation easier, simpler and faster. Owing to the use and support of IT systems, companies and specialized departments can focus on their core competencies and processes, and it also provides a faster flow of information which leads to improved processes and the development of competitive advantage (Kuhn, 2011). Therefore, monitoring wastewater treatment by the SCADA system records represents a massive improvement and a step forward compared to the previous method of monitoring and documenting business processes.

*Draining wastewater to the treatment plant* is a way of transporting wastewater via collector systems to the wastewater treatment plant. At the point, where wastewater enters the inlet works through a pumping station, wastewater samples are taken by an automatic sampler to measure the values of chemical oxygen demand (COD), biological oxygen demand (BOD), dry matter (DM), total nitrogen (TN) and total phosphorous (TP). The inlet flowrate is also measured. After the wastewater entered the inlet works and the accomplished lab analysis, the following parameters are recorded, which are measured in the plant: COD amounting 511 mg/l, BOD amounting 183 mg/l, dry matter amounting 321 mg/l, total nitrogen amounting to 45 mg/l and total phosphorous amounting to 7 mg/l. All measurements are logged in the SCADA system.

*The mechanical treatment of wastewater* in the innovative process includes the filtration of wastewater through coarse and fine screens, wastewater treatment in a sand trap and in primary sedimentation tank. Waste is collected besides the coarse screen and taken away in containers after the relevant measurement. The number of containers transported is duly recorded. Waste is also collected beside the fine screen and its quantity is recorded as well. That waste is disposed in a point for waste disposal. Wastewater is further treated in a sandtrap and the amount of sand that is collected is measured and taken to waste disposal point. In order to determine if at least 85% of particles larger than 0,2micrometres have been removed, particles separated after sand trap treatment are measured and a report on the concentration of dry matter is made. Wastewater treatment in the sand trap is crucial and the above indicated target performances have to be achieved, because if the amount of the removed sand is not appropriate, then the remained sand could accelerate the breakdown of the pumps. After the sand trap, the wastewater flows to the primary sedimentation tank, where primary sludge sedimentation takes place. Here, the flow rate of the primary sludge is measured and recorded. After the mechanical treatment, wastewater is treated biologically, and the primary sludge is used in the electricity production sub-process.

*The biological treatment of wastewater* in the innovative process is significantly improved and it includes the following activities: transporting the wastewater to the biological treatment plant, wastewater treatment in the anaerobic and the anoxic zones, wastewater treatment in the nitrification and disinfection tank, additional aeration in the old biological treatment tank, transporting to additional sedimentation tanks and discharging treated water. During the biological treatment of the wastewater, the concentration of oxygen is measured and its target value should range from 0,5 to 2 mg/l. During the discharge of treated water, target values to be achieved are: ammonium - below 1 mg/l, nitrate - below 0,3 mg/l, COD should be 125 mg/l, BOD should be 25 mg/l, DM 30 mg/l, total nitrogen 10 mg/l and total phosphorous 1 mg/l. The output of this sub-process is treated wastewater in accordance with the 91/271 EEC standards and secondary sludge that will be used together with the primary sludge in the electricity production sub-process. Measurements made during the above listed activities are innovations, because they are implemented in the most contemporary way, continuously, and documented by the records of the SCADA system. In order to

provide better monitoring and control, performances, units of measurements, starting values, target values, the frequency of measurement and measurement/control points should be specified in the sub-process lists.

The energy production *sub-process*, called the “sludge line” includes the following activities: primary sludge thickening in gravity thickener, secondary sludge thickening in gravity thickener band, discharging primary and secondary sludge to digestion tanks, where the anaerobic digestion of the sludge is made in order to produce biogas, delivering of biogas into compressors to increase pressure, processing of biogas in a gas engine, collection of stabilized sludge in a tank and its pressing in band press. The quality of the treated water, biologically active sludge and its density are measured. Then, the thickened primary and secondary sludge are treated in a digestion tank, where anaerobic digestion is performed in order to produce biogas. At this point, it is essential to measure the quality and temperature of biogas. The temperature should be between 30-37 °C, the pH value should be between 6,8-7,5 pH, biogas consumption should be around 2700 m<sup>3</sup>, the amount of hydrogen sulphide should be below 200 ppm, and the quality of gas should be 55%. Biogas is then delivered to compressors, where its pressure is increased. By processing biogas in gas engines, electricity is produced, and its target value is 240 kWh.

The output of this sub-process is stabilized sludge with 20% of dry matter content, and electrical and thermal energy. Thanks to the production of its own electrical energy, the company can satisfy around 50% of its power consumption needs, and it is a significant saving. This sub-process is also accompanied by permanent measurements and control of sub-process performances thus ensuring the managing of the business process.

### **The Use of Sewage Sludge in Agriculture**

Sewage sludge comprises of a huge amount of water, dry matters containing organic matters, nutrients, heavy metals and organic pollutants and pathogenic microorganisms. Depositing sludge next to the wastewater treatment plant, the above indicated sludge pollutants, which are in a concentrated form, get back to the environment, and it is a potential hazard for human health and the environment. For this very reason, the interest in sludge production, depositing and recycling is growing in Europe (Karlović, 2010).

The 86/278/EEC Directive (further as: Directive) regulates and encourages the use of sewage sludge in agriculture in a way that prevents any harmful impact on the soil, vegetation, animals and man. EU Member States, by virtue of their common market, in compliance with the Directive and its annexes I A, I B and I C, are bound to observe the stipulations, which specify the conditions and limit values which should be fulfilled during sludge treatment and its use for agricultural purposes.

In compliance with Article 4 of the Directive, annexes I A, I B and I C specify the values for the concentration of heavy metal in the soil, on which the sludge is used, the concentration of heavy metals in the sludge and the maximum annual quantities of these heavy metals which may be introduced in the soil intended for agriculture.



In accordance with Annex II A, before sludge is used in agriculture, it should be analysed and such an analysis should cover the following parameters: dry matter, organic matters, pH, nitrogen, phosphorous, cadmium, copper, nickel, lead, zink, mercury, chromium.

Annex I B sets the limit values for heavy metal concentrations in sludge for use in agriculture (mg/kg of dry matter) and it is shown in the table below.

**Table 2.** Limit values for heavy metal concentrations in sludge for use in agriculture

Parameters	Limit values (mg/kg of dry matter)
Cadmium	20 to 40
Copper	1000 to 1750
Nickel	300 to 400
Lead	750 to 1200
Zink	2500 to 4000
Mercury	16 to 25
Chrome	-

Source: Directive 86/278/EEC

Member States regulate the use of sludge in agriculture under the condition, that the accumulation of heavy metals in the soil shall not exceed the set limit values. They determine the maximum sludge quantity expressed in tonnes of dry matters, which may annually be used on soil per area unit, and shall observe the limit values for the heavy metal concentrations in sludge, which are indicated in Table 2.

For the case of using sludge in agriculture, the Directive has been supplemented by a Working Document on Sludge - third draft EC 2000, which suggests, that, besides checking heavy metal, organic compounds should also be considered:

1. AOX- sum of halogenated organic compounds,
2. LAS- Linear alkylbenzenesulphonates,
3. DEHP- Di(2-ethylhexyl)phthalate,
4. NPE- Nonylphenol and nonylphenoethoxylates with 1 or 2 ethoxy groups,
5. PAH- polycyclic aromatic hydrocarbons,
6. PCB- polychlorinated byphenils,
7. Polychlorinated dibenzodioxins and dibenzofuranes.

In line with the Directive, it is prohibited to use or supply sludge for the use on:

-“grassland or forage crops if the grassland is to be grazed or the forage crops to be harvested before a certain period has elapsed” and that period shall not be shorter than three weeks;

- “soil in which fruit and vegetable crops are growing, with the exception of fruit trees;

-ground intended for the cultivation of fruit and vegetable crops which are normally in direct contact with the soil and normally eaten raw for a period of 10 months preceding the harvest of the crops and during the harvest itself.”

With responsible treatment before use and accomplishing the prescribed detailed analyses of sludge and soil, sludge may be used in a way that the nutrient needs of plants are taken in consideration and that soil, surface and underground water quality is not deteriorated.

EU Member States are bound to observe the above referred Directive and all its Annexes, which specify the necessary sludge and soil analyses, the referent methods of sampling and analysing, storing updated data about the accomplished analyses and submitting all required data to the competent authorities.

The use of sludge in agriculture is based on the nutrient content of the sludge. Namely, by the decomposition of organic sludge components to anorganic they infiltrate in clay and humus particles and facilitate the growth of plants. The organic components in the sludge improve the structure of the soil and enable its aeration and improves its ability to keep moisture. Besides nitrogen, phosphorous and potassium, sludge also contains iron, manganese, zinc, copper, boron and molybdenum and it all contributes to the better growth of plants (Šišić, Bikić, Avdić, 2015).

### **Conclusion**

Water supply companies should transform their organisation from traditional to business process-oriented one, and product and service quality management should be a permanent process for them.

In order to achieve successful progress in business process management, it is essential, that the company’s basic approach to process-oriented management, customer satisfaction and permanent improvements must not be just empty phrases, but an integral part of the company’s organisational culture (Rentzhog, 2000).

The paper has specifically presented a breakdown (decomposition) of a key business process, i.e. wastewater drainage and treatment, to logically pertaining process parts. The presented decomposition may be of great assistance to companies operating in the field of wastewater treatment. Special attention is paid to the presentation of sludge management in the wastewater treatment plant.

On its ways to full-fledged EU membership, the Republic of Serbia should pay special attention to environment protection. The aim of the paper was to prompt the correct management of residual sludge from wastewater treatment in line with the EU regulation. Innovating the wastewater treatment process and applying acceptable technologies will have a positive impact on environment protection. Eco-remediation, as a biotechnology implies the use of biological, environmentally acceptable technologies by using different microorganisms and green plants to eliminate various pollutions. The selection of the solution to be applied in treating communal sludge should be based on

its environmental acceptability.

The use of sludge in agriculture has a number of advantages (Šišić et al., 2015):

- decreased use of fertilizers,
- less production costs,
- improved fertility and structure of the soil,
- maintaining optimum moisture, improving the permeability of soil,
- enriching the soil with organic ingredients,
- recirculation of phosphorous compounds, already exhausted on global level,
- decreased possibility for erosion.

In EU Member States, after the correct and responsible treatment of the sewage sludge, about 45 percent of the treated sludge is used in agricultural production. Treated sludge may have valuable agronomic properties, therefore its use is encouraged. In the Republic of Serbia a lot has to be done on raising awareness about the use of sludge in agriculture and on responsible conduct of those companies, which deal with wastewater treatment.

#### References:

1. Ahmetagić, E., Piuković, B., Lukić, D. (2011): *Business Process Management and Organization Innovativeness*, Strategic management – International Journal of Strategic Management and Decision Support Systems in Strategic Management Vol.16, No 4, pp 37-44.
2. Anupindi, R., Chopra, S., Deshmukh, D.S., Van Mieghem, J.A., Zemel, E. (2012): *Managing Business Process Flows*. Pearson, New Jersey.
3. Bogdanović, S. (2005): EU Framework Directive on Water. Novi Sad *Yugoslav Association for Water Law*.
4. Buh, B., Kovačić, A., Štemberger, M. (2015): *Critical success factors for different stages of business process management adoption – a case study*. Economic Research – Ekonomska Istraživanja, Vol. 28, No. 1, pp. 243–258, available at: <http://dx.doi.org/10.1080/1331677X.2015.1041776>.
5. Bosilj, V.V., Hernaus, T., Kovačić, A. (2008): *Upravljanje poslovnim procesima – organizacijski i informacijski pristup*. Školska knjiga, Zagreb.
6. Drucker, P. (2002): *Upravljanje u novom društvu*. Adizes, Novi Sad.
7. Janićijević, N. (2010): *Procesni pristup u organizacionoj analizi i promenama*. Ekonomika preduzeća, no.11/12 2010.
8. Karlović, E. (2010): *Muljevi od prečišćavanja komunalnih otpadnih voda - legislativa, korišćenje i tretman muljeva*. available at: <http://www.cecra.dh.pmf.uns.ac.rs/pdfww2010/ELVIRA%202010%20MULJEVI%20OD.pdf>.

9. Kuhn, T. (2011): *Wettbewerbsfähig dank Business Analyse*. Journal Zeitschrift Führung und Organisation.
10. Lukić, D. (2008): *Vodosnabdevanje – razvojne mogućnosti i primena benčmarkinga*. Memorija, Sombor.
11. Ostroff, F. (1999): *The Horizontal Organization*, Oxford University Press, New York.
12. Piukovic, B. (2013): *Upravljanje poslovnim procesima u javnim komunalnim preduzećima za vodosnabdevanje*, doktorska disertacija, Ekonomski fakultet u Subotici, Univerzitet u Novom Sadu, Republika Srbija.
13. Porter, M.E. (1985): *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: The Free Press.
14. Radošević, M., Baosić, M., Carić, M., Jovanović, V., Berić, D., Bojčić, Z., Avramović N. (2014): *Implementation of Business Process Reengineering in Human Resource Management*. Inzinerine Ekonomika - Engineering Economics, 2014, Vol. 25, No. 2, pp. 211-222.
15. Rentzhog, O. (2000): *Temelji preduzeća sutrašnjice*. Prometej, Novi Sad.
16. Scheer, A.W., Feld, T., Casper, R. (2012): *IM Die Fachzeitschrift für Information Management und Consulting*, Available at: [http://www.scheer-management.com/wp-content/uploads/2012/07/IM-2012-Ausgabe2-Senderdruck\\_DE\\_Homepage.pdf](http://www.scheer-management.com/wp-content/uploads/2012/07/IM-2012-Ausgabe2-Senderdruck_DE_Homepage.pdf)
17. Šišić, M., Bikić, F., Avdić, N. (2015): *Ekološki prihvatljivi načini zbrinjavanja muljeva zaostalih na komunalnim uređajima za prečišćavanje otpadnih voda*. Available at: <http://www.quality.unze.ba/zbornici/QUALITY%202015/075-Q15-061.pdf>
18. Thomas, D.J., Griffin, P.M. (1996): *Coordinated supply chain management*. European Journal of Operational Research, Vol. 94, No.1, pp. 1-15.
19. Žabjek, D., Kovačić, A., Indihar Štemberger, M. (2008): *Business process management as an important factor for a successful ERP system implementation*. Economic Research – Ekonomska Istraživanja, Vol.21, no.4. pp.1–18. Available at: [http://hrcak.srce.hr/index.php?show=clanak&id\\_clanak\\_jezik=60008](http://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=60008).
20. *Direktiva Saveta o zaštiti životne sredine, a posebno zemljišta, pri korišćenju kanalizacionog mulja u poljoprivredi 86/278/EEC*, Savet Evropske zajednice.
21. *Strategija upravljanja otpadom za period 2010 – 2019. godine* (Sl.glasnik RS br. 29/10).

## INOVIRANO PREČIŠĆAVANJE OTPADNIH VODA KAO PREDUSLOV ZA KORIŠĆENJE MULJA U POLJOPRIVREDI

*Blaženka Piuković Babičković<sup>4</sup>, Željko Vojinović<sup>5</sup>, Predrag Vukadinović<sup>6</sup>*

### Sažetak

*Ovaj rad se zasniva na istraživanju koje je sprovedeno u preduzećima za vodosnabdevanje koja se nalaze na području Vojvodine u R. Srbiji. U radu je predstavljen inovirani model prečišćavanja otpadnih voda iz razloga što se sa problemom prečišćavanja otpadnih voda i odlaganjem mulja koji nastaje nakon prečišćavanja susreće R. Srbija kao i mnoge zemlje u regionu ali i šire. Cilj ovoga rada je da ukaže kako se pravilnim prečišćavanjem otpadnih voda kao i pravilnim tretmanom mulja koji nastaje nakon prečišćavanja, može doći do mulja koji ima vredna poljoprivredna svojstva. Ovaj rad želi da podstiče ispravnu primenu mulja u poljoprivredi u skladu sa Direktivom 86/278/EEC, koja je doneta od strane Saveta Evropske zajednice a kojom se želi opravdano podsticati primena mulja u poljoprivredi uz obezbeđenje da se ispravno koristi.*

**Ključne reči:** *prečišćavanje otpadnih voda, mulj, poljoprivreda.*

---

4 Dr Blaženka Piuković Babičković, Ministarstvo finansija, Poreska uprava Subotica, Korzo br. 5, 24000 Subotica, Srbija, Telefon: +38124655129, E-mail: [piukovic.b@gmail.com](mailto:piukovic.b@gmail.com)

5 Docent, dr Željko Vojinović, Ekonomski fakultet Subotica, Univerzitet u Novom Sadu, Segedinski put br. 9-11, 24000 Subotica, Srbija, Telefon: +38124628030, E-mail: [zeljko.vojinovic@ef.uns.ac.rs](mailto:zeljko.vojinovic@ef.uns.ac.rs).

6 Docent, dr Predrag Vukadinović, Univerzitet Singidunum, Fakultet Poslovna Ekonomija Beograd, Danilova ulica br. 32, Beograd, Republika Srbija, Telefon: +381 63 216 908, E-mail: [pvukadinovic@singidunim.ac.rs](mailto:pvukadinovic@singidunim.ac.rs)

## PROFITABILITY GAP IN THE MILK PRODUCTION CHAIN: EVIDENCE FROM SERBIA

*Stanislav Zekić<sup>1</sup>, Kristina Mijić<sup>2</sup>, Dejan Jakšić<sup>3</sup>, Ivan Milenković<sup>4</sup>*

### Summary

*The main goal of this paper is to compare profitability of large dairies (processors) versus large milk producers, i.e. farms with 100 or more cows, organized as companies. Profitability is measured by following indicators: return on assets and return on equity. Profitability gap analysis shows that milk processors achieved significantly higher profitability compared to cow breeders. Furthermore research results suggest that the existence of differences in the level of profitability among the participants in the milk production primarily affects capital turnover, and then the profit margin.*

**Key words:** *profitability, milk production, dairies, ROA, ROE.*

**JEL:** *M21, Q12, Q19.*

### Introduction

Agriculture production is a relatively important industry in Serbia. This is the consequence of favorable agro-ecology conditions. On the other hand, this is also the consequence of an underdeveloped economic system. Since the crop production dominates in Serbian agriculture production, its structure in Serbia is not favorable due to the fact that the generator of intensity of agriculture production – livestock breeding – participates in 1/3 of overall production. Cattle breeding dominates among livestock breeding (>50%), while milk production is the second most important product of livestock breeding – around 30% of the total value of animal production. Otherwise, milk production had been 8% of total Serbian agriculture output in the period 2010-2012 (Bogdanov, Rodic, 2014). Milk production in Serbia is taking place on around 156,000 farms, with more than 450,000 milking cows. Around 2/3 of Serbian

- 1 Stanislav Zekić Ph.D., Associate Professor, University of Novi Sad, Faculty of Economics Subotica Segedinski put no. 9-11, 24000 Subotica, Republic of Serbia, E-mail: [zekics@ef.uns.ac.rs](mailto:zekics@ef.uns.ac.rs)
- 2 Kristina Mijić Ph.D., Teaching Assistant, University of Novi Sad, Faculty of Economics Subotica Segedinski put no. 9-11, 24000 Subotica, Republic of Serbia, E-mail: [mijick@ef.uns.ac.rs](mailto:mijick@ef.uns.ac.rs)
- 3 Dejan Jakšić Ph.D., Full Professor, University of Novi Sad, Faculty of Economics Subotica Segedinski put no. 9-11, 24000 Subotica, Republic of Serbia, E-mail: [jaksicd@ef.uns.ac.rs](mailto:jaksicd@ef.uns.ac.rs)
- 4 Ivan Milenković Ph.D., Associate Professor, University of Novi Sad, Faculty of Economics Subotica Segedinski put no. 9-11, 24000 Subotica, Republic of Serbia, E-mail: [imilenkovic@ef.uns.ac.rs](mailto:imilenkovic@ef.uns.ac.rs)

farms have up to two milking cows, which represents the small semi-subsistence agriculture sector (Statistical Office of the Republic of Serbia, 2014). Such farms are not commercially intended, but are elements of social security networks in rural areas.

During the last decade dairy production in Serbia has been in constant decline. This decrease originates in Central Serbia, while there is an increase in Vojvodina (Statistical Office of the Republic of Serbia, 2014). Reduction in production in Central Serbia, that participates around 3/4 of overall milk production, is caused by diminishing of production on small semi-subsistence farms that are closing down due to economic unsustainability. Vojvodina, that gives around 25% of milk production with 17% of total Serbian milking cows, is a region with more intensive livestock production that are commercially intended toward milking cow farms. Therefore around 40% of delivered milk is produced in Vojvodina (Popovic, 2008).

The average milk yield of cows in Serbia has grown in the last several years, which partially amortized decrease of the total number of milking cows. Increase in milk yield of cows is more noticeable in Vojvodina, where milk yield per cow is higher than in central Serbia – a bit less than 4,000 liters per year per dairy cow, in comparison to around 2,500 liters respectively (Statistical Office of the Republic of Serbia, 2014). It is obvious that the variation in milk yield of dairy cows between regions is defined by the size of the farm (Bogdanov, Rodic, 2014). However, in comparison with EU countries, milk production per dairy cow in Serbia is very low at only 50% of the average EU-27. The situation is somewhat more favorable in comparison to neighboring countries, as the average milk yield in Serbia is higher than in Albania, Montenegro, Bosnia and Herzegovina and Macedonia, but still lower than in Bulgaria, Romania and Croatia (Volk et al., 2014).

Contrary to the milk production industry, the milk processing industry in Serbia is mainly concentrated in bigger capacities. These capacities have been recently privatized and modernized and dominate the domestic market with more than 90% of overall processing capacities in Serbia. Production of these processing capacities is mostly oriented toward liquid dairy products, while cheese production is mainly of less priority. On the other hand, there are a large number of small milk processing production facilities that cover 4-6% of overall capacities (there are over two hundred registered dairies in Serbia, but not all of them are active - most of them are dairies of medium and small capacity). Such dairy facilities mainly operate locally, and they are especially interested in production of cheese, spreads and other fermented milk products. In Serbia although purchase is growing, number of producers who deliver milk reduces. Therefore, it implies a trend of strengthening market-oriented farmers in Serbia (Government of the Republic of Serbia, 2010).

Due to the dominance of the big processing capacities on Serbian milk market purchase, or existence of oligopsony or even monopsony structure, a relatively unfavorable position of small farmers as milk producers can be assumed. Small farms can affect the purchase price, and have problems reaching adequate milk quality, which can also negatively influence purchase price, and consequently on the profitability of production. The average price of raw milk in Serbia in the period 2010-2012 was lower in comparison to all other EU countries (20% below the EU-27 average), as well as lower than in countries in the region (Volk et al., 2014).

The biggest share of the total amount of subsidies for agricultural producers in Serbia is for crop production. Milk production accounts for about 14% of this direct support in agriculture (Volk et al., 2014). For many years, premiums for milk has been paid to farmers in Serbia, and as of the mid-2012 it amounts to 7 dinars (120 RSD = 1 EUR) per liter of milk. Necessary condition is to deliver minimum 3,000 liters per quarter. Due to this kind of production bonus payment, a large number of small farms is excluded from the system of supporting milk production, which contributes greatly to the economic unsustainability of production on small farms. A separate issue is the extent to which premium payments contribute to purchase price decrease, when it is known that the effect of subsidies paid to producers depend on elasticity coefficients of supply and demand. However, the question is whether state policy, through premium for milk production, can improve this situation.

From the standpoint of achieving profitability, larger manufacturers (i.e. farms with 100 or more dairy cows) should find themselves in a more favorable situation. These farms have modern technology, high-quality breed composition, qualified labor force and often their own crop production, which all together enables higher milk yield and milk quality and lower production costs per unit of product (Negring et al., 2009). Partially unfavorable aspect is that the selling of large quantities of milk is related to large processing capacities, i.e. large farms would be difficult to have an alternative to cooperation with small and medium-sized dairies, as is the case with small producers. On the other hand, the large dairies have an interest in large producers, since they represent the most significant raw material base of quality product. In addition, transportation issue – delivery of raw milk from large farms - is most rational in terms of organization, as well as cost-effective.

It is expected that all aforementioned aspects affect the financial results of the participants in the milk production chain. There is an ambivalent relationship between milk producers and dairies. On the one hand they are directed to each other, and the necessity of cooperation is obvious. On the other hand, there is a “fight” about the price and other conditions of sale. The result is mainly defined by the market position and financial strength of negotiators. Sustainable development in the milk production industry requires a balanced business performance, which means that the domination of one group could endanger the position of the other participants. In the long-term it could have a negative impact on both the financially stronger and weaker participants.

To explore whether the profitability of Serbian dairies differs in profitability Serbian milk producers aim to identify the economic position of some participants in the chain of milk production. Previous research of profitability of Serbian milk points out that the dairy industry is in slightly better condition than the overall Serbian market (Muminovic et al., 2012). Thus, in comparison with the dairy industry in Slovenia and Croatia, the profitability of the Serbian dairy industry is at a higher level as a result of high prices of the final products, lower production costs, and the lack of EU legislation regarding competition and the free market (Muminovic, Pavlovic, 2012). In addition, the comparative analysis of the profitability of the participants in the chain of milk production in other countries suggests the existence of disproportion in the levels of profitability between dairies and milk producers (Qian et al., 2013). Furthermore, identification of the causes of differences in the level of profitability is the



subject of numerous researchers (see more: Kergler 2012; Wilson 2011; Soboh et al., 2011).

This paper is organized as follows. After the introduction, materials and applied methods of profitability analysis of the participants in the chain of sales of milk in Serbia are presented. On the basis of the reference analytical indicators, a comparison of profitability is made, which is then analyzed in order to identify factors that determine the levels of profitability.

### Materials and methods

The profitability of a company can be analyzed using various financial indicators. The most representative indicators of profitability are the return on assets (ROA - Return on Assets) and return on equity (ROE - Return on Equity) (Wals, 2003). ROA measures a company's ability in using assets to earn net income. ROE measures how much profit (Net Income) a company generates with the shareholders equity. The following table gives an overview of key profitability indicators and reference values.

**Table 1. Profitability indicators and reference values**

Profitability Ratio	The method of calculating	Unit	Reference value
Return on Assets (ROA)	NI/TA	Ratio	$\geq 0.1$
Return on Equity (ROE)	NI/SE	Ratio	$\geq 0.15$

Source: Author's illustration (according to Horngren et al., 2012; Wals, 2003)

where:

NI - net income

TA - total assets

SE - shareholders equity

For the purpose of participants' profitability comparative analysis in the chain of milk production, the companies were divided into two groups: the first group consists of companies engaged in milk production, and the second group consists of dairies. The study is based on a sample of 20 companies, which were divided into two independent samples of the 10 leading companies in the field of milk producers, and 10 leading dairies in the Republic of Serbia.

Profitability analysis was conducted for the period 2010-2013. For the purpose of research data from the financial statements of numerous companies were used, taken from the website of the Agency for Business Registers of Republic of Serbia (<http://www.apr.gov.rs>). Data was processed using the statistical program SPSS IBM Statistics Version 20 (according to Berenson et al., 2012; Field 2009).

The following table shows the descriptive statistics for the profitability indicators ROA and ROE at the level of groups of companies from the milk producers, and a group of dairies companies.

**Table 2.** Descriptive statistics for ROA and ROE on the level of groups of companies: milk producers and dairies.

	ROA				ROE			
	2010	2011	2012	2013	2010	2011	2012	2013
<b>Milk Producers</b>								
Mean	-0.106	-0.012	-0.013	0.013	-0.232	-0.040	-0.046	0.047
Minimum	-0.146	-0.130	-0.557	-0.185	-1.042	-0.797	-1.789	-0.419
Maximum	0.177	0.192	0.176	0.107	0.387	0.378	0.454	0.387
Std. Dev.	0.098	0.087	0.199	0.081	0.417	0.334	0.642	0.213
Variance	0.010	0.008	0.004	0.007	0.174	0.112	0.413	0.045
<b>Dairies</b>								
Mean	0.055	0.082	0.080	0.098	0.150	0.238	0.302	0.416
Minimum	0.007	-0.116	-0.032	0.002	0.013	-0.564	-0.118	0.021
Maximum	0.386	0.217	0.205	0.346	0.773	0.926	1.709	0.649
Std. Dev.	0.114	0.091	0.066	0.101	0.223	0.389	0.511	0.225
Variance	0.013	0.008	0.004	0.010	0.050	0.152	0.261	0.051

Source: Author's calculations (based on data from the Agency for Business Registers of Republic of Serbia)

Comparing distribution of enterprises regarding profitability (whether they generate net profit or net loss) it can be seen that a greater number of milk-processing-companies managed to operate positively in the period 2010-2013. In 2010 and in 2013, all 10 companies in the sample of dairies had net profit, while the number of companies in the field of raw milk production was 6 and 5 respectively (See Table 3).

**Table 3.** Serbian milk producers and dairy processors samples 2010-2013

Group of companies	2010		2011		2012		2013	
	Net profit	Net loss	Net profit	Net loss	Net profit	Net loss	Net profit	Net loss
<b>Milk Producers</b>	6	4	4	6	5	5	5	5
<b>Dairies</b>	10	0	8	2	9	1	10	0

Source: Author's calculations

In order to carry out a comparative analysis of the profitability of the participants in the chain of milk production, two research goals are set:

- 1) To examine whether there is a significant difference in the level of profitability between companies from the milk production sector and dairy industry.
- 2) If there are significant differences in the level of profitability among the participants in the chain of production of milk, to identify the causes of these differences.

Accordingly to the first purpose of research, and bearing in mind that the profitability of the most commonly measured by two analytical indicators (ROA and ROE), the following hypotheses are set:

*H<sub>1</sub>: There is no statistically significant difference in the level of ROA between companies from milk producing industry and companies from dairy processing industry.*

*H<sub>2</sub>: There is no statistically significant difference in the level of ROE between companies from milk producing industry and companies from dairy processing industry.*

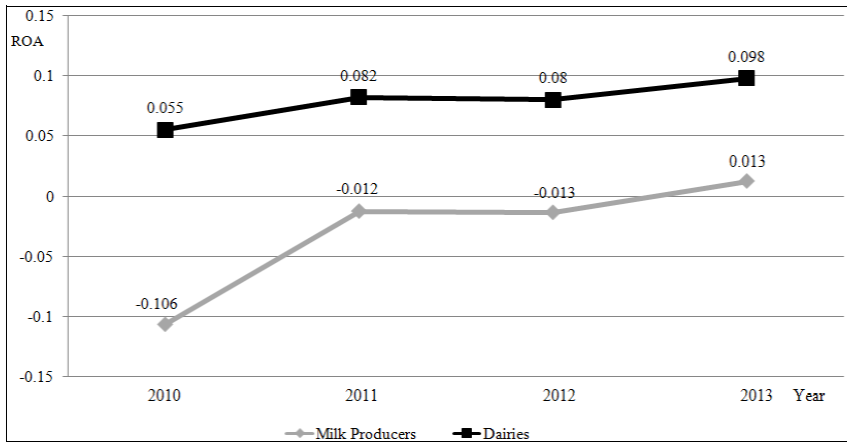
Differences in the level of profitability of the participants in the chain of production of milk was examined using the statistical method of mixed-design repeated measures ANOVA (see for more details: Field, 2009). For companies such as milk producers and dairies, profitability is measured on the basis of indicators ROA and ROE for the period of four consecutive years. The results of a mentioned statistical test indicates whether there is a statistically significant difference in the level of profitability between the two groups of participants: milk producers and dairies (between-subject effects) in the period 2010-2013. In addition, the results of the test indicate the changes of a level of profitability in the period 2010-2013 in the industrial sector of milk (within-subject effects).

## **Results**

### ***ROA Analysis Results***

The results of ROA measurement indicate that companies from the group of dairies have a higher level of average profitability of the companies from the group of milk producers (see Figure 1).

**Figure 1.** ROA of dairy farming and dairy processing for the period 2010-2013



Source: Author's illustration

In accordance with a defined program of research, the significant differences in the level of ROA is tested using statistical method mixed design repeated measures ANOVA. Results of a comparison of ROA between the two groups of participants in the chain of production of milk are shown in Table 4, while the results of changes in the level of ROA over the observed period are shown in the table after it.

**Table 4.** Statistical significance of differences in the level of ROA between milk producers and dairies - Test of Between-Subject Effects for ROA

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	0.037	1	0.037	2.238	0.152
Dairy Industry	0.180	1	0.180	<b>10.903</b>	<b>0.004</b>
Error	0.297	18	0.016		

Source: Author's calculations, SPSS output

Since the obtained statistical value of  $F(1,18) = 10.903$ ,  $p < 0.05$  hypothesis  $H_1$  is rejected, and the alternative hypothesis is accepted. Thus, there are significant differences in the level of ROA between dairies and milk producers, so that dairies have significantly higher levels of ROA of the company from a group raw milk production.

**Table 5.** Results of changes in the level of ROA - Test of Within-Subject Effects for ROA - Mauchly's test

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon <sup>b</sup>		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
ROA	0.782	<u>4.123</u>	5	<u>0.533</u>	0.881	1.000	0.333

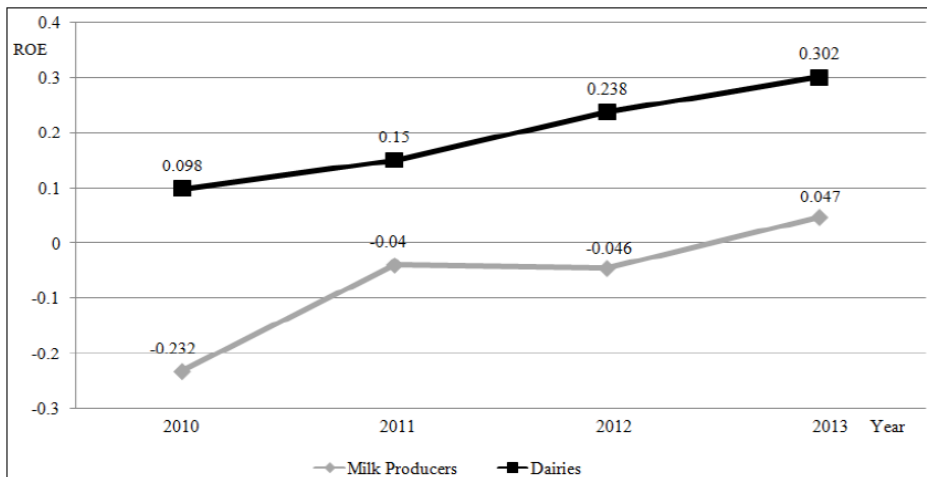
Source: Author's calculations, SPSS output

Sphericity assumption was tested using Mauchly's test. The result of an aforementioned test  $2(5) = 4.123, p > 0.05$  indicates that changes in the level of profitability of the participants in the chain of production of milk during the period 2010-2013 are not statistically significant.

### ROE Analysis Results

Results of ROE measurement indicate that companies from the group dairy industry have better average profitability compared to raw milk producers. During the period of 2010-2013 it is noticeably increasing the level of ROE in both groups of companies.

**Figure 2.** ROE of dairy farming and dairy processing for the period 2010-2013



Source: Author's illustration

The research results of statistical significance of differences in the level of ROE between the two groups of participants in the chain of production of milk are presented in the following table.

**Table 6.** Statistical significance of differences in the level of ROE between milk producers and dairies - Test of Between-Subject Effects for ROE

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	0.328	1	0.328	0.957	0.341
Group	2.601	1	2.601	<b>7.587</b>	<b>0.013</b>
Error	6.170	18	0.343		

Source: Author's calculations, SPSS output

Since the obtained value of  $F(1,18) = 7.587$ ,  $p < 0.05$  hypothesis  $H_2$  is rejected and the alternative hypothesis is accepted. Thus, there are significant differences in the level of ROE between dairies and milk producers, so that dairies have significantly higher levels of ROE than the companies in the group of raw milk production.

The following table shows the results of a statistical analysis of the trend in the level of ROE for the participants in the chain of production of milk.

**Table 7.** Results of changes in the level of ROE - Test of Within-Subject Effects for ROE - Mauchly's test

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon <sup>b</sup>		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
ROE	0.354	17.361	5	<b>0.004</b>	0.601	0.701	0.333

Source: Author's calculations, SPSS output

Since the value of Mauchly's test of sphericity is  $2(5) = 17.361$ ,  $p < 0.05$ , the assumption of sphericity is not fulfilled. Since the value  $< 0.75$  it is necessary to use Greenhouse-Geisser correction.

**Table 8.** Results of changes in the level of ROE - Test of Within-Subject Effects for ROE - Greenhouse-Geisser correction

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
ROE * Group	Sphericity Assumed	0.324	3	0.108	1.135	0.343
	Greenhouse-Geisser	0.324	1.802	0.180	1.135	<b>0.329</b>
	Huynh-Feldt	0.324	2.102	0.154	1.135	0.334
	Lower-bound	0.324	1.000	0.324	1.135	0.301

Source: Author's calculations, SPSS output

The value  $p = 0.329$  according to the Greenhouse-Geisser correction is greater than the limit value 0.05. Therefore there are no significant differences in the change of ROE in the period 2010-2013 of participants in the chain of production of milk.

### ***Identification of Factors Affecting the Differences in the Level of Profitability (ROA and ROE) Between Dairies and Milk Producers***

Given that the application of statistical methods showed a statistically significant difference in the level of profitability measured on the basis of ROA and ROE between companies from dairy industry and raw milk production sector. Factors affecting the existence of aforementioned difference are explored in the remainder of this paper. Return on assets as an indicator of profitability is further explained through two coefficients: the profit margin (PM) and assets turnover (AT) (Walsh, 2003). Profit margin indicates to the net income per unit of sales (Kimmel et al., 2009), while asset turnover indicates how efficiently a company is using its assets to generate sales (Fairfield, Lombardi Yohn, 2001).

$$ROA = PM \times AT$$

$$NI / TA = NI / NS \times NS / TA$$

where:

NS - net sales

On the return on equity, aside of the profit margin and the asset turnover, also influences equity multiplier (see more: Mubin et al., 2014).

$$ROE = ROA \times EM$$

$$ROE = NI / NS \times NS / TA \times TA / SE$$

In accordance with the second research aim set, answers to the following question should be given:

- Which one of following factors (PM, AT and/or EM) influences the existence of statistically significant differences in the levels of ROA and ROE between companies participants in the chain of production of milk.

In order to answer the aforementioned question, the following indicators are calculated for each company in the sample: profit margin, asset turnover and equity multiplier (PM, AT and EM) for the period 2010-2013. Presented in the following table is descriptive statistic PM, AT and EM for a group of companies: dairies and milk producers.

**Table 9.** Descriptive statistics for PM, AT and EM for a group of companies of dairies and milk producers

	PM				AT				EM			
	2010	2011	2012	2013	2010	2011	2012	2013	2010	2011	2012	2013
<b>Milk Production</b>												
Mean	-0.51	-0.41	-1.20	-0.86	0.48	0.45	0.54	0.54	1.80	1.98	2.53	1.98
Min.	-2.23	-2.34	-5.63	-5.82	0.01	0.03	0.02	0.00	1.11	1.14	1.13	1.14
Max.	1.44	0.23	0.06	0.46	1.80	1.36	1.75	1.63	2.72	3.75	6.12	4.91
Std. Dev.	1.03	0.80	1.86	1.92	0.60	0.494	0.64	0.66	0.61	0.90	1.88	1.11
Varia.	1.06	0.64	3.47	3.65	0.36	0.24	0.41	0.43	0.38	0.82	3.55	1.24
<b>Dairy Processing</b>												
Mean	0.04	0.02	0.03	0.07	1.62	1.60	1.59	1.56	2.36	2.89	3.05	3.37
Min.	0.01	-0.09	-0.03	0.00	0.91	0.92	0.85	0.77	1.31	1.31	1.36	1.27
Max.	0.12	0.10	0.13	0.23	3.24	3.72	2.75	2.55	5.49	7.58	7.69	8.65
Std. Dev.	0.04	0.05	0.04	0.07	0.82	0.80	0.55	0.50	1.51	2.16	2.14	2.59
Varia.	0.00	0.00	0.00	0.01	0.68	0.64	0.31	0.25	2.28	4.65	4.60	6.73

Source: Author's calculations, SPSS output

Identification of factors that significantly affect the existence of differences in the ROA and ROE between dairies and milk producers is based on determining the difference in the values of indicators PM, AT and EM between the two groups of companies, as these factors affect the value of the indicator of profitability. If there is a significant difference in some of these indicators, we can conclude that these factors are important to determine the differences in the level of profitability among enterprises engaged in dairy industry and raw milk production. Identifying differences in PM, AT and EM for these two groups of companies for the period 2010-2013 was conducted by using the statistical test of mixed-design repeated measures ANOVA (between-subject effects). The results of conducted statistical tests and explanations are shown in the following tables (Table 10).

**Table 10.** Statistical significance of differences in the level of PM, AT and EM between the dairies and milk producers - Test of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
<b>PM</b>					
Intercept	9.906	1	9.906	5.189	0.035
Group	12.527	1	12.527	6.561	<b>0.020</b>
Error	34.366	18	1.909		



Source	Type III Sum of Squares	df	Mean Square	F	Sig.
<i>AT</i>					
Intercept	87.942	1	87.942	57.711	0.000
Group	23.736	1	23.736	15.577	<b>0.001</b>
Error	27.429	18	1.524		
<i>EM</i>					
Intercept	498.376	1	498.376	51.735	0.000
Group	14.400	1	14.400	1.495	<b>0.237</b>
Error	173.397	18	9.633		

Source: Author's calculations, SPSS output

The result of the analysis – the difference in the level of profit margins at  $p < 0.05$  indicates that there is a statistically significant difference in the level of profit margins between dairies and milk producers. Moreover,  $p < 0.05$  in the analysis of differences in asset turnover ratio indicates that there is a statistically significant difference. On the other hand, the result of the analysis of differences in the level of indebtedness at  $p > 0.05$  indicates that there is no statistically significant difference in the level of indebtedness between dairies and milk producers.

Our research results proved that profit margin (PM) and asset turnover (AT) are identified as factors influencing the differences in the levels of profitability. Given that the difference in the level of indebtedness between dairies and milk producers is not statistically significant, it can be concluded that the debt (EM) is not a factor affecting the existence of differences in the level of profitability between these companies. Since  $p = 0.001$  for AT less than the  $p = 0.02$  for the PM, it can be concluded that among the factor influences profitability, the biggest impact has considerably higher turnover ratio assets of dairies, and then the higher profit margin.

### Conclusion

Milk production is one of the essential sectors of Serbian agriculture, so there is public interest in the survival of the whole production system. This implies the necessity of a balanced business performance of all participants in the milk production chain. In order to study these relationships we made a comparative analysis of the profitability of the participants in milk production in the Republic of Serbia in the period 2010-2013. Aforementioned analysis, that was conducted on the basis of individual financial statements and on the basis of ROA and ROE as a primary indicator of the profitability, point to a significant difference in the levels of profitability between companies from the group of processors of milk – dairy, and companies from the group of breeders of cows - producers of raw milk. In other words, milk processors

achieved significantly higher profitability compared to cow breeders.

For a more complete understanding, it is necessary to identify the causes of the gap in the level of profitability. Since ROA depends on the profit margin and asset turnover, and the ROE depends on ROA and the equity multiplier, the answer is given to the question of which factors (PM, AT and EM) influence the existence of statistically significant differences in the level of profitability between companies participants in milk production. Research results suggest that the existence of differences in the level of profitability among the participants in the milk production primarily affects capital turnover, and then the profit margin. Because there are no significant differences in the level of indebtedness between milk processors and cow breeders, it can be concluded that indebtedness is not a factor of differences in the level of ROE between these two groups of companies.

The weaker business performance of producers of raw milk, caused by a slower turnover of capital and a lower level of profitability, indicating the inferior position of agriculture in relation to the manufacturing industries. This is partly determined by the very characteristics of agricultural production - slow turnover, and partly a weaker market position, which is reflected in a lower level of profitability. The relatively unfavorable position of agriculture is a challenge for agrarian policy of Serbia, which should take into account the viability of milk production in all its segments. In this context, a key factor would be the strengthening of the market position of cow breeders, which is most efficiently done through strengthening the cooperative system, but also through other forms of support this part of livestock production. Also, attention should be paid to the conduct of antitrust policy, both in the processing of milk, as well as in distribution, or retail chain.

### References

1. Berenson, M., Levine, D. and Krehbiel, T. (2012): *Basic Business Statistics*, Prentice Hall, Upper Saddle River.
2. Bogdanov, N., Rodic, V. (2014): *Agriculture and agricultural policy in Serbia*, in Volk T, Erjavec E, Mortensen K., Agriculture policy and European integration in Southeastern Europe, Food and Agriculture Organization of United Nations, Budapest.
3. Business Registers Agency (2014): *Register of Companies - Financial Statements of Company Belgrade*. Available at: <http://www.apr.gov.rs> (accessed October 9, 2014)
4. Fairfield, P., Lombardi Yohn, T. (2001): *Using Asset Turnover and Profit Margin to Forecast Changes in Profitability*. Review of Accounting Studies, Kluwer Academic Publisher, No. 6, pp. 371-385, Netherlands.
5. Field, A. (2009): *Discovering Statistics Using SPSS*, Sage Publication, London.
6. Government of the Republic of Serbia (2010): *National Agricultural Programme of Serbia 2009-2011*, Belgrade. Available at: <http://www.tehnologijahrane.com/standardi/nacionalni-program-poljoprivrede-srbije-2009-2011-16#toc-vi-sektorska-analiza-mlekarstvo> (accessed May 5, 2012)
7. Horngren, C., Harrison, W., Oliver, S. (2012): *Accounting*. Prentice Hall, Upper Saddle River.

8. Kergler, B. (2012): *Factors Affecting Farm Succession: the Case of Slovenia*, Agricultural Economics (Zemědělská ekonomika), Czech Academy of Agricultural Sciences, vol. 58, no. 3, pp. 285-298, Praha.
9. Kimmel, P., Weygandt, J., Kieso, D., Trenholm, B. (2009): *Financial Accounting*, John Wiley & Sons, Ontario.
10. Mubin, M., Iqbal, A. and Hussain, A. (2014): *Determinant of Return on Assets and Return on Equity and Its Industry Wise Effects: Evidence from KSE (Karachi Stock Exchange)*. Research Journal of Finance and Accounting, The International Institute for Science, Technology and Education, vol. 5, no. 5, pp. 148-158, USA.
11. Muminovic, S., Pavlovic, V. (2012): *Profitability of Dairy Industry in Slovenia, Croatia and Serbia*, Mljekarstvo, Hrvatska mljekarska udruga, vol. 62, no. 2, pp. 96-110, Zagreb.
12. Muminovic, S., Pavlovic, V., Joksimovic, D. (2012): *Profitability and Business Excellence Analysis of Dairy Industry in Serbia*, Mljekarstvo, Hrvatska mljekarska udruga, vol. 62, no. 3, pp. 207-218, Zagreb.
13. Nehring, R., Gillespie, J., Sandretto, C., Hallahan, C. (2009): *Small U.S. dairy farms: Can they compete?*, Agricultural Economics, (Zemědělská ekonomika), Czech Academy of Agricultural Sciences, vol. 40, no. 1, pp. 817-825, Praha.
14. Popovic, R. (2008): *Dairy chain analysis – the case of Serbian market*, Strategic management, Ekonomski fakultet u Subotici, vol. 13, no. 1, pp. 63-67, Subotica.
15. Soboh, R. A. M. E., Lansik, A. O., Van Dijk, G. (2011): *Distinguishing dairy cooperatives from investor-owned firms in Europe using financial indicators*. Agribusiness. John Wiley & Sons, Inc., no. 27, pp. 34-46. USA.
16. Statistical Office of the Republic of Serbia (2014): *Electronic Databases*, Belgrade, Internet <http://webrzs.stat.gov.rs> (accessed June 4, 2014)
17. Qian, G., Zhang, Y., Wu, J., Pan, Y. (2013): *Revenue Sharing in Dairy Industry Supply Chain - A Case Study of Hohhot*, Journal of Integrative Agriculture, Chines Academy of Agricultural Sciences, vol. 12, no. 12, pp. 2300-2309, Peoples R China.
18. Volk, T., Rednak, M., Erjavec, E. (2014): *Cross country analysis of agriculture and agricultural policy of Southeastern Europe countries in comparison with the European Union*, in Volk T, Erjavec E, Mortensen K. Agriculture policy and European integration in Southeastern Europe. Food and Agriculture Organization of United Nations, Budapest.
19. Walsh, C. (2003): *Key Management Ratios*, Prentice Hall, London.
20. Wilson, P. (2011): *Decomposing variation in dairy profitability: the impact of output, inputs, prices, labour and management*, Journal of Agricultural Science, Cambridge University Press, vol. 149, no. 4, pp. 507 - 517, UK.

## GEP U PROFITABILNOSTI U LANCU PROIZVODNJE MLEKA: ISKUSTVA U SRBIJI

*Stanislav Zekić,<sup>5</sup> Kristina Mijić<sup>6</sup>, Dejan Jakšić<sup>7</sup>, Ivan Milenković<sup>8</sup>*

### Apstrakt

*Cilj rada je da se sprovede komparacija profitabilnosti velikih prerađivača mleka i velikih proizvođača mleka, odnosno farmi koje imaju više od 100 krava i organizovane su kao privredna društva. Profitabilnost je analizirana na bazi indikatora povrata na imovinu i povrata na kapital. Analiza razlika u profitabilnosti ukazuje da prerađivači mleka ostvaruju statistički značajno bolju profitabilnost u odnosu na proizvođače mleka (farme). Rezultati daljeg istraživanja ukazuju da obrt imovine i profitna marža uzrokuju razlike u nivou profitabilnosti između proizvođača i prerađivača mleka.*

**Ključne reči:** profitabilnost, proizvođači mleka, mlekare, ROA, ROE.

---

5 Vanredni profesor, dr Stanislav Zekić, Univerzitet u Novom Sadu, Ekonomski fakultet u Subotici, Segedinski put br. 9-11, 24000 Subotica, Republika Srbija, E-mail: [zekics@ef.uns.ac.rs](mailto:zekics@ef.uns.ac.rs)

6 Asistent, dr Kristina Mijić, Univerzitet u Novom Sadu, Ekonomski fakultet u Subotici, Segedinski put br. 9-11, 24000 Subotica, Republika Srbija, E-mail: [mijick@ef.uns.ac.rs](mailto:mijick@ef.uns.ac.rs)

7 Redovni profesor, dr Dejan Jakšić Univerzitet u Novom Sadu, Ekonomski fakultet u Subotici, Segedinski put br. 9-11, 24000 Subotica, Republika Srbija, E-mail: [jaksicd@ef.uns.ac.rs](mailto:jaksicd@ef.uns.ac.rs)

8 Vanredni profesor, dr Ivan Milenković, Univerzitet u Novom Sadu, Ekonomski fakultet u Subotici, Segedinski put br. 9-11, 24000 Subotica, Republika Srbija, E-mail: [imilenkovic@ef.uns.ac.rs](mailto:imilenkovic@ef.uns.ac.rs)



## APPLICATION OF SCENARIO ANALYSIS IN THE INVESTMENT PROJECTS EVALUATION

*Tomislav Brzaković<sup>1</sup>, Aleksandar Brzaković<sup>2</sup>, Jelena Petrović<sup>3</sup>*

### Summary

*Investing represents an investment in the present to achieve certain effects in the future, and risk is an essential part of the investment process. Scenario analysis involves key risk factors of the project, its sensitivity to changes in key factors and the likelihood of their changes. Scenario analysis allows us to assign probabilities to the base case, the best case and the worst case so that we can find the expected value and standard deviation of the project's NPV to get a better idea of the project's risk. The goal is to determine whether it is possible to make relevant investment decisions on the basis of the parameters of projects risk, such as the standard deviation and the coefficient of variation. The paper is based on a mathematical model, applied to a specific agricultural company. In our case, the project has a wide range of possibilities and a large potential negative value, which suggests a great risk of the project. Although the scenario analysis shows a higher risk, it is not clear if the project should be accepted or not, and therefore, it is necessary to conduct simulation analysis, in order to get reliable answers.*

**Keywords:** *evaluation, investment project, agriculture, risk, return*

**JEL:** *Q19, G 31*

### Introduction

Riskiness of the investment project is defined as the variability of cash flows of the project in relation to expected trends (Tapiero, 2004). In the context of investment appraisal, risk refers to the business risk of an investment, which increases with the variability of expected returns

- 
- 1 Tomislav Brzaković Ph.D, Full Professor, University Business Academy, Faculty of Applied Management, Economics and Finance, Nemanjina street no. 4, Belgrade, Serbia, Phone: +381 63 218 220, E-mail: [tomislavbrzakovicmef@gmail.com](mailto:tomislavbrzakovicmef@gmail.com)
  - 2 Aleksandar Brzaković M.A., University Business Academy, Faculty of Applied Management, Economics and Finance, Nemanjina street no. 4, Belgrade, Serbia, Phone: +381 63 126 66 62, E-mail: [aleksandar.brzakovic@gmail.com](mailto:aleksandar.brzakovic@gmail.com)
  - 3 Jelena Petrović M.A., University Business Academy, Faculty of Applied Management, Economics and Finance, Nemanjina street no. 4, Belgrade, Serbia, Phone: +381 63 868 26 30, E-mail: [jobradovic777@gmail.com](mailto:jobradovic777@gmail.com)

(Watson, Head, 2007). A project with a higher variability is riskier (Van Horne, Waskovicz, 2007). Because investors require a higher rate of return when companies undertake risky projects, these companies will have a higher cost of capital (Gervais, 2009). There are three major components of risk of each project: individual project risk (stand-alone risk), the risk of the project for the company and market risk. Stand-alone risk is the risk of an individual project which ignores the effects of diversification and, observed in isolation, is of low importance (Brigham, Ehrhardt, 2014). Individual risk assessment of a project can be obtained by analyzing the expected internal rate of return and its standard deviation, as a result of the volatility of expected cash flows. Unlike stand-alone risk, project risk for the company is seen as a contribution to the overall project risk exposure of the company (Orsag, 2002). The company is practically a portfolio of assets. Proceeds from these various assets are not always moving in the same direction, i.e., are not perfectly correlated positively with each other (Gitman, 2009). Therefore, the individual risk of a project is important if it changes the company portfolio risk. In other words, risky project for the company depends on the correlation of its internal rate of return and profitability of existing companies. The lower the correlation between them, the smaller the impact of the project on the riskiness of the company is. Market risk refers to the risk of a relevant project in relation to shares of companies that will keep investors' portfolios well diversified (Shim, Siegel, 2009). Market risk depends on the correlation of project profitability and the capital markets profitability. The lower the correlation between the profitabilities, the lower the market risk is. The project will reduce the individual risk of the project in the market portfolio.

### **Literature review**

Decisions on capital investments require analysis of future cash flows of the desired project, uncertainty of future cash flows and the value of future cash flows (Dedi, Orsag, 2007). Since nothing in the future is certain, investors are faced with the risk associated with future cash flows (Brealey, Myers, Allen, 2014). Typically, for the assessment of project cash flow, the following several methods are used: sensitive analysis, scenario analysis and simulation process. Sensitive analysis does not examine the probability distribution of the net present value of the project. For this reason, the results and conclusions of the sensitive analysis should be supplemented by the results of other methods of testing individual risk projects. In contrast to the sensitivity analysis, scenario analysis involves both key risk factors of the project: its sensitivity to changes in key factors and the likelihood of their changes (Brigham, Ehrhardt, 2011). Scenario analysis is a behavioral approach that uses several possible alternative outcomes (scenarios), to obtain a sense of the variability of returns, measured here by NPV. This technique is often useful in getting a feel for the variability of return in response to changes in a key outcome (Gitman, Zutter, 2012) When the factors are of an interdependent size, scenario analysis provides insight into various combinations of factors that show how the project would look in different scenarios. It encourages „contingent thinking“, describing the future by a collection of possible eventualities (Pike, Neale, 2006). Estimating income or expenses under certain scenarios provides more accurate estimates than an absolute assessment of optimistic or pessimistic values. The

scenario analysis is based on the formation of discrete probability distributions achieving a net present value of the project and its analysis using normal distribution (Parrino, Kidwell, Bates, 2012). Basic techniques of risk assessment based on normal distribution where the observed volatility or variability of possible outcomes around the expected value of the distribution probability. The basic measures of risk are: standard deviation (standard deviation), the variance and coefficient of variation (Fabozzi, Drake, 2009). For the risks to be viewed in a particular portfolio, the risk analysis must include knowledge of the correlation between different sizes and measure the correlation - covariance and correlation coefficient. It is also necessary to recognize and  $\beta$  (beta) ratio, a measure of elasticity of the yield changes yield investments towards companies or the efficiency of the overall capital markets (Fabozzi, Drake, 2010). If, for example, coefficient of variation of the project extends beyond a company, the project is riskier than the average project manager, and vice versa (Brealey, Myers, Allen, 2014). In contrast to the sensitivity analysis where we changed one variable at a time, in scenario analysis we can modify several of the inputs to be better or worse than expected. We can choose as many scenarios as we like, however, by selecting any number of different sets of outcomes for the cash flows. Evaluating a number of scenarios gives a subjective feel for the variability of the NPV to changes in our assumptions about what the cash flows will turn out to be (Lasher, 2008). The portrayal of optimistic and pessimistic scenarios may be useful in providing managers with some feel for the 'downside' risk and 'upside' potential associated with a project (Atrill, 2009). Also, scenario analysis allows us to assign probabilities to the base case, the best case, and the worst case. After that we can find the expected value and standard deviation of the project's NPV to get a better idea of the project's risk (Bodie, Kane, Marcus, 2009).

### Problem and work methodology

The paper is based on a mathematical model. As an example we used Agropro d.o.o., a company which plans to produce innovative technology for the production of organic vegetables. This represents an important expansion project for the company. The company has a license for the production for a period of 4 years and which it received from the inventor. The company opted to use a straight-line depreciation method.

Probability distribution can be expressed using two parameters of distribution: (1) the expected value and (2) the standard deviation.

The expected value of the cash flow is a weighted average of the possible cash flows, where the weights are the probabilities of occurrence. The expected value of the probability distribution of cash flows for the period  $t$ , is defined as:

$$\overline{CF}_t = \sum_{x=1}^n (CF_{xt})(P_{xt})$$

where:

$CF_{xt}$  = cash flow for the possibility of  $x$  in period  $t$ ,

$P_{xt}$  = probability of occurrence of cash flow,



$n$  = total number of possible occurrence of cash flow in period  $t$ .

Standard deviation is a common measure of dispersion. The standard deviation of the cash flow in period  $t$ , can be expressed mathematically as:

$$\sigma_t = \sqrt{\sum_{x=1}^n (CF_{xt} - \overline{CF}_t)^2 (P_{xt})}$$

Square of the standard deviation,  $\sigma^2$ , is known as the variance of the distribution.

A measure of the relative dispersion of the probability distribution of the coefficient of variation (CV) is mathematically defined as the ratio of the standard deviation of the distribution and the expected value of the distribution:

$$CV = \frac{SD}{CF_t}$$

In a scenario analysis, we begin with the base-case scenario, which uses the most likely value for each input variable. We then specify the worst-case scenario (low unit sales, low sales price, high variable costs, and so on) and the best-case scenario (Brigham, Ehrhardt, 2014). Due to the high variability of those factors in the agricultural company, it is recommendation the use scenario analysis in evaluating projects. Often the best and the worst cases are defined as having a 25% probability of occurring, with a 50% probability for the base-case conditions. Table 1. shows the probability and inputs assumed for the base-case, the worst-case and the best case scenarios.

**Table 1.** Inputs for Each Scenario (Dollars in Thousands)

Scenario Name	Scenarios:		
	Base	Worst	Best
Probability of Scenario	50%	25%	25%
<b>Inputs:</b>			
Equipment cost	\$8,000.00	\$8,250.00	\$7,250.00
Salvage value of equip. in Year 4	\$1,600.00	\$1,400.00	\$1,900.00
Units sold, Year 1	10,000.00	8,500.00	11,500.00
% $\Delta$ in units sold, after Year 1	10%	5.00%	20.00%
Sales price per unit, Year 1	\$1.50	\$1.25	\$1.75
% $\Delta$ in sales price, after Year 1	5%	3.00%	6.00%
Var. cost per unit (VC), Year 1	\$1.07	\$1.17	\$0.97
% $\Delta$ in VC, after Year 1	4%	6.00%	3.00%
Nonvar. cost (Non-VC), Year 1	\$2,000.00	\$2,200.00	\$1,800.00
% $\Delta$ in Non-VC, after Year 1	4%	6.00%	3.00%
Project cost of capital ( $r$ )	10%	15.00%	5.00%
Tax rate	20%	30.00%	15.00%
NOWC as % of next year's sales	20%	25.00%	15.00%

Source: Author's calculations

### Paper goals

The paper observed factors that have the largest impact on net present value, and examine their effect on the NPV of the project in different scenarios. The success of this proposed investment project depends on many factors, including the equipment cost, unit sales, sales price per unit, variable cost per unit, nonvariable cost, project cost of capital and others (Moyer, McGuigan, Rao, Kretlow, 2012).

The goal is to determine whether it is possible to make relevant investment decisions on the basis of the parameters of projects risk, such as the standard deviation and the coefficient of variation. The significance of this paper is to show whether on the basis of scenario analysis the relevant investment decision can be made.

This paper consists of introduction, literature review, problem and work methodology, results and discussions, conclusion and references. **Results and discussions**

Table 2., 3., and 4., illustrate how these assumptions and the resulting project NPV might vary under alternative scenarios.

**Table 2.** Analysis for Base Scenario

Intermediate Calculations	0	1	2	3	4
Unit sales		10,000.00	11,000.00	12,100.00	13,310.00
Sales price per unit		\$1.50	\$1.58	\$1.65	\$1.74
Variable cost per unit (excl. depr.)		\$1.07	\$1.11	\$1.16	\$1.20
Nonvariable costs (excl. depr.)		2,000.00	2,080.00	2,163.20	2,249.73
Sales revenues = Units × Price/unit		15,000.00	17,325.00	20,010.38	23,111.98
$NOWC_t = 20\%(Revenues_{t+1})$	3,000.00	3,465.00	4,002.08	4,622.40	0.00
Basis for depreciation	8,000.00				
Annual depreciation rate		25.00%	25.00%	25.00%	25.00%
Annual depreciation expense		\$2,000.00	\$2,000.00	\$2,000.00	\$2,000.00
Remaining undepreciated value		\$6,000.00	\$4,000.00	\$2,000.00	\$0.00
Cash Flow Forecast		Cash Flows at End of Year			
	0	1	2	3	4
Sales revenues = Units × Price/unit		\$15,000.00	\$17,325.00	\$20,010.38	\$23,111.98
Variable costs = Units × Cost/unit		\$10,700.00	\$12,240.80	\$14,003.48	\$16,019.98
Nonvariable costs (excluding depreciation)		\$2,000.00	\$2,080.00	\$2,163.20	\$2,249.73
Depreciation		\$2,000.00	\$2,000.00	\$2,000.00	\$2,000.00
Earnings before interest and taxes (EBIT)		300.00	1,004.20	1,843.70	2,842.28

Intermediate Calculations	0	1	2	3	4
Taxes on operating profit (40% rate)		60.00	200.84	368.74	568.46
Net operating profit after taxes		240.00	803.36	1,474.96	2,273.82
Add back depreciation		2,000.00	2,000.00	2,000.00	2,000.00
Equipment purchases	-8,000.00				
Salvage value					1,600.00
Cash flow due to tax on salvage value (40% rate)					-320.00
Cash flow due to change in WC	-3,000.00	-465.00	-537.08	-620.32	4,622.40
Opportunity cost, after taxes	0.00	0.00	0.00	0.00	0.00
After-tax cannibalization or complementary effect		0.00	0.00	0.00	0.00
Project net cash flows: Time Line	-11,000.00	1,775.00	2,266.29	2,854.64	10,176.22
<b>Project Evaluation Measures:</b>					
<b>NPV</b>					<b>1,581.83</b>
<b>IRR</b>					<b>14.84%</b>
<b>MIRR</b>					<b>13.76%</b>
<b>Profitability index</b>					<b>1.14</b>
<b>Payback</b>					<b>3.40</b>
<b>Discounted payback</b>					<b>3.77</b>

Source: Author's calculations

**Table 3.** Analysis for The Worst Scenario

Intermediate Calculations	0	1	2	3	4
Unit sales		8,500.00	8,925.00	9,371.25	9,839.81
Sales price per unit		\$1.25	\$1.29	\$1.33	\$1.37
Variable cost per unit (excl. depr.)		\$1.17	\$1.24	\$1.31	\$1.39
Nonvariable costs (excl. depr.)		\$2,200.00	\$2,332.00	\$2,471.92	\$2,620.24
Sales revenues = Units × Price/unit		\$10,625.00	\$11,490.94	\$12,427.45	\$13,440.29
$NOWC_t = 25\%(Revenues_{t+1})$	\$2,656.25	\$2,872.73	\$3,106.86	\$3,360.07	\$0
Basis for depreciation	\$8,250				
Annual depreciation rate		25%	25%	25%	25%
Annual depreciation expense		\$2,062.50	\$2,062.50	\$2,062.50	\$2,062.50

APPLICATION OF SCENARIO ANALYSIS IN THE INVESTMENT PROJECTS EVALUATION

Intermediate Calculations	0	1	2	3	4
Remaining undepreciated value		\$6,187.50	\$4,125.00	\$2,062.50	\$0.00
Cash Flow Forecast	Cash Flows at End of Year				
	0	1	2	3	4
Sales revenues = Units × Price/unit		10,625.00	11,490.94	12,427.45	13,440.29
Variable costs = Units × Cost/unit		9,945.00	11,068.79	12,319.56	13,711.67
Nonvariable costs (excluding depreciation)		2,200.00	2,332.00	2,471.92	2,620.24
Depreciation		2,062.50	2,062.50	2,062.50	2,062.50
Earnings before interest and taxes (EBIT)		-3,582.50	-3,972.35	-4,426.53	-4,954.12
Taxes on operating profit (40% rate)		-1,074.75	-1,191.70	-1,327.96	-1,486.24
Net operating profit after taxes		-2,507.75	-2,780.64	-3,098.57	-3,467.88
Add back depreciation		2,062.50	2,062.50	2,062.50	2,062.50
Equipment purchases	-8,250.00				
Salvage value					1,400.00
Cash flow due to tax on salvage value (40% rate)					-420.00
Cash flow due to change in WC	-2,656.25	-216.48	-234.13	-253.21	3,360.07
Opportunity cost, after taxes	0.00	0.00	0.00	0.00	0.00
After-tax cannibalization or complementary effect			0.00	0.00	0.00
Project net cash flows: Time Line	-10,906.25	-661.73	-952.27	-1,289.28	2,934.69
<b>Project Evaluation Measures:</b>					
				<b>NPV</b>	<b>-\$11,371.53</b>
				<b>IRR</b>	<b>-38.00%</b>
				<b>MIRR</b>	<b>-31.14%</b>
				<b>Profitability index</b>	<b>-0.04</b>
				<b>Payback</b>	<b>#N/A</b>
				<b>Discounted payback</b>	<b>#N/A</b>

Source: Author's calculations

In a scenario in which economic conditions are the worst, we expect unit sales to be less than 10,000 because overall demand for units will be lower. The price at which the company sells its product is also lower because the company will probably reduce prices in an effort to boost sales. Also, higher equipment cost, higher variable costs per unit, higher

non-variable cost, project cost of capital, tax rate and higher required net working capital is assumed.

**Table 4.** Analysis for The Best Scenario

Intermediate Calculations	0	1	2	3	4
Unit sales		11,500.00	13,800.00	16,560.00	19,872.00
Sales price per unit		\$1.75	\$1.86	\$1.97	\$2.08
Variable cost per unit (excl. depr.)		\$0.97	\$1.00	\$1.03	\$1.06
Nonvariable costs (excl. depr.)		\$1,800.00	\$1,854.00	\$1,909.62	\$1,966.91
Sales revenues = Units × Price/unit		\$20,125.00	\$25,599.00	\$32,561.93	\$41,418.77
NOWC <sub>t</sub> = 15%(Revenues <sub>t+1</sub> )	\$3,018.75	\$3,839.85	\$4,884.29	\$6,212.82	\$0.00
Basis for depreciation	\$7,250.00				
Annual depreciation rate		25%	25%	25%	25%
Annual depreciation expense		\$1,812.50	\$1,812.00	\$1,812.50	\$1,812.50
Remaining undepreciated value		\$5,437.50	\$3,625.00	\$1,812.50	\$0.00
Cash Flow Forecast	Cash Flows at End of Year				
	0	1	2	3	4
Sales revenues = Units × Price/unit		\$20,125.00	\$25,599.00	\$32,561.93	\$41,418.77
Variable costs = Units × Cost/unit		\$11,155.00	\$13,787.58	\$17,041.45	\$21,063.23
Nonvariable costs (excluding depreciation)		\$1,800.00	\$1,854.00	\$1,909.62	\$1,966.91
Depreciation		\$1,812.50	\$1,812.50	\$1,812.50	\$1,812.50
Earnings before interest and taxes (EBIT)		\$5,357.50	\$8,144.92	\$11,798.36	\$16,576.13
Taxes on operating profit (40% rate)		\$803.63	\$1,221.74	\$1,769.75	\$2,486.42
Net operating profit after taxes		\$4,553.88	\$6,923.18	\$10,028.61	\$14,089.71
Add back depreciation		\$1,812.50	\$1,812.50	\$1,812.50	\$1,812.50
Equipment purchases	-\$7,250.00				
Salvage value					\$1,900.00

Cash flow due to tax on salvage value (40% rate)					-\$285.00
Cash flow due to change in WC	-\$3,018.75	-\$821.11	-\$1,044.44	-\$1,328.53	\$6,212.82
Opportunity cost, after taxes	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
After-tax cannibalization or complementary effect		\$0.00	\$0.00	\$0.00	\$0.00
Project net cash flows: Time Line	-\$10,268.75	\$5,545.28	\$7,691.24	\$10,512.58	\$23,730.03
<b>Project Evaluation Measures:</b>					
<b>NPV</b>					<b>\$30,592.56</b>
<b>IRR</b>					<b>74.30%</b>
<b>MIRR</b>					<b>48.30%</b>
<b>Profitability index</b>					<b>3.98</b>
<b>Payback</b>					<b>1.61</b>
<b>Discounted payback</b>					<b>1.82</b>

Source: Author's calculations

In contrast to the worst economic scenario, stronger economic conditions might result in higher-than-expected unit sales, prices, and lower initial investment (equipment cost), variable cost per unit, non-variable cost, project cost of capital, tax rate and lower required net working capital.

In Table 1. we can see that the project will have a negative NPV (−\$11,371.53) if economic conditions are the worst. Furthermore, the decline in NPV (\$12,953.36, the difference between \$1,581.83 and −\$11,371.53) is less than the increase in NPV if economic conditions are the best (\$29,011.03, the difference between \$30,592.86 and \$1,581.83). The range of NPV values under the three scenarios is \$41,964.39 (the range between −\$11,371.53 and \$30,592.86). This wide range of possibilities, and especially the large potential negative value, suggests that this is a risky project. If bad conditions materialize, the company will realize a loss on the project of \$11,371,530. In contrast, if they achieve favorable forecasts, the company will realize a gain on the project of \$30,592,860.

Although this analysis can help us better understand how much uncertainty is associated with an NPV estimate, there is only one NPV value for a project and the FCF values we use in an NPV analysis represent the expected incremental free cash flows (Ignjatijević, 2015). Scenario analysis extends risk analysis in two ways: (1) it allows us to change more than one variable at a time and, therefore, see the combined effects of changes in several variables on NPV; (2) it allows us to bring in the probabilities of changes in the key variables. Figure 1. presents the cash flows and net present value (NPV) for each scenario. Using the NPV and probability for each scenario, we calculated the expected NPV, the standard deviation, and

the coefficient of variation.

**Figure 1.** Scenario Analysis: Expected NPV and Its Risk (Dollars in Thousands)

		Predicted Cash Flows for Alternative Scenarios						
	Prob	0	1	2	3	4	r	NPV
<b>Best</b>	25%	-\$10,268.75	\$5,545.28	\$7,691.24	\$10,512.28	\$23,730.03	5.00%	<b>\$30,592.56</b>
<b>Base</b>	50%	-\$11,000.00	\$1,775.00	\$2,266.29	\$2,854.64	\$10,176.22	10.00%	<b>\$1,581.83</b>
<b>Worst</b>	25%	-\$10,906.25	-\$661.73	-\$952.27	-\$1,289.28	\$2,934.69	15.00%	<b>-\$11,371.53</b>

Probability Distribution of Scenarios: Outcomes and Probabilities		Expected NPV =
<p>Worst-Case -\$11,371.53      Base-Case \$1,581.83      Exp. NPV \$5,596.17      Best-Case \$30,592.56</p>		Standard Deviation (SD) = \$15,370.04
		Coefficient of Variation (CV) = Std. Dev./Expected NPV = 2.75

Source: Author's calculations

The preliminary analysis of the base case indicates that the project is acceptable. The company has a positive net present value (NPV= 1,581.83). The internal rate of return (IRR=14.84%) and modified internal rate of return (MIRR=13.76%) are higher than the cost of capital. Profitability index is larger than 1. If the company expected Payback and Discounted Payback period to be less than 4, than the investment is also acceptable in these criteria. But, when we multiply each scenario's probability by the NPV for that scenario and then add the products, as shown in Figure 1., we have the project's expected NPV of \$5,596.17, which is significantly higher than the NPV base case (\$1,581.83). Expected NPV differs from the base-case NPV which is the most likely outcome because it has a 50% probability. Standard deviation of the expected NPV is \$15,370.04. Dividing the standard deviation by the expected NPV yields the coefficient of variation, 2.75, which is a measure of stand-alone risk. The coefficient of variation measures the amount of risk per dollar of NPV, so the coefficient of variation can be helpful when comparing the risk of projects with different NPVs or with the risk of the whole company. If the average coefficient of variation of the company projects is 1.25, this means that the considered project is more than twice as risky. Although the scenario analysis shows higher risk, it is not clear if the project should be accepted or not. Therefore, it is necessary to conduct simulation analysis, in order to get reliable answers.

## Conclusions

Investing is a complex process. Making investment decisions is one of the most subtle and the most important decisions with long-term implications. Investment represents an investment in the present to achieve certain effects in the future, and risk is an essential part of the investment process. Risk is uncertainty that the expected results of the project will not be realized or will deviate from the plan. In other words, the risk of the investment project is the variability of cash flows of the project in relation to expected cash flows.

Scenario analysis involves key risk factors of the project - its sensitivity to changes in key factors and the likelihood of their changes. When the factors are of an interdependent size, scenario analysis provides insight into the various combinations of factors that shows how the project would look in different scenarios. Because of this reason it is widely used, including project evaluation and risk of agricultural companies. Scenario analysis allows us to assign probabilities to the base case, the best case, the worst case and find the expected value and standard deviation of the project's NPV to get a better idea of project's risk. Scenario analysis extends risk analysis in two ways: it allows us to change more than one variable at a time and hence, see the combined effects of changes in several variables on NPV and it allows us to bring in the probabilities of changes in the key variables.

The preliminary analysis of the base case indicates that the project is acceptable. But, when we multiply each scenario's probability by the NPV for that scenario and then add the products, we have higher the project's expected NPV than the NPV base case. Standard deviation of the project and coefficient of variation, which is twice higher than the average coefficient of variation of the company projects, means that the considered project is more than twice as risky. The project has a wide range of possibilities and a large potential negative value suggests that this is a risky project. Although the scenario analysis shows a higher risk, it is not clear if the project should be accepted or not. Therefore, it is necessary to conduct simulation analysis, in order to get reliable answers.

## Literature

1. Bodie, Z., Kane, A., Marcus, A. J. (2009): *Osnovi investicija*, 6.ed, Datastatus Serbia.
2. Brealey, R.A., Myers, S.C., Allen, F. (2014): *Principles of Corporate Finance*, 11 ed., McGraw-Hill, USA.
3. Brigham E., Ehrhardt M. (2014): *Financial Management: Theory and Practice*, 14 Ed., South-Western, Cengage Learning, Canada.
4. Gitman L. J. (2009), *Principles of Managerial Finance*, 12th ed., Pearson Prentice Hall, USA.
5. Gervais, S. (2009): *Behavioral Finance: Capital Budgeting and Other Investment Decisions*, Behavioral Finance, USA.
6. Dedi, L., Orsag, S. (2007): *Capital budgeting practices: a survey of Croatian firms*, South East European Journal of Economics and Business, vol. 2, no. 1, pp. 59-67.



7. Ehrhardt M. C., Brigham, E.F. (2011): *Corporate Finance: A Focused Approach*, Fourth Edition, South-Western Cengage Learning, SAD.
8. Ignjatijević, S. (2015): *Ekonomska analiza značaja stranih direktnih investicija*, Oditor, no. 11, pp. 4-15.
9. Orsag S. (2002): *Budžetiranje kapitala: Procjena Investicijskih projekata*, Zagreb, Masmmedia, Croatia.
10. Parrino R., Kidwell D.S., Bates T. W. (2012): *Fundamentals of corporate finance*, second edition, John Wiley & Sons, Inc, USA.
11. Pike, R., Neale, B. (2006): *Corporate finance and investment decisions & strategies*, Fifth Edition, FT Prentice Hall, England.
12. Shim J. K., Siegel, J.G. (2009): *Budgeting Basics and Beyond*, Third edition, Wiley, John Wiley & Sons, Inc, USA.
13. Van Horne J. C., Waskovicz, J.JR, (2007): *Osnovi finansijskog menadžmenta*, DATASTATUS, 12. Izdanje, Serbia.
14. Fabozzi, F. J., Drake P. P. (2009): *Finance : capital markets, financial management, and investment management* , John Wiley & Sons, USA.
15. Fabozzi, F. J., Drake P. P. (2010): *The basics of finance : an introduction to financial markets, business finance, and portfolio management* , John Wiley & Sons, USA.
16. Moyer C., McGuigan J., Rao R., Kretlow W., (2012): *Contemporary Financial Management*, South-Western, Cengage Learning, USA.
17. Gitman L., Zutter C., (2012) *Principles of Managerial Finance*, Prentice Hall, USA.
18. Tapiero C., (2004): *Risk and Financial Management*, John Wiley & Sons Ltd, USA.
19. Watson., Head A., (2007): *Corporate Finance - Principles & Practice*, Pearson Education Limited, England.
20. Atrill P., (2009): *Financial Management for Decision Makers*, Pearson Education Limited, England.
21. Lasher W., (2008): *Practical Financial Management*, Thomson South-Western, USA

## PRIMENA ANALIZE SCENARIJA U POSTUPKU EVALUACIJE INVESTICIONIH PROJEKATA

*Tomislav Brzaković<sup>4</sup>, Aleksandar Brzaković<sup>5</sup>, Jelena Petrović<sup>6</sup>*

### Sažetak

*Investiranje predstavlja ulaganje u sadašnjosti da bi se ostvarili određeni efekti u budućnosti, pa rizik predstavlja neizostavan deo investicionog procesa. Scenarijska analiza obuhvata ključne faktore rizika projekta, osetljivost na promene u ključnim faktorima i verovatnoće njihovih promena. Scenario analiza omogućava dodeljivanje verovatnoće ostvarenja u osnovnom, najboljem i u najgorem slučaju, posle čega se utvrđuje očekivana vrednost i standardna devijacija NPV projekta da bi se dobio bolji uvid u rizik projekta. Cilj je da se utvrdi da li je moguće napraviti relevantne investicione odluke na osnovu parametara rizika projekata, kao što su standardna devijacija i koeficijent varijacije. Rad se zasniva na matematičkom modelu, primenjenom na poljoprivrednoj kompaniji. U našem slučaju, projekat ima širok spektar mogućnosti i potencijalno veliku negativnu vrednost, što ukazuje na veliki rizik projekta. Iako scenario analiza pokazuje veći rizik, nije jasno da li projekat treba prihvatiti ili ne, i zbog toga je neophodno izvršiti simulacionu analizu, kako bi dobili pouzdane odgovore.*

**Ključne reči:** *evaluacija, investicioni projekat, novčani tok, rizik, prinos*

---

4 Profesor, dr Tomislav Brzaković, Univerzitet Privredna Akademija, Fakultet za primenjeni menadžment, ekonomiju i finansije, Nemanjina ulica br. 4, Beograd, Srbija, Telefon: +381 63 218 220, E-mail: [tomislavbrzakovicmef@gmail.com](mailto:tomislavbrzakovicmef@gmail.com)

5 Master Aleksandar Brzaković, Univerzitet Privredna Akademija, Fakultet za primenjeni menadžment, ekonomiju i finansije, Nemanjina ulica br. 4, Beograd, Srbija, Telefon: +381 63 126 66 62, E-mail: [aleksandar.brzakovic@gmail.com](mailto:aleksandar.brzakovic@gmail.com)

6 Master Jelena Petrović Univerzitet Privredna Akademija, Fakultet za primenjeni menadžment, ekonomiju i finansije, Nemanjina ulica br. 4, Beograd, Srbija, Telefon: +381 63 868 26 30, E-mail: [jobradovic777@gmail.com](mailto:jobradovic777@gmail.com)



## RURAL TOURISM – SERBIA'S MISSED CHANCE

*Miroljub Đenadić<sup>1</sup>, Bela Muhi<sup>2</sup>, Dušan V. Jovanović<sup>3</sup>*

### Summary

*Rural tourism is both old and new phenomenon. The interest for recreation in the countryside began to grow as early as XIX century, as a reaction to the pressure of growing urbanization and industrialization.*

*Serbia has great potentials for development of rural tourism. Natural beauty in combination with culture, tradition, festivals, gastronomic specialties and music, might become recognizable tourist brand, which could contribute to the significant monetary influx and improve the overall image of the country.*

*However, current level of Serbia's competitiveness in the area of rural tourism is not particularly high, regardless of the fact that all of the natural, cultural and social prerequisites for its development already exist (natural potentials, significant farming land, great number of agriculturally active population, traditional approach to agriculture, lack of ground pollution as well as the possibility of producing „healthy food“, good potential for development of complementary activities such as hiking, recreation, hunting, fishing, riding and participating in everyday activities of the country folk, traditional local gastronomical specialties etc.).*

*The goal of this paper is to show the resources of Serbia in the area of rural tourism as well as the possible development potentials of this form of tourism.*

**Key words:** *Rural tourism, village tourism, agrotourism, sustainable development, Serbia*

**JEL:** *Q26, L83, R41*

---

1 Miroljub Đenadić, Ph.D, Lecturer, Higher Professional School of Agricultural Studies, Vojvode Putnika Street no. 56, 15000 Šabac, Serbia. Phone: +381 63 26 20 77, E-mail: [miroljub.djenadic@gmail.com](mailto:miroljub.djenadic@gmail.com)

2 Bela Muhi, Ph.D., Assistant Professor, Faculty of Business Economy, Educons University, Vojvode Putnika Street no. 87, 21208 Sremska Kamenica, Serbia. Phone: +381 63 53 37 20, E-mail: [bela.muhi@educons.edu.rs](mailto:bela.muhi@educons.edu.rs)

3 Dušan V. Jovanović, MSc, Ph.D student, University of Novi Sad, Faculty of Agriculture, Dositeja Obradovica Square no. 8, 21000 Novi Sad, Serbia. Phone: +381 62 30 31 22, E-mail: [duda.jovanovic@gmail.com](mailto:duda.jovanovic@gmail.com)

## Introduction

The year 2011 marked 60 years since the first village family homestead for tourism appeared. Long ago in the year 1951, senator of a small archetypical French village Chandal a la Javie in Provence, Emile Aubert, started the idea of providing tourist services on a village homestead. The prime goal was preservation and development of rural environment, opening up new business perspectives by providing tourism services, new impulse to revivification of agriculture and based on that prevention of population migration out of the rural and into urban areas. An old long-abandoned traditionally built stable was transformed into a tourist object, i.e. village house for providing tourist services and it was named „cottage“ (fr. *gites*). It was then and there that the successful realization of this pilot project started the development of village tourism in the form that we know today<sup>4</sup>.

Nowadays, with all the stress, haste, lack of personal time and lack of high-quality activities, rural tourism is an excellent opportunity to escape from such stressful everyday life by giving the possibility of spending a pleasant holiday that evokes nostalgia for the times of our ancestors. Today, rural tourism is an important component of integral and sustainable development of villages, as well as an important factor in encouraging the development of local agricultural and non-agricultural activities in the country, and is also a special stimulus to employment. Social and economic forces that act on a global level are determined not only by appearance, but also by forms of rural landscapes, as well as ways of its valorization and utilization (Butler, Hall, Jenkins, 1998). In many countries of the European Union, rural tourism is included in strategies for the development of regions and rural areas, which helps keeping the population in place, creating new jobs and contributing to the socio-economic progress of the underdeveloped areas (Muhi, 2013).

Rural tourism provides development opportunities for small businesses which would otherwise be unprofitable in rural communities with few inhabitants. Two groups of entrepreneurs have a special benefit from tourism development, primarily those who are directly involved in tourism (eg. attractions, accommodation facilities such as houses for rent, motels and restaurants), as well as those who benefit indirectly from development of tourism (eg. gas stations, retail shops, etc.). In addition, rural tourism is suited to existing rural businesses, such as rural households, helping them to create a secondary income (Wilson et al, 2001).

A research of British magazine „Country Living“ from 2004 shows us just how much are rural way of life and activities carried out in the countryside (primarily through agriculture) really valuable and necessary, with very interesting results. Of the 1,000 respondents, 41% said that moving to the countryside brought excitement into their lives, while 39% noted that their life has improved or that they expect it to happen. Most respondents believe that life in the countryside is better for the health, there is less crime and they expect to live longer. Among those who have moved to the country, 44%

---

4 [www.lematelas-hotellerie.com](http://www.lematelas-hotellerie.com)

said they spend more time with their partner, 38% have more mutual friends, 27% less frequently quarrel, and the overall level of satisfaction is higher among people who have moved from urban to rural area, than those who did not move.

Modern way of human living is characterized by a fast pace, stress, alienation, lack of time for themselves and their families, unhealthy and fast food, specific diseases and unproductiveness at work. The opposite way of life presumes activity over long walks and recreation, sounds from nature for relaxation, enjoying food and more proper nutrition with verified groceries. This significantly contributes to prevention of some diseases, improving the quality of life, higher productivity, getting more time for family, rapprochement with nature, the awakening of positive nostalgia etc. Precisely because of this, the motives for coming to the village such as: peace, clean environment, interaction with new people (local villagers), healthy food, slow food (slow eating, enjoying the food), slower pace of life and leisure, are responsible for the development of and survival of rural tourism as a tourism oriented towards an individual customer and his needs.

„The attractiveness of rural areas for tourism and relaxation can be best explained by the idea of the rural, which is closely associated with the traditional and romantic idea of the „good old days”, innocent and simple way of life, untouched nature and a perfectly fit man in his natural environment. So, desirability and the need to return to the roots and a simple lifestyle without complex organization, stress and the urban environment leads to increasing interest for rural areas” (Kastenholz et al., 1999).

Interest in rural tourism is constantly increasing, given the existence of still attractive and „untouched” rural areas with strictly defined way of life, culture and traditions, great need to preserve these areas, giving the population income opportunities through tourism services and conservation of native services and products, creating a bid for a unique holiday. The relative technological stagnation of our agricultural production (extensive mode of production, low use of mineral fertilizers, reduced consumption of pesticides, etc.) could be fitted into a world megatrend (production and consumption of healthy organic food) and could overnight turn into a significant competitive advantage and form of Serbian tourism product differentiation (Đenadić, 2012).

Rural areas cover about 80% of the total territory of the European Union with about 25% of the total population (Veer, Tuunter, 2005). Rural tourism is gaining importance in the development plans of Spain, Italy, Slovenia, Hungary, Austria and many other countries' tourism. Studies done in this area show an evident increase of all parameters of village tourism (increased offer, increased overnight stays, higher turnover, etc.). There are other positive examples that rural tourism brings: better employment for women, youth stays in the countryside, the use of previously unused capacities, new jobs, better treatment of the local population towards the environment and the like.

### **Rural, village, agro-tourism - definition of concepts**

Rural tourism, village tourism, agrotourism, tourist countryside family household - those are all terms which the household owners who are engaged or intend to engage in tourist

services on their farms inevitably encounter, almost on a daily basis. Frequent use of the above terms often leads to doubts among the household owners, entrepreneurs in village tourism, which is the correct term? One can often hear questions: What am I engaged in: agrotourism, village tourism, rural tourism or something else? If I'm not using the right term, which one is correct? Authors tried to give a simple definition of each of these terms used by the public, and to make an understandable classification of terms, according to which would be possible to clearly distinguish which forms of tourism are in question at first glance, what each individual term means and which term should be used. (Ivanović, Pantić, 2008).

Although the definition of rural tourism is subject of much debate in the literature, a strong consensus has not been reached (Pearce, 1989; Bramwell, 1994; Seaton et al., 1994). Standard definitions of the terms rural, agro and village tourism, which would be accepted in all areas that develop this type of tourism services, do not exist, although they have been discussed since the First World Forum on Rural Tourism held in 2000 in Perugia, where one of the conclusions was the need to develop a comprehensive definition acceptable to all institutions and entities that develop rural tourism. In this respect, harmonizing the views of many authors, rural tourism destinations can be defined as wider areas with natural and wooded environment where there are specific natural, economic and socio-cultural features, such as traditions, local cooperation, trust and good mutual relations and as such create a special tourism products that are primarily based on the economics of small-scale and friendly to the environment, „colored” by ethnic elements, in one word „sustainable” (Pearce, 1989; Bramwell, 1994; Seaton et al., 1994).

However, opinions of experts on the topic of defining the tourism activities in the rural areas is slowly approaching the standpoints in the way of profiling the three basic concepts/terms used in this segment: rural tourism, village tourism, countryside household or farm tourism (tourist country family household), with the following meanings: Rural tourism is the broadest term that encompasses the overall tourist services/activities/aspects of tourism within rural areas, including, e.g. hunting, fishing, tourism in nature parks, ecotourism, health, cultural, village, ethno tourism. Rural tourism is not necessarily additional activity on the family farm which generates additional income, but it can also be a professional activity (e.g. a small family hotel, a center of horsemanship). Furthermore, the very term of a rural area is generally not strictly defined, but includes areas in which prevail: the natural environment, rural environment, small towns and villages, isolated farms with agriculture and forestry as main activities.

Village tourism is a narrower concept of rural tourism, and the broader concept of agrotourism on the farm (countryside family household) and it is connected to the ambience of the village and its immediate surroundings, as well as all its activities (agriculture, events, gastronomy, ethnology, folklore and other economic activities). Rural tourism means and includes a range of activities, services and additional facilities organized by rural population on family farms and ranches in order to attract tourists and create additional income, while respecting the principles of sustainable development and conservation of natural resources (Štetić, 2007).

Rural tourism is usually the second or third vacation during the year (after the summer and winter holidays). The main seasons are spring and autumn, while significant turnover is registered also in summer. The primary motives for tourists to come to the countryside are the nature and cultural heritage, as well as gastronomy, activities, special interests.

Finally, agrotourism or tourism on a countryside household (farm) only refers to a form of tourist services that are an additional activity on the farm with agriculture as their primary activity, which includes offering products produced on the farm. Agrotourism involves staying in the village for education, or actively participating in all agricultural work (e.g. the cultivation of vines, preparing food for winter, storing cured meats).

Ecotourism represents a stay in intact and maintained nature. Ecotourists are environmentally conscious travelers who exclusively choose areas of outstanding natural beauty for their stay, who do not stay in big, fancy and expensive hotels, but rather in the small rural tourist households (whose business activities do not inhibit the natural environment in which they are located). Ecotourism is a type of tourism which records higher annual growth rate than all other forms of tourism (30% annually).

### **Rural Tourism of Serbia**

Rural tourism is a real trump of revitalization for many sleepy, if not completely disappeared, smaller and larger rural spatial entities. Tourism development in these areas can stop the emigration of young people, because the development of tourism today means creating basic conditions for a general, much higher mutual comfort of rural settlements. In such circumstances, young people can find not only economical, but also social and cultural motives to continue living in family homes in areas where the general quality of life really is approaching the level which is nowadays deemed necessary worldwide (Vratuša, Anastasijević, 2002).

Serbia is a land of rural character and is one of the most agrarian countries in Europe. Rural development, as one of the areas of regional policy, is a key instrument for the restructuring of the agricultural sector and should have the task to focus and strategically use the potential of touristically attractive villages. Local specificity and the availability of resources make it difficult to create a universal model for the development of rural tourism products and destinations (Mathieson, Wall, 1982).

Considering the expressed economic and other functions of tourism, as well as diverse and highly valuable potentials, the opportunity and appropriate importance to the development of this sector are given by the spatial plan of the Republic of Serbia and its economic policy. In addition, the Tourism Development Strategy in Serbia established a selective approach, where rural tourism is treated as a priority under those forms of tourism that are tied to special interests.

The rich natural, cultural and historical diversity of the Republic of Serbia creates exceptional conditions for the development of rural tourism, as well as the placement of the wide offer for different segments of demand in the tourist market. Rural tourism has a



large potential, because this segment of offer provides significant opportunities. The rural area, which makes up more than 85% of the territory of the Republic of Serbia, has about 43% of the population in about 42% of households that are directly or indirectly related to agriculture. Considering the natural and cultural diversity of the region, rich resource base of tourist attractions, preserved surroundings and thousands of agricultural households, the Republic of Serbia has all the conditions for the development of rural, and other special forms of tourism related to the rural area. Rural tourism, as well as other forms of rural tourism significantly enrich the tourist offer and provide new quality and impetus to the development of tourism in Serbia (Đorđević-Milošević, Milovanović, 2012).

Since ancient times Serbia has been known as an agricultural country. Visitors have an opportunity for a perfect break from urban life with the fresh air, the smell of hay, flowers, pine and freshly trimmed lawns, clean drinking water and rivers. A significant number of activities are at their disposal during the stay: walking through nature, fishing, gathering plants and berries, but the thing which guests will never forget is hospitality and delicious home-cooked food.

The village population still conscientiously preserves the traditional way of life, devotedly working in the fields and taking care of domestic animals. During the harvest in the summer and autumn months, every village becomes a small factory where food for winter is prepared, as are fruit brandies and juices in keeping with century old recipes. The most important products include raspberries, plums from which world-famous „šljivovica” plum brandy is made, grapes and local wines, as well as other alcoholic and non-alcoholic beverages. During the stay tourists should not bypass „kajmak” homemade sour cream, a product unique in the world. The relative lack of modern technologies in our agricultural production (extensive mode of production, poor use of mineral fertilizers, reduced consumption of plant protection products, etc.) can fit into the global megatrend (production and consumption of healthy organic food) and could be turned into a significant competitive advantage and form of Serbian tourism product differentiation (Đenadić, 2012).

While visiting villages and spending delightful times, a person can evoke memories of own childhood. Short stays in the countryside, mostly on weekends with family and children, are recommended. It is necessary to grant guests a possibility of purchase of healthy, organic food at prices much lower than in urban markets. Often new friends are made, children enjoy the charms of carefree running about through meadows and pastures, where, if nothing else, they can discover that cows are not purple.

Serbian villages have exceptionally favorable natural and cultural prerequisites for development of village tourism. Vacation, recreation, fishing, hiking, horseback riding, picking herbs, picnics and other activities, represent a real opportunity to enjoy the beauty of untouched nature. Tourists will be welcomed by hospitable local population with a rich selection of local food and preserved tradition of rural households.

Village tourism in Serbia has definitely progressed as is evidenced by its contemporary offer: farmhouse with a tennis clay or tartan court, with a swimming pool in the

shade, or one that overlooks the field covered with milfoil, with Finnish sauna or Turkish bath, even with massage parlors! Due to the fact that village tourism began a presentation on the Internet, the profile of tourists has changed and now grandmothers with grandchildren are seldom seen as guests. Most of the guests are young couples, businessmen, people who have traveled, who know what they want and how to enjoy it.

Most of the tourists in the village tourism are families with children and couples. By quantity, they are being followed by groups of friends, students, young people, who are visiting villages looking for a different kind of fun. On the 4<sup>th</sup> place are businessmen, who like to roll up their sleeves, to watch the folklore games, eat well and to pay generously. On the last place are retirees, which is a total turnaround regarding the last decade.

The swimming pool is not always being looked for, but guests can have a swim in twenty or so households: Gostoljublje (Mionica, Kosjerić), The Milica Mansion (Trudelj, Gornji Milanovac), Obradovići (Katići, Ivanjica), Lepenica (Ključ, Mionica) etc. Kačerac has a tennis court in the village Brančić, near Ljig. Sauna and jacuzzi have become a standard offer in households in Gornji Milanovac, Kosjerić, Knić and Užice. Mansion Etna, in the Ugrinovci village, near Gornji Milanovac, offers a true wellness spa, with Turkish bath, massage parlor and a Salt Room. There are thoughts that it is not village tourism anymore, but everything located in a village represents village tourism. Although, guests are not thinking about the village tourism as a sleeping in a hay bed and waking up in a field toilet. There are extremely luxurious objects, where one night costs up to 160€. If two people are ready to travel to Zdravkovac village, to pay 300€ for a weekend and to go home happy, isn't that a high-point of village tourism? (Krsmanović, 2013).

Rural tourism is a key factor in the activation and sustainable development of rural areas, which helps to preserve the local identity, traditions and customs, strengthens indigenous, traditional and ecological production of healthy food. From the very beginnings of development of village tourism in Serbia, everyone who wanted to start providing tourist services in their households, were faced with the lack of service and detailed information and knowledge about village and rural tourism, as more comprehensive concept. Such information (regarding commitments, promotion, marketing and many other topics) are needed primarily for those who only intend to engage in village tourism.

### **Analysis of the state of rural tourism in Serbia**

For the assessment of strengths and weaknesses of rural tourism of the Republic of Serbia, as well as opportunities and threats in the environment, the SWOT analysis is used (Table 1). Based on this analysis, it is noticed that the weakness of rural areas are more numerous and stronger in effect in comparison to the comparative advantages and that in the coming period, environmental factors will pose at the same time significant opportunities, but also a threat to the sustainable development of rural tourism in Serbia. This primarily refers to the forthcoming European integrations, the necessary level of quality of tourism product, trade balance in agricultural products, exposure to competition in this area, and the like.

**Table 1.** SWOT analysis of the rural tourism of the Republic of Serbia

<i>Strengths</i>	<i>Weaknesses</i>
<i>Geographic and tourist location</i> <i>Preserved natural resources and rural landscapes</i> <i>Biodiversity</i> <i>Geothermal springs, lakes, rivers, forests</i> <i>The rich cultural and historical heritage</i> <i>Traditional rural hospitality</i>	<i>Lack of financial resources for investments</i> <i>Underdeveloped infrastructure</i> <i>Migration of populations from rural areas</i> <i>Unfavorable educational and age structure</i> <i>The isolation and rural poverty</i> <i>Undeveloped and undiversified rural economy</i> <i>Inadequate production in terms of quality and volume</i> <i>Inadequate waste treatment</i> <i>Insufficient economic integration</i>
<i>Opportunities</i>	<i>Threats</i>
<i>Sustainable use of natural resources</i> <i>Economic diversification</i> <i>Development of small and medium-sized enterprises</i> <i>Horizontal and vertical integration in tourism</i> <i>The production and use of renewable energy</i> <i>Organic and traditionally prepared food</i> <i>Autochthonous products with protected origin</i> <i>EU pre-accession funds</i> <i>Cross-border cooperation projects</i>	<i>Competition in the domestic and international markets</i> <i>Low purchasing power of the local population</i> <i>Changes in trends and consumer demand</i> <i>Socio-economic and political instability</i> <i>Climate changes</i> <i>Inadequate use of natural resources</i> <i>International standards of service quality</i> <i>Lack of skilled labor</i> <i>Insufficient availability of financial resources</i>

Source: The authors, based on MPŠV, 201, 105-107

In order to utilize the full potential of rural tourism and to create a sustainable, competitive tourist product of rural tourism, it is necessary to conduct market survey, as well as survey of needs, motives and preferences of consumers (tourists). On the basis of these information and taking into account available resources, rural tourism can be developed appropriately.

Identifying different categories of potential visitors (eg. families, the elderly, youth, active tourists, tourists with special interests, etc.) plays a key role in the formation of an adequate offer. Each of these categories of visitors have different preferences, interests and requirements, so it is necessary to form different offers and services for each of these segments in rural tourism (Muhi, 2010).

According to these ascertainment in the following text are stated the results of a survey in which we focused on younger population, the college students. The goal was to

examine their views on rural tourism in Serbia. Even though the results may not represent the entirety of the Republic of Serbia (relatively small number of participants and only two locations), the survey still provides some qualitative conclusions. The aim of this survey research was to show whether and to what extent respondents are satisfied and interested in rural tourism, as a relatively new trend in tourism, which is booming in the world. The data was gathered at the Educons University in Sremska Kamenica and at Higher Professional School of Agricultural Studies in Šabac. The sample consists of 46 respondents.

The research used the five-point scalar method (Likert type). Willingness to answer questions was mandatory. All the answers were valid. The participation in the survey was optional. The validity of this constructed questionnaire provided a precise selection of statements that directly relate to the subject of research.

Respondents were asked to evaluate stated claims on a scale of 1 to 5 (1 - bad, 5 - excellent, resp. 1 - disagree, 5 - I agree completely).

**Table 2.** Survey questions

<b>Claims</b>	<b>Marks (from 1 to 5, 1 - bad, 5 - excellent, resp. 1 - disagree, 5 - I agree completely)</b>
Quality promotion of rural tourism in Serbia	1 2 3 4 5
With what resources Serbia has in the sphere of rural tourism	1 2 3 4 5
The content and the offer of rural tourism in Serbia is interesting to the youth	1 2 3 4 5
The content and the offer of rural tourism in Serbia is interesting to foreign guests	1 2 3 4 5
Promotion of rural tourism in Serbia	1 2 3 4 5
Potential tourists are familiar with the offer of rural tourism	1 2 3 4 5
State investment in the development of rural tourism	1 2 3 4 5
Cooperation among stakeholders (local people, travel agencies, tourist organizations, etc.) in the field of rural tourism	1 2 3 4 5

*Source:* The authors

The results (Table 3) were somewhat expected. Respondents absolutely agree that Serbia has excellent resources in the sphere of rural tourism, but the quality of the

offer is not satisfactory (score 3,6). The content and the offer of rural tourism in Serbia is only partially interesting to young people (score 3,4), so in this segment there is still a lot of work to be done in order to make the contents attractive to the younger population. A similar evaluation is shown for the content and promotion of rural tourism of Serbia to foreign guests (score 3,2), clearly foreign guests are more demanding and choosy, seeking adequate value for money. From this point of view hosts have to make additional effort (among other things to learn foreign languages, especially English, German, etc.). As far as the promotion of rural tourism in Serbia goes, the respondents stated that it is not sufficient in both volume and quality (score 2,8), accordingly potential tourists are not properly familiarized with the offer of rural tourism in Serbia. Also, it should be worked on marketing (print and broadcast media, Internet marketing, participation in trade fairs, etc.). According to the respondents opinions, state investment in the development of rural tourism is also not adequate (score 2,6), as well as cooperation among stakeholders (local people, tourist agencies, tourist organizations, etc.) in the field of rural tourism (score 2,8).

**Table 3.** Survey results

<b>Claims</b>	<b>Average marks</b>
Quality promotion of rural tourism in Serbia	3,6
With what resources Serbia has in the sphere of rural tourism	4,2
The content and the offer of rural tourism in Serbia is interesting to the youth	3,4
The content and the offer of rural tourism in Serbia is interesting to foreign guests	3,2
Promotion of rural tourism in Serbia	2,8
Potential tourists are familiar with the offer of rural tourism	3,0
State investment in the development of rural tourism	2,6
Cooperation among stakeholders (local people, travel agencies, tourist organizations, etc.) in the field of rural tourism	2,8

*Source:* The authors

### **Challenges and possible directions for the development of rural tourism in Serbia**

The most common result of the exclusive or predominant reliance of rural development of a country on agriculture (though it is the most important and most frequent activity of the rural economy) is a phenomenon of rural poverty and unemployment. The experience of developed countries in solving economic and demographic problems of rural areas emphasizes both non-agricultural aspects of sustainable rural development: the manufacturing industry, indigenous crafts, trade of their own products and in particular, rural tourism.

The level of development of rural tourism of a country certainly depends on the overall socio-economic development. Therefore, the total revenue realized by holders of rural tourism in our country is small and inadequate, but also as such from the standpoint of individual rural households is not irrelevant. A significant effect of the development of rural tourism can be a significant involvement of women workforce in this type of activity.

With the advent of urbanization and industrialization, and thereby exhausting work, noise, different kinds of pollution, more and more tourists yearn for areas of preserved nature, clean air and healthy food. An ideal refuge for these tourists are precisely rural, village areas and farms - an oasis of peace, which were previously symbols of wealth, fertility and prestige.

Serbia has very favorable prerequisites for the development of tourism in the countryside. First of all, those are particularly favorable conditions of preserved nature, with a mild climate, clean air, still unpolluted rivers and lakes, rich flora and fauna. Residing in nature gives tourists the possibility for walks, recreation, playing sports, hunting and fishing, horseback riding, hiking, picking forest fruits and medicinal herbs and other recreational and leisure activities in the countryside. Tourists who show interest in it may be included in the agricultural works. According to the opinion Taleb Rifai, Deputy Secretary General of the World Tourism Organization, the Serbian village is a tourism potential which in this form is not registered anywhere in the world (Hotel professional, 2008).

The development of tourism in Serbian villages does not have a long tradition, because the organized travel of tourists in this region began to take place by the end of the '70s. The recent development of village tourism offer of Serbia was marked by uncoordinated and unsynchronized development, without integration with other entities. This development has formed an incomplete and insufficiently differentiated offer of rural tourism in the country (Hrabovski-Tomić, 2008).

One of the most important tasks in the development of rural tourism is to educate village hosts for engaging in this activity. Firstly it is necessary, through professional reevaluating of domestic and foreign positive experience in tourism in the countryside, to demonstrate village hosts the economic justification for practicing this activity. In addition to that, the use of energetic marketing, propaganda and information can set a goal to familiarize the general population of our country, as well as domestic and foreign tourists, with exceptional beauty and possibilities offered by rural tourism.

A development strategy for rural tourism and its implementation must necessarily be carried out through cooperation not only at the local level but also through regional cooperation and integration in the wider international programs. Integration with national and international associations, whose activities are related not only to the development of rural tourism but also for the integral and sustainable development altogether, in addition to the exchange of information, experiences and adoption of methodologies, contributes to more efficient marketing. In order for rural tourism to obtain a significant promotion in the region, a professional marketing approach should be implemented, which could be undertaken by local governments, tourism organizations, NGOs, private sector, etc.

When looking at the most important elements of rural tourism in our country, the following observations can be noted:

- Insufficient use of accommodation facilities, which are already modest in capacity.
- The lack of suites and other accommodation facilities of higher level, resulting in lower prices and total revenue.
- A significant number of rural households (nearly 40%) do not offer food, and therefore does not make any income on that basis.
- Inadequate and underdeveloped promotional and advertising mix, and inadequate sales channels, which are primarily reflected in the limited use of the Internet as a global network, as well as insufficient participation in tourist traffic of the local tourism organizations.
- Low average cost of accommodation and food, which, with a small volume of services results in low total income (the average price of bed and breakfast is about 10 euros, half board 14 euros, and full board is 16 euros).
- Poor offer of additional services in rural households (sports and recreation, trade, transport, handcrafts and the like).
- Insufficient investment in accommodation capacities, which is a sign that there is no need for their expansion.

### **Conclusion**

The main strategic goals of the Serbian tourism in rural areas should be: competitiveness in international market, balanced regional development, self-employment and motivating young people to stay in the countryside, permanent protection, implementing and maintaining high environmental standards for the sake of long-term sustainable valorization of tourism potential of rural areas, developing an overall offer for a tourist destination, raising the quality of accommodation for hospitality and tourism services, encouraging the production of organic food and local products as well as their placement through tourism, educating the employees in rural tourism and increasing the share of rural tourism in the overall tourist traffic.

Looking at the achieved level of development of Serbia in the field of rural tourism, we can conclude that it is unsatisfactory. At the same time it is an indisputable fact that all natural, cultural and social preconditions exist for its development (developed biodiversity, noticeable agricultural resources, a large percentage of active agricultural population, traditional, often extensive ways of farming, limited use of chemicals in conventional production and on that basis the possibility of diverting the production of agricultural products in the direction of organic production, significant preconditions for the conducting the recreational activities such as hiking, adrenaline sports, hunting and fishing, horse riding schools, taking part in agricultural activities within the rural households, as well as the existence of numerous culinary events and the like).

Hard work and effort are necessary to help developing rural tourism in Serbia by education, and to encourage all of those who intend to run tourist services on their homesteads. It is also necessary to facilitate orientation in the business to those who are already operating as rural family households in tourism (involved in agrotourism). It is necessary to further motivate conservation of: ambient architecture, village houses, local specificities, traditions and customs, interesting old arts and crafts, biodiversity, agricultural production on small areas, original products. To allow preserving the vitality of the village and the attractiveness of the village way of life, through tourism services, as a motivator of development of rural areas. It is necessary to do all this in such way as it was done many years ago in France and other most developed tourist destinations in the world today.

### Literature

1. Bramwell, B. (1994): *Rural tourism and sustainable rural tourism*, Journal of Sustainable Tourism, vol. 2, no. 1-2, pp. 1-6.
2. Butler, R.W., Hall, C.M., Jenkins, J.(eds) (1998): *Tourism and Recreation in Rural Areas*, John Wiley & Sons, Toronto
3. Kastenholz, E., Davis, D, Paul, G., (1999): *Segmenting tourism in rural areas; The case of north and central Portugal*, Journal of Travel Research, Boulder, May 1999, pp. 353-363.
4. Mathieson, G, Wall, A. (1982): *Tourism, Economic, Physical and Social Impacts*, Longman, London
5. Muhi, B. (2013): *Ruralni turizam kao komponenta integralnog i održivog razvoja sela u Vojvodini*, zbornik Matice srpske za društvene nauke, Novi Sad, Zbornik Matice srpske za društvene nauke, no. 142, pp 129-137.
6. Muhi, B. (2010): *Ruralni turizam kao faktor revitalizacije sela u Vojvodini – izazovi i mogući pravci razvoja*, časopis Ekonomika poljoprivrede, God. 57, br. 3, Naučno društva agrarnih ekonomista Balkana, UDC 338.43:63 YU ISSN 0352-3462 , Ekonomika poljoprivrede, vol. 57, no. 3, pp 475-487.
7. Muhi, B. (2009): *Primena marketinga u seoskom turizmu Vojvodine*, Univerzitet Educons, Sremska Kamenica.
8. Muhi, B. (2009): *Marketinški aspekti brending strategije seoskog turizma Vojvodine*, časopis Turističko poslovanje – The Business of Tourism, Visoka turistička škola Beograd no. 4, pp 93-103.
9. Pearce, D., (1989): *Tourism Development*, second ed., Longman Scientific and Technical with John Wiley and Sons, New York
10. Seaton, A.V., Jenkins, L.L., Wood, R.C., Picke, P.U.C., Bennett, M. M., MacLellan, L.R. (1994): *Tourism the State of Art*, John Wiley and Sons Ltd., London
11. Hrabovski-Tomić, E. (2008): *Selektivni oblici turizma*, Fakultet za uslužni biznis, Sremska Kamenica.



12. Štetić, S. (2007): *Posebni oblici turizma*, Forma B, Beograd.
13. Đenadić, M. (2012): *Marketing u hotelijerstvu*, monografija, Draslar partner, Beograd.
14. Veer, M., Tuunter, E. (2005): *Rural Tourism in Europe, An exploration of success and failure factors*, Stichting Recreatie, Hague
15. Vratuša, V., Anastasijević, N. (2002): *Održivi razvoj, uređivanje prostora i seoski turizam u Srbiji na početku 21. veka*, Časopis Departmana za geografiju, turizam i hotelijerstvo, Novi Sad, Turizam 6/2002.
16. Ivanović, J., Pantić, M. (2008): *Specifičnosti sela u Srbiji u kontekstu turističkog potencijala*, stručni rad, Institut za arhitekturu i urbanizam Srbije.
17. Đorđević-Milošević, S., Milovanović, J. (2012): *Mala poljoprivredna gazdinstva i ruralni turizam u Srbiji*, Fakultet za primenjenu ekologiju Futura, Univerzitet Singidunum, Beograd, pp. 38.
18. Wilson, S., Fesenmeier, D.R., Fesenmeier J., John, C., (2001): *Factors for success in rural tourism development*, Journal of tourism research, vol. 40, no. 2, pp.132-138
19. Hotel professional, časopis za hotelijerstvo, no. 10, Belgrade, 2008.

Internet:

1. <http://www.lematelas-hotellerie.com>
2. <http://www.countryliving.com> – Život na selu, časopis
3. <http://www.eurogites.com> - Evropska federacija za seoski turizam
4. <http://www.world-tourism.org> - World Tourism Organization - Svetska turistička organizacija
5. <http://www.novosti/rs>, 05.05.2013. Krsmanović, A. „Đakuzi u šljiviku“

## RURALNI TURIZAM - PROPUŠTENA ŠANSNA SRBIJE

*Miroljub Đenadić<sup>5</sup>, Bela Muhi<sup>6</sup>, Dušan V. Jovanović<sup>7</sup>*

### Rezime

*Ruralni turizam je u isto vreme i stara i nova pojava. Interesovanje za rekreaciju u seoskim predelima počelo je da raste već u XIX veku, kao reakcija na pritisak rastuće urbanizacije i industrijalizacije. Srbija ima velike potencijale za razvoj ruralnog turizma. Prirodne lepote u kombinaciji sa kulturom, tradicijom, festivalima, gastronomskim specijalitetima i muzikom, mogu postati prepoznatljiv turistički brend, koji bi doprineo značajnom deviznom prihodu i popravio imidž zemlje.*

*Međutim, trenutno dostignuti nivo konkurentnosti Srbije u sferi ruralnog turizma nije naročito dobar, nezavisno od činjenice da za njegov razvoj postoje svi prirodni, kulturni i socijalni preduslovi (prirodni potencijali, značajno poljoprivredno zemljište, značajan broj poljoprivredno aktivnog stanovništva, tradicionalni pristup poljoprivredi, nezagađenost tla hemijskim supstancama i mogućnost proizvodnje „zdrave hrane“, dobar potencijal za razvoj komplementarnih aktivnosti kao što su šetnje, rekreacija, lov, ribolov, jahanje, učestvovanje u svakodnevnim poslovima seoskih domaćinstava, tradicionalni lokalni gastronomski specijaliteti i sl.).*

*U ovom radu želimo da prikazemo resurse u Srbiji u sferi ruralnog turizma kao i moguće pravce razvoja ovog oblika turizma.*

**Ključne reči:** *ruralni turizam, seoski turizam, agroturizam, održivi razvoj, Srbija*

---

5 Predavač, dr Miroljub Đenadić, Visoka poljoprivredna škola strukovnih studija, Vojvode Putnika 56, 15000 Šabac, Srbija. Tel: +381 63 26 20 77, E-mail: [miroljub.djenadic@gmail.com](mailto:miroljub.djenadic@gmail.com)

6 Docent, dr Bela Muhi, Univerzitet Educons, Fakultet poslovne ekonomije, Ulica Vojvode Putnika br. 87, 21208 Sremska Kamenica, Srbija. Telefon: +381 63 53 37 20, E-mail: [bela.muhi@educons.edu.rs](mailto:bela.muhi@educons.edu.rs)

7 Master Dušan V. Jovanović, doktorand, Univerzitet u Novom Sadu, Poljoprivredni fakultet, Trg Dositeja Obradovića br. 8, 21000 Novi Sad, Srbija. Telefon: +381 62 30 31 22, E-mail: [duda.jovanovic@gmail.com](mailto:duda.jovanovic@gmail.com)



## FOREIGN DIRECT INVESTMENTS IN THE ROLE OF STRENGTHENING THE EXPORT COMPETITIVENESS OF THE SERBIAN ECONOMY

*Dejan Đurić<sup>1</sup>, Jelena Ristić<sup>2</sup>, Dragana Đurić<sup>3</sup>*

### Summary

*The globalization of economic activity imposes the need for all countries to participate intensely in the current international economic cooperation and exchange processes of goods, services, labor and capital. Greater integration into international economic and trade flows is particularly important for small countries, given that the limitation of resources and insufficient domestic production impose the need for greater imports. On the other hand, import imposes a greater need for more exports so that the growing imports could be financed. Adjusting the challenges of globalization is an important task for all countries in order to accomplish basic economic goal, and that is the growth of living standards of all citizens. In this sense, in this paper, special attention is paid to the state of foreign trade and the analysis of the effects of FDI on export competitiveness and increase exports of the national economy, as one of the most important conditions of economic progress in the future. The main objective of this paper is to highlight the importance of the impact of foreign direct investments to strengthen the export activities of the Serbian economy, and the importance of intensification of export activity and qualitative changes in the structure of domestic exports.*

**Key words:** globalization, exports, foreign direct investments, economic growth.

**JEL:** F10, F21, O19, Q17

### Introduction

Republic of Serbia must constantly and rapidly increase its exports to achieve continuous high rates of economic growth and a constant increase in gross domestic product and the

---

1 Dejan Đurić Ph.D., Full Professor, Business School of Professional studies Novi Sad, Vladimira Perica Valtera street no. 4, 21000 Novi Sad, Serbia, Phone: +381 63 805 74 20, E-mail: [ddjuric971@gmail.com](mailto:ddjuric971@gmail.com)

2 Jelena Ristić Ph.D., Full Professor, Business School of Professional studies Blace, Kralja Petra I street no. 70, 18420 Blace, Serbia, Phone: +381 63 404 202, E-mail: [jelenazristic@yahoo.com](mailto:jelenazristic@yahoo.com)

3 Dragana Đurić Ph.D., Professor, Business School of Professional studies Blace, Kralja Petra I street no. 70, 18420 Blace, Serbia, Phone: +381 65 805 74 20, E-mail: [djdragana@ikomline.net](mailto:djdragana@ikomline.net)

standard of living, exports. The increase in export revenue is an important condition for servicing the fiscal deficit and high levels of external debt and it provides financing for the import of equipment and technology, which also implies a prerequisite for economic development in the coming years (Đurić et al., 2011). The projected dynamic growth of external debt shows that an increasing share of gross domestic product for regular servicing of debt obligations of domestic product should be allocated in the future. With the increase in repayment of debt falling due in the coming years, the pressure on foreign exchange reserves will grow, so it is necessary to insist on increased exports as the best way of financing the deficit of the trade balance. In order to achieve this, it is necessary to work towards more intensive attracting of foreign direct investments and achieving qualitative changes in the structure of domestic exports and to adapt global demand for imports. Bearing in mind the fact that foreign direct investments is an important means of strengthening export activity and further development of the Serbian economy, the strategy of influx of international capital movements must become the backbone of its future economic and development policies.

### **Methodology**

Theoretical elaboration and the goals have influence the authors of this paper to use the descriptive, comparative-historical and analytical-synthetical methodology, whereby an attempt was made to consider and understand the problem. Moreover, the analysis of the content of the adopted documents and the results of previous research was used. The research was performed during the period from 2000 to 2014. The basic data sources are represented by the statistics of the external trade and foreign direct investments, materials of the Ministry of Finances of the Republic of Serbia, Chamber of Commerce of Serbia, the World Bank and other relevant sources.

### **The need to strengthen the export activities of the national economy**

The Republic of Serbia, as a relatively small country with underdeveloped infrastructure, unfavorable economic structure and modest development resources, must strive to build an export-oriented economy, with developed tradable goods sector (industry and agriculture). In this country, there is a need for an increase in exports due to the following reasons:

- The limitations of the domestic market cannot provide the economies of scale, and thus one of the most important conditions for strengthening the competitive position of domestic companies on the world market;
- Lack of basic production inputs and the necessity of meeting the needs of all citizens, through the purchase of goods and services, will inevitably lead to the growth of imports, which increases the need for greater exports to the foreign trade sector held in balance. A small country cannot provide a wide enough range of goods and must therefore import and in order to pay for imports must provide the required level of exports.

Given the importance of exports to Republic of Serbia, it is clear that without its growth it cannot achieve its main economic goals. In this sense, the main task of economic policy in the coming period is to increase exports in order to:

- Increase production and hence employment and living standard;
- Ensure macroeconomic stability by reducing the sensitivity of economic growth in the size of capital inflows and
- Allow regular servicing of external debt (Ministry of Finance of the Republic of Serbia, 2011).

The basic measure of the competitiveness of modern economies is the ability of companies, industries and sectors of the economy to lower operating costs and development time and achieve economic competitiveness and competitiveness on the basis of price, as well as the ability of companies, industries and sectors of the economy to improve performances of products and services, above all, quality, functions and after-sales service. Based on this criteria, the largest part of the economy of Serbia lacks sufficient ability to reduce costs and improve product quality, and consequently it does not reach the necessary economic and technological competitiveness in domestic and foreign markets (Đurić, 2007). In this regard, the foreign investors can significantly contribute a stimulating economic environment by addressing problem of low competitiveness of local exports, together with local entrepreneurs and investors. On these grounds, the production, export and technological performance of the Serbian economy could be improved along with the raise of the level of its international competitiveness.

Special importance for reducing the foreign trade imbalance in the coming period will be the inflow of foreign direct investments (FDI), mainly Greenfield investment in export-oriented sectors of the economy in which they need to increase productivity, exports and foreign exchange inflows. These sectors boost export offer and reduce import demand and thereby improve the balance of payments position of the country and lead to financing of the current account deficit, without increase of government borrowing.

### **Developments in the foreign trade sector of the national economy after 2000**

The long isolation of our economy and international economic relations during the nineties of the 20th century, led to a negative economic consequences in the field of foreign trade operations. As a result of wars, economic sanctions, loss of markets and the unstable political environment, in this period there was a dramatic fall in the level of overall economic trends, the reduction of domestic accumulation and a large decline in the level of export activity.

One of the indicators of the relative importance of foreign trade to the domestic economy is the one that points to the share of exports and imports in gross domestic product (GDP) - the coefficient of foreign trade. In the last decade of the 20th century,

the export of the Federal Republic of Yugoslavia (FRY) experienced a lot of pitching, which was directly reflected in the reduction of its share in GDP (export coefficient). The value of this ratio fell from 23% in 1990 to only 13.2% in 2000.<sup>4</sup> The scale of the decline in export flows in the reporting period can be seen on the basis that the share of merchandise exports FRY in world merchandise exports in 1990. It amounted up to 0.17%. After that the fall of this share followed and it was reduced to 0.03% in 2000 (WTO, 2003).

Unlike the successful countries in transition, the situation in the export sector of the Serbian economy in the reporting period was far worse. Besides the decline in the value of merchandise exports, at the same time there was a serious deterioration of its qualitative performance, which, along with other restrictions, also led to a decrease in our trade with foreign countries. The disadvantage of the structure of domestic exports was reflected in the fact that in the period from 1990 to 2000, the share of primary products in world merchandise exports decreased from 26.5% to 20.1%, while our exports increased from 23.5% to as much as 50% (World Bank, 2001). Agricultural production and extractive activities represented a pillar of Serbian foreign trade, and the share of finished products in the structure of total exports showed a negative trend. Domestic exports did not follow the flows of world import demands and it was based on traditional export structure. All this resulted in a summary result of falling levels of exports and expansion of the trade deficit, which was a “trademark” of the Yugoslav economy in that period (Kovačević, 2005).

After 2000 there was a re-inclusion of our country in the international economic environment. This led to a revival of foreign trade activities. The long isolation from the world market and the inability to come up with necessary products caused a strong need for the dynamic import of goods and services, which caused an increase in the trade deficit and current account deficit.

**Table 1.** Merchandise trade balance of the Republic of Serbia for the period from 2001 to 2014 (mil. USD)

Year	Export	Import	Balance	Coverage of imports by exports (%)	Foreign trade deficit as % GDP
2001	1720	4260	-2540	40	21
2002	2074	5614	-3540	36	22
2003	2756	7477	-4721	36	24
2004	2523	10755	-7232	32	30
2005	4480	10461	-5981	41	24
2006	6431	13174	-6743	48	23
2007	8823	19165	-10342	46	25
2008	10974	24332	-13358	45	25
2009	8345	15808	-7463	52	19
2010	9794	16471	-6677	59	17

4 Exports data and GDP of FRJ are from Statistical Office of Serbia, corresponding year.

2011	11780	19862	-8082	59	17
2012	11229	18928	-7699	59	19
2013	14612	20553	-5941	71	13
2014	14845	20650	-5805	71	13

Source: <http://webrsz.stat.gov.rs/WebSite/>

On the basis of information on developments in the foreign trade sector of the Serbian economy after 2000, we can conclude that in the years after 2000 a basic feature of the trade balance of our country was the existence of the high level of trade deficit. It was held at a relatively high level of above 20% of GDP, with that in 2004 it amounted up to 30% of GDP. In 2005 there was a reduction of the share of trade deficit in GDP of Serbia (30.4% of GDP in 2004 to 23.8% in 2005), as a result of the growth of slowing export and import activities in that year. The high share of foreign trade deficit in gross domestic product was also observed in 2006 (23%) and 2007 (25%) and 2008 (25%). In 2008 there was a record of high deficit of over 13 billion USD. The main reason for such a high deficit in this period was the growth of private and public consumption (real growth in public sector wages and excessive public spending) and the insufficient supply of some essential products from domestic production which would be competitive imported products.

Based on the indicators in the table above we can see that in 2009 the volume of foreign trade was reduced and foreign trade deficit (significant reduction in imports than exports). Foreign trade in 2009 was significantly decreased compared to the previous year. The fall in world prices of primary products, the decline in world demand as a result of the global financial crisis and the real depreciation of the dinar influenced the values of exports and imports in 2009 which were significantly below the levels in 2008. Export of goods, expressed in dollars was reduced from 10.9 billion USD to 8.3 billion USD. At the same time imports decreased from 24.3 billion USD to 15.8 billion USD. The larger decline in imports than in exports resulted in a reduction of the trade deficit from 13.3 billion USD to 7.5 billion USD and higher coverage of imports by exports (52%).

In 2010, speaking at an international level, exports and imports of goods increased (values are expressed in US dollars), while the coverage of imports by exports was 59%. At the end of 2010, the foreign trade deficit amounted 6.6 billion USD. The growth in merchandise exports this year, was the result of a recovery section, which in previous years were the pillars of exports, and which were most affected by the crisis, and they were the segments of iron and steel and non-ferrous metals. Exports of these two segments increased compared to 2009 by 56.6% and 66.8%, respectively.

Export of goods in 2011 increased from 9.8 billion USD to 11.8 billion USD. Imports of goods also increased, from 16.5 billion USD to 19.9 billion USD, while the trade deficit was higher by about 1.4 billion USD compared to the previous year and amounted 8.1 billion USD. Significant growth in exports is the result of an increase in exports of metal ores, base metals, agricultural products and the manufacture of rubber and



plastic, as a result of the growth in export demands. The coverage of imports by exports was 59%. The level of trade with foreign countries in 2012 remained at about the same level as in the previous year, along with the certain reduction in the trade deficit.

Merchandise exports in 2013 were higher than in the year of 2012 by 30.1%, while imports rose by 8.5%. The exchange of goods with foreign countries in 2013 was a deficit in the amount of 5.9 billion USD, representing a decrease of as much as 23% compared to the year 2012. The coverage of imports by exports in this year was 71%, and it was greater than the coverage in 2012, when it amounted to 59% ([www.pks.rs](http://www.pks.rs)).

The total foreign trade of the Republic of Serbia in 2014 amounted to about 35 billion USD, which represented the growth of 0.9% compared to the previous year. Merchandise exports reached a value of 14.8 billion USD; an increase of 1.6% compared to the previous year, and imported goods worth 20.6 billion USD, which was 0.5% more than in 2013. In 2014, there was a negative balance of trade in the amount of 5.8 billion USD, which was 2.2% less than in the previous year, while the export-import ratio was 71.9%, which was slightly more than in the corresponding period of coverage in 2013 when it amounted to 71.1%.

Such movements of foreign trade flows in recent years, where the share of merchandise exports has almost continuously been increasing, which, along with the stabilization of the share of merchandise imports, have led to a substantial decline in participation of foreign trade deficit. It should be noted that the positive trend, even in conditions of stagnation or decline in GDP, and even stagnation of exports, after 2008 there has been no significant increase in the share of foreign trade deficit in GDP. However, this does not mean that there has been a strong improvement of export activities in our country. That can be concluded on the basis that the export of Serbia in relation to GDP is still considerably lower than in similar countries of Central Europe. While Serbia's export of goods and services in 2014 amounted to 44% of GDP, the share of exports in GDP in countries of similar size (Bulgaria, the Czech Republic and Hungary), in the same year was about 80%. Starting from the level of external debt of the country and the need to import raw materials and semi-final goods for domestic production, export ratio would have to reach a value of above 50% GDP (Ministry of Finance of the Republic of Serbia). Accordingly Serbia has great space for export growth and reducing the trade deficit on this basis. In addition, export growth is a key drive of sustainable growth of the Serbian economy in the coming years, and would double-digit growth rates of exports accounted signal that Serbia is on a sustainable growth path (Quarterly monitor, 2015).

### **The export structure as the source of the problem of domestic exports**

An assessment of the strong progress of Serbia in the field of export performances could be also acquired on the basis of changes in the export structure of the domestic economy in recent years. However, this conclusion is only partially standing. The rapid improvement of the export structure in the last two years, resulting in the start of production of Fiat (FAS), has, due to the very low volume of total exports, dramatically changed the export structure of the domestic economy. In any case, only the strong

potential growth in domestic exports which would in per capita terms or as a share of GDP be near to the one of the countries of the region, could mean that we are on the road of full recovery of domestic exports. For if the structure would still remain similar to the one we have today, we could talk about a strong qualitative shift. Thus, with exports in per capita term which is several times lower than in most countries in the region, export picture remains bleak. In fact, exports in 2013 amounted to only 14.6 billion USD and two times lower than the Bulgarian, just exceeded the Croatian, and 7.4 times less than Hungarian and 10.2 times lower than the Czech. Serbia's exports per capita of 1.530 EUR in 2013 is one of the lowest of all the countries in transition (e.g. Czech exports amounted to 10.740 EUR pc; 8.254 EUR pc Hungary, Slovakia 14.627 EUR pc. This leads us to the conclusion that growth of domestic trade since 2000 has been impressive, but it was achieved with a very low base, so that Serbia has, in absolute figures a very low export (Nikolić, 2014).

The main structural problems of domestic exports are:

- Export structure is based on domination of reproduction i.e. production of low level of processing,
- Low level of production concentration, despite the relatively small value of total exports,
- Lack of competitiveness of the export offer in terms of products (design and product development, technical standards, durability and appearance, presentation) and in terms of price (the price of raw materials, cost of financing, taxes and transportation)
  - Export activities of several firms determine the overall dynamics of exports (Fiat Serbia, Smederevo steel plant, rolling mill copper and aluminum, Gorenje, Tigar ...) due to the low value of exports,
  - Production and export of the food industry are largely influenced by meteorological conditions (genus farming),
  - There is a significant correlation between exports and imports, even the biggest exporters and the largest importers.<sup>5</sup>

So there are many problems which limit the powerful boosting export activities of Serbian economy. The first highlight in an adequate structure of the domestic economy, i.e. unfavorable export structure, cannot provide sufficient competitiveness in the international market. The export structure of our country is still dominated by products for reproduction i.e. products with a low degree of processing, and the structural changes in the real sector basically lead to an assumption for raising export competitiveness to a higher level. During the period from 2000 to 2014 a moderate structural improvement

---

5 In a situation where the largest exporters are at the same time the largest importers, it is difficult to reduce a country's foreign trade deficit; therefore, one of the possible solutions for reducing this deficit may be import substitution by developing a supplier network from the domestic market.

of domestic exports of goods was recorded, which can be seen through the increase in the share of final products. The technological structure and factor intensity of goods exports have improved, but these changes have not in a critical extent improved the structure of domestic exports and thereby created the conditions for its strong long-term growth. The level of quality of Serbian goods exports still significantly lags behind other countries in the EU, and to a lesser extent, the economies of Central Europe.

Geographic structure of the domestic economy foreign trades points to the fact that most of the national exports are directed to the EU market and CEFTA countries (over 80%). Observed by countries, the most important foreign trade partners of Serbia are Italy, Germany, Bosnia and Herzegovina, the Russian Federation and Romania.

Export structure is not well geographically diversified - as much as 90% surplus of Republic of Serbia is realized with only three countries: Macedonia, Montenegro and Bosnia and Herzegovina. The high concentration of Serbian exports to only a few countries may have a negative impact on the further growth of exports. Therefore, one of the main tasks of foreign policy and the future development is directing the companies into new markets.

In order to achieve optimal geographic diversification of exports, the entry of companies into new markets should flow in two directions:

- In the direction of the market with high growth potential and/or large purchasing power and/or
- In the direction of markets that have been traditional partners of the former Yugoslavia.

In this sense, we can mark four key export markets for Serbia. These are: the European Union; CEFTA; Commonwealth of Independent States (CIS); Near and Middle East and North Africa (BSISA).

Previous analysis of the volume and dynamics of export and commodity export structure of the national economy, points to the conclusion that the increase in the value of exports and improving its structure must become the backbone of our development policy in the future. It is clear that Serbia needs a new development strategy that will focus on reducing unproductive public spending and raising the level of investments and exports in GDP. Such a strategy is practically unfeasible without additional foreign accumulation, i.e., without the inflow of foreign direct investments that may affect the significant increase of the commodity export potentials.

Existing export structure does not provide enough space for bigger growth of total export. Traditional export structure shows a delay of structural changes in import demand in developed countries. The sharp shift in this structure, which would fit contemporary tendencies structure of import demand, is not easy and it involves opening up the reform process in the real sector of the economy. In this regard, enhancing foreign direct investments is crucial to the realization of a new paradigm of economic growth and rising export activity (Nikolić, 2014). A special importance to reduce the foreign

trade imbalance in the coming period will be the inflow of foreign direct investments, primarily greenfield investment in export-oriented sectors of the economy where the increase of productivity, exports and foreign exchange inflows is needed.

### **The impact of FDI on exports of the host country**

Foreign direct investments represent the most important source of financing for the development of domestic economy (Đurić, 2006). In today's conditions, foreign direct investments (FDI) assumes a key function of the development factors, along with the trade as the main mechanism for the globalization of the world economy. Realizing foreign direct investments, economic entities deploy their production systems and other business functions on a global scale, trying to provide the best supply of raw materials, energy and labor, on the one hand, and profitable marketing of their products and services on the other (Đurić et al., 2012). Their significance can not only be seen in the inflow of the necessary funds for investments, but also in the opening of processes of partnership relations with companies from the most developed countries, which represent the development carriers in their activities (Savić, 2002). The influence of foreign direct investments on the structure and specialization of import depends on numerous factors, such as: cumulative level of foreign direct investments, the types of foreign investments (greenfield investments directly affect the rise in the level of gross investments in comparison to the acquisitions in relation to the privatization process, whereby only the change in ownership occurs), sector distribution (only investments in the sector for tradable goods can affect the change in the import structure), the technology type which companies with foreign ownerships use in production and the absorptive capacity of domestic enterprises (Boljanović, 2013).

A special significance of foreign direct investments activities is that it has that component of the investment package which relates to the provision of access to international markets for goods and capital and the expansion of exports of industrial and other products. In addition to bringing the capital to the modern technological knowledge, foreign direct investments also allow easier access to international trade and integration into the global distribution network of global organizations (Đurić, 2003). In this regard, some of the main effects of FDI on the export competitiveness of the domestic economy are as follows (UNCTAD, 2000):

- *Ensuring access to international markets.* Export promotion includes not only competitive products, but also the necessity of expertise and knowledge in the field of marketing and international business. The biggest benefits of FDI can be brought right on in this area, especially when it comes to markets where widespread distribution network and creation of trade marks (brand names) play an important role in product placement. The trade of products with high technological value (which generally takes place between global organizations and their branches – the so - called. Intercompany trade), and the inclusion in the network of global organizations can be of a crucial importance for increasing exports.

- *Building local connections.* In a situation where a global organization provide inputs for their production in local markets, FDI in the context of export-oriented sectors indirectly links domestic suppliers with foreign markets. Such domestic companies can eventually become able to act independently in international markets, too.

- *Creating static competitive advantages.* The inflow of foreign direct investments, the host country may provide the missing resources such as capital goods, knowledge, technology, etc., which are necessary for the effective use of existing comparative advantages (natural resources, cheap labor, etc.).

- *Creating dynamic competitive advantages.* In countries with good educational base, global organizations can contribute to the creation of dynamic benefits of the competing, bringing new knowledge and technology. This was the case with dynamic sectors, such as electronic, material handling in some countries in Southeast Asia. SDI enabled the development of new export-oriented industries, especially electronic, by providing preferential access to export markets within the system of global organizations, or through links with them. Thus, in the electronic industry, the American global organization established branches in Asia, as part of its integrated network of production and trade. As a result of the intensive export activities of US subsidiaries, some of the countries of the region (Singapore, Malaysia, Taiwan, South Korea, etc.) have been integrated into the international division of labor in the electronic industry and specialized in the production for the world market. These countries, which in 70's of the 20th century were the location for installation of the product of Japanese and American global organizations today are involved in all stages of production in the semiconductor industry, electronics, computers, and are significant actors in the global trade. Malaysia has become one of the world's largest exporter and manufacturer of electronics and semiconductors, and South Korea, Taiwan and Singapore's largest exporters of semiconductors and other electronic components from developing countries and among the leaders in the world, relying in large part on technology, organizational skills and global network marketing organizations from developed countries.

The contribution of foreign direct investments (FDI) activity strengthening export performance of the host countries of this form of international capital movements is particularly important for developing countries and countries in transition. Foreign branches in these countries were mostly more export - oriented in relation to domestic firms, and their propensity to export increased proportionally length of time performing economic activity on a foreign destination, which has maintained a positive role in the growth of the participation of the aforementioned groups of countries in total world exports. By bringing new production activities based on modern technology and knowledge, and linking local production to global corporate systems, foreign companies have largely been holders of creating new foreign trade flows.

In the context of the positive impact of FDI on export activity and changes in the export structure, an example of some of the former socialist countries (Poland, Czech Republic, Slovakia, Slovenia and Hungary), which joined the European Union in 2004.

can be cited. These countries have in the early nineties courageously embarked on reforms, achieved a drastic change in the trade structure and practically got a new role in the international division of labour. From traditional exporters of raw materials and products of lower processing phase, during the nineties the observed countries have increased manifold during of export products of higher stages of finalization. Relatively rapid liberalization and a significant inflow of foreign capital, the first through privatization, and later thanks to a favorable institutional infrastructure, have been crucial for this shift. Their exports to the EU in the period 1993 -2001 increased from 29.712 million to 91.769 million USD, respectively, for over three times (Adam et al., 2003). As the evidence of improving export situation of these countries, we can mention the fact that exports of Czechoslovakia in 1990 amounted to 10.7 billion USD to the total exports of the Czech Republic and Slovakia in 2001 which reached 46 billion USD (Kovačević, 2005).

Empirical data show that foreign direct investments in these countries is mainly export-oriented. In Hungary, for example, in 1998 70% of the sales of the industrial sector were conducted by the subsidiaries, which in the same year realized the 86% of the exports of the industrial sector of the country. Companies with foreign capital achieved in the same year, about 53% of Polish exports to the industrial sector and 47% of exports of this sector in the economy of Czech Republic (OECD, 2000). Dynamic growth of foreign trade of the observed countries in transition was accompanied by significant changes in the structure of their exports. Thus, for example, in 2000 in Poland the dominance of machinery and transport equipment in the total structure of its exports (34.2%) was recorded, while in 1993 the share of this equipment was only 20.1% (UNIDO, 2001).

### **Volume and dynamics of foreign direct investments**

The change of political attitude of the international community towards our country and its reintegration into the global integration process, led in the early 21st century, to a significant increase of interest of foreign investors in the domestic economy. All this has contributed to the investment climate in our country as a lot more attractive, which has led to serious attracting foreign direct investments in our economy.

The total amount of FDI in 2001 amounted to 184 mil. EUR, which is 2,5 times more compared to the foreign capital invested in 2000. In terms of sectorial structure and activities of the foreign capital invested in 2001 in a variety of activities were represented, with a dominant share of trade and services in the field of traffic (more than half of the total number of registered contracts related to this area). In this year, significant amounts of foreign investments were invested in the banking sector. In 2002 the inflow of foreign direct investments in the Serbian economy amounted to 500 mil USD, and in total foreign investments hand in cash as a result of taking significant privatization ventures dominated. In this sense, tender sales of shares of cement plants particularly stand out.

**Table 2.** Foreign direct investments net, annual and cumulative, in million EUR

Year	in mil EUR		% as GDP		Per capita in EUR	
	Per year	Cumulative	Per year	cumulative	Per year	Cumulative
2001	184	1.098	1,4	8,6	25	146
2002	500	1.598	3,1	10,0	67	213
2003	1.194	2.792	6,9	16,1	160	373
2004	774	3.566	4,1	18,7	104	478
2005	1.250	4.816	6,2	23,7	168	647
2006	3.323	8.139	14,3	34,9	448	1.098
2007	1.821	9.960	6,4	35,0	247	1.349
2008	1.824	11.784	5,6	36,3	248	1.603
2009	1.372	13.156	4,8	45,5	187	1.797

*Source:* National Bank of Serbia, Republican Bureau of Statistics

The inflow of foreign direct investments in 2003 reached a value of 1.194 million. EUR, mainly thanks to the sale of companies from the tobacco industry, while in 2004 there was a reduction in foreign investment, as a result of a slowdown of the privatization process. In 2005 there was a revival of SDI activities and, above all, in the banking sector, and in 2006 it came to selling of telecommunications company "Mobi 63" for 1,5 billion EUR and the pharmaceutical companies "Hemofarm" to 485 mil EUR, which, along with other investments, led to the total FDI inflow in the amount of over EUR 3 billion. In 2007 and 2008 there was the annual FDI inflow of around EUR 1.8 billion.

At the end of the first decade of the 21st century the global economy was struck by the economic and financial crisis. The economic crisis in the world was first reflected in the flows of foreign direct investments. The inflow of foreign direct investments in 2009 dropped significantly in Serbia and other transition countries of Southeast Europe. The impact of the crisis on FDI reduction of inflows was followed by other factors, such as exhausted possibilities of privatization and structural weaknesses of the economy. Serbia in 2009 managed to attract 1.4 billion EUR net of foreign direct investments, which was 452 million EUR less than in 2008 (Ministry of Finance of the Republic of Serbia, 2011).

In 2010 the downward trend in FDI continued, while inflows of foreign direct investments in Serbia in 2011 established the tendency of growth. A record amount of net FDI in 2011 was achieved in July, when it was accounted at 419.6 mil. EUR, thanks to the incoming payment of Delhaize Group for the purchase of shares of Delta Maxi (Ministry of Finance of the Republic of Serbia, 2011). In 2012, the total value of FDI inflow was one fifth lower than in 2011, and in 2013 the FDI inflow was lower than in the 2012.

In the period from 2001 to 2013, cumulative FDI inflows to Serbia amounted to 22.8 billion USD, and according to this indicator, Serbia was at 67<sup>th</sup> position in the world. Of the countries in the region in the reporting period, the greater inflows of investments were in: Romania (70.3 billion USD), Hungary (68.5), Bulgaria (51.8) and

Greece (29.8). Smaller inflow than Serbia in the neighborhood countries had: Albania (8.2), Montenegro (7.1), Bosnia and Herzegovina (7), and Macedonia (4.3) ([www.makroekonomija.org](http://www.makroekonomija.org); Biznis i finansije, 2014).

Foreign direct investments after 2000 was largely directed towards the areas of financial intermediation, wholesale and retail, manufacturing and real estate. The structure of investment indicates that the dominant capital inflow was motivated by providing quality services to the domestic sector. A small number of investments were directed to the industrial sector, which lead to an increase in exports and competitiveness (Mitra, 2011).

Realization of foreign direct investments in Serbia since 2000, largely took place through the purchase of companies in the privatization process, while the so-called Greenfield investments were not sufficiently represented. The FDI inflow was, for the most part, motivated by buying local monopoly or oligopoly in finance, manufacturing cement, cigarettes, energy and retail. Green field investments (investments in the construction of a new industrial capacity) did not represent the dominant form of foreign capital into our economy, and examples from the region indicate that a significant driver of economic development and the intensification of export activities were just green field investments. Therefore, this type of inflow of foreign investments must become the backbone of our strategy of attracting foreign capital in the future.

It is obvious that after 2000 there was a significant increase in foreign direct investments in our country. However, although there was a significantly larger and encouraging inflow of foreign capital, its extent was insufficient from the standpoint of the development needs of the national economy.

Bearing in mind the fact that FDI is an important means of strengthening export activity and further development of the Serbian economy, the inflow of foreign capital strategy must become the backbone of its economic and development policies (Đurić et al., 2010). To this end, it is essential to define priority areas and branches for foreign investments, and to determine the most desirable form of this inflow. It is necessary for The National Strategy for the inflow of foreign capital to identify the type of foreign investments needed and economic areas to be developed. In order to attract FDI in a more successful way, it is necessary to quickly eliminate existing barriers and constraints and to take measures in the direction of: the elimination of economic and political risks, creating a predictable business conditions, rapid implementation of the initiated economic changes, the further involvement of countries in the international financial and political organizations and others. Otherwise, foreign investors would continue the cautious treatment of Serbia as unattractive and a high-risk area for investment, which for our exports and the overall economy could have extremely negative consequences.

### **Conclusion**

Analysis of the scale and dynamics of export and commodity export structure of the national economy, points us to the conclusion that the increase in the value of exports and improving its structure must become the backbone of our development policy in



the future. It is clear that the country needs new development strategy, which will be based on increasing the investments and exports share in the gross domestic product. Such a strategy is practically unfeasible without additional foreign accumulation, i.e., without the inflow of foreign direct investments that may influence the significant increase of the exports potentials. This means that the foreign investors, together with local entrepreneurs and investors can significantly contribute to solving the problem of low competitiveness of local exports in a stimulating economic environment. On these ground the export and technological performances of the Serbian economy would improve and the level of its international competitiveness would rise. In this sense, the intensification of foreign direct investments is crucial to the realization of a new paradigm of economic growth and the growth of export activities.

### Bibliography

1. Adam, A., Kosma, T. S. and McHugh, J. (2003): *Trade Liberalization Strategies: What Could Southeastern Europe Learn from CEFTA and BFTA*, IMF Working Paper WP/03/239, IMF, Washington, pp. 19.
2. Boljanović, S. (2013): *Komparativna analiza uticaja stranih direktnih investicija na strukturu i specijalizaciju srpskog i mađarskog izvoza*, *Ekonomске teme* 51(1):1-20, Ekonomski fakultet, Niš, Srbija, pp. 37.
3. Đurić, D. (2007): *Jačanje i unapređenje izvoznih aktivnosti kao najvažniji cilj ekonomske politike u 2007. godini*, Konferencija – Izazovi ekonomske politike Srbije u 2007. godini, Naučno društvo ekonomista sa AEN i Ekonomski fakultet u Beogradu, Beograd, Srbija, pp. 273.
4. Đurić, D., (2006): *Reintegracija srpske privrede i rezultati tranzicije u svetlu privlačenja stranih direktnih investicija*, *Ekonomski anali*, Tematski broj, april 2006, godina LI, Ekonomski fakultet, Beograd, Srbija, pp. 280.
5. Đurić, D. (2003): *Ekonomsko finansijski odnosi sa inostranstvom – politika i praktične mere unapređenja izvoza*, *Ekonomski anali*, Tematski broj, Beograd, Srbija, pp. 189.
6. Đurić, D., Đurić, D., Maksimović, D. (2010): *Strane direktne investicione aktivnosti u Srbiji - stanje i perspektive*, Institucionalne promene kao determinanta privrednog razvoja Srbije - monografija, Univerzitet u Kragujevcu, Ekonomski fakultet, Srbija, pp. 153.
7. Đurić, D., Đorđević, M., Tomić, R. (2012): *Nacionalna ekonomija*, Alfa-Graf NS, Novi Sad, Srbija.
8. Đurić, D., Živkov, D., Kolar, S. (2011): *Problemi fiskalnih neravnoteža i mogući rizici koji proizilaze u postkriznom period*, *Ekonomika poljoprivrede*, Vol. 58, No. 2, IEP, Beograd, Srbija, pp. 299.
9. Kovačević, R. (2005): *Ekonomski odnosi Srbije sa inostranstvom*, Centar za izdavačku delatnost Ekonomskog fakulteta u Beogradu, Beograd, Srbija, pp. 250-272.

10. Quarterly monitor: (2015), No. 40.
11. Ministry of Finance of the Republic of Serbia (2011): *The strategy of increasing exports to the Republic of Serbia for the period 2008 to 2011*, Belgrade, Serbia, pp. 1.
12. Ministry of Finance of the Republic of Serbia (2011): *Development Report Serbia 2010*, Belgrade, Serbia, pp. 19-141.
13. Mitra, P. (2011): *Capital Flows to EU New Member States: Does Sector Destination Matter?* (IMF Working Paper WP/11/167), Washington, D.C.: International Monetary Fund, pp. 5.
14. Nikolić, G. (2014): *Strukturno unapređenje domaćeg robnog izvoza*, Časopis Finansije, Ministarstvo finansija Republike Srbije, pp. 15-21.
15. OECD, (2000): *Recent FDI trends, Policies and Challenges in SEE Countries in Comparison with Other Regions in Transition*, The Vienna for International Economic Studies, Vienna.
16. OECD and CEFTA (2010): *Trade Integration, Industry Concentration and FDI Inflows; The Experience in Central and South Eastern Europe*, Paris.
17. Savić, Lj. (2002): *Kako u uslovima privatizacije u Jugoslaviji povećati priliv stranih direktnih investicija*“, *Ekonomске teme*, Vol. 40, No. 1-2, Ekonomski fakultet, Niš, Srbija, pp. 203.
18. UNIDO, (2001): *How to DO Business in Poland*, Warsaw, pp. 64.
19. UNCTAD, (2000): *World Investment Report 2000*, New York and Geneva, pp. 190.
20. World Economic Forum (2011): *Global competitiveness report 2011-2012*, Geneva.
21. WTO, (2003): *World Trade Report 2003*, pp. 8.

## STRANE DIREKTNE INVESTICIJE U FUNKCIJI JAČANJA IZVOZNE KONKURENTNOSTI PRIVREDE SRBIJE

*Dejan Đurić,<sup>6</sup> Jelena Ristić,<sup>7</sup> Dragana Đurić<sup>8</sup>*

### Rezime

*Globalizacija ekonomskih aktivnosti nameće potrebu svim zemljama da se intenzivno uključuju u tokove međunarodne ekonomske saradnje i procese razmene roba, usluga, rada i kapitala. Veća integrisanost u međunarodne ekonomske i trgovinske tokove naročito je značajna za male zemlje, s obzirom na to da limitiranost resursa i nedovoljna domaća proizvodnja nameću potrebu za većim uvozom. Sa druge strane, veći uvoz nameće potrebu za većim izvozom, da bi se rastući uvoz mogao finansirati. Prilagođavanje izazovima globalizacije važan je zadatak svih država, kako bi se mogao ostvariti osnovni ekonomski cilj, a to je rast životnog standarda svih građana. U tom smislu, u okviru ovog rada, posebna pažnja se posvećuje stanju spoljnotrgovinske razmene i analizi efekata stranih direktnih investicija na izvoznu konkurentnost i povećanje izvoza nacionalne ekonomije, kao jednom od najbitnijih uslova ekonomskog napredovanja u budućnosti. Osnovni cilj rada je da se ukaže na značaj uticaja stranih direktnih investicija na jačanje izvoznih aktivnosti privrede Srbije, kao i na važnost dinamiziranja izvoznih aktivnosti i kvalitativnih promena strukture domaćeg izvoza. Teorijska elaboracija i postavljeni zadaci opredelili su nas da u radu koristimo deskriptivnu, komparativno-istorijsku i analitičko-sintetičku metodu, kao i analizu sadržaja.*

**Ključne reči:** *globalizacija, izvoz, strane direktne investicije, ekonomski rast.*

---

6 Redovni profesor, dr Dejan Đurić, Visoka poslovna škola strukovnih studija Novi Sad, Ulica Vladimira Perića Valtera br. 4, 21000 Novi Sad, Srbija, Telefon: +381 63 805 74 20, E-mail: [ddjuric971@gmail.com](mailto:ddjuric971@gmail.com)

7 Redovni profesor, dr Jelena Ristić, Visoka poslovna škola strukovnih studija Blace, Ulica Kralja Petra I br. 70, 18420 Blace, Srbija, Telefon: +381 63 404 202, E-mail: [jelenazristic@yahoo.com](mailto:jelenazristic@yahoo.com)

8 Redovni profesor, dr Dragana Đurić, Visoka poslovna škola strukovnih studija Blace, Ulica Kralja Petra I br. 70, 18420 Blace, Srbija, Telefon: +381 65 805 74 20, E-mail: [djdragana@ikomline.net](mailto:djdragana@ikomline.net)

## COMPARATIVE ANALYSIS OF FUNCTIONAL FOOD PRODUCERS' PROFITABILITY IN SERBIA - A LEADER-FOLLOWER RELATION<sup>1</sup>

*Dragana Draganac*<sup>2</sup>

### Summary

*The functional food market in Serbia is relatively young and insufficiently explored both from the aspects of producers and consumers, the qualitative aspect and especially from the quantitative aspect. The aim of this paper is to illustrate the results of the comprehensive quantitative financial analysis of profitability which focuses on the example of two companies. The main criterion applied in the selection of companies for the analysis represents the fact that one company is recognizable as a producer of foods with nutritive and health claims and is a leader within that market segment, whereas the other analyzed company mostly produces traditional products and has entered the aforementioned market segment at a later stage. The key idea is to do a comparative analysis of the profitability of these two companies for a four-year period. The profitability ratio analysis and the Du Pont analysis system are used in the paper as well as the analysis of solvency and financial leverage effect. The vertical analysis of income statement is also done in order to reveal the relation between some cost categories and operating revenues. The research results lead to a conclusion that the company that mostly produces functional foods has higher profit margins and rates of return and is therefore in a more favourable position since it can benefit from positive effects of financial leverage to a higher extent. The profitability of the second relevant company is mostly based on the better asset turnover.*

**Key words:** *profitability, financial leverage, functional food producers*

**JEL:** *M49, G30, Q19*

---

1 The paper is the result of the quantitative research conducted as part of the projects financed by the Ministry of Education, Science and Technological Development: Project III 41030 "Biological effects, nutritional intake and status of folate and polyunsaturated fatty acids: The improvement of nutrition in Serbia" (working package 5: Nutrition and consumer) and Project III 46001 "The development and application of new and traditional technologies in the production of competitive alimentary value added products for the European and world market - make the wealth from the wealth of Serbia".

2 Dragana Draganac, Teaching Assistant, Faculty of Economics, University of Belgrade, Kamenička Street no. 6, 11000 Belgrade, Republic of Serbia, Phone: +381 11 302 11 77, E-mail: [dragana\\_c@ekof.bg.ac.rs](mailto:dragana_c@ekof.bg.ac.rs)

## Introduction

Functional foods have for a long time been a point of interest of many natural sciences (medicine, biology, food technology, etc.), but they have insufficiently been researched from the point of view of economics. However, with an increased promotion of the benefits of a healthy lifestyle, the need for a better standard of living as well as with the heightened awareness about the importance of including these consumer products in our everyday diet, the focus of economic research has also shifted to include the domain of functional foods. The functional food market has become especially interesting for economic analysis over the course of the past few years primarily because of its important commercial potential. The growth of the functional food market in Serbia has particularly been strong over the last four years, especially because of the rise in the number of functional food consumers, and this tendency is also expected in the future (Stojanović et al., 2014).

The term “functional food” stands for the food that contains some useful nutritive ingredients, such as probiotics, vitamins, minerals, omega-3 fatty acids, etc. the regular consumption of which has positive effects on our health both in preventive and curative terms (available at: <http://www.somboled.rs/en/magazine/healthy-diet/functional-food>). The most representative foods are mainly found in the category of dairy and fruit products.

Functional foods are consumer products which, in addition to providing an organism with sufficient nutrients for the normal functioning and satisfying our basic physiological needs, also have an important supplementary role: they reduce the risk of disease, or prevent the further progression of a disease through their beneficial physiological and psychological effects (Diplock et al., 1999).

A nutritive claim is a statement which offers confirmation that the product contains some nutrients or that it contains high/low levels of some ingredient (high level of vitamins, 0% of fat, etc.). Health claims usually point out that nutrients have positive effects on some body functions or that they reduce the risk of the occurrence of a certain disease (Mitić et al., 2014).

Foods with nutritive and health (N&H) claims are not only targeted at vulnerable consumer groups, i.e. the ones that experience chronic health problems such as noncommunicable diseases (diabetes, cardiovascular diseases, etc.), but also at pregnant women, sportsmen, children and everyone who is aware of the relationship between the quality of nutrition and health. In the beginning, the targeted consumer groups were young, educated women with high incomes who live in urban areas, but the scope of the target group is now gradually expanding to include members of the elderly population with a medium range of income (Stojanović et al., 2013, b).

More N&H claims are found on products which are traded on unregulated functional food markets than on the regulated ones. In Serbia, for example, numerous N&H claims can be viewed as being unattestable as they are very vague and general, or may even be confusing and induce consumers to arrive at wrong conclusions about certain product characteristics (Dragutinović Mitrović et al., 2014).

It is of utmost importance to improve regulations referring to product labeling and the use of nutritive claims in Serbia. Regulations pertaining to health claims are still non-existent in Serbia. As a consequence of regulatory oversight and/or the general absence of regulations, some producers in Serbia are given the opportunity to manipulate the consumers by the inadequate use of N&H claims, which ultimately creates mistrust between the consumers and is certainly one of the main reasons of the insufficient consumption of functional food products.

When it comes to the evaluation of motives for the N&H claimed food production and selling in the Western Balkan countries, the producers and retailers most often cite the improvement of a company's image and the need to respond to consumer demands (Stojanović et al., 2013, a). One should be careful in considering profit as a motive, having in mind that the list and the ranking of the relevant motives is usually compiled and obtained by means of in-depth interviews. We should also bear in mind that the answer which includes profit as the main motivation is very likely to be avoided due to its socially inappropriate connotations.

This paper focuses on the analysis of the causes of difference in profitability between the two companies from the same industry. The main distinction between the two relevant companies is the structure of the product assortment (functional vs. traditional food) and the moment of their entering the N&H claimed product market. The rationale behind the choice of these two particular companies lies in the fact that the very emergence of the functional food markets in Europe and Serbia is directly related to dairy products.

### **General remarks about analyzed companies**

„Imlek” is a regional company that is constantly investing in modern technology, staff, the quality management system, the food safety system and environmental protection which ultimately yields high quality products that have been presented with numerous awards and certificates (available at: [www.imlek.rs/en](http://www.imlek.rs/en)).

The company produces more than 80 different dairy products. Besides the commonly recognizable brands, such as “Moja Kravica” (*My Little Cow*) yogurt, it especially invests in the segment of functional products which provides the consumers with dairy products with added ingredients that positively affect different aspects of the healthy functioning of the human organism. Moreover, „Imlek“ has a product range called „Bello“, which includes the first 100% organic products in Serbia. The company produces products which are rich in vitamins, minerals, probiotics and fiber that improve digestion, boost metabolism, strengthen the immune system, or reduce body mass and the percentage of fat in the body by converting fat into energy in a natural way.

“Somboled” is currently one of the most successful dairy industry companies in Serbia and that stable position is further ensured with its continual investment in primary milk production and new innovative dairy products. Within its product range, the company has brands such as „Dukat“ and „President“ which are one of the best known brands of dairy products in Serbia and in the region. By looking at the product assortment of the company, it is clear that traditional products which satisfy the gastronomic preferences of gourmets

are the most dominant ones (available at: [www.somboled.rs](http://www.somboled.rs)).

In the domain of functional foods, „Somboled“ produces Dukat UHT milk which is enriched with 7 essential vitamins and folic acid. Some yogurts are rich in probiotics which regulate digestion and balance the intestinal microflora in a natural way, simultaneously boosting the immune system. „Dukat“ chocolate milk is enriched with vitamins and folic acid which makes this brand of chocolate milk especially convenient for the needs of growing children. The company also produces products with a very low percentage of milk fat, as well as those that are rich in calcium.

### **Hypotheses, methodology and data sources**

This paper illustrates the results of the financial analysis and the comparison of profitability of the abovementioned companies. The key point of research revolves around identifying the causes of differences in the profitability as well as around identifying value creation methods.

In the course of the analysis, I have applied the profitability ratio analysis as well as the Du Pont system analysis. In identifying the specific causes of difference in profitability, it was necessary to analyze solvency, financial leverage, some turnover ratios and cost structure. This paper relies on the data obtained from publicly available financial statements of these two companies.

It is to be expected that “Imlek” should have higher profit margins and higher rates of returns in comparison with “Somboled”, but it should also be apparent that this company has higher specific kinds of costs, such as marketing costs, sponsorship costs, research and development costs, costs of raw milk, costs of the quality analysis of final products, consultancy costs, etc. This assumption seems even more plausible if we take into account the fact that this company has a wider range of N&H products and that it has produced functional foods for a longer period of time in comparison with the other company.

In accordance with the defined scope of this paper, the main research objective is to reveal whether „Imlek“ has higher profitability and different ways of increasing profitability in comparison with „Somboled“. The following hypotheses are tested in this paper:

H1: The company that is recognizable as a functional food producer has higher profit margins.

H2: The company that mostly has traditional products in the product assortment uses the strategy of higher asset turnover.

H3: The cost structure of the company that mostly produces N&H products is different from the cost structure of the company that has a smaller number of N&H products in its product assortment.

H4: The company that is recognizable as a functional food producer can afford and benefit from higher levels of financial leverage because it has higher rates of return.

## Research results

As mentioned above, for the purpose of this research I have applied the ratio analysis of revenue profitability, the ratio analysis of asset and equity profitability, as well as the Du Pont system analysis.<sup>3</sup> I have also analyzed the cost structure, i.e. the relation between some specific cost categories and operating revenues.

### Ratio analysis of profitability

For the purpose of the ratio analysis of revenue profitability, I have calculated, interpreted and conducted a comparative analysis of the following ratios: gross margin, operating profit margin, net profit margin and EBIT margin. The ratio analysis of asset and equity profitability has been applied across the following ratios: return on asset – ROA and return on equity – ROE.

The profitability ratios for the companies „Imlek“ and „Somboled“ for the four-year period (2010-2013) are shown in the table below.

**Table 1.** Profitability ratios: “Imlek” vs. “Somboled”, 2010-2013

Ratio	Year							
	2010		2011		2012		2013	
	Imlek	Somboled	Imlek	Somboled	Imlek	Somboled	Imlek	Somboled
1. Gross margin	51.12%	37.71%	50.42%	34.17%	52.94%	35.80%	52.85%	35.20%
2. Operating profit margin	14.89%	3.41%	14.45%	5.12%	15.40%	9.64%	15.59%	8.14%
3. Net profit margin	6.33%	0.56%	10.15%	3.55%	12.53%	5.07%	10.62%	5.09%
4. EBIT margin	7.31%	1.19%	11.12%	3.88%	13.94%	5.29%	13.15%	5.14%
5. ROA	7.84%	1.61%	12.48%	6.37%	14.79%	9.47%	11.12%	8.65%
6. ROE	12.08%	1.08%	19.68%	8.25%	25.94%	12.87%	21.76%	11.57%

Source: Calculations made by the author on the basis of financial statements available at: <http://fi.apr.gov.rs/prijemfi/cir/objavljivanje.asp><sup>4</sup>

It can be seen that there are variations in profitability indicators both between and within observed companies. Generally speaking, the sources of variation in profitability can be classified into four groups: country, industry, corporate group and firm-level determinants. Country level determinants include law system, financial and technological infrastructures, access to international markets, etc. The examples of industry-level variables are: economics of scale, entry and exit barriers, market share, etc. Corporate group effects include advantages or disadvantages of individual firm's membership of a larger corporation. Internal firm-level factors that may cause difference in profitability are: internal strengths and weaknesses, organizational structure, management practices, competitive positioning,

3 Formulas used for calculation of all ratios used in the paper are given in the Appendix 1.

4 <http://fi.apr.gov.rs/prijemfi/cir/Podaci1.asp?Search=07042701&code=29d1ebedc140fd4d8e3f0eada5bde7cb8175d006>  
<http://fi.apr.gov.rs/prijemfi/cir/Podaci1.asp?Search=08067953&code=00ce7a74d7b161b83dfc00b86abbf96327038c33>



product assortment structure, technical expertise, etc. (Goddard et al., 2009). In present paper I analyze the difference in the product assortment and leader – follower relation as a factors that may cause the difference in profitability between two analyzed companies.

The “Imlek’s” gross margin is quite stable in each of the observed years and shows signs of a slight increase in both 2012 and 2013. The same tendency can be noticed in the analysis of the operating profit ratio which reflects the company’s core business profitability without taking financing and tax effects into consideration. However, it can also be noticed that the operating profit margin appears to be only slightly higher in 2013 than in 2012. The net profit margin increased 4 percentage points in 2011 from 2010. The ratio also increased in 2012, but its decrease of less than 2 percentage points in 2013 from 2012 is worrisome. Even though we can observe a slight growth in sales revenue in 2013 from 2012, the net profit is significantly decreased, which means that the sales revenue contain less net profit, which is of course a bad indicator. A deeper analysis can be conducted in order to reveal which cost categories have risen and in turn led to a decrease in the net profit margin. In 2013 the cost of the sold goods rose significantly, but the main cause of fall in net profit was a drop in financial income that resulted in higher net financial expenses. The EBIT margin has a trend which is similar to the net profit margin ratio.

The return on asset ratio increased in the period from 2010 to 2012. In 2013 it decreased to 11.12% from 14.79% in 2012. Although there was an increase in the total asset investment, it resulted in a lower corresponding concept of profit<sup>5</sup>, which is bad for the company. In the following sections of the paper I will show the two-component ROA in the Du Pont analysis system that will enable me to analyze the causes of the ROA decrease in greater detail - through revenue profitability and asset management efficiency analyzes. It is important to have in mind that the level of ROA partly depends on the industry’s features while partly on strategy choice and implementation (Malinić, 2013). Although both analyzed companies belong to the same industry and it is expected that they have the similar degree of operating leverage, the fact that „Imlek“ is more oriented toward functional food production than „Somboled“ may cause different level and structure of costs, difference in production technologies, and as a consequence, different operating leverage, asset turnover and profit margins. The change in ROA is also influenced by product life cycle: the height of operating income and investments are different during different phases of product life cycle (Seling, Stickney, 1989).

The return on equity increased significantly in the period from 2010 to 2012, but there was a drastic fall in 2013 of as much as 4 percentage points. I have already noticed a decrease in net profit in 2013 and have identified the reasons. The increase in the average net equity is also notable because it means that investments were rising, but that they also generated less amount of net profit, which is an unfavorable situation for the analyzed company. More detailed insights into the causes of ROE changes will be given within the Du Pont analysis system when I present a two-component and a four-component ROE. I will also analyze

---

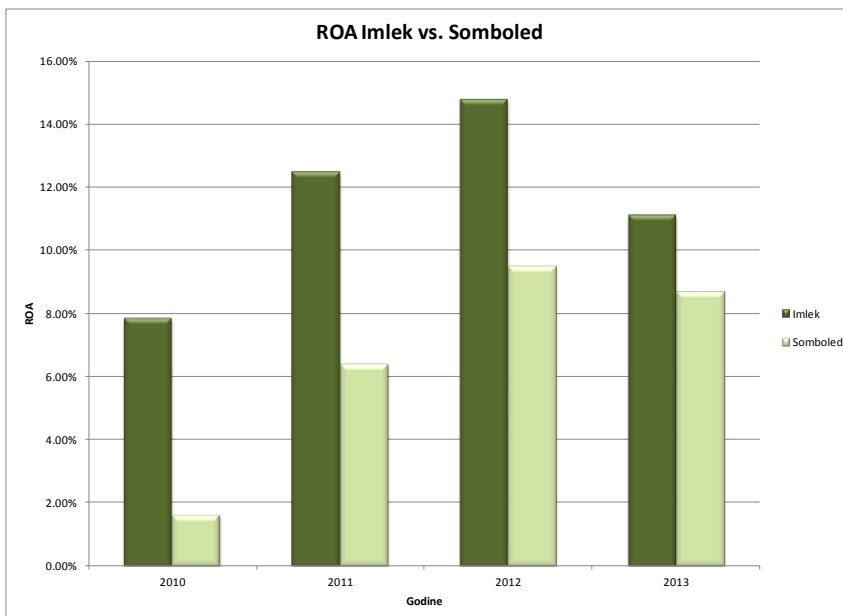
<sup>5</sup> Net profit + Interest Expenses\*(1-Tax Rate). See formulas in the Appendix 1.

revenue profitability, the equity turnover ratio and, for the first time, the capital structure and the effect of financial leverage.

I now turn to the analysis of the profitability of “Somboled”. Its gross margin reached the highest point in 2010. It decreased in 2011 but in the following two years it remained stable, at the level of about 35%. However, this ratio is significantly lower than the same ratio calculated for “Imlek” within the given time period – in 2013 alone, the difference amounted to 17.65 percentage points. The operating profit margin showed signs of growth in the period from 2010 to 2012, but dropped in 2013. Sales revenue decreased, but the operating profit was decreasing at a higher rate, and, as a consequence, the sales revenue contained less operating profit. This is a bad indicator for “Somboled”, especially if we have in mind that its operating profit margin is considerably lower than “Imlek’s”. The net profit margin of “Somboled” stood at a very low level of only 0.56% in 2010 when the company earned the lowest amount of net profit. The net profit margin increased in the following years, but reached a level of only 5.09% in 2013, which is considerably below „Imlek’s” achievement of 10.62%. All ratios of revenue profitability clearly point out that sales revenue contain a significantly lesser amount of different profit concepts in the case of „Somboled” than in the case of „Imlek”. The detailed analysis conducted above speaks in favor of the first-stated hypothesis.

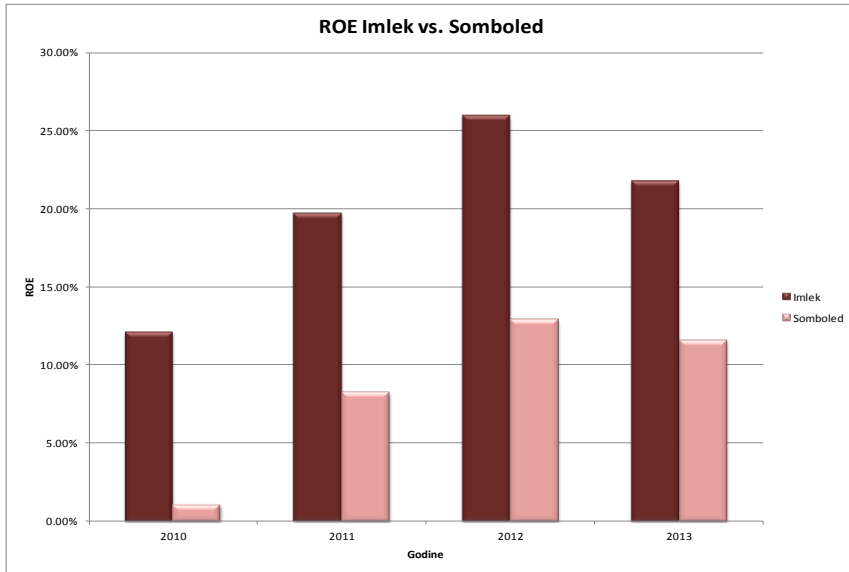
Asset and equity profitability ratios, i.e. ROA and ROE are graphically illustrated by means of the following two figures:

**Figure 1.** ROA „Imlek“ vs. „Somboled“



Source: Calculations made by the author on the basis of financial statements available at: <http://fi.apr.gov.rs/prijemfi/cir/objavljivanje.asp>

**Figure 2.** ROE „Imlek“ vs. „Somboled“



Source: Calculations made by the author on the basis of financial statements available at: <http://fi.apr.gov.rs/prijemfi/cir/objavljivanje.asp>

The ROA of „Somboled“ stood at a very low level of only 1.08% in 2010 due to a very small net profit. During 2011 and 2012, the ROA increased and reached 9.47% in 2012, but it decreased in 2013. Within the same period of time, „Imlek’s“ ROA was higher than „Somboled’s“ but we can see signs which indicate that difference is gradually decreasing.

The ROE of „Somboled“ was on the increase in the period from 2010 to 2012, but it dropped in 2013 as a result of the simultaneous increase in equity and the decrease in earned net profit. The ROE was lower than the ROA in 2010, which signals the presence of the negative financial leverage effect. During each year of the relevant time period, the ROE was higher than the ROA, but the company did not adequately benefit from the positive effect of financial leverage. The same conclusion seems to be valid within the capital structure analysis. The fact that „Somboled“ did not have an either long-term or a short-term financial obligation in 2012 and 2013 is very interesting. By comparing the ROE between „Imlek“ and „Somboled“, I may conclude that the former company appears to be more successful. In 2013, for every 100 RSD<sup>6</sup> invested by owners, „Imlek“ earned 21.76 RSD net profit, and „Somboled“ only 11.57. This fact additionally supports the first-stated hypothesis.

### The Du Pont analysis system

The advantage of the Du Pont analysis system is that the separation of the rate of return into several components gives us the possibility to identify which „levers“ are the ones

<sup>6</sup> RSD stands for Serbian Dinar, i.e. national currency

that the management should simultaneously manage in order to increase profitability. In other words, the management team is able to single out the drivers of value which highlight to the key fields where they should undertake concrete actions in order to achieve the desired results. The goal is that the asset employed in a business should produce as much as possible sales revenues that contain as much as possible profit. The turnover ratios have multiplicative effects on profit margins.

The idea of the Du Pont analysis system is the creation of performance measurement system that can help different levels of management, from operational to strategic, in achieving the goal of profitability increase (Lohman et al., 2004). By means of the Du Pont analysis system the interpretation of the rates of return is greatly enhanced in terms of quality, which in turn enables the identification of methods for increasing profitability: a more efficient asset and equity management, cost reduction, increase/decrease in selling prices and a better use of the positive effect of financial leverage. Bearing in mind the interconnection between the factors that affect the rates of return, it is clear that making the right decision is not easy. Cost reduction may lead to a higher profit, but, on the other hand, it is also possible that a reduction of the quality of products as well as the fall in demand may cause a decrease in revenues that could ultimately cancel the positive effects of the reduction of expenses. Moreover, an increase in costs may lead to an increase in both the revenues and the profit margin. The improvement of product quality and the quality of after-sales services (warranties, faster delivery, etc.) increases costs, but it may also induce a rise in demand and revenues, that could in turn increase profit margins as well as turnover ratios (Malinić, 2010). The Du Pont analysis system for „Imlek“ and „Somboled“ for a four-year period is shown in the following table.

**Table 2.** Du Pont analysis system: “Imlek” vs. “Somboled”, 2010-2013.

Ratio \ Year	2010	
	Imlek	Somboled
1. ROA (Du Pont)	7.3081% * 1.0728 = 7.84%	1.1925% * 1.3524 = 1.61%
2. ROE (Du Pont)	6.3255% * 1.9101 = 12.08% 1.7806 * 1.0728 * 7.3081% * 0.8655 = 12.08%	0.5587% * 1.9281 = 1.08% 1.4257 * 1.3524 * 1.1925% * 0.4685 = 1.08%
	2011	
1. ROA (Du Pont)	11.121% * 1.1218 = 12.48%	3.8783% * 1.6429 = 6.37%
2. ROE (Du Pont)	10.1519% * 1.9385 = 19.86% 1.728 * 1.1218 * 11.121% * 0.9129 = 19.86%	3.5535% * 2.3226 = 8.25% 1.4137 * 1.6429 * 3.8783% * 0.9163 = 8.25%
	2012	
1. ROA (Du Pont)	13.9448% * 1.0604 = 14.79%	5.2862% * 1.7919 = 9.47%
2. ROE (Du Pont)	12.529% * 2.0707 = 25.94% 1.9527 * 1.0604 * 13.9448% * 0.8985 = 25.94%	5.0711% * 2.5374 = 12.87% 1.416 * 1.7919 * 5.2862% * 0.9593 = 12.87%
	2013	
1. ROA (Du Pont)	13.1489% * 0.8456 = 11.12%	5.1353% * 1.6837 = 8.65%
2. ROE (Du Pont)	10.6164% * 2.0499 = 21.76% 2.4244 * 0.8456 * 13.1489 * 0.8074 = 21.76%	5.0888% * 2.2745 = 11.57% 1.3509 * 1.6837 * 5.1353% * 0.991 = 11.57%

Source: Calculations made by the author on the basis of financial statements available at: <http://fi.apr.gov.rs/prijemfi/cir/objavljivanje.asp>

Within the Du Pont analysis system, ROA is shown as a product of EBIT margin and (total) asset turnover ratio. EBIT margin of „Imlek“ was on the rise throughout the analyzed period of time, but fell in 2013 because of a decrease in net profit. Within the revenue profitability analysis I focused on identifying the reasons for the net profit decrease. The asset turnover ratio showed a substantial decline in 2013, which means that „Imlek“ managed their total assets less efficiently. A decrease in asset management efficiency is also perceived in 2012, but because the EBIT margin increased at a higher rate, ROA was higher in 2012 than in 2011. With regard to ROA in 2013, the decrease in both the EBIT margin and the asset turnover ratio is worrisome. Having in mind that the (total) asset turnover ratio is the most general and synthetic indicator of asset management efficiency, it is necessary to analyze fixed asset and working capital turnover, within which the efficiency of accounts receivable and the management of inventories should be investigated in order to reveal why the asset turnover ratio was decreasing in the observed years.

The fixed asset turnover ratio was recording an increase during the whole observed period. Thus, the problem is in the working capital turnover: this ratio fell in 2013 in comparison with 2012. Sales revenues were rising, but the working capital was rising at a higher rate, which resulted in the fall in the value of the ratio. Within the working capital, the efficiency of accounts receivable was decreasing. The accounts receivable turnover ratio fell in 2013 in comparison with 2012. In terms of credit risk related to accounts receivable collection, a similar amount of gross accounts receivable (in the range from 11.87% to 13.26%) is written off in each of the analyzed years. By observing the age structure of accounts receivable, I can see that in 2012 and 2013, where the collection period was longer than 360 days, the percentage of accounts receivable increased, which is, of course, a bad signal.

Within the Du Pont analysis system, ROE can be shown as a product of two ratios: net profit margin and equity turnover ratio as well as a product of four components: financial leverage, asset turnover ratio, EBIT margin and interest burden. The product of the second and third component in the four-component ROE is equal to ROA, so it can be noticed that there is a close relationship between ROA and ROE. The value of ROA is much more determined by production, marketing and sales capacities of the company, than by the capital structure. However, the capital structure directly affects ROE. In the four-component ROE, the level of the first and the fourth components mentioned above is determined by capital structure, i.e. the combination of debt and equity in asset financing. The formulas for the calculation of financial leverage and interest burden are given below:

$$\text{Financial leverage} = \frac{\text{Asset}}{\text{Equity}} = \frac{\text{Equity} + \text{Total Liabilities}}{\text{Equity}} = 1 + \frac{\text{Total Liabilities}}{\text{Equity}} \quad (1)$$

$$\text{Interest burden} = \frac{\text{Net profit}}{\text{Net profit} + \text{Interest expenses} \times (1 - \text{profits tax rate})} \quad (2)$$

When the company has liabilities, the indicator of financial leverage is always higher than 1 and the indicator of interest burden is always less than 1. This means that borrowing can cause

either an increase or a decrease in equity profitability (Malinić et al., 2011).

Financial leverage ratio can be calculated both on the basis of book and market values of equity and debt. The argument that speaks in favor of market values are as follows. Market value of the company finally determines whether the debtholders get their money back. However, market values include the value of intangible assets that are not readily salable and may disappear completely if the company falls in financial distress (Brealey et al., 2011).

In order to identify the effect of financial leverage, i.e. to determine how borrowing affects the profitability of equity, it is necessary to compare ROA with the after-tax cost of debt. For that purpose, ROE is decomposed as follows (Vernimmen et al., 2005):

$$ROE = ROA + \left\{ (ROA - \text{After Tax Cost of Debt}) \times \frac{\text{Total Liabilities}}{\text{Equity}} \right\} \quad (3)$$

$$\text{Net profit} = ROA \times \text{Equity} + (ROA \times \text{Total Liabilities} - \text{Interest Expenses}) \quad (4)$$

The expression in braces of formula (3) and the one in the parenthesis of formula (4) represent the effect of financial leverage. When return on asset is higher than the after-tax cost of debt, there is a positive effect of financial leverage that causes ROE to be higher than ROA. However, borrowing also has many disadvantages, such as the costs of financial distress and the agency cost of debt (Ivanišević, 2012). The cost of debt as well as the cost of equity rise with the increase in financial leverage due to a higher risk that investors bear. When the cost of debt increases and becomes equal to ROA, the company should stop borrowing. When the value of ROA becomes less than the cost of debt, i.e. when the return on asset is not enough to cover interest, there is a negative effect of financial leverage and further borrowing decreases equity profitability, i.e. the value of ROE becomes less than that of ROA.

By analysing the two-component ROE of „Imlek“ I can conclude that the net profit margin was rising in the period from 2010 to 2012, but that it dropped in 2013. The reason for the fall in ROE in 2013 is the abovementioned decrease in net profit. The equity turnover ratio increased in the period from 2010 to 2012, and then fell slightly. The analysis of the four-component ROE provided us with much more information. Two of the four components, i.e. the asset turnover ratio and the EBIT margin, were already analyzed in ROA Du Pont analysis. Now, I am focusing on the company capital structure and the financial leverage effect. Financial leverage decreased in 2011 from 2010. In 2012 and especially in 2013, it increased. During each of the analyzed years there was a positive effect of financial leverage. ROE was higher than ROA, which means that financial leverage influenced a rise in equity profitability. However, it can be noticed that ROE decreased in 2013 from 2012 and that the positive difference between ROE and ROA slightly decreased.

It is necessary to analyze the levels and trends of „Imlek's“ debt ratios. The total liability to equity ratio should have the approximate standard value of 1, which means that the maximum share of liabilities in financing total assets is 50%. „Imlek's“ total liability to equity ratio was less than 1 in 2010 and 2011, but it increased in 2012 and 2013 and was higher than 1 in both years. In 2013 the ratio was even equal to 1.61.

Given that this is the ratio of total liabilities (both interest and non-interest bearing) to equity, it is advisable to analyze the debt indicator calculated as a ratio of interest-bearing liabilities<sup>7</sup> and equity. „Imlek“ recorded a rapid growth of this ratio in 2012, when the value of 0.97 was recorded, and in 2013 the ratio was equal to 1.3, when the interest-bearing liabilities were higher than equity. This fact additionally supports the statement that the financial leverage of the company increased. Debt-to-equity (D/E) ratio, as a ratio of long-term debt<sup>8</sup> and (net value) of equity, was also calculated. The ratio increased in 2013 because of the increase in long-term debt.

The causes of rise in debt ratios can be identified by balance sheet analysis. The value of the item Common Stock decreased continuously during the whole analyzed period because of the cancellation of treasury shares. The value of the item Treasury Shares increased during the observed four-year period.

In terms of liabilities structure, the company had more current than long-term liabilities in each of the observed years. Current liabilities significantly rose in 2012 and 2013. The cause of the rise in current liabilities in 2012 was „Imlek’s“ additional borrowing, i.e. an increase in short-term debt. In 2012 there was a rise in other long-term liabilities on the basis of promisory notes which were issued in accordance with the contract for the lease of advertising slots. This clearly shows that the company has been intensively investing in marketing activities, probably because of the strengthening of competition within the functional foods sector. On the other hand, long-term loans decreased in 2012 because of principal payments.

In 2013 the current liabilities increased additionally. The highest percentage within the current liabilities can be attributed to short-term debt since the banks granted new loans to the company. Long-term debt also increased because of new bank loans aimed at refinancing short-term loans and because of a rise in capital lease obligations caused by the lease of the “Pet Aseptic” production line.

In the following section of the paper I apply the Du Pont analysis system to „Somboled“, the second relevant company. I first focus on ROA analysis. When I analyzed the EBIT margin, I noticed that the ratio increased in the period from 2010 to 2012, but then fell slightly in 2013. In terms of the asset turnover ratio, as the multiplier of the abovementioned profit margin within the two-component ROA, it can be seen that the efficiency of asset management increased in the period from 2010 to 2012, but that it decreased in 2013. Therefore, a decrease in both revenue profitability and asset management efficiency caused the fall in ROA in 2013. It is advisable to analyze the turnover ratios of different types of total assets: fixed assets, accounts receivable, inventories, etc. The fixed asset turnover ratio decreased slightly as a result of a rise in fixed assets which was followed by a slower growth in sales revenue. The decrease in fixed asset turnover is not a cause for concern if the investments are profitable and if their positive effects are likely to be

---

7 Interest-bearing liabilities are calculated as a sum of long-term provisions, long-term liabilities and short-term financial liabilities.

8 Long-term debt is calculated as a sum of long-term provisions and long-term liabilities.

realized in the foreseeable future. The accounts receivable turnover ratio also decreased. In 2013, an increased investment in accounts receivable was followed by a decrease in sales revenue, which is a very bad sign. Unfortunately, "Somboled's" notes to the financial statements do not include the information about the age structure of the accounts receivable. However, by comparing the accounts receivable turnover ratios of the two relevant companies, it can be concluded that „Imlek“ was more efficient in accounts receivable management than „Somboled“.

„Somboled's“ asset turnover ratios were higher than „Imlek's“ in each of the observed years which leads to a preliminary conclusion that our second-stated hypothesis makes sense - "Somboled", a company which relies on the traditional products in its product assortment, uses the strategy of higher asset turnover. On the other hand, „Imlek's“ gross margin is higher than „Somboled's“. A thorough analysis conducted in this paper points out the methods which should be used for the increase in profitability of both companies. „Imlek“ should introduce more efficient ways for asset turnover increase, whereas „Somboled“ should consider how to increase the margins by cost reduction without creating a decrease in product quality, functionality and reliability.

With regard to „Somboled's“ two-component ROE, I analyzed the net profit margin and noticed that it increased, but that it was still significantly lower than „Imlek's“. The second component, the equity turnover ratio, increased in the period from 2010 to 2012, and, as a multiplier of net profit margin, caused ROE to rise more intensively. But, equity turnover decreased in 2013 and caused a fall in ROE.

The four-component ROE is more informative. It gives an insight into the capital structure and the use of positive financial leverage effects. The asset turnover ratio and EBIT margin were already analyzed within ROA in the Du Pont analysis. The further analysis focuses on financial leverage and interest burden. Financial leverage was at its highest in 2010 when ROE was lower than ROA, i.e. when the company suffered a negative financial leverage effect. The financial leverage slightly decreased in 2011 and 2012, but it fell significantly in 2013. The interest burden indicator was very low in 2010: it was equal to 0.4685 only. In the following years, it increased and approached a value of 1 in 2013, which means that interest expenses decreased the net profit to a greater extent. Even though financial leverage was quite stable within the analyzed period, the same cannot be said for the interest burden. The reason for the seemingly inconsistent values of these two debt ratios is the fact that the first indicator took total liabilities in consideration and that the second considered only interest-bearing liabilities while spontaneous sources of financing were irrelevant.

Interest expenses decreased significantly throughout the observed period of time due to a decrease in long-term debt, and in 2012 and 2013 „Somboled“ did not use long-term debt as a source of financing at all. Short-term debt also decreased and was equal to zero in 2012 and 2013. The fact that the company did not use debt at all in 2012 and 2013 is very surprising and necessitates further analysis. I calculated the cash conversion cycle in order to check whether the company managed to finance the whole operating cycle



by using spontaneous non-interest bearing sources of financing. However, this proved not to be the case: the cash conversion cycle was positive during whole period and was significantly prolonged in 2013 because of the increase in the average collection period.

The conclusion is that „Somboled“ should benefit from positive effects of financial leverage to a higher extent. The company should increase the financial leverage to a reasonable level which will result in ROE increase. The debt ratio analysis speaks in favour of this conclusion. The ratio of total liabilities to equity was considerably below the upper approximate standard value of 1 and it considerably decreased throughout the observed period of time. The ratio of interest-bearing liabilities to equity and the D/E ratio stood at a very low point throughout the observed period of time as well.

The findings about financial leverage of „Imlek“ and „Somboled“ stay in line with the main conclusions of the paper that analyzed the determinants of the capital structure in emerging capital markets (Malinić et al., 2013). Namely, the authors concluded that companies from Serbia have much lower debt ratios than companies from other transitional economies. The structure of debt is also specific: short-term debt is higher than long-term debt.

There is close relation between profitability and capital structure. Only profitable companies are able to provide internal financing sources. Profitability is also positive sign for investors, that ultimately lead to long-term sustainable growth (Malinić, 2013).

There are two types of liabilities, financial and operating. So there are two types of leverage coming from liabilities that can differently affect ROE. One leverage effect comes from borrowing to finance operations and the second from borrowing in the course of operations (Nissim, Penman, 2003).

### **The analysis of the level and the structure of specific kinds of costs**

As mentioned above, it is to be expected that “Imlek” should have higher specific kinds of costs than “Somboled”. These specific kinds of costs include marketing costs, sponsorship costs, costs of raw milk, costs of the quality analysis of final products, consultancy costs, etc. Most of these costs fall within the scope of the costs that can produce additional revenues. It is also expected that the difference in costs between two relevant companies will be decreasing because of “Somboled’s” more active presence on the functional food market. It also means that “Somboled” must make some specific investments in order to become more recognizable as a brand by functional food consumers. The vertical analysis of income statements was done in order to test the stated hypothesis. I analyzed the relation between some cost categories and operating revenues/operating expenses. However, the problem that I encountered in the vertical analysis of income statements was that some specific cost categories were not represented as separate income statement items, but were sometimes found in notes to the financial statements, which did not have the same form, i.e. they did not include the same items for the companies that were analyzed. The „Imlek’s“ notes were richer in information as they contained separate items for costs of raw milk and packaging costs, whereas the relevant notes of „Somboled“ only contained an aggregate item for direct material costs. Additionally, the item marked as Other Operating Expenses included more subitems in the case of „Imlek“,

such as advertising and sponsorship costs, the costs of the quality analysis of raw milk and final products, the cost of hygiene maintenance, etc. The item Consultancy Costs was given as an aggregate sum which included the cost of services of healthcare consultants, lawyers, auditors and other consultants. Such an aggregate sum of costs was useless for the purpose of my analysis. "Somboled's" notes contained only the costs of advertising and representation as the components subsumed under the item Other Operating Expenses, but other relevant subitems were not mentioned. Likewise, external consultancy costs and severance costs were also subsumed under one aggregate item. This item was also very heterogeneous and hence useless for the purpose of my analysis. In accordance with the objectives of the analysis, clearly separated cost items would have played a major role in determining which cost items reflect the costs of the specific technology used for functional food production.

"Imlek's" production technology is specific because it has more functional foods in the product assortment. Its operating cycle, as well as its inventory period, were both longer than "Somboled's" throughout the relevant period of time. However, by reading the Management Discussion and Analysis Report (MD&A), it can be noticed that „Imlek“ neither significantly invested in research and development of its core business, nor in the information technologies and human resources both in 2012 and 2013, which represents a potentially bad outlook for the future of the company. In terms of investment, the most important project was related to the processes of upgrading the production, the packaging equipment and the production infrastructure.

The „Imlek's“ percentage share of the advertising, sponsorship and representation costs in operating revenues/operating expenses decreased while the reverse is true for „Somboled“. This could mean that the latter company invests more in its functional food marketing since it entered that market segment at a later stage and is now a follower.

The possibilities for testing the third-stated hypothesis in greater detail are limited due to my restricted access to data contained only in the financial statements which are made publicly available.

### Conclusion

The main contribution of this paper represents a detailed quantitative financial analysis of the profitability of two companies which fall within the domain of a specific sector of N&H claimed food producers, where one of the analyzed companies is, hypothetically speaking, a leader on the functional food market, and the other is a follower which is gradually entering the market. The ratio analysis was here used primarily as a "signal board" that pointed a direction for further analysis and research and ultimately yielded comprehensive conclusions.

The research hypotheses set at the beginning of this research have been confirmed as valid for both of the companies which represent the focus of my analysis. The profitability ratio analysis of „Imlek“ and „Somboled“ has shown that the former company, i.e. the one that is more recognizable as functional food producer, has higher profit margins, while the latter, which is still focussed on producing traditional foods, centres its profitability on the strategy of higher asset turnover. „Imlek“ also has higher rates of return. The detailed debt ratio

analysis and the analysis of the financial leverage effect showed that the benefits of „Imlek“ are based on the positive financial leverage effects to a substantially higher extent than those of „Somboled“. Although it is expected that some kinds of costs of „Imlek“ will be higher due to its specific technology which is employed for functional food production and its potentially more extensive marketing activities, I have not managed to completely test this hypothesis because I mostly relied on the data from the financial statements that are publicly available.

However, it is important to bear in mind that the difference in product assortment between the two analyzed companies and the fact that one company is, hypothetically speaking, a leader and the second is a follower, constitute only two of many causes for the difference in profitability. Since we do not want to make general conclusions on the basis of the financial analysis conducted for the purpose of the analysis of the profitability of these two companies per se, we cannot be sure whether the conclusions reached in the particular case of „Imlek“ are valid for all companies that mostly produce functional foods - the observations made in the case of „Somboled“ cannot be applied to all companies that mostly produce traditional foods.

The financial analysis that I have conducted in this paper pertains to the companies as a whole, even though they actually have a mixed product assortment. However, what is important is that the first relevant company is recognizable as functional food producer, while the second is generally viewed as a traditional food producer. These financial analyzes could be conducted in an even greater detail if the companies had reports which were clearly delineated into segments: in that case, we would be able to make comparisons between the functional food and traditional food segments. Unfortunately, the analyzed companies are not organised in segments in accordance with the IAS 14 and it is therefore not possible to analyze and keep track of individual products and product groups profitability.

Since „Somboled“ is organised as a limited liability company, it is not possible to apply the market value ratio analysis. This type of analysis, where accounting and market data are combined, would certainly give me a better insight into the causes of profitability differences between the two companies since the market price of shares is a unique overarching indicator of past, current and projected future company performances.

Within the vertical analysis of income statements, where I tried to find the differences which account for the share of some costs in operating revenues, the conclusion would certainly be more plausible if the notes to the financial statements included a more detailed cost structure and if the items were more comparable between companies.

Financial statements, which represent the basis of information for my financial analysis, are ex-post documents but they are also the best foundation for the projection of company's future performances. They are published on a regular basis and are publicly available to all stakeholders. The financial analysis serves as a compass as well as a reliable guideline for the choice of the appropriate developmental course which is intended to enhance the progress of a company. The problem with financial statements as a source of data can be attributed to the use of different accounting policies that certainly hinder comparison. The compulsory compliance with the International Accounting Standards enhances the quality of financial

statements and analysis, limits the choices in terms of different accounting policies and leads to an increasing number of claims for disclosures. The need for financial statements to be subjected to exhaustive external and internal auditing practices is very important for ensuring the validity and reliability of information.

Future research should focus on the analysis of the value creation process within a company by using the value performance measures such as EVA (Economic Value Added) and MVA (Market Value Added). Moreover, it would be interesting to keep track of ratios analyzed in this paper within the following time period in order to make comparisons for longer time series. If „Somboled“ changes its legal form and becomes a publicly limited company in the following years, then it will be useful to apply the market value ratio analysis. It is of the utmost importance to analyze the profitability of products and group of products and to make comparisons between N&H claimed and traditional ones. Additionally, it would be interesting to analyze the market shares of the companies, the market concentration measures, as well as the M&A (Mergers and Acquisitions) transactions and their effects on the profitability of the company or group of companies.

### Appendix 1

Used formulas:

$$\text{Gross margin} = \frac{\text{Gross profit}}{\text{Sales revenue}} \times 100$$

$$\text{Operating profit margin} = \frac{\text{Operating profit}}{\text{Sales revenue}} \times 100$$

$$\text{Profit margin} = \frac{\text{Net profit}}{\text{Sales revenue}} \times 100$$

$$\text{EBIT margin} = \frac{\text{Net profit} + \text{Interest expenses} \times (1 - \text{Profits tax rate})}{\text{Sales revenue}} \times 100$$

$$\text{ROA} = \frac{\text{Net profit} + \text{Interest expenses} \times (1 - \text{Profits tax rate})}{\text{Average asset}} \times 100$$

$$\text{ROE} = \frac{\text{Net profit}}{\text{Average equity}} \times 100$$

$$\text{Asset turnover ratio} = \frac{\text{Sales revenue}}{\text{Average asset}}$$

$$\text{Equity turnover ratio} = \frac{\text{Sales revenue}}{\text{Average equity}}$$

$$\text{Fixed asset turnover ratio} = \frac{\text{Sales revenue}}{\text{Average fixed asset}}$$

$$\text{Accounts receivable turnover ratio} = \frac{\text{Sales revenue (at external market)}}{\text{Average accounts receivable}}$$

$$\text{Accounts payable turnover ratio} = \frac{\text{Total supplier purchases}}{\text{Average accounts payable}}$$

$$\text{Inventory turnover ratio} = \frac{\text{Costs of goods sold}}{\text{Average inventory}}$$

### Literature

1. Agencija za privredne registre, financial statements of companies „Imlek“ and „Somboled“, available at: [www.apr.gov.rs](http://www.apr.gov.rs) (<http://fi.apr.gov.rs/prijemfi/cir/Podaci1.asp?Search=07042701&code=29d1ebedc140fd4d8e3f0eada5bde7cb8175d006> and <http://fi.apr.gov.rs/prijemfi/cir/Podaci1.asp?Search=08067953&code=00ce7a74d7b161b83dfc00b86abbf96327038c33>)
2. Brealey, R., Myers, S., Allen, F. (2011): *Principles of Corporate Finance*, McGraw-Hill Irwin, New York, USA.
3. Diplock, A. T., Agget, P. J., Ashwell, M., Bornet, F., Fern, E. B., Roberfroid, M. B. (1999): *Scientific Concepts of Functional Foods in Europe: Consensus Document*, British Journal of Nutrition, vol. 81, no. 1, pp. 1-27, Cambridge University Press on behalf of The Nutrition Society, United Kingdom.
4. Dragutinović Mitrović, R., Gligorić, M., Cvetković, M. (2014): *Kvantitativna analiza tržišta*, u knjizi - Tržište hrane sa NiZ izjavom na Zapadnom Balkanu: Stanje, izazovi i perspektive, (urednici) Stojanović, Ž., Dragutinović Mitrović, R., Ognjanov, G., pp. 23-38, CID Ekonomskog fakulteta, Beograd, Srbija.
5. Goddard, J., Tavakoli, M., Wilson, J. (2009): *Sources of Variation in Firm Profitability and Growth*, Journal of Business Research, vol. 62, no. 4, pp. 495-509, Elsevier, Amsterdam, The Netherlands.
6. Ivanišević, M. (2012), *Poslovne finansije*, CID Ekonomskog fakulteta, Beograd, Srbija.
7. Lohman, C., Fortuin, L., Wouters, M. (2004): *Designing a Performance Measurement System: A Case Study*, European Journal of Operational Research, vol. 156, no. 2, pp. 267-286, Elsevier, Amsterdam, The Netherlands.

8. Malinić, D. (2010): *Finansijski benčmarking kao instrument za unapređenje performansi preduzeća*, Zbornik radova sa Simpozijuma Saveza računovođa i revizora Republike Srpske - Uloga finansijske i računovodstvene profesije u prevazilaženju krize u realnom i finansijskom sektoru, Banja Vrućica, Republika Srpska, vol. 14, pp. 155-179.
9. Malinić, D. (2013): *Insufficiency of Serbian Economy's Operating Performances: Manifestations, Causes and Main Guidelines of Recovery*, Ekonomika preduzeća, vol. 61, no. 1-2, pp. 41-62, Serbian Association of Economists, Belgrade, Serbia.
10. Malinić, D., Denčić-Mihajlov, K., Ljubenić, E. (2013): *The Determinants of Capital Structure in Emerging Capital Markets: Evidence from Serbia*, European Research Studies, vol. 16, no. 2, pp. 98-119, University of Piraeus, International Strategic Management Association, Piraeus, Greece.
11. Malinić, D., Milićević, V., Stevanović, N. (2011): *Upravljačko računovodstvo*, CID Ekonomskog fakulteta, Beograd, Srbija.
12. Mitić, S., Gligorićević, M. (2014): *Kvalitativno istraživanje stavova potrošača o oznakama na hrani*, u knjizi - Marketing prehrambenih proizvoda, ch. no. 2, (urednici) Mitić, S., Ognjanov, G., pp. 73-94, Dosije studio, Beograd, Srbija.
13. Nissim, D., Penman, S. (2003): *Financial Statement Analysis of Leverage and How It Informs About Profitability and Price-to-Book Ratios*, Review of Accounting Studies, vol. 8, no. 4, pp. 531-560, Springer-Verlag New York, Inc., New York, USA.
14. Seling, T., Stickney, C. (1989): *The Effects of Business Environment and Strategy on a Firm's Rate of Return on Assets*, Financial Analysts Journal, vol. 45, no.1, pp. 43-68, CFA Institute, Charlottesville, USA
15. Stojanović, Ž., Dragutinović Mitrović, R., Ognjanov, G. (2013, a), *Processors and retailers attitudes towards consumer demand for dairy nutrition and health claimed products in Western Balkan Countries*, in Book - Consumer attitudes to food quality product, ch. no. 2, (editors) Klopčić, M., Kuipers, A., Hocquette, J.F., pp. 135-146, Wageningen Academic Publishers, The Netherlands.
16. Stojanović, Ž., Filipović, J., Stojković, D. (2014): *Tržište hrane sa NiZ izjavom: perspektive proizvođača i maloprodavaca*, Ekonomski horizonti, vol. 16, no. 1, pp. 63-75, Ekonomski fakultet Univerziteta u Kragujevcu, Kragujevac, Srbija.
17. Stojanović, Ž., Ognjanov, G., Spiroski, I., Zaouche-Laniau, M. (2013, b): *Exploring an Emerging Market through Focus Groups and Expert Interviews: Health Claimed Products in the Western Balkans*, in Book - Food Consumer Science: Theories, Methods and Application to the Western Balkans, ch. no. 5, pp. 57-72, (editors) Barjolle, D., Gorton, M., Milošević Đorđević, J., Stojanović, Ž., Springer, New York, London.
18. Vernimmen, P., Quiry, P., Dallochio, Le Fur, J., Salvi, A. (2005): *Corporate Finance – Theory and Practice*, John Wiley & Sons, Ltd.

19. Web site of the company "Imlek", [www.imlek.rs/en](http://www.imlek.rs/en)
20. Web site of the company "Somboled", [www.somboled.rs](http://www.somboled.rs) and [www.somboled.rs/en/magazine/healthy-diet/functional-food](http://www.somboled.rs/en/magazine/healthy-diet/functional-food)

## KOMPARATIVNA ANALIZA RENTABILNOSTI PROIZVOĐAČA FUNKCIONALNE HRANE U SRBIJI - ODNOS LIDER-PRATILAC

*Dragana Draganac*<sup>9</sup>

### Rezime

*Tržište funkcionalne hrane je relativno mlado u Srbiji i nedovoljno istraženo, kako sa aspekta proizvođača, tako i sa aspekta potrošača, kako sa kvalitativnog, tako posebno sa kvantitativnog aspekta. Cilj ovog rada je da napravi sveobuhvatnu kvantitativnu finansijsku analizu rentabilnosti na primeru dva preduzeća, gde je kriterijum za izbor to što se jedno od njih na tržištu prepoznaje kao proizvođač hrane sa nutritivnim i zdravstvenim izjavama i lider je na tom segmentu tržišta, a kod drugog su zastupljeniji tradicionalni proizvodi i kasnije je ušlo na ovaj segment tržišta. Ključna ideja je da se izvrši komparativna analiza zarađivačke sposobnosti ova dva tipa preduzeća za period od četiri godine. U radu je sprovedena racio analiza profitabilnosti, Du Pont sistem analize, analizirana je zaduženost i efekat finansijskog leveridža, a napravljena je i vertikalna analiza bilansa uspeha, da bi se videlo učešće pojedinih troškova u poslovnim prihodima. Dobijeni rezultati upućuju na zaključak da prvo analizirano preduzeće, koji je na tržištu prepoznato kao proizvođač funkcionalne hrane, ima više profitne marže. Takođe, ostvaruje više stope prinosa, a zbog toga može da, u većem stepenu, koristi pozitivne efekte finansijskog leveridža. Drugo istraživano preduzeće svoju rentabilnost uglavnom bazira na bržem obrtu imovine.*

**Ključne reči:** *rentabilnost, finansijski leveridž, proizvođači funkcionalne hrane*

---

9 Dragana Draganac, Asistent u nastavi, Univerzitet u Beogradu, Ekonomski fakultet, Kamenička ulica br. 6, 11000 Beograd, Republika Srbija, Telefon: +381 11 302 11 77, E-mail: [dragana\\_c@ekof.bg.ac.rs](mailto:dragana_c@ekof.bg.ac.rs)

## APPELLATIONS OF GEOGRAPHICAL ORIGIN AS A GENERATOR OF NATIONAL COMPETITIVENESS

*Marina Jovičević Simin<sup>1</sup>, Predrag Jovičević<sup>2</sup>, Srđan Novaković<sup>3</sup>*

### Summary

*The protection of appellations of geographical origin worldwide, through the Lisbon Agreement mainly refers to agricultural and food products and the leading countries in the number of registrations of appellations of origin are: France, Czech Republic, Bulgaria, Italy etc. By the product structure 85% of registrations of appellations of origin in the world refer to the four major categories of food products such as: wine (61.5%), spirits (9.5%), agricultural products (8.4%) and cheese (8.5%). Considering that the protection of appellations of geographical origin in Serbia is mainly related to agricultural and food products, and the fact that we have 52 domestic and only 3 internationally protected appellations of origin, these could be used as a powerful tool to support the growth of competitiveness in agriculture of certain regions as well as of the entire country. Appellations of geographical origin have a collective ownership and represent a kind of national resource.*

**Key words:** *appellations of geographical origin, appellations of origin, intellectual property, competitiveness, agricultural products*

### Introduction

Products that bear the appellations of geographical origin, the protected products enjoy certain competitive advantage compared to the same kind of anonymous products. Thus, the reputation gained thanks to the natural conditions and the skills of people of a particular region, contribute to an increased demand for these products, and have a strong economic impact. Therefore, the protected appellations become a significant competitive tool between the products of the same or similar types and encourage market competition

---

1 Marina Jovičević Simin, Ph.D., College of Professional Studies in Management and Business Communication, Mitropolita Stratimirovića street no. 110, 21205 Sremski Karlovci, Serbia, Phone: +381 021 882 892, E-mail: [marsimin06@gmail.com](mailto:marsimin06@gmail.com)

2 Predrag Jovičević, Ph.D., Faculty of Applied Management, Economics and Finance, Nemanjina street no. 4, 11000 Beograd, Serbia, Phone: +381 011 26 43 390, E-mail: [prejov@yahoo.com](mailto:prejov@yahoo.com)

3 Srđan Novaković, Ph.D., Faculty of Applied Management, Economics and Finance, Nemanjina street no. 4, 11000 Beograd, Serbia, Phone: +381 011 26 43 390, E-mail: [srdjan.novakovic@mef.edu.rs](mailto:srdjan.novakovic@mef.edu.rs)



between the different manufacturers of the same type of product.

At the time of economic globalization the tradition and proven values are gaining more and more importance. Therefore, when promoting the quality of a particular product in the market it is insisted on specific natural factors or a traditional production method which has been used in the area from which the product originates and which together give a special, specific quality to that product. A product bearing appellation of geographical origin acquires significantly greater reputation in the international market, and also achieves a higher price than an anonymous product. In Serbia there are many unprotected nationally recognizable products that should be protected in the near future such as: Ivanjica potato, Valjevo raspberry, kajmak from Zlatibor, Pester Lamb and others.

Appellations of geographical origin as an integral part of intellectual property rights could become the main promoters of the Serbian economy and the country's expression of identity because the notion of quality of products is directly transmitted to the country's reputation. Export promotion with an emphasis on non-price forms of competition, such as constant quality of the product, health safety of the product, visual identity of the product, collective trademarks and appellations of geographical origin are the imperatives of modern business.

### **Data sources and methods**

The scientific justification of this paper is reflected in the fact that the field of protection of appellations of geographical origin in function of competitiveness of the national economy, is insufficiently or very little studied in our economic theory. This research offers a very objective presentation of the situation because the entire analytics is based on the actual data from the public registries of the Intellectual Property Office of the Republic of Serbia and the World Intellectual Property Organization (WIPO).

From general scientific methods for processing quantitative data we used statistical method. Given that this research deals with phenomena from the sphere of social sciences and in order to explain certain facts, trends and to check certain positions we used the quantitative and qualitative statistical methods to establish a connection and to determine the importance of the protection of appellations of geographical origin for the growth and development of the economy as a whole.

From the special scientific methods we used the method of analysis and synthesis for the comparison of development of the national competitiveness by the subject of appellations of geographical origin protection and geographical coordinates (Serbia and the member countries of the Lisbon Agreement for the Protection of Appellations of Origin) in the period from 1958 to 2014. The most frequent forms of analysis in this paper are: structural, functional, genetic and comparative analysis.

This paper does not deal with the analysis and proposal for improvement of laws and legal regulations in the field of intellectual property, although they have been kept in mind throughout the paper. The protection of appellations of geographical origin in Serbia is an area of law which is harmonized to a very large extent with the European Union

and the TRIPS Agreement (Agreement on Trade Related Aspects of Intellectual Property Rights). Due to the fact that the laws in this area are relatively recent, today we can talk about the work related to continuation of harmonization. The problem of our economy is the low level of protection of domestic and especially international appellations of geographical origin, and consequently the lack of awareness and willingness of economic entities to implement and enforce the law from this field.

### **The subject of protection and economic importance**

Legal protection for appellations of geographical origin shows the interdependence between specific qualitative characteristics of the product or services and production areas (climate, soil composition, water, etc.). Agricultural products are conditioned by the qualities that originate from the place of production and are most influenced by local factors such as climate, soil composition, water and others. This indicates that the subject of protection cannot be an appellation of geographical origin which has no relation to the actual place of origin of goods.

While trademarks refer to a company that sells one particular product on the market, the appellations of geographical origin point to a geographical area whose reputation, quality or similar characteristics are attributable to that particular place of origin. Regardless of difference in the subject of protection, appellations of geographical origin are similar to trademarks by its effect and power, and can be used to support regional and national economic development, and also as part of the marketing strategy of the economy for the promotion of its products.

The subject of protection is the appellation of geographical origin, actually the appellation (name) of a certain geographical area. The geographical area may be a settlement, mountain, forest, highland, island, region, but also the entire country. Examples of this are numerous, appellation "Champagne" in France is registered for the sparkling wine produced in the French province bearing the same name, appellation "Cognac" in France is registered for the type of brandy that is produced in the homonymous town and its surroundings, appellation "Roquefort" is registered in France for the type of cheese that is produced in the homonymous town and its surroundings, appellation "Tequilla" is registered in Mexico for the type of cactus brandy that is produced in the homonymous town and its surroundings (Markovic, 2000).

Protection of a product by an appellations of geographical origin makes sense only if it prevents such product from becoming a generic or commonly known name of the product on the market and if prevents use by the unauthorized users.

In the European Union, the total annual turnover in trade of products with protected geographical origin is about 40 billion Euros. Some countries within the European Union in recent years significantly lead in trade of these products. France reached a turnover of around 19 billion Euros in over 138,000 enterprises engaged in the production and trade of these products. Almost 84%, or 16 billion Euros of total turnover is generated from the sale of wine and other spirits, 85% of the total quantity of wine that is exported from

France, bears the protected geographical origin. The rest of the total turnover of exports of products with protected geographical origin, 16% or EUR 3 billion is generated from other food products. Italy achieves a turnover of 12 billion Euros from the sale of products with protected geographical origin, and Spain almost 3.5 billion (Savić, Đurić, 2010).

The economic importance of appellations of geographical origin is multiple:

- They are used as part of the marketing strategy for the promotion of products of the country or region.

An example of the success of appellations of geographical origin is the history of Italian cheese Parmigiano Reggiano, which is protected as an appellation of origin since 1969 under the Lisbon Agreement managed by WIPO. Consorzio del Formaggio Parmigiano Reggiano since its establishment in 1934 represented the interests of its members, and is made up of about 400 dairies and 3,500 individual vendors. Farms and dairies that produce Parmigiano Reggiano are located in five provinces, as follows: Parma, Reggio Emilia, Modena, Bologna and Mantova. Locally produced fodder and climate of these areas are the most important factors that give to Parmigiano Reggiano its own distinctive and unique taste. The best indicator of the global market success of this cheese is the turnover amounted to 1.5 billion Euros in 2007, of which 16% represents exports. Almost 3 million wheels of Parmigiano Reggiano cheese is produced every year. In the export structure of the Consortium, the largest part represents vacuum - packed cheese (62.9%), followed by the whole cheeses (18.7%), grated cheese (15.3%) and cubes of cheese (3%). Also known as the “king of cheese” Parmigiano Reggiano and its creators have gained a worldwide reputation for the quality that has become a symbol of northern Italy ([www.wipo.int](http://www.wipo.int)).

- Consumers sometimes value regional specialties more.

This statement is especially true for gourmet food products, so consumers are willing to pay a higher price. For example: Olive oil protected by appellation of origin “Riviera Ligure” is being sold 30% more expensive than an anonymous olive oil. Free range chickens and fed by natural food, and three weeks before slaughter cereals and dairy products are added to their food, protected by appellation of origin “Poulet de Bresse” have a four times higher price than industrial-reared chickens (Marković, 1999).

- Appellations of geographical origin have collective owners because all producers, inhabitants of a particular area have the exclusive right to use certain geographical indications since they are a powerful tool for regional and national development.

Evidence to this claim is the example of the collective trademark “Melinda ®” which was protected in 1989 and in 2003 grew into an appellations of origin “Val di Non apples”. Awareness of the importance of the trademark protection appeared in the 80s, when the producers of apples from Val di Non found that in the Italian market three times more

apples known as Val di Non apples had been sold annually compared to the amount they produce. This was the reason of foundation of the Melinda Association which gathered all producers of apples from Val di Non, using traditional manufacturing techniques, advanced packaging techniques, modern marketing techniques etc.

The Melinda Association specializes in producing and selling apples from 16 cooperatives with approximately 5,000 members whose annual output is 300,000 tons of apples, which represents 60% of total production in Trentino area, 10% of production in Italy and 5% in the European Union. Consumers recognize the appellations of geographical origin which indicate qualitative connection between the product and production area. One quarter of production is destined for export and turnover of the Melinda Association increases by 200 million Euros per year ([www.wipo.int/ipadvantage](http://www.wipo.int/ipadvantage)).

A product bearing the appellation of geographical origin is synonymous with quality in the market. Quality of a product is determined by its natural properties, as unpolluted water or soil, mild climate and the knowledge and skills of people from that area. Appellations of geographical origin open a free market competition between the different manufacturers of the same product types and thus contribute to increasing the competitiveness of domestic products.

### **Sources of law and term**

Legal regulations defining appellations of geographical origin are the newest in the evolution of the legislation that protects intellectual property rights. France was the first country to establish the protection of appellations of geographical origin as a form of intellectual property. At the beginning of the twentieth century, in France, a country famous for its production of high quality wines, suffered an epidemic of phylloxera which destroyed entire grapevines. Wine producers from Spain and Italy took advantage of the situation to sell their wines with the appellations of geographical origin of France in order to achieve a higher price due to better quality of French wines at that time (Simin, 2011). The Association of French winemakers, after several years of efforts to recover vineyards made a decision to protect the quality of French wines and established appellations of geographical origin as a form of intellectual property.

The result of these phenomena is a need to protect appellations of geographical origin, as an integral part of intellectual property rights by acts of international character, such as the Paris Convention and the Madrid Agreement for the Repression of False or Deceptive Indications, and later the Lisbon Agreement for the International Registration of Appellations of Origin, which Yugoslavia ratified in 1999.

In our legal system, appellations of geographical origin as a special type of intellectual property rights are regulated for the first time through the Law on the protection of inventions, technical improvements and distinctive signs of 1981. According to this law, there is only one category of rights - the indication of source of goods. The Law on Appellations of Geographical Origin of 1995 established two categories of appellations of geographical origin: appellation of origin as a qualified indication and geographical

indication as a weaker indication. Law on Appellations of Geographical Origin from 2006 also stipulated two rights: appellation of origin and geographical indication, but compared with the previous law this was more compliant with the TRIPS Agreement (Agreement on Trade Related Aspects of Intellectual Property Rights). According to the Law on Appellations of Geographical Origin in 2010, the definition of geographical appellations is in accordance with the definitions of the EU Regulation 510/2006 (Dragojevic, 2014).

The Law on Appellations of Geographical Origin defines Appellations of geographical origin as rights that protect the appellation of origin and geographical indication which designate the products produced by natural or legal entity within a specific geographical area. Thus, appellations of geographical origin are used to mark natural, agricultural, food and industrial products, traditional handicrafts products and services (the Law on Appellation of Geographical Origin, 2010). Also, appellation of geographical origin used by more authorized users may be subject only to a collective trademark. In practice, collective trademark is often the first step towards establishing appellations of geographical origin (Manigodic, 2001).

According to the Law on Appellation of Geographical Origin, there is a difference between the appellations of origin and geographical indications. Appellation of origin is the geographical name of a region, locality, or country used to designate a product originating therein, the quality and specific characteristics of which are due exclusively or essentially to the geographical environment, including natural and human factors, and such product is produced, processed and prepared entirely within a specific geographical area. (eg. Honey from Homolje, Pirot carpet, Petrovska sausage, etc.).

The essence of this type of protection through appellations of geographical origin is that all stages in the production process of the product (from the raw materials to manufacturing, packaging and labeling) take place in a defined geographical area. Only the product protected in this way can be protected through the Lisbon Agreement in another 28 countries, out of which 7 are member states of the European Union.

Geographical indication is an indication which identifies particular goods as a goods originating from the territory of specific country, region or locality within such territory, where a given quality, reputation or other characteristics of such goods can be essentially attributed to its geographical origin, and such goods are produced and/or processed and/or prepared within a definite geographical area. The conditions for protection are less demanding. It is enough to fulfill only some of the requirements, for example Jelen beer from Apatin, Bezdanski damask and others.

Appellation of origin is more complex from the standpoint of intellectual property protection of geographical indication, as it includes mandatory submission of the study when submitting application for the protection to the Office (Mihajlović, 2016). The study proves that a product produced in a particular geographic area actually meets the criteria, particularly in terms of quality and other set forth characteristics conditioned by geographic environment where production of the protected product takes place. In accordance with the foregoing, the products protected by appellations of origin require a

constant control by the competent authority specified in the application which deals with the quality control of the concerned product.

The difference between these two categories is reflected in the field of quality control and origin of raw materials. Product designated by a name of appellation of geographical origin is subject to regular controls carried out by institutions authorized for quality control, which guarantee that the product has characteristics and quality listed in the study on the method of production. Products designated by a geographical indications do not have to be fully produced in a designated locality, but can be made by processing raw materials originating from another locality (Besarević, 2007).

The described procedure can be illustrated by the example of Kladovo caviar where in the description of the geographical area one part of the Danube River is specified or the part of the Danube from 845 km to 1800 km. The line ministry has agreed that for this purpose can be used the zone of the Danube River and fishing farm “Kladovo” in order to control the amount of fish catches in order to protect the environmental conditions and prevent abuse and poaching (Simin, 2005). The study on method of production of Kladovo caviar contains a detailed description of the species (beluga, sturgeon, starry sturgeon-sterlet) and the method and procedure of production of the product, which can be considered as some sort of business secret.

Articles 38-45 of the applicable Law on Wine of the Republic of Serbia, state that a producer may produce wine with appellation of geographical origin after obtaining a certificate of the Ministry of Agriculture on registration of designation for that wine with appellation of geographical origin. Along with the application for issuance of a certificate, a study on the production of wine with appellation of geographical origin must also be submitted. Based on the control of production of grapes and wine with appellations of geographical origin and quality control and organoleptic testing of wines, a control organization prepares a report and expert opinion with accompanying documents. On the basis of the expert opinion and accompanying documents, the Ministry of Agriculture issues a certificate on fulfillment of conditions for using appellation and marketing the wine with geographical appellation from that year of vintage.

In order for agricultural and food products with appellations of geographical origin to be recognized in the market, the Ministry of Agriculture issued the Regulation introducing registration marks for labeling wines with appellation of geographical origin. This is also a guarantee to consumers that the product comes from a certain area and has a specific quality and that a reliable excellence system has been established on the basis of a serial number of the registration mark. By introducing registration marks, wine has become the first agricultural food product in Serbia that bears appellation of geographical origin, which would in future be recommendable for other agricultural and food products.

A product bearing the appellation of geographical origin is synonymous with quality in the market. In support of this claim, the Australian experience with wine is a good example of strategic use of appellation of geographical origin for the promotion of local industry. Over the last 10 to 15 years the Australian wines became popular and gained a reputation

for high quality and good taste. This recognition has led Australia to the conclusion of the wine trade agreement with the European Union, as well as to the implementation of legislation that provides protection of appellations of geographical origin. One wine company used the “registration mark” indicating an Australian appellation of origin to enhance the export of their wines to the United Kingdom from 5,000 boxes in 1986 to 1 million boxes in 1994. In 1995 it was declared the best-selling wine brand in the UK, surpassing even French and Californian wines (Idris, 2003).

The goal of establishing an appellation of geographical origin by the natural or legal entity is to become an authorized user of appellation of geographical origin. Once established the appellation of geographical origin lasts indefinitely, and the status of authorized user of a particular appellation of geographical origin is renewed every three years from the date of entry of the authorized user into the relevant register.

### Protection of domestic appellations of geographical origin

Appellations of geographical origin are especially important for developing countries such as Serbia, where the greatest part of the export structure is maintained by agricultural food products for which these appellations have a crucial role as a form of non-price competitiveness.

In Serbia until now several dozen agricultural and food products have been protected by the appellation of origin or geographical indication. On the list of protected products are: Leskovac ajvar, Uzice ham, Srem sausage, Rtanj tea, honey from Homolje, Sombor cheese, Ečanski carp, Zlatar cheese, Fruska Gora, linden honey from Fruska Gora, Sjenica lamb, pork cracklings from Valjevo, fresh and pickled cabbage from Futog, Arilje raspberry, Banat Riesling, beremet and others. The Intellectual Property Office has so far registered 52 domestic and 15 foreign appellations of geographical origin.

During 2013, the Intellectual Property Office directly received five applications for registration of appellations of geographical origin: Novokneževačka paprika, Ečanski carp, Sjenica cow cheese, Lemeshko sausage and Vrsac ham.

**Table 1. Protected products in the Intellectual Property Office of the Republic of Serbia until 2014**

Products by Category	Number of registrations	% registration
Wine	9	17,3
Alcoholic beverages	–	
Agricultural products	23	44,2
Cheese	11	21,2
Decorative objects	3	5,8
Tobacco and Cigarettes	–	
Mineral waters	4	7,7
Beer and malt	2	3,8
<b>Total</b>	<b>52</b>	<b>100</b>

Source: Author's calculation based on data of public registers of the Intellectual Property Office

*of the Republic of Serbia*

(Table 1.) shows that 90% of the registrations of appellation of origin in Serbia refer to the four main categories of food products as follows: agricultural products (44.2%), cheese (21.2%), wine (17.3%) and mineral waters (7.7%).

Considering that in Serbia the protection and use of appellations of geographical origin is mainly related to agricultural and food products, these could take the leading position compared to all other types of intellectual property rights, both with regard to the use of the most important advantages of the domestic agro-industrial complex and its improvement, and from the aspect of more equitable participation in the international trade. Therefore, in the near future the following products should be protected: Ivanjica potato, Valjevo raspberry, Peštar lamb, kajmak from Zlatibor and others. This is of primary importance for Serbia, which has only 3 internationally protected appellations of geographical origin.

The Stabilization and Association Agreement contains specific provisions on the protection of appellations of geographical origin for agricultural, fishery and food products. These provisions are set out in Article 33 of the Agreement within the chapter on free movement of goods.

Due to the specificity of matter the provisions of protection of appellations of geographical origin of wines and alcohol beverages were singled out in Annex II of Protocol 2 to the Agreement. Although the Intellectual Property Office is primarily responsible for the registration of indications of geographical origin, the entry into force of the Law on Wine (Official Gazette of the Republic of Serbia, 2013), the Law on brandy and other spirits (Official Gazette of the Republic of Serbia, 2009) the responsibility for the registration procedure passed to the Ministry of Agriculture, but the Office is still responsible for the procedure of international registration.

In order to enable agro-industrial complex in Serbia to fulfill the tasks stemming from the EU accession process, it is necessary perform a harmonization with the European standards, rules and regulations in the field of application of quality control systems and health safety of agricultural food products. Bearing in mind the importance of applying the quality control system and in particular the importance of applying HACCP (Hazard Analysis and Critical Control Points) the Government of the Republic of Serbia in May 2005 adopted the "Regulation on the use of incentives for the introduction and certification of food safety systems in 2005 (Official Gazette of the Republic of Serbia, 2004). By the adoption of the "Law on Food Safety" in May 2009, a chain of control was established to ensure the safety of food and that every consumer in the market is assured that agricultural food products meet all the requirements regarding health and hygiene safety and prescribed quality.

Preparation of the new law on food safety is ongoing and should improve the control in this area. The new law stipulates that the Directorate of national reference laboratories is no longer part of the Ministry of Agriculture, but in accordance with the practice of the European Union is an autonomous and independent body. Also, control of agricultural and food products on the market should be the responsibility of the sanitary inspection of



the Ministry of Health.

One of the important prerequisites in this process is a well designed policy of development, protection and enforcement of appellations of geographical origin that in the long run would provide a more favorable positioning of our companies from the field of agriculture and of the overall economy in the negotiations with the European Union. Creating such a policy would require cooperation between potential authorized users of indications of geographical origin, regional chambers and the republic Chamber of Commerce, the relevant ministries and the Intellectual Property Office.

### **International protection of appellations of geographical origin**

In the field of protection of appellations of geographical origin two terms are being applied, the appellation of origin and geographical indication, but since the conclusion of the Uruguay Round, the General Agreement on Tariff and Trade - GATT and the adoption of the Agreement on Trade Related Aspects of Intellectual Property Rights -TRIPS, of 1994, uses the term “geographical indications”.

The Lisbon Agreement for the provision of protection by appellation of origin requires cumulative fulfillment of the conditions for protection, that the quality and characteristics of a product are exclusively or essentially conditioned by the geographic environment, including natural and human factors, while not providing protection to the products with only a certain reputation, but no other quality due to their place of origin. On the other hand, the TRIPS agreement sets the conditions for protection optionally, to either quality or reputation or other characteristics of the product are attributable to its geographical origin.

Protection of appellation of origin at an international level is governed by the Lisbon Agreement for the Protection of Appellations of Origin and their International Registration of 1958, amended in Stockholm in 1967, and amended in 1979.

Serbia has ratified the Agreement, which was published in (Official Gazette of FRY” - International Treaties no.6/98). With the entry into force of the Lisbon Agreement on the protection of appellations of origin of June 1999, all domestic legal and natural entities who are authorized users of a domestic appellations of origin, have been enabled to receive by submitting an application, through the Intellectual Property Office, the protection for a particular indication of origin under the simplified procedure in 28 countries (Table 2. does not specify all 28 countries, but only those that have internationally protected products). International protection allows domestic companies to achieve more favorable export prices for its products marked by appellation of origin which enjoys international protection, also representing a powerful promotional factor of the country’s economy and tourism. Through the Lisbon Agreement for the Protection of Appellations of Origin of the products, only three Serbian products are internationally protected, honey from Homolje, wine Bermet and Leskovac homemade ajvar.

Greater harmonization and openness of the multilateral system for the protection appellations of geographical origin can provide easier access of manufacturers and

companies from developing countries to the global market that recognizes application of the quality systems. Recognition of application of the quality system is a guarantee to the domestic producers to invest financial resources in the protection and application of indications of geographical origin in the traditional agricultural and food products and specialties. A greater use of various forms of geographical labels, including the appellations of origin, geographical indications and collective trademarks offers new opportunities to the companies from developing countries for successful positioning in the international market.

The application for international registration is filed only for the appellation of origin. By 2014, a total of 816 appellations of origin were registered under the Lisbon Agreement for the Protection of Appellations of Origin, detailed in (Table 2).

European consumers are prepared to pay a higher price for products with specific geographical origin which they link with the positive experience of previous purchases and high quality products. Origin gives an extra value to Italian Parmesan, French champagne and Portuguese sherry, given that these products guarantee proper and consistent quality, food safety and constant availability on the market (Loureiro, Umberger, 2005).

Appellation of origin is gaining in importance worldwide as it informs consumers about the national origin of the product, which can be an important criterion when making purchasing decisions. Those who advocate wider application of appellation of origin in the United States highlight the right of consumers to know the origin of agricultural and food products in order to reduce concerns about the quality, safety and production methods (Anders, Caswell, 2008).

Appellation of origin represents a qualitatively higher category of geographical indications, because it can be borne only by products that have special properties and qualities that other products of this type do not possess, and thus has a guarantee function (Auby, Plaisant, 1974). Table 2. shows that the leading country in the number of registrations of appellations of origin is France (509), followed by the Czech Republic (76), Bulgaria (51), Italy (33) and others.

**Table 2. Appellations of origin - Registration in force by country of origin on the basis of the Lisbon Treaty in 2014**

Country of origin	Number of registrations	Percentage of registrations
Algeria (DZ)	7	0,9
Bulgaria (BG)	51	6,3
Costa Rica (CR)	1	0,1
Cuba (CU)	19	2,3
Former Yugoslav Republic of Macedonia (MK)	4	0,5
France (FR)	509	62,4
Georgia (GE)	28	3,5
Hungary (HU)	28	3,5
Iran (IR)	5	0,6
Israel (IL)	1	0,1
Italy (IT)	33	4,0
Mexico (MX)	14	1,7
Montenegro (ME)	2	0,2
Peru (PE)	8	1,0
Portugal (PT)	7	0,9
Republic of Moldova (MD)	1	0,1
Republica Democratica Popular de Corea (KP)	6	0,7
Czech Republic (CZ)	76	9,2
Serbia (RS)	3	0,4
Slovakia (SK)	6	0,7
Tunisia (TN)	7	0,9
<b>Total:</b>	<b>816</b>	<b>100</b>

Source: Bulliten - Appellations of origin 2013, Publication of the International Bureau of the World Intellectual Property Organization (WIPO), Geneva

Many manufacturers and companies from the European Union and wider community view the introduction and application of appellations of origin as an important marketing tool which is based on a positive image of the country of origin that favors sale of local agricultural and food products as an import substitution. Appellations of origin can serve as a powerful tool to support the growth of exports of agro-industrial complex of certain countries or regions.

(Table 3.) shows that 85% of the registrations of appellations of origin refers to the four main categories of products such as wine (61.5%), spirits (9.5%), agricultural products (8.4%) and cheese (8.5 %).

**Table 3. Protected products on the basis of the Lisbon Agreement by 2014**

Products by Category	Number of registrations	Percentage of registrations
Wine	502	61,5
Spirits	78	9,5
Agricultural products	69	8,4
Cheese	61	8,5
Decorative objects	35	4,2
Tobacco and Cigarettes	34	4,0
Mineral waters	24	2,4
Beer and malt	13	1,5
<b>Total</b>	<b>816</b>	<b>100</b>

*Source: Author's calculation based on data of Bulliten - Appellations of origin 2013, Publication of the International Bureau of the (WIPO)*

Agricultural products are unique because they are related more than other products to the area in which they grow and gradually become a symbol of the whole region, when it comes to cheese the examples are Parmigiano Reggiano - Parma region in Italy or Roquefort - Roquefort city in southern France. Recognition of the sign implies creation of a certain positive attitude of consumers through a recognizable product.

Favorable interdependence between the image of the country of origin and the product appears in the case when a certain dimension of the country of origin is seen as an essential product characteristic. The practice is that producers who intend to sell their goods on the international market, decide whether to indicate the country of origin on the label - Norwegian salmon, New Zealand lamb, Californian grapes, Australian wool, Welsh leek and French onion. In recent years, such labels have become more popular due to the development of the concept of countries of origin in the role of trademarks (Aaker, 1991). Country can be a powerful symbol, especially at the national level, based on its direct connection with the products, materials and possibilities.

Unfavorable interdependence is expressed when the essential characteristics of the product are perceived as dimensions of a negative image of the country of origin. It is certain that nobody in their right mind will buy Italian whiskey, or Scottish olive oil (Olins, 2003).

Also, the affirmation of protection and enforcement of appellations of origin is essential to prevent infringement of the rights or counterfeiting of products and indications which determine certain commercial, traditional or national interests.

### **Concluding remarks**

Most manufacturers and companies from the European Union and the wider international community, consider protection and application of appellations of geographical origin as an important marketing tool which is based on a positive image of the country of origin that favors sale of local agricultural and food products as an import substitution. As

previously mentioned, the EU countries are taking advantages of protection of products with appellations of origin, reaching in such a way a turnover of a few billion Euros in some countries (eg. France, Italy, Spain, etc.). Appellations of origin can serve as a powerful tool to support the growth of exports of agro-industrial complex of certain countries or regions.

The paper has proven that the protection and application of appellations of origin worldwide is mainly related to agricultural and food products and the leading countries in the number of registrations of indications of origin are France (509), followed by the Czech Republic (76), Bulgaria (51), Italy (33) and others. By the structure of products 85% of the registrations of appellations of origin in the world belong to the four major categories of food products such as: wine (61.5%), spirit (9.5%), agricultural products (8.4%) and cheese (8, 5%).

This is of a significant importance to Serbia, which has 52 domestic appellations of geographical origin, but only 3 internationally protected appellations of origin. Specifically, through the Lisbon Agreement for the Protection of Appellations of Origin of the product only three Serbian products are internationally protected: honey from Homolje, wine Bermet and Leskovac homemade ajvar. The study based on data from the Intellectual Property Office shows that 90% of the registrations of appellations of origin in Serbia belong to four major categories of food products: agricultural products (44.2%), cheese (21.2%), wine (17.3 %) and mineral water (7.7%).

Appellations of origin are of particular importance to developing countries such as Serbia, where the leading part in the structure of exports is maintained by agricultural food products for which these indications have a crucial role as a form of non-price competitiveness. These could take the leading position in relation to all other types of industrial property rights, as from the aspect of use of the most important advantages of the domestic agro-industrial complex and its improvement, as well as from the aspect of more equitable participation in the international trade. This is important because Serbia is rich in numerous agricultural and food products that are produced in underdeveloped rural areas so that would be a chance for their economic development and progress.

Advantages of labeling products by appellations of geographical origin for producers are multiple. A product bearing the appellation of geographical origin is synonymous with quality in the market. The quality of a product is determined by its natural properties, as unpolluted water or soil, mild climate and the knowledge and skills of people from that area. Products protected by appellations of geographical origin are being sold more expensively than anonymous products from the same area because consumers value products with special properties and quality more, and this is especially true for products and gourmet food specialties. Also, an appellation of geographical origin is a part of the marketing strategy for the promotion of products of a particular manufacturer in the form of advertisements that give an advantage to the user over the competition in the market.

At the macro level, appellations of geographical origin open a free market competition between the different manufacturers of the same product types and thus contribute to

increasing the competitiveness of domestic products. Appellations of geographical origin can serve as a powerful tool for national and regional growth, contributing to rural development, preventing migrations of the rural population, contributing to the development of tourism, serving as part of the marketing strategy for the promotion of products of a country or region, and generally promoting the country as a whole.

Just like French wines and champagne create a positive attitude towards France, Italian cheeses and mortadella towards Italy, Cuban cigars towards Cuba in the same way Valjevo raspberry, wine from sand soil, Ivanjica potatoes, kajmak from Zlatibor etc. could be a good starting point for creating a positive attitude towards our country. Appellations of geographical origin are an excellent method to transfer the comparative advantages into competitive. They are a key factor for strengthening competitiveness, and that provides more power or strength to a product, company or economy compared to others. This indicates the importance of appellations of geographical origin as an expression of identity of a country, and the notion of quality of some products is directly related to the country's reputation.

### References

1. Aaker, D.A. (1991): *Managing Brand Equity – Capitalizing on the Value of a BrandName*, Maxwell Macmillan, U.S.A., pp.7.
2. Anders S., J. Caswell (2008): *The Benefits and Costs of Proliferation of Geographical Labeling for Developing Countries*, University of Massachusetts Amherst, Working Paper No.7, U.S.A., available at: [www.wipo.int/ipstats/en/statistics/geographicalindications](http://www.wipo.int/ipstats/en/statistics/geographicalindications)
3. Auby, J.M., Plaisant, R. (1974): *Le droit des appellations d'origine: l'appellation Cognac*, librairies Techniques, Paris, France, pp. 49.
4. Besarević, V. (2007): *Nove tendencije u razvoju prava intelektualne svojine*, Anali no.1, pp. 46.
5. Bulliten - *Appellations of origin* (2013), Publication of the International Bureau of the World Intellectual Property Organization (WIPO), Geneva, available at: <http://www.wipo.int/ipdl/en/search/lisbon/search-struct.jsp>, accessed at: January, 2016.
6. Dragojević, Z. (2014): *Oznake geografskog porekla u našem pravnom sistemu*, EIC Bilten no.16, Srbija, pp. 3.
7. Idris, K. (2003): *Intelektualna svojina – moćno sredstvo ekonomskog rasta*, Zavod za intelektualnu svojinu, Balkan Kult, Beograd, Srbija, pp. 151.
8. Loureiro, M.L., Umberger, W.J. (2005): *Assessing consumer preferences for country-of-origin labeling*, Journal of Agricultural and Resource Economics 37, U.S.A., pp. 8.
9. *Law on Appellation of Geographical Origin*, Official Gazette of the Republic of Serbia, no.18/2010
10. *Law on Wine*, Official Gazette of the Republic of Serbia, no.41/2009 and 93/2012
11. *Law on brandy and other spirits*, Official Gazette of the Republic of Serbia,

- no. 41/2009
12. Manigodić, M. (2001): *Robni i uslužni žigovi*, Beograd, Srbija, pp. 249.
  13. Marković, M. (1999): *Pravni i ekonomski značaj geografske oznake porekla*, Glasnik Privredne komore Jugoslavije, Beograd, Srbija, no.11, pp. 57.
  14. Marković, S. (2000): *Pravo intelektualne svojine*, Službeni glasnik, Beograd, Srbija, pp.167.
  15. Melinda: *The First Italian Designer Apple*, available: <http://www.wipo.int/ipadvantage/en/details.jsp?id=908>
  16. Mihajlović, M. (2016): *Odnos menadžmenta preduzeća i korporativnog upravljanja*, Oditor, Belgrade, vol. 2, no. 1, pp. 4-10.
  17. Olins, W. (2003): *On the brand*, Thames & Hudson Ltd., London, Great Britain, pp.8.
  18. Savić, M., Đurić, I. (2010): *Geografske oznake porekla – poljoprivredni i prehrambeni proizvodi*, available at: <http://agroekonomija.wordpress.com/2010/12/20/>, accessed at: January, 2016.
  19. Simin, M. (2005): *Politika razvoja i zaštite robnih marki poljoprivredno prehrambenih proizvoda u SCG*, magistarski rad, Fakultet političkih nauka, Beograd, Srbija, pp.56.
  20. Simin, M., (2011): *Politika primene prava intelektualne svojine kao sredstvo za razvoj malih i srednjih preduzeća u Srbiji (1883-2008)*, doktorska disertacija, Fakultet političkih nauka, Beograd, Srbija, pp.59.
  21. Pursuant to Article 90,-paragraph 2 of the Constitution of the Republic of Serbia, and in connection with Article 7 and 19 of the *Law on budget of the Republic of Serbia for 2005*, Official Gazette of the Republic of Serbia, no.127/2004.
  22. *Regulation on the method of packaging, declaring and labeling of wine and some other products in production and trade*, Official Gazette of the Republic of Serbia, no.38/2012
  23. *The King of Cheese and its IP Crown*, available at: <http://www.wipo.int/ipadvantage/en/details.jsp?id=3664>

## OZNAKE GEOGRAFSKOG POREKLA KAO GENERATOR KONKURENTNOSTI NACIONALNE PRIVREDE

*Marina Jovičević Simin<sup>4</sup>, Predrag Jovičević<sup>5</sup>, Srđan Novaković<sup>6</sup>*

### Rezime

*Zaštita oznaka geografskog porekla u svetu prema Lisabonskom aranžmanu, uglavnom se odnosi na poljoprivredno prehrambene proizvode, a vodeće zemlje po broju registracija oznaka porekla su: Francuska, Češka, Bugarska, Italija i dr. U strukturi proizvoda 85% registracija oznaka porekla u svetu odnosi na četiri glavne kategorije prehrambenih proizvoda i to: vina (61,5%), alkoholna pića (9,5%), poljoprivredni proizvodi (8,4%) i sir (8,5%). Obzirom da se i u Srbiji zaštita oznaka geografskog porekla uglavnom odnosi na poljoprivredno prehrambene proizvode, kao i činjenica da imamo 52 domaće i samo 3 međunarodno zaštićene oznake porekla, ove oznake mogle bi da posluže kao snažno sredstvo za podršku rasta konkurentnosti agrokompleska pojedinih regiona kao i čitave zemlje. Oznake geografskog porekla imaju kolektivno vlasništvo i predstavljaju neku vrstu nacionalnog resursa.*

**Ključne reči:** *oznaka geografskog porekla, oznaka porekla, intelektualna svojina, konkurentnost, poljoprivredni proizvodi*

---

4 Dr Marina Jovičević Simin, Visoka škola strukovnih studija za menadžment i poslovne komunikacije, Ulica Mitropolita Stratimirovića br. 110, 21205 Sremski Karlovci, Srbija, Telefon: +381 021 882 892, E-mail: [marsimin06@gmail.com](mailto:marsimin06@gmail.com)

5 Profesor, dr Predrag Jovičević, Fakultet za primenjeni menadžment, ekonomiju i finansije, Ulica Nemanjina br. 4, 11000 Beograd, Srbija, Telefon: +381 011 26 43 390, E-mail: [prejov@yahoo.com](mailto:prejov@yahoo.com)

6 Dr Srđan Novaković, Fakultet za primenjeni menadžment, ekonomiju i finansije, Ulica Nemanjina br. 4, 11000 Beograd, Srbija, Telefon: +381 011 26 43 390, E-mail: [srdjan.novakovic@mef.edu.rs](mailto:srdjan.novakovic@mef.edu.rs)





## PROTECTION AGAINST DETRIMENTAL EFFECTS FROM WATERS IN THE REPUBLIC OF SERBIA<sup>1</sup>

*Nataša Kljajić<sup>2</sup>, Vesna Popović<sup>3</sup>, Biljana Grujić<sup>4</sup>*

### Summary

*The authors of this paper emphasise the analysis of the state and investment in systems for protection against waters in the previous, transitional, period, the consequences of the 2014 floods, and financing the reconstruction of damaged water facilities as well as the legislative and institutional framework for the policy of protection against waters in the pre-accession period. The results of the analysis imply insufficient investments in watercourse regulation and maintenance and improvement of facilities for protection against floods from surface water, groundwater, erosion and torrents in the transition period. In the past years, especially after the last-year's floods, there is an intensification of activities on recovery, reconstruction and construction of water management infrastructure for protection against waters. There is also intense work on harmonising the legislation with the corresponding legislation of the EU and fulfilling the obligations from the signed international conventions in this area.*

**Key words:** *floods, water management infrastructure, protection measures, risk management.*

**JEL:** *Q54*

### Introduction

Among natural disasters, with serious risks for people and their activities, floods have been the most common in terms of frequency, their threat level and the damage they cause; accordingly, they deserve special attention (Gavrilović Lj, et al., 2012). Floods

- 
- 1 This paper is part of research on the project No 46006: "Sustainable agriculture and rural development in the function of achieving the strategic goals of the Republic of Serbia in the Danube region", financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.
  - 2 Nataša Kljajić Ph.D., Research Associate, Institute of Agricultural Economics, Volgina street no. 15, 11060 Belgrade, Serbia, E-mail: [natasa\\_k@iep.bg.ac.rs](mailto:natasa_k@iep.bg.ac.rs)
  - 3 Vesna Popović, Ph.D., Principal Research Fellow, Institute of Agricultural Economics, Volgina street no. 15, 11060 Belgrade, Serbia, E-mail: [vesna\\_p@iep.bg.ac.rs](mailto:vesna_p@iep.bg.ac.rs)
  - 4 Biljana Grujić, B.Sc., Research Assistant, Institute of Agricultural Economics, Volgina street no. 15, 11060 Belgrade, Serbia, E-mail: [biljana\\_g@iep.bg.ac.rs](mailto:biljana_g@iep.bg.ac.rs)

are, after draught, the most common and widespread natural disaster. Floods affect a large number of people and inflict great material damage, much larger than all other kinds of natural disasters. They can destroy entire cities and send thousands of people to search for shelter. Leading a constant battle against floods, people view them with anxiety and fear. Almost every year, the rivers leave their beds and flood smaller or larger areas, thus threatening both people and material goods.

Floods are a natural phenomenon, but humans who have, through their actions, intensified climatic changes and harmed the environment, have certainly contributed to their frequency in the past years. Since 1980, there were 325 major floods in Europe, 200 of which from the year 2000 to today. Land use change is often mentioned as a reason for this. In urban surroundings, where soil sealing is common, there is a distinct threat from more frequent and intense natural disasters followed by heavy precipitation that exceeds the capacity of the rain sewer and jeopardise the water quality in the aqueducts. The frequency and intensity of this precipitation is connected to the disturbance in the hydrological cycle caused by global warming (EEA, 2012). Among natural hazards with serious risks for people and their activities, torrential (flash) floods are the most common hazard in Serbia and the most significant regarding huge material damage and loss of human lives. The frequency of these events, their intensity and diffusion in the whole country make them a permanent threat with severe consequences to environmental, economic and social spheres (Ristic, et al, 2012.a).

Appearance of torrential floods is mostly out of man control. Man made hazard could be increased by irresponsible activities concerning land use or decreased with preventive activities: spatial planning in endangered watersheds; afforestation of bare lands, amelioration of degraded forests, meadows and pastures; appropriate agricultural techniques; application of agroforestry; erosion control measures and torrent training works (Ristic et al., 2012b).

Floods are directly influenced by precipitation, the state of the water level in the main stream during the flood wave, ice jams, flow meanders, active landslides and the coincidence of high levels of water from tributaries and the main river flow, (Gavrilović, 1981).

Precipitation has the highest significance for the occurrence of floods. Rain immediately leads to an increase in water level, while snow increases the water level when it melts. The height of the flood wave depends on the amount of precipitation and the size of the river basin, while intensity is of less significance. Pouring rain is short lasting and affects smaller areas, while long lasting rain affects the whole basin or large portions of it; they saturate the land with water and lead to growth in water levels in the whole river network. That is when there occurs a large flood wave and floods of catastrophic proportions in the valley of the main river. Snow cover can contain large amounts of water, and snow precipitation can only lead to an increase in the water level after the snow melts. The unfavourable circumstances are, though, that the snow melting usually coincides with the oncome of heavy spring and late autumn rains. In this case, there is an increase in water level and the formation of a flood wave, which lasts longer on large and midsized rivers. During especially cold winters,

*ice jams*, which can reach significant thickness, can form on rivers. In the early spring, when the ice melts, icy corks can form in the riverbed, in the form of bridges, shelves or river meanders, the icy barrier becomes thicker and thicker, and up-flow, the river turns into a lake and then floods the surrounding areas. This type of floods used to occur on the Velika Morava, Tisa and Danube rivers, before the construction of accumulation.

**Indirect** contribution to floods is also made by the *shape and size of the basin, density of the river network, relief, water-saturation in the soil, state of underground water levels, degree of forestation and the manner of tilling the agricultural land in the basin* (Gavrilović, 1981). The occurrence of floods is also influenced by the geological composition of the terrain in the basin, the pedological structure, degree of cultivation in the observed area, canal construction and other factors. Consequences (damage) that occur from floods are diverse, but the greatest and most difficult consequence is the loss of human lives, which are un-recoupable. For the threatened population, the most difficult consequences are the destroyed homes. The outpouring of sewers, aqueduct damage and drinking water pollution in the settlements can be followed by the occurrence of various epidemics and health threats for many people. The river valleys house the largest agricultural areas and the most productive soil. Floods completely destroy crops, and in some better cases – their yields are reduced. Traffic infrastructure can also suffer from floods. They tear down bridges, embankments, roads and railways, they can cover them or cause them to slide in places where the conditions of the natural relief are disturbed. Due to flooding in industrial facilities, production discontinuance or material loss can occur, and in the case of chemical industry or industry of dangerous substance production, there is also the danger of water pollution with toxic elements (Gavrilović, 1981).

On the other hand, we must not forget that floods are a part of the normal functioning of the ecosystem of flood forests and swamps. These represent natural mechanisms of flood protection by slowing down and disburdening the river flows. These ecosystems are jeopardised by work on regulation and the construction of water facilities as well as systems for defence against water. The measures for preservation of the so-called “green infrastructure”, especially those connected to natural water retention (NWRM) have gained a significant place in the plans for water basin management and management of flood risk, and they will also have financial priority in the following plan period (EC, 2012; ICPDR, 2014a; ICPDR, 2014b).

### **Flooded areas and areas protected against floods in the Republic of Serbia, 2009-2013**

According to data from the Statistical Office of the Republic of Serbia, in the period of 2009-2013, every year between 5 and 117 thousand ha was flooded, of which between 4 and 98 thousand ha was utilised agricultural land. In this period, between 88 and 448 settlements were endangered yearly, between 118 and 360 industrial facilities, 9 and 50 km of railway lines, as well as between 81 and 763 km of roads (*Table 1.*).

**Table 1.** Flooded areas and facilities in the Republic of Serbia, 2009-2013

Year	Total flooded area, thous. ha	Utilised agricultural area, thous. ha	Settlements, number	Industrial facilities, number	Railway lines, km	Roads, km
2009	49	23	88	313	15	81
2010	117	98	448	171	50	763
2011	85	76	303	360	44	464
2012	65	55	206	235	9	547
2013	5	4	114	118	14	634

Source: SORS, Statistical Yearbook, 2012, 2014.

According to the Spatial Plan for the Republic of Serbia 2010-2021 (Official Gazette of the RS, 88/2010), around 2.08 million ha of land should be protected from flooding by surface water, groundwater, mostly in Vojvodina. In the absence of the existing protection systems, around 1.29 million ha in Vojvodina as well as the valley of the great rivers in central Serbia and Kosovo would be threatened by the one-hundred-year flood. There we can find high quality agricultural land, large industrial systems and developed transport infrastructure. Categories I-III erosion threatens 36% of the country's territory. Excessive erosion (category I) is especially present in the basins of Južna Morava, Pčinja and Beli Drim.

Protection against the detrimental effects from waters also includes measures and work on protection from surface water, groundwater, and protection against ice, protection against erosion and torrents and the recovery from such water effects. It is conducted using *systems for protection against external waters* – water facilities for watercourse regulation and embankments, erosion and torrents and *drainage systems* – water facilities for protection against the detrimental effects from *internal waters*.

The total area defended from floods in the period of 2009-2013 moved in the interval from 995 thousand ha in 2013 to 2 million ha in 2009 (of which utilised agricultural land was between 855 thousand ha and 1.9 million ha). The number of settlements defended from floods was between 563 (2009) and 716 (2012). Every year, between 553 km and 1,039 km of railway lines and between 2,304 km and 4,832 km of roads were defended from floods. The length of flood defence embankments in 2013 was 2,828 km (Table 2).

**Table 2.** Areas and facilities protected against floods in the Republic of Serbia, 2009-2013

Year	Total area protected against floods, thous. ha	Utilised agricultural area, thous. ha	Number of settlements	The number of industrial facilities	Railway lines, km	Roads, km	Length of embankments, km
2009	1,999	1,869	563	442	983	2,558	3,032
2010	1,959	1,763	657	498	862	4,810	3,299
2011	1,958	1,709	644	481	1,039	4,832	3,446
2012	1,469	1,260	716	586	711	2,411	3,458
2013	995	855	603	506	553	2,304	2,828

Source: SORS, Statistical Yearbook, 2012, 2014.

Besides embankments, protection systems also include around 1,200 km of regulated flow and canal systems and 29 accumulations, which alleviate the flood waves. Defence line systems along the three large rivers, Danube, Sava and Tisa, including the hydro-system Danube-Tisa-Danube (HS DTD) protect more than 852 thousand ha. The situation is significantly less favourable on the banks of Drina and Velika Morava and Južna Morava. In the Drina basin, 65 thousand ha are threatened, and just as much land in the basin of Velika Morava, where adequate systems only defend somewhat more than 23 thousand ha, while protection against the one-hundred-year floods in the basin of Južna Morava is only provided for about 4.6 thousand ha of about 39 thousand ha threatened land (Đorđević, 2009).

According to regional models of climate changes, an increased frequency and intensity of torrential floods is expected in the near future. Anti-erosion work was most intensive in the period of 1961-1988, when, besides the afforestation and melioration of forests, meadows and pastures, there was built around 14,000 km of rows, walls and terraces on the erodible terrains, as well as 3,200 barriers on the torrential flows, for controlling deep erosion, riverbed stabilisation and reducing deposit transportation (Group of authors, 2003).

Land drainage in the Republic of Serbia in the period of 2009-2013 was conducted on an area of 1.9 million ha (2009) to 2.2 million ha (2011). The statistics in 2009 have registered 5,093 km of drainage canals, and in 2013 5,601 km. There were 223 pumping stations operating within these systems in the year of 2013<sup>5</sup> (Đorđević, 2009) (*Table 3.*).

**Table 3.** Drainage in the Republic of Serbia, 2009-2013

Year	Total area covered by drainage systems, thous. ha	Drainage canals, km	Number of pumping stations
2009	1,917	5,093	226
2010	1,954	5,488	231
2011	2,240	5,336	249
2012	2,156	5,575	231
2013	2,132	5,601	223

Source: SORS, Statistical Yearbook, 2012, 2014.

Investment in the maintenance and development of water management infrastructure could only be characterised as “acceptable” until the 1980ies (Group of authors, 2003). During the transitioning period that followed and still lasts today, there was a sudden drop in budget financing of water management, which left big consequences on the functioning of the system for protection against waters.

According to the initially envisaged financial means for the year of 2014 of public company for water management (PCWM) “Srbijavode”, the programme for maintenance of water facilities for protection against the detrimental effects from waters was reduced to 38% of

5 According to available data from 2009, around  $2.08 \times 10^6$  ha was under some of the 400 drainage systems, where 210 major pumping stations were operational, with an installed capacity of 543 m<sup>3</sup>/s.

the needed scope, while the level of investment into maintenance of dams with accumulation does not ensure the functional security of these capital facilities.

It is estimated that around 1.5 billion RSD annually, i.e. 7.5 billion RSD in total should be provided for the protection of the most threatened areas in Serbia in the next five years. The mentioned assets would ensure the necessary degree of maintenance and functionality of the built water facilities for protection against waters, enhancing the existing facilities in accordance with the predetermined priorities, and technical documentation for the new investment cycle in the area of protection against waters (PCWM “Srbijavode”, 2014).

The lack of financial assets in the budget of the Republic is reason enough for insufficient maintenance of facilities for protection against floods in the past twenty years in the territory of AP Vojvodina as well, according to assessments from the PCWM “Vojvodina vode”. Thirty to seventy percent of work on water system maintenance was done in accordance to the current standards and criteria, which resulted in poor functional state of water facilities, decrease in system efficiency up to 50%, i.e. inadequate degree of flood protection of people and goods in AP Vojvodina (PCWM “Vode Vojvodine”, 2014).

#### **Floods in Serbia in 2014 – damage and reconstruction of damaged water facilities**

Serbia was hit by floods of great proportions in May 2014, caused by heavy rain that went on for 48 hours. The damage caused by the floods in the territory of 24 municipalities was estimated to be 1,525 million EUR (where the value of destroyed properties was 885 million EUR, and loss in production about 640 million EUR), which represents 3% of the country’s GDP<sup>6</sup> (The Government of the Republic of Serbia, 2014). The greatest loss and damage was noted in the production sector (agriculture, manufacture, trade, tourism, mining and energetics), in the amount of 1,064 million EUR (70%). It is estimated that 51,800 workplaces will be lost before time due to cessation in production activities in the threatened municipalities, with proportional decrease in household income. In the sectors of accommodation, education, health and culture, the damage amounts to 242 million EUR (16%). The damage on infrastructure is estimated at 192 million EUR (12%), while in the area of environment protection and multipurpose facilities, the damage lies at around 28 million EUR (2%) (*Table 4*).

**Table 4.** Summary of estimated damages and losses caused by the disaster, 2014

		Disaster Effects, mln EUR		
		Damage	Losses	Total <sup>6</sup>
<b>Social</b>		<b>234.6</b>	<b>7.1</b>	<b>241.7</b>
	Housing	227.3	3.7	230.9
	Education	3.4	0.1	3.5
	Health	3.0	2.7	5.7

<sup>6</sup> If we consider the municipalities not included in the assessment, but which were still affected by the floods to a lesser degree, then the estimated damage goes up to 1.7-1.8 billion EUR.

		Disaster Effects, mln EUR		
		Damage	Losses	Total*
	Culture	1.0	0.6	1,6
<b>Productive</b>		<b>516.1</b>	<b>547.6</b>	<b>1,063.6</b>
	Agriculture	107.9	120.1	228.0
	Manufacturing	56.1	64.9	121.0
	Trade	169.6	55.2	224.8
	Tourism	0.6	1.6	2.2
	Mining and energy	181.9	305.8	487.7
<b>Infrastructure</b>		<b>117.3</b>	<b>74.8</b>	<b>192.1</b>
	Transport	96.0	70.4	166.5
	Communications	8.9	1.1	10.0
	Water and sanitation	12.4	3.2	15.7
<b>Cross cutting</b>		<b>17.2</b>	<b>10.6</b>	<b>27.9</b>
	Environment	10.6	10.1	20.6
	Governance	6.7	0.6	7.2
<b>Total</b>		<b>885.2</b>	<b>640.1</b>	<b>1,525.3</b>

Source: The Government of the Republic of Serbia (2014): *Serbia Floods 2014*, Belgrade ([http://ec.europa.eu/enlargement/pdf/press\\_corner/floods/20140715-serbia-rna-report.pdf](http://ec.europa.eu/enlargement/pdf/press_corner/floods/20140715-serbia-rna-report.pdf))

Floods have, most of all, damaged the energy sector, which took more than 210 million EUR to reconstruct, while the damage in accommodation is estimated at 227 million EUR. Water and landslides have destroyed more than 400 accommodation units, while approximately 17,000 flats and accommodation units have suffered partial damage. Another 74 facilities of healthcare took damage, including emergency facilities, health offices and clinics, as well as 35 pre-school and school facilities. The total amount of assets for the recovery and reconstruction is estimated at 1,346 million EUR, where 403 million EUR goes to recovery and 943 million EUR is for reconstruction (Table 5).

**Table 5.** Summary of estimated recovery and reconstruction needs

Sector	Post-Disaster Needs, mln EUR		
	Recovery	Reconstruction	Total*
Agriculture	40.8	111.4	152.1
Manufacturing	16.6	53.3	69.8
Trade	12.9	144.0	157.0
Tourism	0.5	0.7	1.2
Mining and energy	211.8	202.0	413.8
Housing	58.8	204.5	263.3
Education	2.0	4.3	6.3
Health	2.7	4.4	7.1
Culture	0.1	1.2	1.3
Transport	-	128.2	128.2
Communications	-	12.6	12.6



Water and sanitation	3.5	24.0	27.5
Environment	2.8	38.7	41.5
Governance	2.3	14.1	16.4
Employment	46.4		46.4
Gender	2.0		2.0
<b>Totals</b>	<b>403.0</b>	<b>943.5</b>	<b>1,346.5</b>

Source: The Government of the Republic of Serbia (2014): *Serbia Floods 2014*, Belgrade ([http://ec.europa.eu/enlargement/pdf/press\\_corner/floods/20140715-serbia-rna-report.pdf](http://ec.europa.eu/enlargement/pdf/press_corner/floods/20140715-serbia-rna-report.pdf))

The Law on Post-Flood Rehabilitation in the Republic of Serbia (Official Gazette of the RS, 75/2014) regulates the recovery from the consequences of the floods, i.e. landslide activation in areas affected by the floods that took place in May 2014 in Serbia. The recovery in areas affected by the floods is taking place in accordance with *Government Recovery Programmes*, which lay down the measures and criteria for providing assistance or post-flood rehabilitation and recovery criteria, measures and procedures in individual fields and in a specified territory. The funds for the rehabilitation from the consequences of floods and/or activated landslides in the sense of this law are provided from: the budget of the Republic of Serbia, the budget of the autonomous province, the budget of the units of local self-government, donations, contributions and gifts, borrowings, receipt from the sale of financial assets, financial assistance of the European Union, funds of public enterprises and other forms of organisation founded by the Republic of Serbia, autonomous province, or local self-government unit, and other sources in accordance with the law. Recovery and reconstruction will take place in the period of 2014-2016 (Table 6.).

**Table 6.** Time schedule of recovery and reconstruction requirements, 2014-2016

Needs	2014	2015	2016	Total <sup>7</sup>
	Mln EUR			
Recovery	236.1	146.4	20.5	403.0
Reconstruction	592.7	290.5	60.3	943.5
<b>Totals</b>	<b>828.9</b>	<b>436.8</b>	<b>80.8</b>	<b>1,346.5</b>

Source: The Government of the Republic of Serbia (2014): *Serbia Floods 2014*, Belgrade ([http://ec.europa.eu/enlargement/pdf/press\\_corner/floods/20140715-serbia-rna-report.pdf](http://ec.europa.eu/enlargement/pdf/press_corner/floods/20140715-serbia-rna-report.pdf))

The government programme for recovery of damaged water facilities<sup>7</sup> predicts taking measures of *urgent interventions* (temporary closing of embankment perforations and critical damage on water facilities) and *urgent work on recovery* of water facilities for regulation of watercourses, water facilities for protection against floods, erosion and torrents and water facilities for drainage, with providing adequate documentation, in the total value of 3,146.9 million RSD (PwMC “Srbijavode” 1,687 million RSD, PwMC

7 The Act on Determining a Government Programme for Recovery of water facilities for watercourse regulation, water facilities for protection against floods, erosion and torrents, and water facilities for drainage.

“Vode Vojvodine” 400.3 million RSD and PWMC “Beogradvode” 1,059.6 million RSD) (Official Gazette of RS, 86/2014, 103/2014). It was predicted that urgent interventions should be realized by the end of October 2014, and urgent work on recovery of the mentioned water facilities by July 15<sup>th</sup>, 2015. The investor is the Republic of Serbia.

The Government of Serbia in December 2014 adopted a national program for the management of risks from natural disasters, which will be implemented in cooperation with the World Bank, the UN and the EU. For the implementation of prevention programs has so far provided over 70 million euros. The value of donations to the sources of funding are (<http://www.obnova.gov.rs/uploads/useruploads/Documents/Kancelarija-za-pomoc-poplavljenih-podrucja-infograf-15-04-2016-srb.pdf>):

- For the agriculture sector of the identified 11 million, EU financed 8 million euro<sup>8</sup>;
- FAO, in cooperation with the Ministry of Agriculture and Environmental Protection organized the distribution of seeds, fertilizers (61 million RSD) and fuel (almost 65 million RSD) for small farms;
- In cooperation with the World Bank were provided subsidies to farmers in the amount of 35 million dollars.

### **Financing the work and activities on protection against waters in the year of 2015**

The budget fund for waters of the Republic of Serbia<sup>9</sup> intends 2,033.8 million RSD for watercourse regulation works and protection against the detrimental effects from waters in the year of 2015 (Official Gazette of RS, 142/2014). An amount of 1,969.3 million RSD is meant for financing new work and the rest for covering the expenses of work done in 2014. The distribution of assets is performed by an annual programme of water management (Official Gazette of RS, 21/2015). Most assets will be used to *maintaining* water facilities for watercourses regulation, water facilities for protection against floods, erosion and torrents (805.2 million RSD), and maintaining water facilities for drainage (409.1 million RSD). Over 90% of these investments represent *regular maintenance* of the mentioned facilities, while the assets meant for *investment maintenance* are particularly modest, as well as assets for *construction and reconstruction* of water facilities for watercourses regulation and water facilities for protection against floods, erosion and torrents (60 million RSD) and for protective, *biological and biotechnical* works (45 million RSD). The *recovery* of water facilities for watercourses regulation, water facilities for protection against floods, erosion and torrents and water facilities for drainage should receive 431 million RSD and *conducting*

---

8 Were donated aid packages in the form of: of seedlings, domestic animals, feed for farm animals, equipment etc.

9 The total amount of assets in the Budget Fund for Waters (evidential account within the Treasury General Ledger, in the heading of The Ministry of Agriculture and Environment Protection of the Budget of the Republic of Serbia) for the year of 2015 is determined at 3,120 million RSD, where budget revenues participates with 2,320 million RSD and donations from international organisations with 800 million RSD.

*defence against floods and ice* another 170 million RSD. The rest of the assets will cover expenses of *project planning* (110 million RSD) and maintaining *expert surveillance* over conducting work on recovery and maintenance of riverbeds and protective biotechnical work on the territory of the City of Belgrade (3.5 million RSD).

The budget fund for waters of the AP Vojvodina in 2015 finances works on regulation, use and protection of waters on the territory of the AP Vojvodina, as defined by the business programme of PWMC “Vode Vojvodine”, in an amount of 2,476 million RSD (Official Gazette of APV, 54/2014). According the data from the Business Programme of PWMC “Vode Vojvodine” for the year of 2015, *for regular maintenance and functioning of water facilities in 2015* from the Province Fund is allocated 1,379.2 million RSD of required 4,459.5 million RSD, as follows:

- Regular maintenance and functioning of the drainage systems received 1,075 million RSD out of the needed 3,566.3 million RSD (30.1%),
- Regular and urgent maintenance and enhancement of protective facilities, protection against detrimental effects from waters and defence against floods received 132 million RSD out of the needed 606.8 million RSD (21.8%), and
- Maintenance of the HS DTD received 172.2 million RSD out of the needed 286.4 million RSD (60.1%).

Additional means are provided from the Programme of Regulation, Protection and Use of Agricultural Land in APV, other sources of financing from provincial level, and other sources (RS, municipalities, own assets and EU funds). Still, even with these additional assets, the maintenance of the mentioned water facilities and systems still lacks 961.5 million RSD, i.e. the maintenance is performed at a degree of 78.4% (PWMC “Vode Vojvodine”, 2014).

### **Measures of defence against floods – legislative and institutional framework**

The measures of integral protection against the detrimental effects from waters are divided into investment measures (hydro-engineering) and non-investment. The investment measures include active measures (building accumulations, retentions and diversion canals) and passive measures of protection against floods (building embankments, bank revetments and protective cassettes, and regulation of riverbeds).

*Active measures* of flood protection have a goal of reducing unfavourable characteristics of large waters. For example, up-flow accumulations, which are some of the most important active measures, serve to reduce the flow of large waters. Active measures are not dominant in Serbia, considering that the possibilities for building significant accumulations for levelling large waters on large water flows are limited.

*Passive measures* of protection from floods are used to prevent direct overflow of large waters out of the riverbed. The most important and most common passive measures include coastal embankments built along the riverbed. In Serbia, the degree of construction

of embankments alongside the smaller rivers is not satisfying, which is why floods are relatively common. Considering the natural characteristics of the waters, and the limited possibility of constructing significant accumulations for levelling large waters, the systems of defence in key flood prone areas in Serbia (Vojvodina, Mačva, Srem, Lower Posavina with the City of Belgrade, Pomoravlje) must still rely on passive measures, which have to be adjusted to the realistic conditions and needs.

*Non-investment measures* of flood protection include administrative, regulative and institutional measures that preventively reduce the current and future damage from floods or ensure adequate defence from floods through preventive action or good organisation. Non-investment measures are a significant addition to active and passive measures of flood defence (Petković, 2006 and Kljajić et al., 2012).

*Preventive and operative non-investment measures* are directed at flood danger combat and reducing the negative consequences in all phases of flood defence. *Regulative and institutional measures* define the manner of land use in the flood threatened area (zoning the terrain according to the degree of threat, regulations on the purpose of the threatened terrain, civil engineering regulations). *Measures of solidarity* for mitigating the consequences of floods have a goal to reduce the damage that appears during and after the floods, due to disturbances in the social and economic life (recovery and reconstruction, insurance from the consequences of the floods etc.) *Informing and educating* the population are necessary for the efficient conduction of flood defence (Varga, Babić-Mladenović, 2001).

Due to the described state and need for harmonising the legislation on flood protection with that of the EU, in future activities special attention should be dedicated to:

- *permanent studying of the state, conditions and measures of flood defence,*
- *systematic and high-end maintenance, reconstruction and operation control of the existing facilities,*
- *non-investment protection measures,*
- *adjusting the newly appeared conditions in accordance with the principles of sustainable development,*
- *harmonising the legislation with the EU acquis and intensifying international cooperation.*

Managing risk of detrimental effects from waters is the foundation of successful protection against floods, erosion and torrents and according to the Law on Waters (Official Gazette of RS, 30/2010, 93/2012) it includes: the preliminary assessment of flood risk<sup>10</sup>, making and conducting the plans on flood risk management, general and operative plans of flood defence, conducting regular and urgent flood defence, conducting defence against ice on the watercourses and protection against erosion and torrents.

---

10 The preliminary flood risk assessment from 2011 defined 99 areas of potential significant flood risk on the territory of the Republic of Serbia.

The EU Floods Directive (Directive 2007/60/EC of the European Parliament and of the Council on the assessment and management of flood risks. OJ L288, 6.11.2007.) regulates the construction of flood risk management plans on the river basin level (FRMPs), predicted by the *2000 Water Framework Directive - WFD* (Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy. OJ L327, 22.12.2000.) starting from the next RBMPs plan cycle in 2015. The Flood Risk Management Plans must be considered when making inter-sector plans on risk management and plans on natural disaster risk management. By ensuring the due attention to consequences of climate changes and measures of adaptation, we improve spatial planning and land management (EC, 2012).

Serbia, as Contracting Party of the Convention on cooperation for the protection and sustainable use of the River Danube (Official Gazette of FRY – International Treaties, 2/2003), has committed itself to the development of the co-ordinated international River Basin Management Plan for the Danube River Basin as requested by the EU Water Framework Directive. On that account, it has participated in the development of the EU Danube River Basin Management Plan 2009-2015 (DRMB) and its Update 2015 as well as in the development of the 1st DRB Flood Risk Management Plan. Plan for flood risk management in the Danube basin focuses on prevention, protection and preparedness, including flood forecasts and early warning systems (ICPDR, 2014a). In the draft of the updated DRBM Plan, there is emphasis on the need for coordinating flood risk management and river basin management planning<sup>11</sup> in order to increase the efficiency of the implementation of measures and improve resource efficiency (ICPDR, 2014b).

As an EU-candidate, Serbia is intensely working on transposing the EU acquis into domestic legislative. Most of the Water Framework Directive and the Floods Directive has been transposed through the Law on Waters and the following subordinate regulations, and a complete transposition is planned until the end of 2017 (WFD), i.e. mid 2018 (all relevant EU regulations). The passing of the Danube River Basin Management Plan with Programme of measures is expected in middle 2015, and the preparation of flood hazard maps and their publication towards the end of 2018 (The Government of RS, 2014a).

In accordance with the EU recommendations and practice, following measures and activities for flood risk management are included in the *National Programme for Natural Disaster Risk Management* (The Government of RS, 2014b):

- identification and monitoring the flood risks and building the systems of early warning and preparedness,
- structural (infrastructural and institutional flood defence interventions) and non-structural measures of flood risk reduction (flood risk incorporation into the land use plans and urban planning, improvement of the engineering regulations),
- establishment of institutions and financing strategies,

---

<sup>11</sup> The achievement of synergies in practice needs to be ensured mainly at the national level, as the implementation of measures envisaged by RBM Plan and FRM Plan is a national task.

– efficient recovery from floods.

### Conclusion

Flood defence is an important segment of measures and activities connected to river basin management. During the previous development of this subsector of water management, the principle of *flood combat* was principally used in Serbia. It included construction of significant and expensive investment facilities (dams, accumulations, embankments, watercourses regulation, diversion canals, etc.) in order to ensure safety for people and material goods situated in the flood risk areas.

Defence against the detrimental effects from waters in the coming times must be based on the principles of *sustainable development* (the consciousness that there is no absolute flood defence, but that floods are something we have to live with, adjusting the needs of society and the environment), *integrality* (ensuring flood protection by combining investment and non-investment measures) and *coordination* (harmonised action of authorised organisations on a local, national and international level) with respect to the current state of the flood protection system and the economic strength of the society.

An adequate combination of non-investment and investment (hydro-engineering) work and measures at the river basin level should provide a good solution to integrated regulation and protection of the flood risk areas in Serbia. On large river basins, flood protection will still rely on hydro-engineering facilities, but the protection measures must also be based on flood hazard maps and flood risk maps, in order to adjust the activities with the specificities of a defined flood risk area. In the basins of smaller and mid-ranged rivers, non-investment measures should become more significant, as they influence the reduction of damage, whether by preventive action, or by good organisation in flood defence. In the following period, the main emphasis will be on increasing the degree of flood protection in large agglomerations (Belgrade, Novi Sad), industrial centres, and thermo-energetic capacities and increasing the retention capacities in the basins by building cassettes, accumulations etc.

It is expected that the mentioned measures and activities should be defined at the level of areas of potential significant flood risk and based on flood hazard maps and flood risk maps. As such, they will be included in flood risk management plans, which are, according to the Law on Waters, made for the territory of the Republic of Serbia and water areas. In the domain of international cooperation, emphasis lies on participation in making and implementing flood risk management plans, coordinated with river basin management plans, in accordance with the EU Floods Directive.

By reducing the risk of floods and other natural disasters, we influence the increase of competitiveness of Serbia on the international markets.

## Literature

1. Directive 2007/60/EC of the European Parliament and of the Council on the assessment and management of flood risks. OJ L288, 6.11.2007.
2. Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy. OJ L327, 22.12.2000.
3. Đorđević, D. (2009): *Vodoprivreda i vodoprivredna infrastruktura*, Strategija prostornog razvoja Republike Srbije, Studijsko-analitička osnova, Institut za arhitekturu i urbanizam Srbije, Beograd, Srbija
4. European Commission (2012): *A Blueprint to Safeguard Europe's Water Resources*, Brussels, COM(2012) 673 final.
5. European Environment Agency – EEA (2012): *European waters – current status and future challenges*, Synthesis, EEA Report, No 9/2012.
6. Gavrilović, L. M. (1981): *Poplave u SR Srbiji u XX veku - uzroci i posledice*, Beograd: Srpsko geografsko društvo, Special edition, book 52.
7. Institut za vodoprivredu «Jaroslav Černi»– IJČ. (2003): *Studija održivog razvoja vodoprivrede Republike Srbije*.
8. International Commission for the Protection of the Danube River – ICPDR (2014a): *Flood Risk Management Plan for the Danube River Basin District*.
9. International Commission for the Protection of the Danube River – ICPDR (2014b): *The Danube River Basin District Management Plan – Update 2015*. Draft, December 2014.
10. Gavrilović Ljiljana, Milanović Pešić Ana, Urošev Marko (2012): *A hydrological analysis of the greatest floods in Serbia in the 1960 – 2010 period*“. Carpathian Journal of Earth and Environmental Sciences, November 2012, vol. 7, no. 4, pp. 107 – 116.
11. JVP “Srbijavode” (2014): *Program poslovanja za 2014. godinu*.
12. JVP “Vode Vojvodine” (2014): *Godišnji program poslovanja za 2015. godinu*.
13. Kljajić Nataša, Arsić Slavica, Mijajlović Nada (2012): “Zemljište kao ekološki factor poljoprivredne proizvodnje”. *Tranzicija* vol. 14, no 29, pp. 38-47.
14. Petković, S. (2006): *Izveštaj o korišćenju voda, zaštiti voda i zaštiti od voda u 16 opština/ gradova Srbije*, CeSID, Beograd.
15. Ristic, R., Kostadinov, S., Abolmasov, B., Dragicevic, S., Trivan, G., Radic, B., Trifunovic, M., Radosavljevic, Z. (2012a): “*Torrential floods and town and country planning in Serbia*“, *Natural Hazards and Earth System Sciences* no. 12, pp/ 23-35.
16. Ristić, R., Kostadinov, S., Radić, B., Trivan, G., Nikić, Z. (2012b): „*Torrential floods In Serbia – man made and natural hazards*“, 12th Congress INTERPRAEVENT 2012 – Grenoble / France Conference Proceedings (available at: [www.interpraevent.at](http://www.interpraevent.at)).
17. The Government of the Republic of Serbia. (2014): *Serbia Floods 2014*, Serbia Recovery Needs Assessment Report: The European Union, the United Nations and the World Bank (available at: [http://ec.europa.eu/enlargement/pdf/press\\_corner/floods/](http://ec.europa.eu/enlargement/pdf/press_corner/floods/)

[20140715-serbia-ma-report.pdf](#)).

18. The World Bank (2014): *Irrigation and Drainage Rehabilitation Project (Serbia)*, Implementation completion and results report (IBRD-74670 IDA-41050)No: ICR00003127, October 22, 2014.
19. Varga, S., Babić-Mladenović, M. (2001): *Zaštita od poplava u Srbiji-novi pristup*, U: Upravljanje vodnim resursima Srbije, Beograd, Institut za vodoprivredu Jaroslav Černi.
20. Vlada Republike Srbije, Kancelarija za evropske integracije (2014a): *Nacionalni program za usvajanje pravnih tekovina Evropske unije 2014-2018*.
21. Vlada Republike Srbije, Kancelarija za pomoć i obnovu poplavljenih područja (2014b): *Nacionalni program upravljanja rizikom od elementarnih nepogoda* (available at: <http://www.obnova.gov.rs/cirilica/news/article/vode>)
22. <http://www.obnova.gov.rs/uploads/useruploads/Documents/Kancelarija-za-pomoc-poplavljenih-podrucja-infograf-15-04-2016-srb.pdf>



## ZAŠTITA OD ŠTETNOG DEJSTVA VODA U REPUBLICI SRBIJI<sup>12</sup>

*Nataša Kljajić<sup>13</sup>, Vesna Popović<sup>14</sup>, Biljana Grujić<sup>15</sup>*

### Apstrakt

*Autori u radu akcenat stavljaju na analizu stanja i ulaganja u sisteme za zaštitu od voda u prethodnom, tranzicionom periodu, posledica poplava iz 2014. godine i finansiranje obnove oštećenih vodnih objekata, kao i na zakonodavni i institucionalni okvir politike zaštite od voda u pretpristupnom periodu. Rezultati analiza ukazuju na nedovoljna ulaganja u uređenje voda i održavanje i dogradnju objekata i sistema za zaštitu od poplava spoljašnjim i unutrašnjim vodama, erozije i bujica u periodu tranzicije. Poslednjih godina, a naročito posle prošlogodišnjih poplava, intenziviraju se aktivnosti na sanaciji, obnovi i izgradnji vodoprivredne infrastrukture za zaštitu od voda. Aktivno se radi i na harmonizaciji zakonodavstva sa odgovarajućim u EU i ispunjavanju obaveza iz potpisanih međunarodnih konvencija u ovoj oblasti.*

**Ključne reči:** *poplave, vodoprivredna infrastruktura, mere zaštite, upravljanje rizikom.*

---

12 Rad je deo istraživanja na projektu broj 46006: "Održiva poljoprivreda i ruralni razvoj u funkciji ostvarivanja strateških ciljeva Republike Srbije u okviru Dunavskog regiona", koji finansira Ministarstvo prosvete, nauke i tehnološkog razvoja Republike Srbije.

13 Dr Nataša Kljajić, naučni saradnik, Institut za ekonomiku poljoprivrede Beograd, Volgina ulica br. 15, 11060 Beograd, Srbija, E-mail: [natasa\\_k@iepbg.ac.rs](mailto:natasa_k@iepbg.ac.rs)

14 Dr Vesna Popović, naučni savetnik, Institut za ekonomiku poljoprivrede Beograd, Volgina ulica br. 15, 11060 Beograd, Srbija, E-mail: [vesna\\_p@iepbg.ac.rs](mailto:vesna_p@iepbg.ac.rs)

15 Dipl. ing. Biljana Grujić, istraživač saradnik, Institut za ekonomiku poljoprivrede, Beograd, Volgina ulica br. 15, 11060 Beograd, Srbija, E-mail: [biljana\\_g@iepbg.ac.rs](mailto:biljana_g@iepbg.ac.rs)

## IMPACT OF SOCIO-DEMOGRAPHIC CHARACTERISTICS ON TRAVEL EXPENDITURES OF HUNGARIAN TOURISTS IN THE VILLAGE OF SKORENOVAC

*Živana Krejić<sup>1</sup>, Slobodan Čerović<sup>2</sup>, Snežana Milićević<sup>3</sup>*

### Summary

*Development of rural tourism in Vojvodina affects the survival of village and livelihoods of its people. Despite the numerous problems that villages of Vojvodina face, an example of good practice is the village of Skorenovac in the municipality of Kovin in Banat. Local culture, traditions and legends of the distant past, and a unique way of life of the population of this village are the primary motives and grounds of the arrival of tourists and they affect the development of rural tourism. The aim of this study was to determine whether there are differences in the consumption of Hungarian tourists in the village Skorenovac in relation to age, level of education and gender. The results of research should serve as encouragement of rural households to monitor socio-demographic characteristics of tourists to suitably form the tourist offer in order to increase profit.*

**Keywords:** *socio-demographic characteristics, rural tourism, Hungarian tourists, Skorenovac, consumption.*

**JEL:** *Q1, L83, Q18*

### Introduction

From the earliest times to the present day, cultural motives were the primary motives that encouraged people to travel. A certain degree of cultural development in a society increased the likelihood of organization of first travels, as it was in Egypt, Mesopotamia, Babylon, Persia, Ancient Rome, Ancient Greece, and so on (Goeldner, Ritchie, 2009).

---

1 Živana Krejić M.A., Ph.D candidate, University of Singidunum, Faculty of Tourism and Hospitality Management, Danijelova street no. 32, Belgrade, Serbia, Phone: +381 66 900 78 78; E-mail: [zkrejić@yahoo.com](mailto:zkrejić@yahoo.com)

2 Slobodan Čerović Ph.D., Full Professor, University of Singidunum, Belgrade, Danijelova street no. 32, Phone: +381 11 309 32 10, E-mail: [scerovic@singidunum.ac.rs](mailto:scerovic@singidunum.ac.rs)

3 Snežana Milićević Ph.D., Assistant Professor, University of Kragujevac, Faculty of Hotel Management and Tourism in Vrnjačka Banja, Vojvođanska Street no. 5A., 36210 Vrnjačka Banja, Serbia, Phone: + 381 36 515 00 24, E-mail: [snezana.milicevic@kg.ac.rs](mailto:snezana.milicevic@kg.ac.rs)

Ever since tourism has become a global phenomenon, in recent decades there are evident changes in the tourist demand. Classic destinations and travel motives are changing. A way is given to new, specific forms of tourism, which also include rural tourism.

According to the World Tourism Organization (UNWTO), rural tourism is complex and is divided to several segments: natural and rural environments (rivers, lakes, forests), rural cultural and spiritual features (architecture, churches, monasteries), ethno tourism (which includes traditional food, music, souvenir shops) and rural activities such as horseback riding, hunting and fishing (Prentović et al., 2012).

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 (Milićević, Podovac, Čavlin, 2015).

Authors Ruth, Donagh (2011) emphasize the importance of rural areas as complexes with multipurpose capabilities and their capacities for development of various interest groups.

Muhi and Jovanović (2012) pointed out that the rural tourism is an important component of integrated and sustainable development and revitalization of villages, as well as an important factor in encouraging the development of local agricultural and non-farm activities in rural areas and villages; what is more, it is a substantial incentive to employment.

The fact that the traditional festivals, events and folklore artistic performances are an important part of rural tourism is also confirmed by Grossman (2013) in his book *Shaping the Image and Perception of Japan's Folk Tradition*. His research has shown that the historical motives such as legends, castles, festivals, folk traditions and different rituals are important elements for decision-making of tourist for traveling.

Addendum to this claim is the research of group of authors (Wanda et al., 2009) which has shown that the past is an integral part of cultural tourism. The tradition of the local culture and the unique way of life of its population, inherited cultural and architectural heritage are subjects of tourism demand. According to the same authors, this type of tourism has many positive effects, among which above all one should highlight employment opportunities, preservation of cultural heritage, its monuments, but also the preservation of languages, traditional crafts, traditional foods etc.

The importance of rural tourism development in China is highlighted in the research work *Rural Tourism in China* (Baoren, 2011) especially in terms of socio-economic revival of China.

Domestic authors (Bošković et al., 2013) emphasize the advantage of rural areas of Vojvodina for the development of cultural heritage among other things.

On the other hand (Štetić et al., 2014) they emphasize that rural tourism is associated with economic, social, cultural, natural and human resources. They also point out that numerous factors affect the implementation of integrated tourism in rural areas.

The aim of this paper is to present the results of research based on survey data obtained from Hungarian tourists in the village Skorenovac and to encourage the local community to enrich its tourist offer and observe socio-demographic characteristics of tourists in order to encourage consumption.

As the influence of cultural motives on the development of tourism increased through time especially when it comes to economic effects, the paper investigated the motives that were crucial for the arrival of tourists to the village of Skorenovac, the average expenditure, the reasons which affected the expenditure, with the aim to encourage the underdeveloped rural areas to follow the example of this village for the development and achievement of the economic effects of tourism.

### **Research Methodology**

The data in the paper were collected by direct research. The sample consisted of tourists from Hungary who stayed in the village of Skorenovac during the May Day holidays in 2015. A total of 75 tourists were surveyed.

By applying appropriate research methods (Kruskal-Wallis and Man-Whitney test), the variables included in the survey were related to: motives of tourists' arrival, how they have learned of this place (marketing before the start of travel), their satisfaction with the quality of service provided as well as the ratio between price and quality, the distribution of spending in relation to gender and the like.

*Man-Whitney* test was used in the research to test differences between the two variables: gender/expenditure (*Did men and women spend money on this trip equally?*). The obtained values are converted to ranks and it is then calculated whether these ranks significantly differ. The main values within this test are significance level and approximation.

The main hypothesis of the paper is that socio-demographic characteristics of tourists influence their consumption and that the analysis of these characteristics should be used as a basis for the development of tourist offer with the aim of increasing tourist spending. Within this hypothesis, three auxiliary hypotheses were also investigated, one of which is related to the expenditure of tourists in Skorenovac: with the premise that the expenditure of tourists is related to their age, that is, that expenditure level is neither linked to the level of education, nor the gender of a tourist. In the survey on tourist spending, has been reported and whether the level of education of tourists can affect the level of spending on their destination.

Data obtained in the survey were entered and analyzed using Statistical Package for the Social Sciences (SPSS) for Windows Release 21.0.0, which allowed drawing conclusions.

### **Cultural motives as factors of development of rural tourism**

Cultural tourism is one of the oldest forms of travel. Due to the different motives that comprise it, this type of tourism has direct impact on tourism demand and initiates the development of other types of tourism.

Different classification of cultural resources usually involves cultural and historical monuments, architectural objects, ethnographic and monastery complexes, churches, museums, monuments, exhibitions, galleries and various cultural attractions (Mrkša, Gajić, 2014).

Richards and Munster (2010) consider that it is difficult to distinguish between “culturally motivated” tourists and other travelers, due to the growing tendency towards different holiday motives.

However, an increasing number of arrivals and overnight stays of Hungarian tourists to the village of Skorenovac (the municipality of Kovin, South Banat region, the wider area of Vojvodina) was a motivation to conduct research on whether the cultural motives were the only reason for their arrival, but also to show that they are the basis and impetus for the development of rural tourism in this small settlement.

In this regard, the main objective of this paper is to show that the main reasons for the arrival of Hungarian tourists in the area of South Banat are cultural and historical motives, thanks to which cultural and rural tourism are developed i.e. that the multiculturalism in Vojvodina is extremely important and can favorably affect the development of tourism, i.e. it may be a decisive factor in the tourist travels and the achievement of economic effects from tourism.

For many countries around the world, the growth and development of tourism carry with them many positive and negative consequences. When it comes to rural tourism, it can be concluded that this form of tourism is of great importance for employment of the population, job creation and the overall economic development of rural areas.

To begin with, rural development has a profound influence on the development of rural tourism industry, i.e. the establishment of small and medium enterprises. In the US, 99% of all facilities related to tourism in rural areas qualify as small businesses; in the New Zealand, tourism industry is estimated to consist of between 13,500 to 18,000 small and medium-sized businesses, while in Israel rural tourism is based on small family businesses that employ up to three employees (Derek et al., 2005).

Rural tourism in Vojvodina can be an incentive for the development of small and underdeveloped communities, that thanks to tourism, they could contribute to a significant transformation of the society and the economy as a whole.

The demand for rural tourism has grown over the last years and the market does not seem to be saturated yet (Pesonen et al., 2011).

### **Motives as primary values and decision factors for travel**

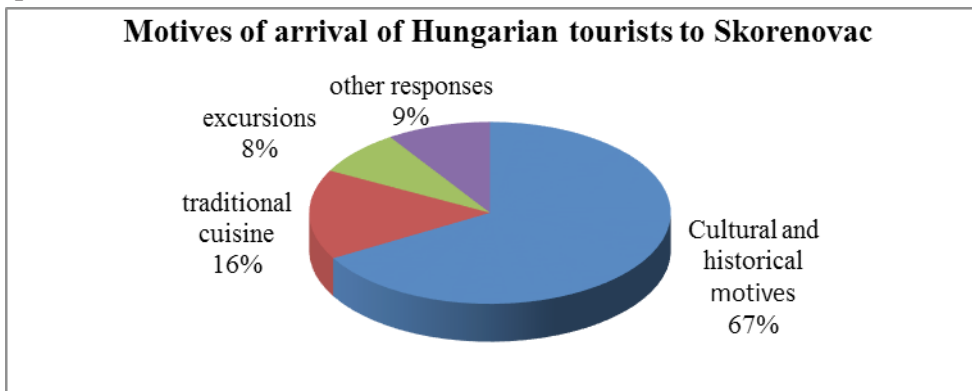
Based on a survey which included 75 tourists, with respect to the primary values in the tourism value chain in Skorenovac, the following conclusions were drawn.

When asked „*what was the motive of your arrival in the village of Skorenovac?*“, as many as 50 respondents (66.67% of the total number of tourists) responded that

their travel is related to the culture and history of the Hungarian people in the past. 12 respondents (16%) responded that the reasons for coming were to taste traditional Hungarian dishes in this town, while six people (8%) indicated that they decided to take this trip because of excursions organized in Romania which are also associated with the history of the Hungarian nation. Seven respondents specified other, different answers (A total of 9.33%).

Figure 1 shows the answers concerning the motives of arrival of Hungarian tourists to Skorenovac, while Figure 2 provides a better overview of the number of tourists in relation to the ways in which they learned about this destination before making any travel decisions.

**Graph 1.** Travel motivations of tourists to visit Skorenovac



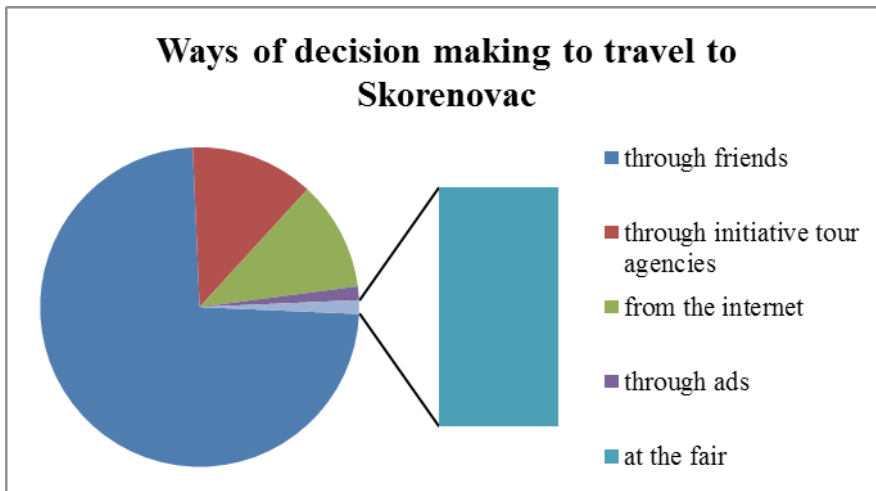
Source: authors, based on research

Based on the graph, it can be concluded that the cultural and historical motives were primary to influence the decision of the arrival of Hungarian tourists to the village of Skorenovac. Culture and tradition are strongly associated and this is the reason why the traditional cuisine is the second strongest motive for arrival of these tourists. Trips to Romania that are related to the history of the Hungarian population are the third motive for the tourists made a decision about going on this trip.

Figure 2 shows the answers to question No. 5, which referred to the promotion of Skorenovac before making travel decisions, that is, *how the tourists found out about this village and what type of promotion made them choose this trip*. 53 respondents (70.66%) have declared that they found out about the trip from friends, 9 (12%) via the emitting travel agencies, 8 respondents (10.67%) learned about it from the internet, while one (1.33%) respondent learned about it at the tourism fair in Budapest, and one (1.33%) from an advertisement. Three respondents did not answer (4%)<sup>4</sup>

<sup>4</sup> Other primary values in tourism of Skorenovac such as accommodation, catering services, and human resources were not analyzed and compared because the village offers private accommodation only.

**Graph 2.** Decision making before traveling



Source: authors, based on research

**Analysis of tourist expenditure in relation to age**

Auxiliary hypothesis was used which stated that the tourists’ expenditure is age-related. From a total of 75 Hungarian tourists polled, most of them had visited Skorenovac for the first time.

With the help of the Kruskal-Wallis test, it was investigated whether the age actually affected the level of expenditure.

In Table 1 we compared the responses of tourists to question 15 (*How much money did you spend in Skorenovac?*) and Question 2 (*How old are you?*) in order to come to the conclusion whether the expenditure of tourists age-related.

Based on the results shown in Table 1, we conclude that the largest number of tourists who visited Skorenovac were aged 60 to 70. However, based on the sum of ranks, i.e. Kruskal-Wallis test results, it can be concluded that tourists aged 50 to 60 spent the most money.

**Table 1.** Results of Kruskal-Wallis test

	Question #2	Number of tourists	Rank sum
Question 15	30-40	12	29.63
	40-50	12	38.00
	50-60	15	41.67
	60-70	36	39.26
	<b>Total:</b>	<b>75</b>	

Source: authors, based on research

Data from Table 2 was obtained with the help of the SPSS software; the values can be analyzed based on chi-square test, number of degrees of freedom and significance level (Asymp. Sig.).

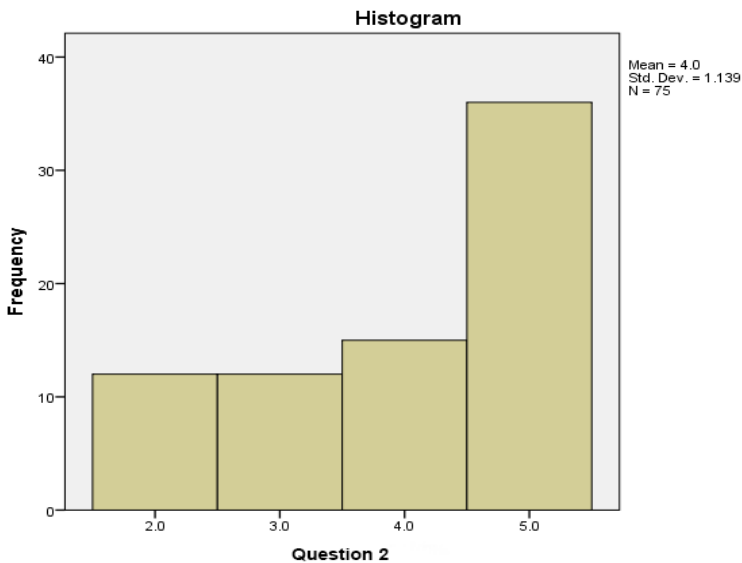
**Table 2.** Interpretation of Kruskal-Wallis test

Group variable	question 15
Chi-Square	2.719
df	3
Asymp. Sig.	.437

Source: authors, based on research

Considering that the significance level is greater than 0.05 (in our case 0.437), it is an important indicator that there are significant statistical differences in the expenditure of tourists of different age groups. That is, we conclude that the tourists aged 50 to 60 spent the most. Relation between expenditure of tourists in relation to age is shown graphically on the basis of Figure 1.

**Figure 1.** Histogram of frequency distribution of tourists in Skorenovac in relation to the age structure



Source: authors, based on research

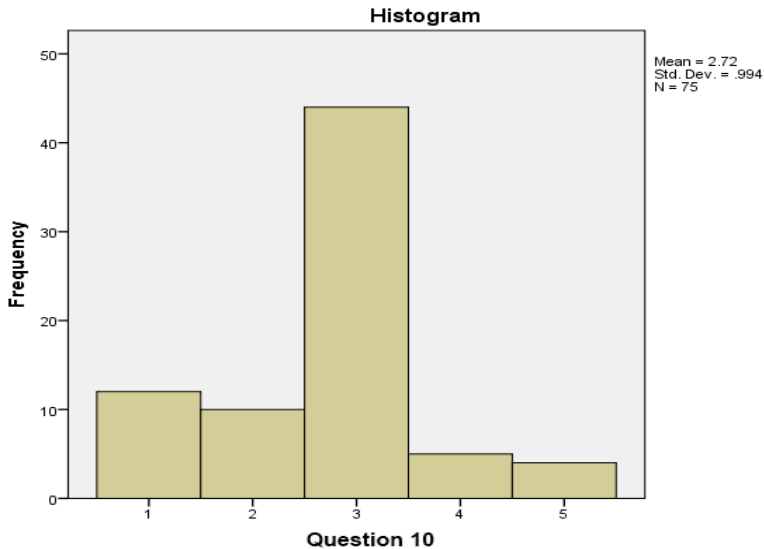
Based on the obtained data, we can conclude that the first auxiliary hypothesis that we tested can be accepted and we conclude that the expenditure of Hungarian tourists in Skorenovac is related to their age structure and the highest expenditure was realized by tourists aged 50 to 60.



**Analysis of the expenditure of tourists in relation to their level of education**

With the help of the Kruskal-Wallis test, the second auxiliary hypothesis from this paper was also tested: whether the level of education had an impact on the level of expenditure of tourists in Skorenovac. By comparing the responses of tourists to the question number 10 (*degree of education*), it was concluded that the most of the tourists who visited this settlement have education level that falls between college and university, which can be concluded on the basis of data from Figure 2.

**Figure 2.** Histogram of frequency distribution of tourists in Skorenovac in relation to the degree of their education



Source: authors, based on research

By applying the Kruskal-Wallis test and comparing the question #15 (*How much money did you spend on this trip*) with question #10 (*degree of education*) we conclude that the largest number of tourists (even 44) had college degree.

**Table 3.** Results of Kruskal-Wallis test

	question 10	N	Rank sum
<b>Question 15</b>	1	12	33.42
	2	10	32.50
	3	44	38.00
	4	5	43.50
	5	4	58.63
	Total	75	

Source: authors, based on research

However, by comparing the level of expenditure of tourists in relation to the degree of their education, we can conclude that the expenditure increases with the degree of education – highest expenditure was achieved by PhDs, and there was for PhDs on this trip (this can be seen from Table 3). One explanation for this level of expenditure lies in the logical observation of facts, i.e. the most educated members of a society earn most, and consequently, spend most.

The tourists with master’s degree have the second highest level of expenditure (five of them), while most tourists with the bachelor’s degree are in the third place according to expenditure. These are followed by tourists with secondary education, and finally, tourists without qualification.

Table 4 (with chi-square test, number of degrees of freedom and significance level) reveals that the significance level is 0.203, well over 0.05.

Therefore, we can conclude that this is an important indicator of significant statistical differences in tourist expenditure with regard to age.

Hereby, we demonstrated that we reject the second auxiliary hypothesis we started with, which assumed that expenditure does not depend on the degree of education of tourists.

**Table 4.** Interpretation of Kruskal-Wallis test

	<b>question 15</b>
Chi-Square	5.946
df	4
Asymp. Sig.	.203

Source: authors, based on research

### **Analysis of tourist expenditure in relation to gender**

The third auxiliary hypothesis was that the expenditure of tourists is not related to their gender.

Thanks to the application of Mann-Whitney U test, two independent samples were tested: tourist gender (*question #3*) and their expenditure (*question #15*).

**Table 5.** The results of Mann-Whitney U test

	<b>question 3</b>	<b>N</b>	<b>Average</b>	<b>Sum of Ranks</b>
<b>question 15</b>	1.0	35	35.37	1238.00
	2.0	40	40.30	1612.00
	<b>Total</b>	75		

Source: authors, 2015.

The survey included 75 subjects, of which 35 men and 40 women. It was found that there is a statistically significant difference in expenditure between men and women, which is evident from the significance level of 0.29.

**Table 6.** Results of Man-Whitney U test

	question 15
Mann-Whitney U	608.000
Wilcoxon W	1238.000
Z	-1058
Asymp. Sig. (2-tailed)	.290

Source: authors, 2015.

Hence, based on the obtained results we can conclude that women are spending significantly more money as compared to men. Based on these results, we reject an auxiliary hypothesis which assumed that gender has no influence on the level of expenditure.

When it comes to the distribution of expenditure, with the help of the Kolmogorov-Smirnov test, it can be concluded that there are no extreme values in tourist expenditure.

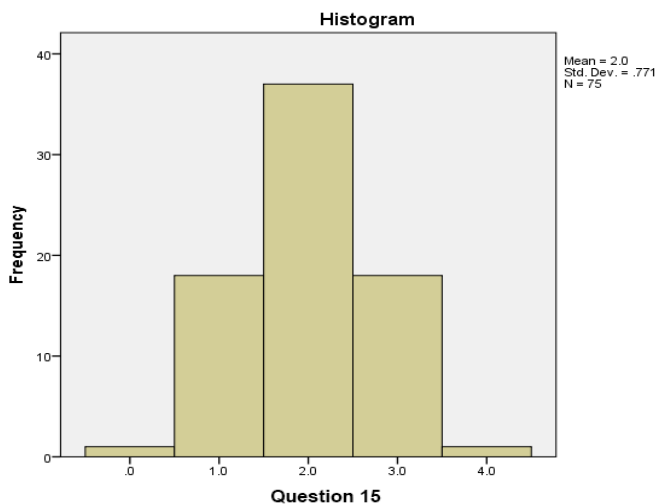
**Table 7.** Extreme values of tourist expenditure in Skorenovac

	Kolmogorov-Smirnov 1			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Question 15	.247	75	.000	.859	75	.000

Source: authors, based on research

This can also be observed in Figure 3. During this period there was no extremely high expenditure of tourists in the village of Skorenovac. Most tourists spent about 200 euros including total costs: costs of accommodation, transport, food, daytrips, souvenir shopping etc.

**Figure 3.** Distribution of expenditure

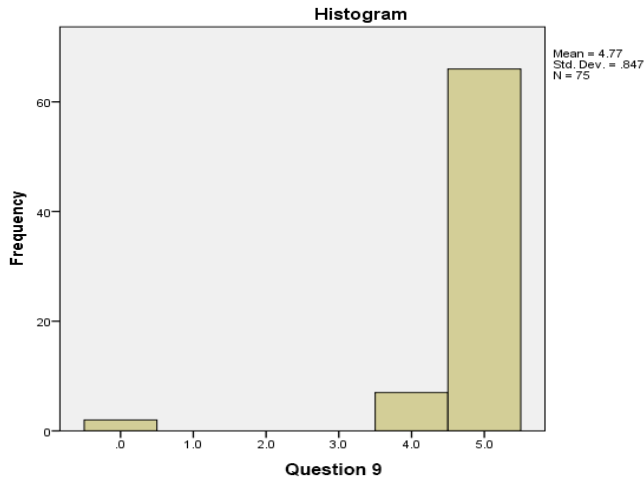


Source: authors, based on research

**Assessment of the complete tourist offer of Skorenovac and normality of data distribution**

By taking advantage of descriptive statistics, 75 respondents were asked to indicate their satisfaction with the overall service and tourist offer of Skorenovac. The complete offer was rated very high: of 75 respondents, 73 gave opinion. 68 of them gave the highest mark (5), while 7 of them gave a rating of four. Two of the tourists did not respond.

**Figure 4.** Frequency of evaluation of satisfaction with the complete tourist offer of Skorenovac



Source: authors, based on research

Based on Figure 4 we conclude that the largest number of Hungarian tourists was very pleased with the overall tourist offer during the two-day trip to Skorenovac.

**Conclusion**

The basic hypothesis in the work that socio-demographic characteristics affect the consumption of tourists, can be confirmed. Figure 1 shows the analysis of the responses of 75 tourists and shows that the majority of them were inspired to travel by the cultural and historical motives (67%).

In addition to the main hypothesis, the paper also discusses three auxiliary hypotheses which should determine whether the consumption of tourists in Skorenovac is related to their age, gender and level of education.

By using specific statistical methods, we came to the following conclusions: in Skorenovac, where Hungarian tourists spend around 10,000 nights annually, the tourists aged 50 to 60 spend the most money. Based on this research, the first auxiliary hypothesis can be confirmed.

The second auxiliary hypothesis which assumed that expenditure is not related to the degree of education, must be rejected, because research has shown that the most educated tourists spend the most money, which is not in accordance with the presumption. This can be explained by the fact that the most educated tourists have the highest earnings in their home country, and therefore spend the most. Since most respondents had college degree, the tourist offer at the destination shall be adapted to suit the largest group of tourists and their purchasing power.

The third tested hypothesis was related to gender of tourists and their spending. The starting point in this paper was the standpoint that the expenditure of tourists who visited Skorenovac is not related to their gender.

However, research has shown that women were spending considerably more money than men. It is therefore necessary to extend, adapt and modernize the offer to raise the interest of women to spend even more and to continue the trend of increasing expenditure. Also, it is important to examine what products and services would raise interest in men to spend more money. These products and services should be made available to them.

Tourist destination is a set of attractions, infrastructure, equipment, and service providers in precisely bounded geographical areas in which specific activities contribute to the overall visitor experience of a destination (Čerović, 2009).

In modern market economies, especially in those which tend to build market mechanisms, marketing consulting is the result of a need for adequate and timely market information, which has become a key factor of a business's success (Cvijanović et al., 2015).

The research also showed that Vojvodina can be a competitive and attractive tourist destination in specific segments of offer, and the subject of interest by tourists from the region.

The development of rural tourism includes the participation and cooperation of different participants with diverse internal and external characteristics (Čikić et al., 2015).

However, it takes a lot of changes, in both micro and macro levels in the country in order to increase the number of visits, and consequently, the consumption of tourists; for example, greater control of all institutions and individuals involved in the process of providing services is needed: increasing quality of services, issuing fiscal receipts, registration of guests, paying taxes and so on.

In the context of multifunctionality the rural tourism, which allows to satisfy the growing interest towards the natural heritage and rural culture by modern society that, with the advent of new technologies and hectic lifestyle, it is deprived of these values is increasingly affirming. This contribute to reduce the exodus of population from rural areas and to create job opportunities, promoting the socio-economic development of disadvantaged areas (SgROI et al., 2014).

On the other hand, the village of Skorenovac is an example of a good practice (data has showed that the largest number of tourists came based on word-of-mouth

recommendations) on how to raise the interest of foreign tourists to visit our country, despite the poor touristic infrastructure, reduced diversity in terms of catering services, accommodation, souvenirs, daytrips and ways of bringing tourists.

However, despite the deprived tourist offer, the largest number of Hungarian tourists rated the overall tourist offer of Skorenovac with the highest mark. Nevertheless, the question is whether the demand for this destination will exist in the future and whether the destination as such is sustainable. The reason is the lack of activities, lack of investments and non-expansion of the tourist offer.

For the rural tourism sector to thrive, local inhabitants must become entrepreneurs and develop and promote their own enterprises (Pena et al., 2013).

Strategy without tactics is the slowest route to victory. Tactics without strategy is the noise before defeat (Kaplan, Norton, 2010).

### References

1. Arch G. Woodside, Martin D. (2009): *Tourism Management, Analysis, Behavior and Strategy* (ISBN 978-1-84593-323-4). Cab International.
2. Areavey R.M, Donagh J.M. (2011): *Sustainable Rural Tourism: Lessons for Rural Development, Sociologia Ruralis*. The European Society for Rural Sociology (ESRS), vol. 51, no. 2, pp. 175-194.
3. Baoren S. (2011): *Rural Tourism in China*. Tourism Management, Volume 32, Issue 6, pp. 1438-1441.
4. Bošković T., Tomić R., Tomić D. (2013): *Potential and Limitations for the Development of Rural Tourism in Vojvodina*. Economics of Agriculture, IAE Belgrade, vol. 60, no. 1, pp. 103-111.
5. Cvijanović D., Mihajlović B., Čavlin M., Čavlin G. (2015): *Impact of Marketing Consulting on Performances of Agrarian Clusters in Serbia*. Sustainability, 2015, vol. 7, no. 2, pp. 1099-1115.
6. Čerović S. (2009): *Strategijski menadžment u turizmu* (ISBN: 978-86-7912-177-6). Univerzitet Singidunum, Beograd.
7. Čikić J., Petrović M., Đurđev B. (2015): *Diffusion of Knowledge and Rural Tourism Development - Example of Vojvodina*. Economics of Agriculture, no. 1, p. 123-137.
8. Derek H., Kirkpatrick I., Mitchell M. (2005): *Rural Tourism and Sustainable Business* (ISBN 1-84541-012-2). Cromwell Press, Great Britain.
9. Garson D. (2012): *Testing Statistical Assumption*. North Carolina State University, Statistical Publishing Associates. (ISBN-10: 1626380333)
10. Goeldner Ch.R., Ritchie J.R.B. (2009): *Tourism: Principles, Practices, Philosophies* (ISBN 978-1118071779). John Wiley & Sons, New Jersey.
11. Grossman E. (2013): *Kurokawa No: Shaping the Image and Perception of*

- Japan's Folk Traditions, Performing Arts and Rural Tourism* (ISBN 978-9004223349). Global Oriental.
12. Kaplan R.S., Norton D.P. (2008): *The Execution Premium: Linking Strategy to Operations for Competitive Advantage* (ISBN 978-1422121160). Harvard Business Review Press.
  13. Milićević S., Podovac M., Čavlin M. (2015): *Resources for Development of the Rača Municipality as a Rural Tourism Destination*, Economics of Agriculture. Balkan Scientific Association of Agrarian Economists, Institute of Agricultural Economics, vol. 62, no. 3, pp. 751-765, Belgrade, Serbia.
  14. Mrkša, M., Gajić, T. (2014): *Opportunities for Sustainable Development of Rural Tourism in the Municipality of Vrbas*. Economics of Agriculture, IAE Belgrade, vol.61, no.1, pp. 163-167.
  15. Muhi, B., Jovanović, D. (2012): *Rural Tourism as a Factor of Integral and Sustainable Development of Rural Areas and Villages of Serbia and Vojvodina*. Herald Journal of Geography and Regional Planning vol. 1, no. 2, pp. 14-18.
  16. Pesonen, J., Komppula, R., Peters M., (2011): *Understanding Relationship Between Push and Pull Motivations in Rural Tourism*. Tourism Review, vol. 66, no. 3, pp. 32-49.
  17. Polo-Pena AI, Olmo J.Ch., Jamilena F.A.D., Molina R.A.M. (2015): *Market Orientation Adoption among Rural Tourism Enterprises: The Effect of the Location and Characteristics of the Firm*. International Journal of Tourism Research, vol. 17, no. 1, pp. 54-65.
  18. Popović, V., Katić, B., Savić, M. (2011): *Ruralni razvoj u Srbiji i lokalne zajednice*. Ekonomika poljoprivrede, IAE Belgrade, vol. 63, no. 1, pp. 33-44.
  19. Prentović R., Kurjački A., Cvijanović D. (2012): *Hunting in Rural Areas of Bačka*. Economics of Agriculture, IAE Belgrade, vol. 59, no.3, pp. 385-400.
  20. Richards G., Munster W. (2010): *Cultural Tourism Research Methods* (ISBN 978-1845935184). Cabi International, USA.
  21. Sgroi F., Trapani A.M., Testa R., Tudista R. (2014): *The Rural Tourism as Development Opportunity of Farms. The Case of Direct Sales in Sicily*. American Journal of Agricultural and Biological Sciences vol. 9, no. 3, pp. 407-419.
  22. Štetić S., Pavlović S., Stanić S., Šimičević D. (2014): *Dimensions of Integrated Tourism—Case Studies of Selected Villages in the Serbia-Romania Border Area*. Journal of Settlements and Spatial Planning, Special Issue 3, pp. 81-88.
  23. George W.E., Mair H., Reid D.G. (2009): *Rural Tourism Development: Localism and Cultural Change* (ISBN 978-1845410995). Channel View Publications.

## UTICAJ SOCIO-DEMOGRAFSKIH KARAKTERISTIKA NA POTROŠNJU MAĐARSKIH TURISTA U SELU SKORENOVAC

*Živana Krejić<sup>5</sup>, Slobodan Čerović<sup>6</sup>, Snežana Milićević<sup>7</sup>*

### Sažetak

*Razvoj seoskog turizma u Vojvodini utiče na opstanak sela i egzistenciju njegovog stanovništva. Uprkos brojnim problemima sa kojima se vojvođanska sela suočavaju, primer dobre prakse predstavlja selo Skorenovac u opštini Kovin, u Banatu.*

*Lokalna kultura, običaji i legende iz daleke prošlosti, jedinstven način života stanovništva ovog sela, predstavljaju primarne motive koji su razlog dolaska turista i koji utiču na razvoj seoskog turizma.*

*Cilj ovog istraživanja bio je da utvrdi da li postoje određene razlike u potrošnji mađarskih turista u selu Skorenovac, u odnosu na starost, nivo obrazovanja i pol.*

*Rezultati istraživanja mogu poslužiti kao inspiracija i podsticaj seoskim domaćinstvima za praćenje socio-demografskih karakteristika turista u formiranju turističke ponude sa ciljem povećavanja profita.*

**Ključne reči:** *socio-demografske karakteristike, seoski turizam, mađarski turisti, Vojvodina, potrošnja*

---

5 Master Živana Krejić, doktorand, Univerzitet Singidunum, Fakultet za turistički i hotelijerski menadžment, Danijelova ulica br. 32, Beograd, Srbija, Telefon: +381 66 900 78 78; E-mail: [zkrejić@yahoo.com](mailto:zkrejić@yahoo.com)

6 Redovni profesor, dr Slobodan Čerović, Univerzitet Singidunum, Beograd, Srbija, Telefon: +381 11 309 32 10, E-mail: [scerovic@singidunum.ac.rs](mailto:scerovic@singidunum.ac.rs)

7 Docent, dr Snežana Milićević, Univerzitet u Kragujevcu, Fakultet za hotelijerstvo i turizam u Vrnjačkoj banji, Vojvođanska ulica br. 5A, 36210 Vrnjačka Banja, Srbija, Telefon: + 381 36 515 00 24, E-mail: [snezana.milicevic@kg.ac.rs](mailto:snezana.milicevic@kg.ac.rs)





## ESTIMATING VALUE WHEN BALANCING REAL ESTATE OF AGRICULTURAL ENTERPRISES IN THE REPUBLIC OF SERBIA

*Aleksandar Majstorović<sup>1</sup>, Vesna Petrović<sup>2</sup>, Slavko Vukša<sup>3</sup>*

### Abstract

The first aim of this paper is to analyze the possibilities that an appropriately created and positioned function of financial estate management opens up for an agricultural enterprise and its significance for optimal balancing of estate in a company's total assets. Since estates often represent a significant position in the assets, it is necessary to repeatedly reassess the value of the agricultural company's estates by using an appropriate methodology, and that task is often assigned to an audit. If the values of particular positions of estate determined in the process of reevaluation differ significantly from the positions in the balance of assets, it is necessary to carry out corrections in financial reports. Depending on the degree of correction, an assessment is carried out and a contribution to the quality of financial reports is made. The importance of this paper stems from the fact that it presents a methodology of an agricultural company's estate value reassessment and gives a model of how, based on determined differences, one can assess quality of financial statements in the area of estate balance policies.

**Key words:** *financial statements, management, real estate, value*

**JEL:** *M21, M41, Q13*

### Introduction

The object of interest of this article are certain conditions under which it is necessary to carry out re-assessment of the real estate of an agricultural company and perform adequate corrections in financial reports that are followed by the assessment of quality of those reports and consequences of those activities for the agricultural company based on the degree of correction.

---

1 Aleksandar Majstorović Ph.D., Associate Professor, University Union-Nikola Tesla, Faculty for real estate management, Kosančićev Venac no. 2/5, 11000 Belgrade, Serbia, E-mail: [majstorovicaleksandar@gmail.com](mailto:majstorovicaleksandar@gmail.com)

2 Vesna Petrović Ph.D., Full Professor, University Union-Nikola Tesla, Faculty of law, Goce Delčeva street no. 36, 11000 Belgrade, Serbia, E-mail: [vesnabeg@sezampro.rs](mailto:vesnabeg@sezampro.rs)

3 Slavko Vukša Ph.D., Full Professor, Alfa University, Fakultet za finansije, bankarstvo i reviziju, Palma Toljatira street no. 3, 11000 Belgrade, Serbia, E-mail: [slavko.vuksa@gmail.com](mailto:slavko.vuksa@gmail.com)

The aims of the paper are: first, to position the function of financial management and to determine its duties in the domain of estate balancing policy; next, to define the conditions under which it is necessary to conduct the agricultural company's real estate re-assessment and to present a methodology of land and building assessment as those are the most important forms of real estate; thirdly, and perhaps most importantly, the goal is to demonstrate who and in what way decides on the elimination of observed differences in terms of real estate and the correction of financial reports as well as to show the kinds of consequences that those decisions might have for the agricultural company.

Starting hypotheses were: Re-assessment or reevaluation of an agricultural company's real estate finds significant discrepancies when compared to the values found in financial reports; Correction of financial reports for the established discrepancy causes significant consequences for the agricultural company and decreases the quality of financial reports.

Testing of the stated hypotheses is carried out through the application of the appropriate methodology, primarily inductive-deductive method, analysis and synthesis as well as the descriptive method.

The significance of the paper is bolstered by the fact that a large number of our companies state substantial values in asset balances when it comes to the relationship between real estate and the overall asset value without having a defined function or at least accurately defined purpose in the domain of financial real estate management. For that reason, it is justified to question the stated real estate positions and the necessity of their reassessment as well as the application of certain corrections to the financial reports that are needed on the basis of the reevaluation. Simultaneously, it is important to think about the implications (good and/or bad) for the agricultural company.

For the purposes of the application of tests of the initial hypotheses it is necessary to define certain terms more accurately. For instance, the term assessment (evaluation) refers to the process whereby the value is determined as well as the provision of an opinion about the value of asset (in this case we are dealing with land and buildings) exclusively on one particular day.

Probably the most frequently used term is value which is in itself quite inaccurate because there are several acceptable definitions of the term, the most common of which is fair value. Fair value is the sum of money for which the seller is ready to give away the ownership over the estate in a voluntary exchange and with a reasonable degree of awareness on the relevant facts (exchange under usual trade conditions). It is also presupposed that one is dealing with a particular buyer and a particular seller i.e. the sale is not hypothetical and the estate is analyzed as it is without significant investments which is what needs to be done in an event of value assessment. Also, what is important is the fact that the sum that will be declared as the value of a particular estate and almost never identical to the sum specified in the financial reports of the agricultural company so the process of determining the discrepancy is implied.

## 1. Financial management of real estate in a contemporary agricultural corporation and its impact on the positions of real estate stated in the financial reports

Broadly speaking, real estates are parts of the Earth's surface i.e. something that cannot be moved from one place to another without losing its original character. In that light, land is a part of the Earth's surface that has a unique mark (cadaster number) and purpose (for agricultural production: agricultural and for construction: construction plot). On a municipal building land, different kinds of objects can be built. Their value together with the value of the land is stated in the asset balance of an agricultural company that owns them. According to a widespread economic perspective, "the value of estate represents the sum of all uses and profits that a particular estate can generate expressed in money" (Majstorović et al., 2013).

Prior to making decisions significant for agricultural enterprise financial management, it is required that the decision makers acquire the best possible image of comprehensive conditions, such as socio-economic (Popović, 2014) influences on the agricultural enterprise they manage. There is no general model for reaching actual, that is, initial understanding of the environment and influences on the agricultural enterprise that the management could implement, but it is very useful to make a short SWOT analysis of the existing situation which will present the following: opportunities, weaknesses, odds and threats the agricultural enterprise will most probably encounter with. Consequently, prior to control process (Gritsenko, Skorba, 2015), harmonization (Panchuk, 2015) and audit (Majstorović, Popović, 2015), it would be preferable to execute SWOT analysis, first of all, of the initial state. This is why the authors start this study with the presentation of possible short SWOT analysis, presented in Tab. 1.

**Table 1.** SWOT analysis of the existing state of influences on evaluation of the real-estate in the Republic of Serbia.

The available options and the existing power	Weaknesses
<ul style="list-style-type: none"> <li>- Just the existence of legal solutions that encourage re-evaluating the assets of the agricultural company in the Republic,</li> <li>- The tradition of combining work book which dates from the time of the socialist economy, which proved to be very useful in real business conditions, we say that it is time that precedes Serbia's EU accession,</li> <li>- The existence of high-quality workforce that knows the situation in Serbia and finance companies,</li> <li>- Existence desires of skilled labour to perform continuous education and their professional development, which is essential in the process of assessing real estate,</li> <li>- The existence of a legal basis in the Republic of Serbia for the implementation of modern MRS, especially IAS 16 and IFRS 13 in the field of real estate appraisal agricultural company</li> </ul>	<ul style="list-style-type: none"> <li>- The lack of current information,</li> <li>- Insufficient interest of managers, due to the short presence in companies that link,</li> <li>- Insufficient repressive role of the state in terms of the implementation of adopted laws that relate to tax policy,</li> <li>- Lack of interest of local companies for the re-valuation, as in the case of an increase in expression of the value grows tax liability companies,</li> <li>- Incoherence inspections and other state authorities, especially when detecting irregularities detected the final accounts of the agricultural company</li> </ul>

Chances	Threats
<ul style="list-style-type: none"> <li>- Permanently increase the security of financial statements, especially large companies,</li> <li>- Accelerating the integration of several related companies in the large business system of international companies,</li> <li>- Development of new forms of financial reporting which is compliant with the EU reporting system,</li> <li>- Companies who first introduce a new system of financial management and control can be sold to other companies that model and realize the benefits of “knowledge” which are mastered,</li> <li>- Strengthening the institutional capacity of the state, if there are a large number of companies that present fairly the state of their business books</li> </ul>	<ul style="list-style-type: none"> <li>- The suppression of domestic agricultural enterprises by foreign big companies that have introduced new systems of financial reporting, as pressuring them to buy the right to use their knowledge, AOP, software systems et al.</li> <li>- Striving to increase the purchase price of finished programs of financial reporting companies, or pressure that big of estimating and audit firms carry out the assessment of property for the needs of domestic agricultural enterprises,</li> <li>- Negative impact of certain legal provisions, which are introduced in the Republic of Serbia, under the direction and influence of large companies that realistically lobby for some legal solutions that will be adopted in Serbia</li> </ul>

Source: authors' calculations

After completion of the SWOT analysis, agricultural enterprises may start with forming of the agricultural enterprise internal control mechanisms (Popović, 2014a; 2014b), which is particularly useful in case of capital investments (Wang, 2003; Titman et al., 2004). The procedure of the essential evaluation process is continued with concretisation of evaluation of the agricultural enterprise, that is, evaluation of the parts of equipment or the real-estate (Popović et al., 2015), and finally completed with the audit process (Slottani, 2009; Skrypnyk and Vygivska, 2015).

The authors of this study provide presentation of certain factors significant for agricultural enterprise management, and which have particular influence on the real-estate evaluation, as follows: if majority of risk intervals is higher in the presented Table 2, the influence on the agricultural enterprise will be stronger and the management will have to execute correction of the current agricultural enterprise policy.

**Table 2.** Presentation of the selected possible factors of influence on the agricultural enterprise preparing to make decisions relating real-estate evaluation and balancing

General factors influence		The impact of activities on risk assessment		Internal factors in agricultural enterprise organization	
Selected risk factor	Interval risk	Selected risk factor	Interval risk	Selected risk factor	Interval risk
Number of days of illiquidity in the past 12 months	1-5	Public-sector agricultural enterprises	1-5	Built mechanism of internal audit	1-5
The gearing ratios (the ratio of total loans and equity)	1-5	Sector Finance and Insurance	1-5	The existence of the obligation to harmonize accounting policies	1-5

Profitability ratios (the ratio of net income and operating income)	1-5	Industrial sector	1-5	The existence of the obligations of the IAS and IFRS in the agricultural company	1-5
The total risk	***		***		***

\*\*\* (Total risk represents the value of adding risk presented by groups, numbered and presented on the basis of measurable impact on the Agricultural Company in accordance with the policies of management companies).

Source: authors' calculations

Possible explanation of the risks interval authors illustrate Table 3, where they presented three possible models of real value determining intervals of risk expressed in the range of risks that are obtained after collecting the results shown in the previous table.

**Table 3.** Tabulation three proposed models intervals of risks, which are obtained after evaluating the overall results given in the previous table

Displaying risk sharing interval of possible risks by using three models				
The division into three categories of risk that different intensity affect the agricultural company		The estimated value intervals in numerical risk evaluation		
		Model B	Model C	
Model A				
1	Low risk	1-10	1-11	1-12
2	Medium risk	10-13	11-13	12-13
3	High risk	13-15	13-15	13-15

Source: authors' calculations

After presentation of this “walk through the possible system”, that is, the steps that the authors present in the first part of the study, the management may decide to execute balancing in the agricultural enterprises, as there are minimal risks of entering poor data in the business records of the agricultural enterprise.

### 1.1. Balancing within the agricultural company based on management decisions

Financial managers are responsible for the creation and execution of policies of estate balancing in an agricultural company. They are the ones who need to apply all measures determined by the accountancy, finance and other relevant sectors, and as the final result, they need to state the values of estates that are as close to the fair value as possible.

However, our accountancy legislature promotes the principles of stating the value according to the value of initial purchase which implies the use of the following formula:

$$I_{pv} = P_u + DEA \quad (1)$$

$I_{pv}$  - Initial purchase value

(this is the value that needs to be stated in the financial reports) (2)

$P_u$  - The price of using the estate (from a bill) (3)

DEA - Dependent expenses of appropriation

(expenses of assembly, adaptation, etc.) (4)

Once the price of a newly appropriated estate is expressed in the asset balance this way, financial estate management needs to determine the rate of amortization of buildings. "Our accountancy legislature requires that land need not be amortized but that buildings have to be amortized according to the rate which is an integral component of the official agricultural company balancing policy" (Majstorović et al., 2011). Therefore, financial management should define a period ( $n$  – the number of years of use) during which the buildings will be functional and to decide on one of the available methods of calculating amortization. For real estate it is usually one year. The amortization rate for buildings is determined by dividing  $I_{pv}$  by  $n$ , and the resulting value represents the yearly amortization of a building.

In financial reports, it is also necessary to state  $I_{pv}$  deducted by the yearly amortization and that value is most commonly referred to as corrected value of buildings (account 0229). This process is incorporated in the official rules of the agricultural company's accountancy and it is applied when acquiring new real estate and it is one of the most important duties of financial estate management.

However, after a certain number of years of use, "the value of a real estate in financial reports can differ substantially from its fair value, which is when it is necessary to carry out reevaluation of the estate and the correct financial reports in accordance with the universally applied principle of objectivity in accountancy" (Majstorović, Milojević, 2008). In addition to fair value, it is also possible to demand the assessment of the market value of estate.

Market value of estate can be defined as "the amount of money for which it can be exchanged in a free and competitive market voluntarily, under normal circumstances, in a transaction between interested parties that possess a reasonable amount of information about the relevant facts" (Dukić et al., 2013). Approximating the market value is the main motive for the implementation of evaluation models and the value thus received is never 100 % accurate as it is simply the result of a process of evaluation, assessment and valorization and as such it is subjective. The conditions under which to carry out re-evaluation of real estate are not explicitly stated in accountancy legislature. Nonetheless, it is important and in the following cases, one can safely say that it is essential:

- The need to obtain additional financial resources by means of sale of an estate,
- Making adequate investment and business decisions in the domain of real estate,
- The validity of financial and accountancy reports,

- Legal proceedings in the domain of assets,
- Taxation, insurance etc.

In practice, the market value is the price which is possible to receive under the given market conditions and it is located in an interval: the lowest market value (the price which can be obtained quite easily in a market with a large number of buyers) – realistically expected market value (the price that can be obtained in a reasonable amount of time with a larger number of potential buyers) – the highest market value – (the price which can be obtained with limited probability in a short period of time and with a small number of buyers who, for subjective reasons, have special interests in buying the estate).

Of course, the relationship of supply and demand determines the part of the interval in which the value of estate will be found. In cases where the supply is larger than the demand, the time period of achieving the selling price will be longer and the selling price will usually be located between the lowest market value and realistically expected market value. In cases where the supply is smaller than the demand the time period of achieving the selling price will be shorter and the selling price will be found between the realistically expected market value and the highest market value.

Financial estate management always needs to weigh out the decision carefully in terms of who has to conduct reevaluation when and how, because the decision will always determine the correction of value in the asset balance of the agricultural company. The answers to the questions when and how will be offered by the methodological framework of evaluation but the answer to the question who will be given by the top management of the agricultural company in response to the suggestion of financial management.

For less complicated elements of estate, the evaluation can be carried out by teams consisting of competent individuals from the agricultural company itself, but more complicated and more significant estates require hiring external experts, most commonly from a firm that does auditing of financial reports of an agricultural company because they are familiar with the agricultural company's assets and it is usually the most economical option for the agricultural company (Milojević, Zekić, 2015a).

If evaluation reports a decrease of value, certain financial parameters decline which leads to an overall deterioration of the financial conditions of the agricultural company. Conversely, if there is an increase in the value of estate financial parameters are improved but it can lead to the flow of money away from the agricultural company in terms of estate taxes or other expenses which are calculated based on the success of the agricultural company.

## **2. Methodological aspects of real estate evaluation regarding different forms of real estate according to the relevant accountancy legislature**

“Evaluation of assets (specific components – real estate) is a procedure which is carried out by a team of competent and certified evaluators and which results in giving an opinion about the assets or particular components of assets on a given day” (Leko et al., 1997).



Different authors emphasize different factors – elements of real estate value assessment. Those elements receive smaller or greater significance depending on which part of the estate is being evaluated (buildings, infrastructure, land, forest etc.), but the dominant opinion is that the following are the most important factors:

- the location (cadaster municipality)
- quality (type, class)
- purpose (possibility of eventual change of the original purpose)
- distance from a settlement
- distance from the nearest road
- type and year of construction (for buildings only)
- Functionality of the estate.

The listed factors can be determined: by examining the ownership documents, by examining a copy of the plan in the cadaster office, by examining a the parcel map (this is the most common and the most important method when it comes to land), by examining pedological maps and through a firsthand analysis on the spot.

In order to determine the value, one can use the data about market prices of real estate in a particular area as well as the data about the taxation rate for real estate which is determined by the local tax authority. While making a value assessment, it is necessary to determine a method which will be used (methodological framework of assessment), all on the basis of previously defined and presented elements which can determine that value most accurately.

Real estate value assessor has the goal to predict fair and market value by means of an adequate methodology. Also, he or she needs to determine what are the possible benefits or profits that the estate can generate in a foreseen period and all of that has to be expressed in money on a given day. Therefore, the notion of evaluation or assessment refers to the expert opinion about the value of real estate as a consequence of application of an appropriate methodological framework.

In the assessment procedure, the basic assumption is the objectivity of the evaluator and the absence of any kind of conflict of interests, and it is necessary to keep in mind special ethical and professional standards. The significance of a correctly positioned methodological framework is seen in the fact that that correct applications of various methods can yield different results. Therefore, the decision about the application of a certain method is an exclusive responsibility of the assessor.

The choice of a method of assessment needs to depend on the quality and availability of data. Theoretically, under the conditions of perfect and equally accessible information, appropriate application of any method would yield the same result. However, in practice,

where there are no perfect pieces of information, methods should correspond to one another and the value assessments should be made through the application of at least three or four approaches. It is possible to successfully implement three different groups of methods:

- expense method (method of determining real values, expense approach, static method),
- comparative method (method of sales comparison, direct comparison of sales prices),
- method of capitalisation (method of profit assessment, yield approach, dynamic method, gain capitalisation method).

Before we define these methods theoretically and present the effects of application of any of them to the evaluation of real estate, it is important to point out that the process of evaluation has to contain the following elements of form and content:

- defining the evaluation arrangement,
- collection, selection and analysis of data,
- general data (macroeconomic, statistical, regional, etc.),
- special data about the estate being evaluated (history, expenses, prices, profits, use),
- comparative data (competition, similar transactions, etc.),
- the analysis of the best use of the estate,
- assessment of the value of land and buildings,
- application of the methodological framework of assessment (expense method, market method, yield method)
- reaching a conclusion about the value of the estate and
- writing a report about assessment.

The value of the estate expressed in the report of a certified assessor is, apart from the application of the appropriate method, knowledge and skills of the assessor, affected by market, political and natural factors.

At this point, we turn to an example of a concrete analysis of evaluation methodology of a municipal building land with constructed objects and infrastructure of an agricultural company, conducted for the purposes of correcting balance values necessary for the transformation of ownership structure.

### **2.1. Estate location - microlocation description:**

The location of real estate is on the outskirts of the industrial area Novi Sad Sever, on an attractive location, by the E-75 highway and very close to an international railway corridor, 7.6 km away from the port Danube 1. It is characterized by excellent traffic connections which has the benefit of being available for additional infrastructural upgrades which could increase the value substantially. The land on this location belongs to the 1st class and it is

appropriate for agriculture as well. The plot is of rectangular shape with the dimensions given in the appendices, ideally even and just 950m away from a irrigation channel.

The entry to the plot is open from the main road and along the longer side of the plot there is a solid macadam road which is its integral component. There is no data about recent trade with plots of this kind and with the same objects even though there have been some sporadic sales of smaller plots below 1.5 ha with the prices in the range between 10 000 and 16 000 Eur/ha.

A firsthand examination showed that there are no negative impacts on the given plot, not is there a possibility of a sudden natural or man-made pollution of the plot. The plot contains an industrial warehouse with, 2800m<sup>2</sup> in surface, build in 1976 which is no longer usable. More than 60% of the tin roof is cut and 90% of glass surface is destroyed which contributed to the damage of the floor and the walls of the object. It is estimated that the value of the object can be at most 20% of the average market value of similar objects, i.e. 100eur/m<sup>2</sup>. It has also been estimated that the value of the state stagnates in the lower region o highest expected market value and that the interest in buying it is low, and the interest in renting it is non-existent, the average sale time of an estate of this kind is around 10 months.

**Table 3.** Final results of the application of evaluation model according to the three presented methods

Plot surface (1,2ha) Building surface (2800m <sup>2</sup> )	Value assessment Expense method 20.000E/ha	Value assessment comparative method 16.000E/ha	Value assessment Profit capitalization method 10.000E/ha	Expected market value 15.000E/ha	Overall assessed estate value Euro/ dinar	median exchange rate / date of assessment
land €/din	224,000 / 25,621,120	179,200 / 20,496,896	112,000 / 12,810,560	168,000 / 19,215,840	448,000	114.38
Object €/din				280,000 / 32,026,400	51,242, 240.00	12.31.2012.

Source: authors' calculations

The Table created by the authors, following: Research project: Evaluation of different forms of estate in the Republic of Serbia and the possibilities of their expression in accountancy, Faculty of Estate Management, University Nikola Tesla Union, Belgrade, 2012--2014. pp. 66-82.

An analysis of the data in table 1, will help us reach appropriate conclusions and spot certain regularities. It is important to point out that in every evaluation, it is necessary to create an Elaboration of evaluation which contains all the working papers of a certified assessor. Elaboration is an official document which can be used to reconstruct the entire process of evaluation and by the same token it is possible to calculate the number of hours

that the evaluation team spent, one the basis of which the compensation for the service of estate evaluation will be determined. "That elaboration can be used as evidence in the case of a potential lawsuit between a client and an assessor" Brkic (Brkić, 2007).

Since in the description of microlocation, it has already been estimated that the value of the construction object is 100Eur/m<sup>2</sup> then the overall value of the estate is estimated to 280000.00 Eur. As it can be seen from the table 1, the highest estimated value of the estate is 20 000 Eur/ha or 224000 Eur in total, and it was arrived at by using an expense method. The lowest value is 10 000 Eur/ha or 112 000 Eur, calculated by using the profit capitalization method. By examining the working papers of the assessor, it has been established that that state of affairs is a consequence of high expenses of potential investment in production on that plot and poor chances of acquiring a similar plot, which would be very expensive in this case.

The application of a comparative method implied taking the maximal realized sale value of 16 000Eur/ha (realized in the case of a much smaller plot of similar characteristics), which gave a total price of 179 200 Eur and the value that can be expected in terms of the final market value of this plot is somewhere around that sum. According to the Elaboration, the estimated sale value has been lowered for 1000 Eur/ha or 11 200 Eur in total so we estimate that the overall market value of the land is 1680 000 Eur.

To this, we add the overall value of the object which is 280 000 Eur and the overall evaluation of market value of estate equals 448 000 Eur or 51.24 million dinars. Here, it is necessary to state the day on which the assessment was carried out. In this case, it is 12.31.2012. This was done according to the request as the financial reports of the agricultural company are dated to that day which makes the comparison much easier and does not require further corrections. In the end, it is necessary to state the value of exchange rate by which it is calculated, because the legal obligation is to make financial reports in the national currency- the dinar.

## **2.2. Removal of the difference in the assessment and balance value of the estate with a discussion about the implications for the agricultural company**

The evaluation procedure is completed when the Report of evaluation with the accompanying documentation (Elaboration of evaluation) is given to the client, i. e. in this case, to the financial estate management in the agricultural company, which then initiates the procedure of finding differences between the assessment and the balance value of individual elements of estate.

If the estate evaluation were to be dated differently, the agricultural company would need to make trial financial reports on that day or to make an additional request from the assessor to correct the assessment for the day to which the financial reports are dated. In our example the evaluation and the financial report are date to the same day and the procedure of identifying differences will be shown in the following table.

**Table 4.** Difference between assessed value and balance value of the agricultural company's estate.

Data on the day: 12.31.2012.	Balance Value (BV in dinars)	Estimated Value (EV in dinars)	DIFFERENCE EV - BV (in dinars)
Land account 020	40,580,000.00	19,215,840.00	-21,364,160.00
Value correction Buildings Account 0229	20,220,000.00	32,026,400.00	+11,806,400.00
TOTAL (in dinars)	60,800,000.00	51,242,240.00	-9,557,760.00

Source: authors' calculations

From the table, it can be seen that estimated value of the estate is 51.2 million dinars and that the balance value is 60.8 million dinars. i.e. that balance value has to be lowered by 9.6 million dinars. The principle of caution in accountancy instructs us to "reduce the value of the assets if it is certain that a reduction has occurred" (Damodaran, 2010). However, if after looking at the overall balance, we see that the overall assets of the agricultural company are worth 200 million dinars, the above mentioned reduction in the estate balance value would reduce the overall asset balance for 5% which would deteriorate the parameters of the agricultural company's indebtedness (the relationship total between total debt and overall assets, which in this case would be reduced by 5%), but at the same time, the parameters of efficiency would improve (smaller taxes, profit obtained by using the assets of smaller value, etc.)

Now we will focus the discussion on the land and buildings in order to examine the effects of potential corrections of those positions in the financial reports. The estimated value of land is 19.2 million dinars, but the balance value is 40.6 million dinars, that is, it should be reduced by 21.4 million dinars and state that the value of land has been reduced practically by half, which would cause the effects that we stated when analyzing the overall assets. It should be noted that the mentioned land was bought in 1960, and that the building was activated in 1976 and they had been listed in the balance according to their initial purchase value. Due to the changes in the buying power of dinar from 1976 until 2012, there have been at least 52 re-valorizations in accordance with statistical indices in order to obtain the current balance value for which according to the suggestion of the financial estate management and the assessor, it is necessary to accept the results of evaluation and correct the value.

Buildings are significantly described by the accountants, which means that the predicted number of years of use ( $n=50$ ) has not been exceeded and that the balances under konto 0229 list the initial purchase value deducted by the annual amortization rate, which yields a correction of the value of buildings for the sum of 20.2 dinars, and the estimated market price is 32 million dinars. The suggestion of financial estate management is that the value of the buildings needs to be increased for 11.8 million dinars, i.e. the new balance value of the building is 32 million dinars and a new amortization rate has to be determined.

Therefore, the financial estate management has suggested that the evaluation should be accepted in its entirety and that the positions in financial reports should be corrected for suggested values as it was stated in the table number 2 in the column of differences. The final judgment is given by the top management.

Before it makes the decision, the top management has to examine the Elaboration of evaluation, the analysis of evaluation prepared by the financial management and the impact of the decisions of the financial management on the agricultural company as a whole. The evaluation methodology and the decisions on the part of the financial estate management have been discussed, and now we turn to the implications of the decision of the top management to accept or reject the proposal for the financial reports and the agricultural company as a whole.

The decision to reject the results of evaluation is usually difficult to defend if there is no adequate response on the following two questions:

- if we are now prepared to accept the results of evaluation, why did we order it and by it in the first place?
- how to convince the users of financial reports that they are valid if there so great discrepancies in the field of estate only?

In our example, the discussion has been about the differences between estimated and balance values so the attention has to be paid to the assessment of quality of financial reporting in the agricultural company for which the responsibility is held by the top management. It is certain that numerous market and business factors impacted the estate value in the period in which the agricultural company has owned it (52 years for the land and 36 years for the building), which then led to such a significant value mismatch.

However, one can ask if it is necessary to reevaluate all other positions of asset balance as well as to inquire in the quality and structure of financial and accounting departments when there are such great differences.

In this particular case, it was shown that it is necessary to accept the results of evaluation in entirety, correct the balance values of estate and make a decision about the re-evaluation of overall assets of the agricultural company in the coming report period (Milojević, Zekić, 2015b). It has also been shown that making this decision did not improve the quality of financial reports significantly, but only in the domain of estate balancing policy.

However, the potential decision of top management to reject the results of evaluation would have a negative impact on the quality of financial reports which would not show the value of assets of the agricultural company realistically and that would have various negative implications for the agricultural company.

### **Conclusions**

The projected goals of the paper have been reached completely, both in terms of presenting the role of financial estate management in re-evaluation and in terms of determining the

conditions under which re-evaluation is necessary and the implications of the decision of top management to correct the financial reports for the agricultural company. The application of adequate methodology was tested and the first hypothesis has been completely confirmed, which was that re-evaluation of an agricultural company's estate brings significant differences when compared to the values stated in the reports. In our case, it has been shown that the total difference between the estimated and balance value of the estate is almost 20%.

The hypothesis that a correction of financial reports has significant consequences for the agricultural company and that it decreases the quality of financial reports has only been partially confirmed. Namely, even though a difference between the estimated and balance value has been found to be 9.6 million dinars or 20%, which in overall asset balance of 200 million dinars amounts to 5%, significant consequences have been found only in the fact that it contributed to the deterioration of indebtedness parameters while the parameters of efficiency have been improved.

The part of the hypothesis which states that a correction simultaneously decreases the quality of financial reports has not been confirmed because it has been shown that a decision about a significant balance correction does not impact the quality of financial reports. Interestingly, it has been shown that a potential decision of the top management not to correct the balance of estate values would cause a decrease in the quality of financial reports, especially in the domain of reliability and objectivity, which would be an interesting topic to research.

### Literature

1. Brkić, D. (2007): *Nepokretnosti, prava na nepokretnostima, promet prava na nepokretnostima i upis u javne knjige*, Građevinska knjiga, Beograd.
2. Damodaran, A. (2010): *The Dark Side of Valuation Valuing Young, Distressed and Complex Business*, FT Press, New Jersey.
3. Dukić, D., Majstorović, A. and Aničić, J. (2013): „*Extent and types of management consulting services to SMEs in Vojvodina*“, *Industrija*, Vol. 41, No 3, pp. 147-165.
4. Gritsenko, O.I., Skorba, O.A. (2015): „*Internal business control of service quality costs: managerial aspect*“, *Actual problems of economics*, No. 3, 365-373.
5. Leko, V., Vlahović, A., Poznanić, V. (1997): *Procena vrednosti kapitala*, Ekonomski institut, Beograd.
6. Majstorović, A., Milojević, I. (2008.): *Računovodstvo*, Fakultet za ekonomiju i inženjerski menadžment, Alfa-graf NS, Novi Sad.
7. Majstorović, A., Popović, S. and Volf D. (2015.): *Teorija i politika bilansa*, drugo izmenjeno i dopunjeno izdanje, Fakultet za ekonomiju i inženjerski menadžment, Novi Sad.
8. Majstorović, A., Dukić, D., Zogović, M. (2013): „*An agricultural land value*

- assessment model*“, Ekonomika poljoprivrede, Vol. 60, No. 2, pp. 355-365.
9. Majstorović, A., Popović S. (2015): „*Revizija poslovanja poljoprivrednog preduzeća*“, Računovodstvo, No. 1, pp. 77-85.
  10. Milojević, I., Zekić, M. (2015a): *Finansijsko izveštavanje u hiperinflatornim privredama prema međunarodnim računovodstvenim standardima*, Oditor, no. 11, pp. 24-31.
  11. Milojević, I., Zekić, M. (2015b): *Organizaciona struktura preduzeća kao pretpostavka konsolidacije bilansa*, Oditor, no. 12, pp. 22-28.
  12. Panchuk, I.P. (2015): „*Harmonization of accounting and taxation accounting at reporting formation on income*“, Actual problems of economy, No. 3, 373-379.
  13. Popović, S. (2014): *Socio ekonomski faktori ograničenja razvoja agrara*, Fakultet za ekonomiju i inženjerski menadžment, Novi Sad.
  14. Popović, S. (2014a): „*The Significance of the Introduction of Internal Control Mechanisms to Monitor Production Company*“, Communications in dependability and QM, Vol. 17, No. 4, pp. 56-62.
  15. Popović, S. (2014b): „*Kontrolne funkcije u vođenju finansijske evidencije traktora konkretnog poljoprivrednog preduzeća*“, Traktori i pogonske mašine, Vol. 19, No. 4, pp. 67-72.
  16. Popović, S., Majstorović, A., Grublješić Ž. (2015): „*Valuation of facilities in use and application of international accounting standards*“, Actual problems of economics, No. 3, 165, pp. 379-387.
  17. Skrypnyk, M.I. and Vygivska, I.M. (2015): „*Mortgage as one of the most effective types of collateral: accounting aspects*“, Actual problems of economics, No. 3, pp. 388-393.
  18. Soltani, B. (2009): *Revizija*, Međunarodni pristup, Mate, doo Zagreb.
  19. Titman, S., Wei, K. C. J., and Xie, F. (2004): *Capital investments and stock returns*, Journal of Financial and Quantitative Analysis, Vol. 39, No. 4, pp. 677–700.
  20. Wang, X. (2003): „*Capital allocation and accounting information properties*“, Emory University, Working paper.



## PROCENJIVANE VREDNOSTI PRI BILANSIRANJU NEKRETNINA POLJOPRIVREDNIH PREDUZECA U RS

*Aleksandar Majstorović<sup>4</sup>, Vesna Petrovic<sup>5</sup>, Slavko Vukša<sup>6</sup>*

### Rezime

*Prvi cilj ovog rada je da se analiziraju mogućnosti da se na odgovarajući način stvori i pozicionira funkcija finansijskog menadžmenta nekretnina preduzeća i istakne njegov značaj za optimalno uravnoteženje pozicije nekretnina u ukupnoj aktivni bilansa stanja preduzeća. Kako nekretnine često predstavljaju značajnu poziciju u ukupnoj imovini, potrebno je više puta preispitati vrednost, koristeći pritom odgovarajuću metodologiju. Ako se vrednosti pojedinih pozicija nekretnina u imovini značajno razlikuju od vrednosti u bilansu, potrebno je izvršiti njihovu ponovnu procenu, a na osnovu toga i odgovarajuće korekcije u finansijskim izveštajima preduzeća, što bitno doprinosi kvalitetu tih finansijskih izveštaja. Značaj ovog rada proizlazi iz činjenice da on prezentuje moguću metodologiju procene vrednosti nekretnina i daje model kako se, na osnovu ponovne procene, može izvršiti korekcija finansijskih izveštaja preduzeća u domenu nekretnina, što je jedan od osnovnih zadataka funkcije finansijskog menadžmenta nekretnina.*

**Ključne reči:** *finansijski izveštaji, menadžment, nekretnine, vrednost*

---

4 Aleksandar Majstorović PhD, Associate Professor, Union Univerzitet-Nikola Tesla, Fakultetu za menadžment nekretnina, Kosančićev Venac br. 2/5, 11000 Beograd, Srbija, E-mail: [majstorovicaleksandar@gmail.com](mailto:majstorovicaleksandar@gmail.com)

5 Vesna Petrović Ph.D., Professor, University Union-Nikola Tesla, Faculty of law, Ulica Goce Delčeva br. 36, 11000 Beograd, Srbija, E-mail: [vesnabeg@sezampro.rs](mailto:vesnabeg@sezampro.rs)

6 Slavko Vukša Ph.D., Full Professor, Alfa Univerzitet, Fakultet za finansije, bankarstvo i i reviziju, Ulica Palma Toljatira br. 3, 11000 Beograd, Srbija, E-mail: [slavko.vuksa@gmail.com](mailto:slavko.vuksa@gmail.com)

## CHARACTERISTICS OF HUMAN RESOURCES IN SERBIAN RURAL TOURISM

*Jelena Premović<sup>1</sup>*

### Summary

*Modern consumer society affects the changes in behavior and wishes of modern tourists who require high-quality tourist service which can be provided only by highly qualified and well-trained tourism personnel. However, the education system, in almost all tourist countries doesn't follow the trends of modern tourism.*

*This paper analyzes demographic conditions and the basic characteristics of human resources in rural areas of Serbia. In this analysis were applied the method of induction and deduction, analysis and synthesis method, deductive and comparative methods as well as techniques of structured questionnaire. The obtained data were processed in SPSS program.*

*Based on the results of the original research, it was concluded that there is a positive correlation between level of education and the number of days spent on professional training of human resources and the competitive position of tourism enterprises in which human resources are working.*

**Key words:** human resources, learning, education, rural areas, rural tourism.

**JEL:** L83, J11, J24, O15, Q01, Z32

### Introduction

The largest part of the territory of Serbia as much as 85%, according to Organization for Economic Co-operation and Development (OECD) criteria, belongs to the so-called rural areas, where live 55% of the total population in Serbia and where are most natural resources with rich ecosystems and biodiversity. Although the Serbian rural areas spread over a large part of its territory, they are in a very precarious position and are facing numerous problems (Pejanović, Njegovan, 2011). Serbia rural areas are characterized by a high degree of differentiation in terms of size and morphology of the village, natural conditions and infrastructure facilities. This differentiation is reflected also in the field of social development, demographic trends, economic development,

---

<sup>1</sup> Jelena Premović, Ph.D., Municipality of Vrbas, 21 460 Vrbas, Republic of Serbia, M. Tita street no. 89, Phone: +381 64 144 17 98, E-mail: [jelena.premovic@gmail.com](mailto:jelena.premovic@gmail.com)

quality of life, environmental and other characteristics.

Limited human resources, lack of regulatory framework and funding and insufficient experience in policy formulation and operating large projects, are the major obstacles to more efficient rural development policies. As a result of this situation, there are differences in the capacity of local governments to develop and implement local rural policy (Papić, Bogdanov, 2015). As Anna Ivolga (2014) pointed out, effectiveness of rural policies directly affects living standards of people in rural areas, social and demographic situation in them, national food security, social and economic control over rural territories, and development of traditional cultures and rural way of life.

Rural tourism has been identified as a key catalyst that should activate the differentiation in the rural economy by starting new business initiatives and by finding synergies between the existing agricultural production and tourism (UNWTO, Tourism & Leisure Advisory Services, 2011). Tourism can play a significant role in promoting rural areas as a kind of ecological oasis with a specific nature and cultural and historical heritage.

Rural tourism has a plethora of definitions, from the very minimalist one: “any tourism activity that takes place in rural areas” (Košić et al., 2015). Tourism in rural areas or rural tourism can be defined as tourism that offers the visitor a “rural environment”, offering him a combination of experiences in nature, culture and people with typically rural character.

The basic assumption of the development of rural tourism consists of favorable natural and demographic conditions. Given that sustainable tourism depends mostly on the geographical physiognomy of rural areas, comparative advantages for the development of this type of tourism in Serbia are obvious.

The positive effects of sustainable development of rural tourism are numerous. Rural tourism can help lead the way to a more diversified rural economy while creating jobs and increasing income, since tourism enhances the local economy by offering opportunities for locally-processed products, handicrafts and souvenirs (Pavlović et al., 2015).

Based on the research of basic characteristics of sustainable tourism and rural areas of Serbia, as the most important benefits of sustainable rural tourism are seen to be following:

- protection and preservation of natural, cultural, national and historical heritage
- keeping the local population in rural area and prevention of migration to urban areas
- development of related economic and non-economic activities, primarily agriculture and services
- an increase of employment of the local population
- increase in income (and/or additional opportunities for income)
- sustainable rural development and sustainable economic development of Serbia as a whole.

Taking into account the results of various studies that have been carried out in the country and the region, it can be assumed that for every eight new tourists to rural areas in Serbia a new direct job position is generated, additionally each 25 daily visitors present an opportunity for a new direct job position. Based on 10 years projections made on creating new jobs in Serbia arising from rural tourism that were made for the purpose of the Master Plan for sustainable development of rural tourism in Serbia, is expected to create realistic presumptions for as much as 250,000 new jobs in rural areas (Premović, 2016).

These are all reasons why rural tourism is emerging as a real possibility of development of rural areas and as an element of a better utilization of the comparative advantages of rural areas in Serbia.

### **Data sources: Characteristics of Human Resources in Modern Tourism**

In turbulent conditions with rapid change, modern enterprises gain a competitive advantage in the market based on the so-called core competence. The core competence is the main source of competitive advantage, and it is built only through the learning process, because only foreground generated as a result of the learning process, predominantly affects the creation of added value in today's market.

In a society where the economy is based on knowledge as a backbone of comparative advantage, a key factor of the production is a group of intangible factors. They include knowledge, skills and work culture, which are gaining greater market value over time (Zubovic et al., 2015).

Human resources are the main intangible factor and source of competitiveness in modern society, but they do not create a competitive advantage a priori and per se, but it is necessary that the company its available human resources put in function of creation and achievement of competitive advantages and use them to the superior manner in comparison to the competition in the industry. In order to gain and maintain a competitive advantage realized, the company must continuously develop the knowledge, creativity, innovation of human resources, because successful company in the future will be the meeting place of knowledge, qualities and skills that will allow company to be always ready to react to short-term market anomalies. Each beneficial strategic plan or planning process rather than insisting on a static approach to the development of the market needs to concentrate on developing and perfecting of these capabilities that mean a willingness to seek out and seize new opportunities (Premović, 2010).

Internet and information technologies completely change the concept of education that focuses on increasing specialization and training to use different software as a tool for managing business processes. The concept of lifelong learning is no longer a matter of prestige, but a requirement for successfully performing tasks that require constant adaptation of knowledge and skills defined business objectives (Tešić et al., 2015).

However, the human resources as well as other business resources are limited. Based on detailed research of the supply and demand of human resources has been calculated that “at the global level supply of human resources is growing at 6-7% annually, and demand at a much higher rate of 9-11%. The gap is even greater if only a segment of highly potent human resources (educated and with good practice). The strategic implication of this situation is that the survival and prosperity of enterprises depend on its ability to attract, retain and promote talent of human resources” (Đuričin et al., 2009).

Radical changes in the overall socio-economic environment created under the influence of scientific and technological progress have affected also the changes in the tourism sector. The necessity that tourism constantly monitors technical and technological, cultural and other changes in order to ensure adequate and timely knowledge of the characteristics of tourist demand while adapting the tourist offer to the new needs of tourists, this confirm the role and importance of human resources in tourism. Three basic elements or factors of tourism development are: human resources, space and material basis where human resources are the first and main factor of development. Although in the literature are present thinking (especially geographers) that space is prime element in tourism development, the reality that space without the presence of human remains just a place exposed to the natural processes challenge such opinions. Meaning that designated area by human work can be made more interesting to visit and can be arranged certain tourist offer. Therefore, it must build infrastructure as one of the basic elements of the material basis. So, the man in best case the educated and professional human resources identify and evaluate natural and anthropogenic values of the area and build in it infrastructure systems, create the material basis of tourism, based on which it is organized specific tourist offer (Vujović et al., 2014).

In Programme of development of sustainable rural tourism in the Republic of Serbia (2011), development of human capital in rural tourism is pointed out as one of the priorities. Under such context, the role of professional help and support from extension service is of great assistance. Its role is getting more important, according to Čikić et al. (2015), when it takes into account that in rural tourism, attempt to create and offer authenticity is in rural hosts, mostly unprofessional, hands. They design experience based mostly on indigenous knowledge of local specifics and skills in providing services.

The basic premise on which is based this paper is that human resources especially skilled and educated human resources is the most important intangible business asset, which affects the quality of tourism services and quality of tourism activities, at whole. Starting from this premise, the main objective of paper is to show the importance of investment in continuous professional development and training of human resources who are employed in the tourism sector.

Human resources, particularly skilled and educated human resources are the most important for ensuring the quality of tourism services. Given the fact that the management of service quality is continuous process, it would and training employees to provide quality services should be active and that is acquired through working

and learning, and once acquired skills, abilities and knowledge needed continuously upgraded and updated.

The specificity of tourism products and tourism needs undeniably impact on the specification of human resources that actively participate in the creation of tourism and providing tourist services.

The seasonal nature of tourist activities causes and „seasonal“ needs for human resources in tourism. The needs for human resources in the entire tourism sector during the period of the season are high, which affects the attractiveness of tourism employment in the so-called peak tourist season in certain destinations and periods that are in summer and during weekends, holidays and at night. Working hours are extended in these situations and earnings are growing. However, in the off-season, the situation is diametrically opposite. Uncertainty in the execution of conditional “job security-employment” creates major problems for managers of tourism enterprises in the recruitment, selection and engagement of adequate special tourism staff for a longer period. The mobility of human resources in tourism is much more pronounced than in other service industries. Incomes or income which is realized in the tourism industry are usually low, except during the peak tourist season. Also, when analyzing the human resources involved in the performance of the tourist accommodation activities, it can be noted that their qualification basis is very low.

On the other hand, the modern consumer society affects the behavior changes and the desire of modern tourists who require high-quality and sophisticated services that can provide only highly qualified and well-trained tourism personnel.

Because of growing perceptions and preferences of future tourists in terms of demand for high-quality tourist products, and especially tourist services, human resources, which are employed in the tourism sector, and actively participate in the creation of tourism and providing tourist services, must constantly improve their knowledge and skills. Not only because of increasing competition in the tourism market, but also to discover new tourist destinations and content in them, which will satisfy the wishes and needs of modern tourists for new experiences and adventures.

### **Metodology: Characteristics of demographic structure of rural population in Serbia**

Although rural areas are more and more alike urban areas in social and infrastructural terms, farm users are still different from urban residents as regards their behaviour, sense of community spirit, greater piety (Chmieliński, Chmielewska, 2015). Rural area of Serbia is naturally compact and anthropogenically highly heterogeneous environment. This gives it a great challenging opportunity for multipurpose utilization of the various subtypes of rural tourism (Milenković, Utvić, 2013).

This paper analyzes demographic conditions and the basic characteristics of human resources in rural areas of Serbia. In this analysis were applied: the method of induction

and deduction, the method of analysis and synthesis method, deductive and comparative methods, as well as techniques of structured questionnaire for field research. The obtained data were processed in SPSS program.

The territory of the Republic of Serbia covers an area of 88,509 km<sup>2</sup> of which is settled 6,158 populated places of which 193 are cities or 3.1% in urban areas and 5,965 are other settlements which are automatically considered rural (without Kosovo and Metohia). The average population density in Serbia is 92.6 citizens per 1 km<sup>2</sup>, while it is much lower in villages or rural areas.

Demographic trends are more and more unfavorable, which is especially noticeable in rural areas of the country. Namely, according to the census of year 2011 from Statistical Office of the Republic of Serbia, in the period from 2002 to 2011, the total population has decreased by 4.15%, while in rural areas decreased by as much as 10.9% or 311 139 residents, so that today the rural population makes 40.6% of the total population of Serbia.

One of the key characteristics of the demographic structure of the rural population in Serbia is unfavorable age structure (Table 1). Coefficient of age dependency in Serbia is 30.4 while in the region of Southern and Eastern Serbia its biggest value is as high as 38.3. This means that for every resident over the age of 65 years comes almost four of those aged 15-64. The values of the coefficient of age dependency were only slightly more favorable in the region of Belgrade where it is 22.9 and Vojvodina, which has a value of 25.2.

**Table 1.** Age structure of the rural population in Serbia

REGIONS IN SERBIA	Age structure (%)			Coefficient of age dependency	Ratio of young and old people
	0-14	14-64	65+		
SERBIA	13.9	66.0	20.1	30.4	69.3
BELGRADE REGION	15.0	69.1	15.8	22.9	95.2
VOJVODINA REGION	14.3	68.5	17.3	25.2	82.7
ŠUMADIJA AND WESTERN SERBIA REGION	14.1	65.3	20.6	31.5	68.7
SOUTHERN AND EASTERN SERBIA REGION	12.8	63.1	24.1	38.3	52.9

*Source:* Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia, 2013;

An important indicator in the analysis of the age structure represents the ratio of young and old people. The average value of this indicator in Serbia was 69.3. The limit value of the relationship of young and old population, Belgrade has the highest value of 95.2, while in the region of Southern and Eastern Serbia the most unfavorable value of this indicator, because for every 100 people older than 65 years, there has only 53 residents under the age of 15 years.

When analyzing the educational structure of the rural population of Serbia older than 15 years, the situation is as follows: for the first time there are more persons with secondary education (37%) compared to illiterate persons or persons who have completed primary school education (15%). In addition to this positive trend is noticed and reducing the number of highly educated population in all rural regions of the country, except in the province of Vojvodina.

Revenues generated by the rural population of Serbia in the highest percentage of 35 to 42% derived from employment income, followed by the share of pensions with a growing tendency since 2006, the share of pensions amounted to about 20%, to be increased in 2012 by as much as 10%, so that today pensions make up almost a third of the revenue structure of the rural population. Natural consumption is the third largest share in the revenue structure of the rural population of Serbia, while revenues from agriculture with a share of 7.6% take fourth place in this structure. Specific data on the structure of income of the rural population in Serbia, which were realized in the period from year 2006 to year 2012, are shown in the following table.

**Table 2.** Structure of income of the rural population in Serbia

<b>STRUCTURE OF INCOMES-REVENUES</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
<b>Employment income</b>	38.9	37.1	42.1	39.9	36.3	36.9	35.7
<b>Pensions</b>	19.7	23.1	24.2	26.6	29.5	36.8	30.2
<b>Revenues from agriculture</b>	7.8	6.8	8.3	6.8	9.3	7.8	7.6
<b>Natural consumption</b>	14.8	14.7	12.7	12.6	12.4	13.9	13.2
<b>Others:</b>	18.8	18.3	12.7	14.1	12.5	14.6	13.3

*Source:* Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia, 2013;

In rural areas of Serbia is very strong gender inequality in terms of economic independence. Among the female population is less active participation of people, fewer employees and fewer women working outside agriculture than in men population. Broken down by regions, in all segments of the labor market disadvantage of women is particularly acute in Southern and Eastern Serbia, while slightly more favorable in Vojvodina. Besides expressed gender disproportions, the participation of young people in rural areas is also very unfavorable. In support of expressed opinion the data says that every fifth resident of rural areas aged from 15 to 24 is employed in the service industry, but the participation of young people from 15 to 34 years old in the overall rate of unemployment is 15.5%.

Based on the analysis of demographic structure of the rural population of Serbia, which is viewed from the aspect of age, education and gender structure, and the structure of revenues earned, it can be concluded that although rural areas of Serbia have the natural resources and rich cultural and historical heritage, tendencies of depopulation of these



areas are evident, and economic implications of this discharge are apparent.

In order to stop the further uncontrolled exploitation and degradation of natural resources and to improve the situation in rural areas of Serbia it has formed a support network for rural development consisting of nine regional centers. The final objective of these regional centers, which are organized in the form of special office is the promotion of agriculture, is the creation of better living and working conditions and reducing poverty in rural areas. Network for support rural development supports the development of rural areas or villages and their residents through the project goals and sub-objectives.

It is expected that an effective system of transfer of knowledge, technology and information, as well as an innovative way of using the potential of cultural and historical heritage and biodiversity will impact on increasing the attractiveness of rural areas and the realization of the outlined strategic goals for rural development.

**Results with discussion: Empirical research of human resources in tourism sector in Serbia**

Systematic and continuous implementation of the process of learning and education becomes one of the most important forms of development of tourism personnel. However, the education system in almost all tourist countries does not follow the trends of modern tourism.

Researches from professors Vidoje Stefanović and Dobrica Jovičić (2010) has shown that the most frequently mentioned weaknesses in the tourism sector are: the lack of basic knowledge and skills of tourism products and services, target market areas, marketing, sales, focus on consumers and electronic data processing of reservations via the Internet. Also, employees are missing and inter-peronnel skills, especially in matters of development of human resources and direct contact with consumers.

By analyzing the structure and educational level of employees in tourism in local markets, a professor Svetislav Milenković noted that the qualification of employees in the accommodation sector is at grassroots level as well as their structure, as evidenced the data are presented in the Table 3.

**Table 3.** Qualification and structure of employees in tourism sector in Serbia

DEGREE OF EDUCATION	PARTICIPATION IN TOURISM (basic and additional)	STRUCTURE OF EMPLOYEES	PARTICIPATION IN TOURISM
HIGH AND HIGHER EDUCATION (classic VII-1 and VI level of education and master or bachelor according to Bologna standard)	4%	MANAGERS	6%

<b>HIGHSCHOOL EDUCATION</b>	9%	SUPERVISORY AUTHORITIES	8%
<b>ELEMENTARY EDUCATION</b> (classic 8 year education)	75%	TECHICAL SUPPORT	22%
<b>W I T H O U T H E L E M E N T A R Y E D U C A T I O N</b>	38%	OPERATIONS	64%

Source: Milenković, 2009;

What is the importance of type, in other words the level of education, on the quality and efficiency of every employee, shows also the latest research in which it is calculated that “primary education increases the working capacity of 30-40%, medium for 100% and higher education and up to 300%. Therefore, it “must be emphasized that education has an economic function, because the educators are one of the essential factors for the development of the productive forces and the increase in labor productivity in society, and thus also for improvement of human development” (Kovačević, 2012).

Starting from the prior knowing and with aim to determine the real situation in the tourism sector in Serbia, it was conducted concrete empirical research by interviewing employees by applying the techniques of structured questionnaires.

On the territory of the Republic of Serbia which is 88,509 km<sup>2</sup> live 7,186,862 inhabitants. The employment rate in the tourism sector in 2013 amounted to 1.71%, while the average net salary was 24.362 dinars which is almost twice less than the average net salary in the Republic of Serbia at 43.932 dinars in the same period.

To put its comparative tourism potential to operate at achieving higher employment rates and competitive advantages Serbia must, above all, invest in continuous professional development and training of personnel who are employed in the tourism sector. Increasing the rate of employment in the tourism sector and the continuous improvement of the quality of human resources involved in the creation of tourism and providing tourist services will positively affect the development of tourism, which should become one of the most important drivers of overall economic development of the country in the coming period.

In order to prove the claims or the basic hypotheses of research which states: Continuous and designed human resources management is needed in order to create the necessary (pre) conditions for gaining competitive advantages and successful operation of tourism enterprises, it was conducted and concrete empirical research.

The original empirical research was conducted through a survey - Questionnaire for the analysis of human resources in the tourism sector of Serbia and was conducted on the territory of Serbia in 2013. The questionnaire was circulated in two ways: “Face to Face” - personal contact and communication during the survey of employees in the tourism sector, as well as electronically - sending e-mails. The purpose of the

survey is to collect concrete data by respondents who are employed in companies, tourist organizations, agencies, institutions and other legal and natural persons who directly and/or indirectly are involved in the creation of tourist offer and in providing tourist services on the territory of Serbia. For data processing was used SPSS program that runs under Microsoft Windows environment. From quantitative methods were applied descriptive statistics, t test for independent samples, correlation and analysis of variance. For the purposes of processing data it was used registration of frequencies and calculation of the percentage as well as the arithmetic mean for determination of the mean values (Premović, 2015).

Based on the answers of 141 examinees – human resources who are engaged in tourist activities in Serbia, the data on prevalent age and educational structure of tourist companies and their employees are obtained and after statistical processing shown in the table below.

**Table 4.** Age and educational structure in the tourism sector in Serbia

Age structure in the tourism sector Serbia (%)		Educational structure in the tourism sector Serbia (%)	
Age:	Enterprices (prevailing structure)	The level of education	Enterprices (prevailing structure)
<25	/	Doctorate / Master	/
26-32	4.3%	High education	38.2%
33-40	41.1%	Bachelor	13.7%
41-55	51.8%	High school education	48.1%
>56	0.7%	Lower medium and / or primary and lower	/

Source: Authors' calculation based on the survey data

It can be noticed that the middle-aged employees prevail in the tourist companies. In the half of the companies, the employees aged from 41-55 are dominant, and the smallest number of employees in tourist companies in Serbia is older than 56. In 40% of the companies the highest number of employees is aged between 33 and 40, whereas there are no companies in which employees younger than 25 prevail. Tourist staff who graduated from secondary schools prevails in tourist companies in Serbia in which the examinees are employed. According to the survey, 50.04% of examinees have a university degree or academic studies of the 2nd degree –master. 36.9% of employees have a secondary school diploma, while every tenth employee has a bachelor degree.

The research results show that the educational structure of the employees in tourist companies encompassed by the survey is notably different from the starting researches since the university degree is the dominant level of education with more than 60%.

Ownership-management structure of the companies which employ the examinees has also been analyzed. The results of this specific research are shown in the following table.

**Table 5.** Ownership-management structure of the companies in the tourism sector in Serbia

OWNERSHIP STRUCTURE OF THE COMPANIES		MANAGEMENT STRUCTURE OF THE COMPANIES	
Form of ownership:	Companies (prevailing structure)	Form of management:	Companies (prevailing structure)
State-owned (Republic, Province, local authorities – city-municipality)	33.3%	Managers	23.5%
Private	48.9%	Professional-technical staff	31.3%
Mixed	5%	Administrative staff	37.5%
Stake-holders	22.3%	Physical and supporting staff	6.5%
Other	0.7%	Other	1.2%

*Source:* Authors' calculation based on the survey data

After analyzing ownership-management structure of companies, the obtained empirical data lead to the following conclusions:

- The surveyed examinees are mostly employed in the private-owned companies (69). There are 47 state-owned companies. They are followed by stake-held companies (16) and mixed companies (7).
- The administrative staff is dominant with 37.5% in the management structure of the companies; slightly smaller percentage of participation of 31.3% has professional-technical staff. The representation of managers is 23,5% on the average, while based on the results of empirical research, the physical and supporting staff is the least present.

In performing tourist activity and providing tourist services, continuous training and education of human resources have a particularly important role, which is why „tourist companies have to allocate additional resources for intensive training of personnel (rule of successful companies becomes that each employee needs to spend some time in the „classroom“). What are the services provided by tourism enterprises more sophisticated, with more built-in knowledge, it is also mandatory time spent in education longer. For managers, it is estimated that they need to spend over a fifth of their working time in their own education, in order to prevent „the obsolescence of knowledge.“ This means that the knowledge service time shorter, so that it can no longer live by the „old glory“, ie. Knowledge gained in an earlier era. (Milenković, 2009).

Accepting cited above paragraphs, and in order to obtain specific data on the amount of additional funds allocated for the improvement of knowledge and education of human resources in tourist enterprises on the territory of Serbia, was conducted original research. Obtained results show that the largest number of companies to allocate 1%,

while the least of those tourism enterprises that annually allocate over 10% of the revenues for the improvement of knowledge and education employees.

When is included in the analysis also data on the participation of employees in various forms of professional training and the number of days spent on professional training, there are received following results: around 60% of employees conducted by an average of up to 5 days at various training programs and education, while one in four employees spent more than 10 days. Companies in which 25% of employees spent 10 days or more on vocational training have a better or superior position in the tourism market of Serbia and these companies allocate more additional funds for various forms of professional training and education of employees. In 40% of the company's half or more employees passed various types of vocational training and education, while in 20% of enterprises training was provided to every fifth employee.

### **Conclusion**

Research that is on Serbian territory enforced by the ministry responsible for tourism have shown that the key of success of rural tourism development should be sought in the optimal utilization of the potential of rural areas, active effort, modern approach, quality staff and managers, and in good use of known instruments of stimulating local economic development.

Based on the results of the original research conducted within the tourism entities on the territory of Serbia, it was concluded that there is a positive correlation between level of education and the number of days spent on professional training of human resources on the one side and the competitive position of tourism enterprises in which human resources are working on the other side.

If tourism wants to achieve its role as one of key generators of economic development in Serbia, it is essential that human resources working in the tourism sector have the knowledge, skills and abilities, as well as to continuously manages their professional training and development.

However, particularly low educational structure of human resources involved in the provision of services in rural tourism can be considered as one of the most important factors that hinder the economic development of rural areas as it is in it reason for the low entrepreneurial potential of rural residents, as well as causing high economic interest of foreign investors. In support of this statement speaks official statistics according to which 97% of the rural population has not attended additional training programs, and 54% have no specific knowledge and skills, as well as the fact that in Serbia there are still no specific organized training programs and education of the rural population in the provision of services in rural tourism, which is necessary to change in the future.

### Literature

1. Chmieliński, P., Chmielewska, B. (2015): *Social changes in rural areas: incomes and expenditures of rural households*, Economics of Agriculture, vol. 62, no. 4, pp. 907-920, The Balkan Scientific Association of Agrarian Economists, Belgrade, Institute of Agricultural Economics, Belgrade, Academy of Economic Studies, Bucharest, Belgrade, Serbia.
2. Čikić, J., Petrović, M., Đurđev, B. (2015): *Diffusion of knowledge and rural tourism development – example of Vojvodina*, Economics of Agriculture, vol. 62, no. 1, pp. 123-136, The Balkan Scientific Association of Agrarian Economists, Belgrade, Institute of Agricultural Economics, Belgrade, Academy of Economic Studies, Bucharest, Belgrade, Serbia.
3. Đuričin, D., Janošević, S., Kaličanin, Đ. (2009): *Menadžment i strategija*, Centar za izdavačku delatnost, Univerzitet u Beogradu, Ekonomski fakultet, Beograd, Srbija.
4. Ivolga, A. (2014): *Overview of contemporary issues of sustainable rural development in Russia in terms of existing differences between regions*, Economics of Agriculture, vol. 61, no. 2, pp. 331-345, The Balkan Scientific Association of Agrarian Economists, Belgrade, Institute of Agricultural Economics, Belgrade, Academy of Economic Studies, Bucharest, Belgrade, Serbia.
5. Košić, K., Demirović, D., Pejanović, R., Lazić, L., Stamenković, I. (2015): *Key principles of rural tourism households development strategy- case study of Vojvodina*, Economics of Agriculture, vol. 62, no. 4, pp. 975-988, The Balkan Scientific Association of Agrarian Economists, Belgrade, Institute of Agricultural Economics, Belgrade, Academy of Economic Studies, Bucharest, Belgrade, Serbia.
6. Kovačević, B. (2012): *Uticaj nivoa obrazovanja na zadovoljstvo humanog kapitala u turističko-hotelijskom poslovanju*, Škola biznisa 2/2012, pp. 49-59, Beograd, Srbija.
7. Milenković, S. (2009): *Turizam i ekonomija*, monografija, Univerzitet u Kragujevcu, Ekonomski fakultet Kragujevac, Kragujevac, Srbija.
8. Milenković, S., Utvić, S. (2013): *The challenges of rural areas in Serbia promising tourist activities*, Economics of Agriculture, vol. 60, no. 1, The Balkan Scientific Association of Agrarian Economists, Belgrade, Institute of Agricultural Economics, Belgrade, Academy of Economic Studies, Bucharest, Belgrade, Serbia.
9. Ministarstvo poljoprivrede, šumarstva i vodoprivrede Republike Srbije. (2013): *Nacrt Strategije poljoprivrede i ruralnog razvoja Republike Srbije (2014-2024)*, Beograd, Srbija.
10. Papić, R., Bogdanov, N. (2015): *Rural development policy – a perspective of*

- local actors in Serbia*, Economics of Agriculture, vol. LXII, no. 4, pp. 1079-1093, The Balkan Scientific Association of Agrarian Economists, Belgrade, Institute of Agricultural Economics, Belgrade, Academy of Economic Studies, Bucharest, Belgrade, Serbia.
11. Pavlović, N., Medić, S., Tešić, A. (2015): *Relations, interactions and networks of cultural tourism stakeholders in rural areas of Vojvodina*, Economics of Agriculture, vol. 62, no. 2, pp. 481-495, The Balkan Scientific Association of Agrarian Economists, Belgrade, Institute of Agricultural Economics, Belgrade, Academy of Economic Studies, Bucharest, Belgrade, Serbia.
  12. Pejanović, R., Njegovan, Z. (2011): *Ruralni razvoj i lokalni ekonomski razvoj AP Vojvodine*, monografija, Univerzitet u Novom Sadu, Poljoprivredni fakultet, Novi Sad, Srbija.
  13. Premović, J. (2010): *Inovativne organizacije u funkciji ostvarivanja konkurentne prednosti*, Montenegrin Journal of Economics, vol. 6, no. 11, pp. 157-163, Kotor, Crna Gora.
  14. Premović, J. (2015): *Ljudski resursi kao strateški potencijal održivog turističkog razvoja Srbije*, doktorska disertacija, Ekonomski fakultet Kragujevac, Univerzitet u Kragujevcu, Kragujevac, Srbija.
  15. Premović, J. (2016): *Obrazovna struktura kadrova: neophodna ulaganja u edukaciju turističkih kadrova*, Poljoprivrednikov poljoprivredni kalendar 2016: nova znanja, dostignuća, iskustva, pp. 50-51, „Dnevnik-Poljoprivrednik“ AD Novi Sad, Novi Sad, Srbija.
  16. Republički zavod za statistiku. (2012): *Popis stanovništva, domaćinstava i stanova u Republici Srbiji*, Beograd, Srbija, (available at: [www.popis2011.stat.rs](http://www.popis2011.stat.rs)).
  17. Stefanović, V., Jovičić, D. (2010): *Neophodnost „znanja o znanju“ u turizmu*, Glasnik srpskog geografskog društva, broj 3/2010, pp. 53-62, Srpsko geografsko društvo, Beograd, Srbija.
  18. Tesić, A., Ilić, V., Đelić, A. T. (2015): *Labour market in Serbia - an opportunity or limitation of economic growth*, Economics of Agriculture, vol. 62, no. 4, pp. 1117-1136, The Balkan Scientific Association of Agrarian Economists, Belgrade, Institute of Agricultural Economics, Belgrade, Academy of Economic Studies, Bucharest, Belgrade, Serbia.
  19. Vujović, S., Premović, J., Grujić, B. (2014): *Kadrovi u turizmu*, Ekonomski vidici, godina 19, br. 4/2014, str. 437-447, Društvo ekonomista Beograda, Beograd, Srbija.
  20. UNWTO, Tourism & Leisure Advisory Services. (2011): *Master plan održivog razvoja ruralnog turizma u Srbiji*, jun 2011, Beograd, Srbija.
  21. Zubović, J., Jeločnik, M., Subić, J. (2015): *Can human resources induce sustainability in business? Modeling, testing and correlating hr index and*

*company's business results*, Economics of Agriculture, vol. 62, no. 2, pp. 399-420, The Balkan Scientific Association of Agrarian Economists, Belgrade, Institute of Agricultural Economics, Belgrade, Academy of Economic Studies, Bucharest, Belgrade, Serbia.

## SPECIFIČNOSTI LJUDSKIH RESURSA U RURALNOM TURIZMU SRBIJE

*Jelena Premović<sup>2</sup>*

### Rezime

*Savremeno potrošačko društvo utiče na promene u ponašanju i željama savremenih turista koji zahtevaju visokokvalitetnu turističku uslugu koju može pružiti jedino visoko kvalifikovan i kvalitetno obučen turistički kadar. Međutim, obrazovni sistem u skoro svim turističkim zemljama ne prati trendove modernog turizma.*

*U radu su analizirani demografski uslovi i osnovne karakteristike ljudskih resursa u ruralnim područjima Srbije. U ovoj analizi su primenjene metode indukcije i dedukcije, analize i sinteze, deduktivna i komparativna metoda kao i tehnika strukturiranog upitnika za terensko istraživanje. Dobijeni podaci su obrađeni u programu SPSS.*

*Na osnovu rezultata originalnog istraživanja, došlo se do zaključka da postoji pozitivna korelacija između stepena obrazovanja i broja dana provedenih na stručnom usavršavanju ljudskih resursa i konkurentne pozicije turističkih preduzeća u kojima ljudski resursi rade.*

***Ključne reči:*** *ljudski resursi, učenje, obrazovanje, ruralna područja, ruralni turizam.*

---

<sup>2</sup> Dr Jelena Premović, Opštinska uprava Vrbas, 21 460 Vrbas, Srbija, M. Tita 89, Telefon: +381(0) 64 144 17 98, E-mail: [jelena.premovic@gmail.com](mailto:jelena.premovic@gmail.com)





## FINANCIAL ANALYSIS OF FOREIGN DIRECT INVESTMENT ON ECONOMIC GROWTH OF DEVELOPING COUNTRIES

*Božidar Raičević<sup>1</sup>, Svetlana Ignjatijević<sup>2</sup>, Ivan Milojević<sup>3</sup>*

### Abstract

*The object of the research paper is to perform an empirical analysis of foreign direct investment (FDI) influence on economic growth with the aim of establishing factors that will contribute to overcoming the problem. The research results imply that realistic exchange rate, export and import as well as state expenditures are statistically significant for predicting economic growth movement and they have a positive influence on FDI movement. Empirical analysis, contrary to expectations, has shown that FDI, public debt and openness have a negative impact on economic growth in the case of Republic of Serbia. In the following period Serbia has to decrease the share of budget deficit in GDP and control public debt. Serbia has to pay special attention to improving investment environment and encourage export oriented production, whereas finance management and continuation of reform processes are the basis for establishing sustainable development of country, with sustainable use of available resources.*

**Keywords:** *foreign direct investment, economic growth, export, Republic of Serbia, sustainable development*

**JEL:** *Q10, F21*

### Introduction

By foreign direct investment it is implied that investors from one country invest in another country. In the process an investor gains control over the management in the company in which the resources have been invested. Foreign direct investments ensure product placement, technology export, placement of managerial knowledge

- 
- 1 Božidar Raičević, Ph.D., Professor emeritus, Slobomir P University, Svetog Save street no. 1, Dobož, BiH, E-mail: [boskoraicevic@gmail.com](mailto:boskoraicevic@gmail.com)
  - 2 Svetlana Ignjatijević Ph.D., Associate Professor, Faculty of Economics and Engineering Management in Novi Sad, Cvećarska Street no. 2, 21000 Novi Sad, The Republic of Serbia, E-Mail: [ceca@fimek.edu.rs](mailto:ceca@fimek.edu.rs)
  - 3 Ivan Milojević Ph.D., Full Professor, University of Defense, Military Academy, Pavla Jurišića Šturma Street no. 33, 11000 Belgrade, The Republic of Serbia, Phone: +381 60 66 99 177, E-Mail: [drimilojevic@gmail.com](mailto:drimilojevic@gmail.com)

and experience, expansion to the markets of capital importing countries, using natural resources and costs saving. In recent years FDIs have been directed towards developing countries and countries in transition, since privatization processes in them ended or they are coming to an end. In order to achieve faster economic growth, beside stimulating the capital of international financial institutions, it is necessary to stimulate FD inflow into production activities which will stabilize the economy and increase export. Apart from the expected economic growth, salaries and employment, FDI should contribute to tax income increase, development of technical and managerial abilities as well as competition increase. What foreign investors find attractive are a relatively high purchase power of the market, favourable infrastructure and especially, cheap though qualified labour force. These countries are intensifying their participation in international trade, the increase in export and import in GDP is also present, which facilitates FDI inflow.

Due to privatization in Serbia, FDIs have been on the increase since 2001. In 2006 their growth reached the maximum of \$4,286 million, which coincided with a high rate of investment increase in the region. In 2011 investments amounted to \$2,142 million, out of which 39.5 % was invested in wholesale and retail trade, 21.1% in processing industry, 11.1% in financial activities and insurance and 6.9% in real estate business. In the period between 2001 and 2010 the largest investors were the companies Telenor with €1,602 million investment in the field of communications, Gazprom Neft with €947 million in oil and gas industry and Fiat with €940 million in automobile industry. The economic growth in recent years has been characterized by insufficient FDI inflow and its low participation in GDP.

Numerous studies have been dedicated to the significance of FDI for economic growth and they emphasize the influence of FDI on export increase and natural resources exploitation. Cuadros et al. (2004) point out positive and negative influences of FDI, while Chowdhury, Mavrotas (2006) emphasize that positive influence is generally expected owing to human capital and productivity level. The studies of FDI influence on economic growth have been analysed by some authors at micro or macro level and precisely Carkovic, Levine (2002) indicate positive FDI results at macro level. When it comes to FDI and export correlation, Marchant et al. (2002) imply substituting effect, while Graham (1997) implies complementary relationship between FDI and export. In that context the aim of this paper is to examine the influence of FDI on economic growth. Empirical analysis should answer the question which factors contribute to FDI growth and how investment inflow is reflected in GDP increase.

### **Literature Overview**

Graham, Wada (2002) analysed FDI inflow in China. The investment inflow from Japan, Europe and North America was on the increase. They stated that FDI encouraged income growth. Blomstrom, Kokko (2003) analysed the effect of investment incentives and specified that benefits are present for local companies if they are capable and motivated to apply foreign technology and skills. Investing in learning and management

development is required and investments will contribute to the increase in employment, export and tax income. The focus is on the usage of investment incentives for foreign companies. They concluded that these incentives were not efficient in terms of improving national well-being. Instead of investment policy defined in this way, they suggest a package of investment incentives for complete industrial policy, equal incentives for domestic and foreign investors, incentives for investments that connect domestic and foreign companies, education, and training about R&D.

Choe (2003) explored the causal connection between economic growth and FDI. A strong positive connection between these two elements was proven. Numerous studies have focused on the economic growth research from the aspect of long-term inflow of FDI and GDI rates (gross domestic investment). However, the positive correlation does not confirm that high FDI and GDI rates result in heightened inflow or vice versa.

Brock (2005) examined the influence of FDI on regional economic growth. He emphasized the limited effect of FDI on the growth of domestic companies due to limited reforms of institutions, judicial reforms, etc. Chowdhury, Mavrotas (2006) examined the relation between FDI and economic growth. The relation studied was the one between growth determinant, FDI determinant, the role of multinational companies in the host country and the causality direction. The authors emphasized that FDI added on domestic investments and affected employment, technology transfer and overall economic growth. Empirical study proved unidirectional or mutual connection between FDI and GDP.

The results of the study performed by Nunnenkamp, Schweickert, Wiebelt (2007) imply that FDI inflow increases economic growth and decreases poverty. They concluded that FDI contributes to differences between cities and rural areas. The growth and employment can be limited so the state needs to strengthen economic capacities, while public investment can contribute to overcoming bottlenecks in infrastructure.

The data of the empirical research by Asiedu (2006) suggest that macroeconomic instability, limited investment, corruption and political instability affect FDI negatively. The paper analysed the significance of natural resources, market size and the power of institutions to direct FDI inflows. Good infrastructure, natural resources, low inflation and efficient judicial system have a positive influence. Nevertheless, it is also pointed out that a country which lacks natural resources can attract FDI through the improvement of institutions. The IMF and the World Bank can contribute to FDI inflow as well.

Hansen, Rand (2006) emphasize that FDI inflow can have a positive influence on the economic growth of a country only if a minimum of educational, technological and infrastructural level of development is achieved. The question is whether FDI contributes to long-term growth and development or the accelerated economic growth attracts investments of transnational companies searching for new markets and profit.

Bengoa, Sanchez-Robles (2003) explored the connection between economic freedom,

FDI and economic growth. The research proved the significance of government engagement in achieving political and economic stability and market-oriented economy. Economic freedom increase should be politics' priority.

The influence of FDI on economic growth was examined by Carkovic, Levine (2002). Positive effect of FDI and portfolio inflow is a result of technology transfer. They proved that FDI inflow does not affect economic growth independently.

In their study Hermes, Lensink (2003) examined the role of financial system in strengthening positive effect of FDI on economic growth. They investigated the level at which FDIs can improve technological change through the inflow of knowledge and new capital goods. Authors claim that financial system development of FDI receiver is essential for positive influence of FDI on economic growth.

Chen, Chang and Zhang (1995) ascertained that FDIs influenced economic growth positively. The opening of Chinese economy is a constant process and it is necessary to establish the contribution to the success of most recent economic reforms. In a similar study Asiedu (2006) suggested that macroeconomic instability, investment limits, corruption and political instability had a negative influence on FDI in Africa. The significance of natural resources and market size, government policy and institutions of the host country in directing FDI were also analysed. The results of the research show that inflation decrease, good infrastructure, educated population, openness for foreign direct investment, lower level of corruption, political stability and reliable legal system have a positive effect on attracting FDI.

Raičević and Ignjatijević (2001) indicated that natural resources can be an invaluable advantage for more substantial FDIs in the sphere of tourism. FDIs need to be directed towards reconstruction, revitalization and building new modern capacities, the application of modern information technologies and modern marketing concepts, management concepts and promotional activities as well as raising the level of tourism services quality. Ignjatijević et al. (2015) indicated that "if we start from the fact that the goal of every company is long-term survival, profitability, cost effectiveness and positive financial results, it is clear that companies must continually work on sustainable development of trade by applying new technologies for management".

## Methods

In the paper we use regression analysis in order to examine empirical relationship between FDI and economic growth. As we can see, numerous authors have explored the mentioned relationship and defined several indicators. Our intention is to perceive the aspects relevant for Serbian economy. One of the basic variables is GDP per capita, which is at the same time an indicator of market size (Cannonier et al., 2007) or market development (Kolstad and Villanger, 2004). As a measurement of non-exchangeable goods and imported goods we used realistic exchange rate. Inflation rate is a significant macroeconomic indicator; a share in the sum of export and import in GDP is an indicator of economy openness, while public consumption share in GDP is the indicator of the

government role. It is logical to expect that an increase in FDI inflow will affect the decline in public finance from privatization (Flexner, 2000). We will mention another direct influence of GDP growth rate in the world. We refer to the position of Kolstad and Villanger (2004) on the relevance of the method applied.

In our paper we used the data of Statistical Office of the Republic of Serbia, World Bank and IMF for the period between 2001 and 2011. Following the example of Cannonier et al. (2007) we used natural algorithms of all values and STATA economic software.

In our theoretical research we used the following model:

$$FDI = \alpha_0 + \alpha_1 GDP_{it} + \alpha_2 DEBT_{it} + \alpha_3 EXP_{it} + \alpha_4 RER_{it} + \alpha_5 INF_{it} + \alpha_6 GOV_{it} + \alpha_7 IMP_{it} + \alpha_8 WGDP_{it} + \alpha_{10} IMPEXP_{it} + \varepsilon_{it} \quad (1)$$

in which *j* indicates country and *t* stands for time period.

$$GDP = \beta_0 + \beta_1 FDI_{it} + \beta_2 DEBT_{it} + \beta_3 EXP_{it} + \beta_4 GOV_{it} + \beta_5 WGDP_{it} + \beta_6 IMP_{it} + \beta_7 IMPEXP_{it} + \beta_8 RER_{it} + \beta_9 INFL + \varepsilon_{it} \quad (2)$$

where:

GDP = Domestic Real GDP per capita; IMP= Imports of goods and services to GDP; RER= Real exchange Rate (EC\$ per US\$); EXP= Exports of goods and services to GDP; INFL = Inflation rates; DEBT = External Debt to GDP; IMPEXP = Imports plus Exports of goods and services to GDP; GOV= Central Government expenditure to GDP; FDI = Foreign direct inflows per capita; WGDP= World Growth in GDP;  $\varepsilon$  = Stochastic Error Terms; Where,  $\alpha$  and  $\beta$  are the respective parameters.

### Results and discussion

The most common mode of foreign capital inflow in Serbia is in the form of buying domestic companies or banks. Considering that Serbian economy is characterized by low cumulative capability, minimal savings FDI gain in importance. For Serbia as well as all countries in transition foreign direct investments which would set country's economic growth in motion are necessary. In the period between 2006 and 2010 a significant decline in FDI inflow was noted, which had a negative impact on introducing new production capacities, unemployment and export growth, finally resulting in country's economic growth downtrend. According to UNCTAD data, Serbia has received \$16 billion in the last 10 years and if we observe a longer time period (1995-2010) \$ 21.5 billion of foreign direct investments. In recent years a negative downward trend of FDI decline has been present. In 2006 FDIs amounted to \$4.3 billion and in 2010 it was \$800 million. The analysis has shown that the share of European countries' investment is dominant, followed by lower amount of investments coming from the USA.

FDI share in total investments at the world level is significantly lower even when compared to transition countries, and especially considering developed European economies. A large number of factors affect FDI movement direction and the level of investment. Uncertainty among investors certainly conditioned FDI moderation and oscillations. Different level of FDIs was probably affected by levels of technological development, efficiency as well as business productivity. The size and level of public sector, the structure of industrial production, geographic position and the level of development of human capital are just a few more determinants of FDI attraction (Prača, 2015). If we perceive the large difference in the FDI levels in Serbia and developed countries it is clear that balanced politics, macroeconomic stability, corruption, institutional disorder are actually a limiting factor for FDI attraction – Table 1.

**Table 1.** US Dollars at current prices and current exchange rates in millions, US Dollars at current prices and current exchange rates per capita and Percentage of total world

		2000	2005	2011
US Dollars at current prices and current exchange rates in millions	Serbia	-	-	2,709.27
	Serbia and Montenegro*	51.78	2,077.65	-
	Transition economies	7,038.38	30,853.96	92,162.89
	Developed economies: Europe	724,898.34	507,184.96	425,266.24
US Dollars at current prices and current exchange rates per capita	Serbia	-	-	274.94
	Serbia and Montenegro	4.81	198.19	-
	Transition economies	23.06	102.25	303.95
	Developed economies: Europe	1,465.17	1,004.46	822.8
Percentage of total world	Serbia	-	-	0.18
	Serbia and Montenegro	0	-	-
	Transition economies	0.5	0.211848	6.05
	Developed economies: Europe	51.76	3.146029	27.9

Source: <http://unctadstat.unctad.org/TableViewer/tableView.aspx>

In the analysed period the UN observed the data for Serbia as a part of the union of Serbia and Montenegro, whereas after 2008 the data shown refer to Serbia only.

We have already pointed out that the influence of factors varies from country to country. In order to perceive the influence of factors on FDI in Serbia we have observed

the influence of GDP, public debt, realistic exchange rate, inflation, export state expenditures, the world GDP growth rate and the country openness. In continuation we demonstrate the regression analysis results – Table 2.

**Table 2.** The influence of factors on FDI in Serbia - Regression statistics

Multiple R	0.999975		Df	SS	MS	F	Significance F
R Square	0.999949	Regression	9	1.159614	0.128846	2199.569	0.016546
Adjusted R	0.999495	Residual	1	5.86E-05	5.86E-05		
Standard Error	0.007654	Total	10	1.159673			
Observations	11						

Source: The Statistical Office of the Republic of Serbia, author's calculation

Based on the coefficient of determination (R-Sq) we conclude that 99.99% of changes in FDI have been explained by variations of all factors. The constant 10.42 indicates hypothetical value of FDI when all factors equal zero. By means of empirical analysis we have established the probability of correlation existence. The empirical level of F distribution is 2199.57 and it is higher than critical value (Significance F – 2.88E-05) of F distribution. The calculated value indicates that the high value of F distribution is not random, as well as that regression equation is applicable when predicting FDI movement. T statistics should establish the utility of each coefficient in predicting FDI movement. By means of comparing all absolute values and t – critical point we conclude that the following factors are crucial when forecasting the movement: export, import, inflation, real exchange rate, state expenditures.

By means of correlation matrix we have established the correlation of the stated factors. The strongest correlation of FDI is with GDP, export, import, openness and real exchange rate. The highest correlation coefficient of GDP is with export, import, openness and real exchange rate. The highest correlation coefficient of export and import is openness which is in accordance with the conclusions of Cannonier et al. (2007).

A positive FDI correlation can be noticed in export. The 1% increase results in FDI growth by 44.23 times, which is in accordance with the results of the research by Cannonier et al. (2007). Precisely Marchant et al. (2002) favored the influence of export on FDI, which agrees with our conclusion about the strongest influence of this factor. We believe that complementary nature of FDI and export is also present, which was explained by Graham (1997). He emphasizes that FDIs are stimuli to export production. The resources realized through export should contribute to the increase of production,



incomes, technology transfer or, as Campbell (2001) states, resources can be directed towards tertiary sector, by which he implies tourism – Table 3.

**Table 3.** The influence of GDP, public debt, real exchange rate, inflation, export state expenditures, the world GDP growth rate and the country openness on FDI

	Coefficients	Stan. Error	t Stat	P-value
Intercept	10.42011	1.12737	9.242848	0.06861
X <sub>1</sub> GDP	-18.6287	0.981108	-18.9874	0.033498
X <sub>2</sub> DEBT	-9.56877	0.4044	-23.6617	0.026889
X <sub>3</sub> EXP	44.23821	0.796902	55.51274	0.011467
X <sub>4</sub> RER	17.83982	1.498165	11.90778	0.053337
X <sub>5</sub> INFL	6.897528	0.44007	15.67371	0.040562
X <sub>6</sub> GOV	59.30418	4.06593	14.58564	0.043579
X <sub>7</sub> IMP	19.60811	0.545318	35.95719	0.0177
X <sub>8</sub> WGDG	-41.1808	2.067775	-19.9155	0.031939
X <sub>9</sub> IMPEXP	-6.6073	0.843856	-7.82989	0.080869

Source: The Statistical Office of the Republic of Serbia, author's calculation

Similar influence on FDI is exercised by import, so its increase by 1% contributes to the increase of the FDI by 19.61 times and, apart from export, it is statistically a rather significant factor. We found the confirmation of our findings in Cannonier et al. (2007). Cuadros et al. (2004) pointed out the existence of complementary relationship between FDI and import. Through the research we found positive influence of real exchange rate on FDI, which is not statistically important. A positive effect of real exchange rate was expected and the results obtained are in correlation with the results of Cannonier et al. (2007). The results confirm the hypothesis that a strong and stable currency decreases domestic export, but it increases purchase power abroad and according to Marchant et al. (2002) it probably makes FDIs more attractive. Through the research we identified a positive influence of state expenditures on FDI. The increase of 1% will lead to the boost in FDI by 59.3 times, contrary to the results obtained by Cannonier et al. (2007). Our research implies a complementary relationship between state expenditures (expressed in GDP percentage) and FDI. The state creates significant investment incentives which contribute to FDI growth. As Blomstrom, Kokko (2003) emphasize, the resources should be directed towards foreign companies, but along with the investment in domestic companies. This way, an increase in national well-being will be achieved. The results indicate positive influence of inflation on FDI which is statistically significant.

Empirical results suggest a negative influence of trade openness on FDI. The increase

in trade openness, which is expressed as a share of import+export in GDP, results in the drop in FDI. The result corresponds to the conclusion of Cannonier et al. (2007) and implies a “vulnerability to external shocks”. Great external trade dependence of Serbia is the confirmation of this hypothesis.

Although a positive influence of GDP on FDI is expected, our results imply a negative influence, which is not statistically important. Since we used GDP per capita as an indicator of the market size or market development (Kolstad, Villanger, 2004) a negative correlation leads to a dilemma. Is the market in Serbia limited and underdeveloped and that is why we obtained a negative correlation dependence, have we used an adequate indicator in measuring FDI movement or are the GDP values per capita low, indicating inefficient market, macroeconomic instability, political uncertainty, corruption, incomplete reform processes, bottlenecks and inefficiency in productions? Our result confirms Choe’s (2003) position that the existence of positive correlation, i.e. FDI increase, does not guarantee a GDP increase and vice versa.

The coefficient of the world GDP has been used as a substitution for external income, following the example of Cannonier et al. (2007). Quite the opposite of the results obtained in his study, we have identified a weak negative influence.

At the same time we have observed the effect of factors on GDP. In the equation of factor influence on GDP movement, most of them have an expected value. State expenditures, inflation, real exchange rate and export are statistically significant – Table 4.

**Table 4.** The effect of factors on GDP - Regression statistics

Multiple R	1		df	SS	MS	F	Significance F
R Square	0.999999	Regression	9	0.191988	0.021332	126726.1	0.00218
Adjusted R	0.999991	Residual	1	1.68E-07	1.68E-07		
Standard Error	0.00041	Total	10	0.191988			
Observations	11						

Source: The Statistical Office of the Republic of Serbia, author’s calculation

The result of F distribution shows that this value is not random and that it is significant for predicting GDP movement. The research results show a strong positive influence of state expenditures on GDP movement, which is statistically significant. The increase in state expenditures of 1% will create a 3.2 time increase in GDP. Export also has a positive influence on GDP movement, so a 1% increase leads to 2.4 time increase in GDP (Milojevic, Zekic, 2015). Correspondingly, import also influences GDP positively, so the rise of 1% conditions an increase in GDP by 1.1 times.

Contrary to the findings of Cannonier et al. (2007) and Chowdhury, Mavrotas (2006), the FDI influence on GDP is negative and statistically unimportant. When FDI influence on the economic growth of a country is analysed, the authors point out limiting factors. Thus, Lensink and Morrissey (2001) indicate that countries with high risk and high level of business insecurity are not attractive for investors. Tian, Lin and Lo (2006) express certain doubts in the significance of FDI for the economic growth in less developed countries and transition countries. FDI and economic development are brought into connection with the level of technologic development, but also political stability, economic reforms and, as Lensink and Morrissey (2006) state, the ability of countries to deal with climatic, agricultural and trade risks. We hold the opinion that macroeconomic and political stability, market size and efficiency are especially significant for attracting FDI and positive influence on GDP. Reform processes, political stability, continuity of economic reforms are necessary, just like, as specified by Tian, Lin Lin and Lo (2006), improving the level of technologic equipment – Table 5.

**Table 5.** The influence of FDI, public debt, real exchange rate, inflation, export state expenditures, the world GDP growth rate and the country openness on GDP

	Coefficients	Stan. Error	t Stat	P-value
Intercept	0.556043	0.080523	6.905424	0.091555
X 1 FDI	-0.05353	0.002819	-18.9874	0.033498
X 2 DEBT	-0.51336	0.006953	-73.8374	0.008621
X 3 EXP	2.369649	0.101797	23.27811	0.027332
X 4 GOV	3.18577	0.070231	45.36122	0.014032
X 5 WGDP	-2.21028	0.015054	-146.828	0.004336
X 6 IMP	1.05081	0.03878	27.09638	0.023484
X 7 EXPIMP	-0.35172	0.061576	-5.71199	0.110335
X 8 RER	0.959075	0.03446	27.83184	0.022864
X 9 INFL	0.370375	0.009762	37.94005	0.016776

Source: The Statistical Office of the Republic of Serbia, author's calculation

### Conclusions

Long-time isolation and the absence of Serbian economy from international economic courses resulted in economic backwardness during the last decade of 20th century, which resulted in a modest foreign capital attraction as a consequence. Considering the lack of domestic resources, FDI is a significant mean of economic recovery and development of Serbian economy. Within the framework of defining development

policy of Serbia, it is required to identify priority branches and areas towards which FDIs need to be directed. A national strategy should define the type of the necessary FDI and the economy areas that need to be developed. Comparative advantages of Serbian economy should be used, by which we in the first place refer to natural resources and cheap educated labour force.

In order to improve Serbian economy, investments should be directed towards overcoming infrastructural underdevelopment as the main limiting factor of other sectors' development. Communication sector has already drawn significant financial resources, so the IT sector is a development opportunity of Serbia. Comparative advantages of agriculture and food industry should be further improved by investing in the production of organic, safe and healthy food.

The FDIs in the analysed period came from EU countries, countries in the region and the USA in small percentage. The highest amount of FDIs was directed towards the service sector, while the lowest amount was intended for the production of processing industry. The period of intensifying FDIs was in direct connection with the process of privatization; hence, the resources were mostly used for covering budget deficit, public debt and only in a small portion for production improvement. Certain part of FDI came to the country through large trading companies.

The results of the research indicate that the models used are relevant for predicting FDI movement and economic growth. The state largely used FDI resources, invested in Serbia through privatizations, for covering budget deficit and public debt. Through the research we identified the positive influence of export on FDI, where complementary influence is also present. On the other hand, FDIs will affect the augmentation of production and employment, transfer of technologies and knowledge. A complete positive effect of the export on FDI is connected with real exchange rate. A stable currency increases purchase power abroad, which is in correlation with positive influence of import on FDI movement. Stabilization of macroeconomic situation, simulation of export cost the state in terms of state expenditures increase. The programmes created for attracting FDIs in their basis rely on budget stimuli. The obtained empirical results confirm a strong positive influence of state expenditures on FDI movement. The research has identified the influence of GDP per capita, which has been used as an indicator of market size and development on FDI. Contrary to the research results of other authors our study indicates a negative influence. We conclude that the market is undeveloped, inefficient, politically and economically unstable, with corruption present. All the mentioned features do not contribute to GDP growth.

The openness of Serbian economy is not an adequate incentive to FDI movement, which is a situation that is a consequence of our economy's sensitivity to external influences and high import dependence. Encouraging international cooperation, deepening international agreements and a firmer integration would affect FDI and economic growth positively. Although in our study we did not examine the influence of budget deficit, but only government's expenditures the results refer to a direct conclusion.

Public consumption increase would lead to GDP increase, and precisely GDP increase causes budget deficit increase. Public debt servicing also raises budget deficit and thus affects FDI movement negatively. The state can initiate fiscal income boost, it has to control state expenditures in order to stabilize budget deficit and achieve positive influence on FDI. Further on, we also perceive the influence of factors on economic growth. It has been established that a stable currency and controlled level of prices favour external trade exchange and in that way, affect economic growth positively.

Contrary to theoretical and empirical research of other authors, we have identified a negative influence of FDI on economic growth. In order to eliminate the negative FDI influence, it is necessary to perform a detailed study of budget incentives for domestic and foreign companies. Positive results of FDI on economic growth can be achieved only through fulfilling prerequisites such as highly educated population, fast acceptance of new technologies and cooperation with domestic companies.

### Literature

1. Cuadros, A., Orts, V., Alguacil, M. (2004): *Openness and Growth: Re-Examining Foreign Direct Investment, Trade and Output Linkages in Latin America*. Journal of Development Studies, Vol. 40, No. 4, pp. 167-192.
2. Chowdhury, A., Mavrotas, G. (2006): *FDI and Growth: What Causes What?*, The World Economy, Vol. 29, No. 1, pp. 9-19.
3. Carkovic, M., Levine, R. (2002): *Does foreign direct investment accelerate economic growth?*, University of Minnesota Department of Finance. Working Paper, Available at: <http://ssrn.com/abstract=314924>; <http://dx.doi.org/10.2139/ssrn.314924>
4. Marchant, M. A., Manukyan, T., Koo, W. (2002): *International Trade and Foreign Direct Investment: A Focus on the Free Trade Area of the Americas*, Available online: <http://cnas.tamu.edu/publications/powerpoint/papers/Marchant.pdf> (accessed on 25.07.2013)
5. Graham, E. M. (1997): *Working Together: Foreign Direct Investment and Trade*, Economic Reform Today, Globalization, Trade and Democracy, Number 3.
6. Graham, E., Wada, E. (2002): *Foreign direct investment in China: effects on growth and economic performance*, Institute for International Economics, Working Paper, (01-03). Available online: [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=300884](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=300884) (accessed on 11.05.2013)
7. Blomstrom, M., Kokko, A. (2003): *The Economics of Foreign Direct Investment Incentives*. No. w 9489, National Bureau of Economic Research,
8. Choe, J.I. (2003): *Do foreign direct investment and gross domestic investment promote economic growth?* Review of Development Economics, Vol. 7, No. 1, pp. 44-57.
9. Brock, G. (2005): *Regional Growth in Russia During the 1990s—What Role did FDI Play?*, Post-communist economies, Vol. 17, No. 3, pp. 319-329.

10. Nunnenkamp, P., Schweickert, R., Wiebelt, M. (2007): *Distributional effects of FDI: how the interaction of FDI and economic policy affects poor households in Bolivia*, Development policy review, Vol. 25, No. 4, pp. 429-450.
11. Asiedu, E. (2006): *Foreign direct investment in Africa: The role of natural resources, market size, government policy, institutions and political instability*, The World Economy, Vol. 29, No. 1, pp. 63 – 77.
12. Hansen, H., Rand, J. (2006): *On the causal links between FDI and growth in developing countries*, The World Economy, Vol. 29, No. 1, pp. 21-41.
13. Bengoa, M., Sanchez-Robles, B. (2003): *Foreign direct investment, economic freedom and growth: new evidence from Latin America*, European journal of political economy, Vol. 19, No. 3, pp. 529 – 545.
14. Hermes, N., Lensink, R. (2003): *Foreign direct investment, financial development and economic growth*, The Journal of Development Studies, Vol. 40, No. 1, pp. 142-163.
15. Chen, C., Chang, L., Zhang, Y. (1995): *The role of foreign direct investment in China's post-1978 economic development*, World development, Vol. 23, No. 4, pp. 691-703.
16. Raičević, V., Ignjatijević, S. (2011): *Strane direktne investicije kao podsticaj razvoju privrede Srbije, Međunarodni naučni skup o ekonomskom razvoju i životnom standardu*, EDASOL 2011, Banja Luka: Univerzitet APEIRON, 439-448. Available online: <http://www.edasol-au.com/sites/zbornikradova.pdf> (accessed on 15.07.2012)
17. Ignjatijević, S., Milojević, I., Cvijanović, G., Jandrić, M. (2015): *Balance of Comparative Advantages in Processed Food Sector of the Danube Countries*, Sustainability, Vol. 7, No. 6, pp. 6976 – 6993.
18. Cannonier, C., Francis, B., Lorde, T. (2007): *Foreign Direct Investment and Trade in the Eastern Caribbean Currency Union*, Journal of Eastern Caribbean Studies, Vol. 32, No. 3, pp. 23 –49.
19. Kolstad, I., Villanger, E. (2004): *Determinants of Foreign Direct Investments in Services*. CMI Working Paper WP 2004:2, Available online: <http://bora.cmi.no/dspace/bitstream/10202/122/1/Working%20paper%20WP%202004-2.pdf>, (accessed on 11.06.2014)
20. Flexner, N. (2000): *Foreign direct investment and economic growth in Bolivia, 1990-1998*. Economic Policy Division, Central Bank of Bolivia, La Paz–Bolivia, Available online: <http://econwpa.wustl.edu/eps/mac/papers/0309/0309009.pdf> (accessed on 15.04.2013)
21. UNCTAD, Available online: <http://unctad.org/en/Pages/Home.aspx>, (accessed on 14.06.2014)
22. Campbell, T. (2001): *Foreign Direct Investment (FDI) Inflows and their Impact on Barbados' Current Account: Implications for Substitute/Complements*

- Between FDI and Exports*, Research Department, Central Bank of Barbados. Presented at Canadian Economic Association (CEA) 2001 Annual Meeting, McGill University, Montreal, Canada.
23. Lensink, R., Morrissey, O. (2001): *Foreign direct investment: flows, volatility and growth in developing countries*, University of Groningen.
  24. Praća, N. (2015): *Recesija i njeno prevazilaženje u uslovima savremenog kapitalizma*, Oditor, no. 10, pp. 23-33.
  25. Tian, X., Lin, S., Lo, V. I. (2004): *Foreign Direct Investment and economic performance in transition economies: Evidence from China*, Post-Communist Economies, Vol. 16, No. 4, pp. 497-510.
  26. Lensink, R., Morrissey, O. (2006): *Foreign Direct Investment: Flows, Volatility, and the Impact on Growth*, Review of International Economics, Vol. 14, No. 3, pp. 478-493.
  27. The Statistical Office of the Republic of Serbia, Available online: <http://webbrzs.stat.gov.rs/WebSite/> (accessed on 15.07.2014)
  28. Milojevic, I., Zekic, M. (2015): *Organizaciona struktura preduzeca kao pretpostavka konsolidacije bilansa*, Oditor, Vol. 12, No. 1, pp. 22-28.

## FINANSIJSKA ANALIZA UTICAJA STRANIH DIREKTNIH INVESTICIJA NA EKONOMSKI RAST ZEMALJA U RAZVOJU

*Božidar Raičević<sup>4</sup>, Svetlana Ignjatijević<sup>5</sup>, Ivan Milojević<sup>6</sup>*

### *Apstrakt*

*Predmet istraživanja u ovom radu je izvršenje empirijske analize uticaja stranih direktnih investicija (FDI) na ekonomski rast sa ciljem određivanja faktora koji doprinose prevazilaženju problema. Rezultati istraživanja upućuju na realističan kurs, uvoz i izvoz, kao i to da su javni rashodi značajni za predviđanje kretanja ekonomskog rasta i imaju značajan pozitivan uticaj na kretanje FDI. Empirijska analiza, uprkos očekivanjima, je pokazala da FDI, javni dug i otvorenost imaju negativan uticaj na ekonomski rast u slučaju Republike Srbije. U narednom periodu Srbija mora da smanji udeo deficita u BDP-u i kontroliše javni dug. Srbija mora da obrati posebnu pažnju poboljšanju investicionog ambijenta i podstakne izvozno orijentisanu proizvodnju, dok je upravljanje finansijama i nastavljanje reformskog procesa osnova za uspostavljanje održivog razvoja zemlje, sa održivim korišćenjem raspoloživih resursa.*

**Ključne reči:** strane direktne investicije, ekonomski rast, izvoz, Republika Srbija, održivi razvoj

---

4 Profesor emeritus, dr Božidar Raičević, Slobomir P univerzitet, Ulica Svetog Save br. 76, Doboj, BiH, E-mail: [boskoraicevic@gmail.com](mailto:boskoraicevic@gmail.com)

5 Vanredni profesor, dr Svetlana Ignjatijević, FIMEK Novi Sad, Cvečarska ulica br. 2, 21000 Novi Sad, Srbija, E-Mail: [ceca@fimek.edu.rs](mailto:ceca@fimek.edu.rs)

6 Redovni profesor, dr Ivan Milojević, Univerzitet Odbrane, Vojna Akademija, Ulica Pavla Jurišića Šturma br. 33, 11000 Beograd, Srbija, Telefon: +381 60 66 99 177, E-Mail: [drimilojevic@gmail.com](mailto:drimilojevic@gmail.com)





## TOURISM AS A FACTOR OF SUSTAINABLE DEVELOPMENT OF RURAL AREAS BELONGING TO RUDNIČKA MORAVA

*Lela Ristić<sup>1</sup>, Milan Vujičić<sup>2</sup>, Miljan Leković<sup>3</sup>*

### Summary

*The paper looks at tourism as an essential component of sustainable development of rural areas belonging to Rudnička Morava territory. The aim of the paper is to point to the role of tourism in the integration of rural areas into the national and international economy based on the analysis of the relevant rural development model and in terms of more efficient endogenous development. The main hypothesis is that rural areas belonging to Rudnička Morava territory have significant natural and anthropogenic resources for tourism development. However, what lacks is an integrated strategy that would contribute to sustainability and strengthening of the competitiveness of the rural economy. In accordance with the subject of the paper, its aim and the set hypotheses, qualitative, quantitative and SWOT analysis were applied during the research. A survey was conducted in order to obtain positions and feedback from the key actors involved in tourism development. The paper is organized in eight sections. The main result of the research points to the necessity of giving priority to rural tourism development as an essential component of the revitalization of villages and local communities.*

**Key words:** sustainable tourism, rural development, tourism products, destination marketing system, Rudnička Morava.

**JEL:** O18, P25, Q19, R19.

### Introduction

Tourism is generally considered in scientific literature as an industry that has a sig-

- 
- 1 Lela Ristić, Ph.D., Associate Professor, University of Kragujevac - Faculty of Economics, Đure Pucara Starog №3, 34000 Kragujevac, Republic of Serbia, Phone: +381 60 33 48 719, E-mail: [lristic@kg.ac.rs](mailto:lristic@kg.ac.rs)
  - 2 Milan Vujičić, Ph.D., University of Kragujevac - Faculty of Philology and Arts, Jovana Cvijića street bb, 34000 Kragujevac, Republic of Serbia, Phone: +381 60 33 77 404, E-mail: [vujicicm@yahoo.com](mailto:vujicicm@yahoo.com)
  - 3 Miljan Leković, Teaching Assistant, University of Kragujevac - Faculty of Hotel Management and Tourism in Vrnjacka Banja, Vojvođanska bb, 36210 Vrnjacka Banja -Vrnjci Spa, Republic of Serbia, Phone: +381 64 358 23 04, E-mail: [m.lekovic@kg.ac.rs](mailto:m.lekovic@kg.ac.rs)

nificant effect on the economic, social and functional structure of rural areas and as an essential factor in the revitalization and diversification of rural economy (Cozac, 2012; Todorović, Štetić, 2009; Todorović, Bjeljac, 2007; Štetić, Šimičević, 2008; Udovč, Perpar, 2007; Buhalis, Costa, 2006; Pejanović, Vujović, 2008; Bogdanov et al., 2011; Saarinen, Lenao, 2014; Košić et al., 2015). As a matter of fact, those tourist destinations that are distinctive for their preserved and protected nature and unique anthropogenic tourism resources are nowadays considered as the most attractive ones to tourists. Rural areas and their communities have the ability to offer these tourism values and therefore, this is the basis for their tourism potential. The available resources on the territory of Rudnička Morava qualify this microregion to be included in the list of development priorities; furthermore, Rudnička Morava is declared a highly valued region with important natural, cultural and historical resources and a tourism region with distinctive tourist attractions and development potential. Natural and anthropogenic values are characterized by diversity of territorial units of this microregion, as well as their complexity and complementarity. Also, its natural resources represent a solid basis for tourism development. Natural values are especially reflected in beautiful nature, breathtaking landscapes, unique geomorphological features, forests, flora and fauna, rivers and streams, mineral springs, spas, etc. Cultural offer of this microregion is enriched by a series of events and its most authentic traditions are contained in legends, narratives and stories. Sports and recreational activities are a significant motivator of tourist travel in this area. The proximity of cities and roads contribute to the tourism potential and attractiveness of this area.

### **Research methodology**

For the purpose of analysis and in accordance with the aim of the paper, several scientific methods were applied. The method of analysis and synthesis was applied due to the fact that the research in this paper is based on the key strategic documents in the field of sustainable rural development and tourism, relevant scientific literature and official statistical publications; therefore, it was necessary to make a proper selection, process and analyze written material and the results of previous research in the above-mentioned scientific field. The descriptive method was used in terms of the detailed description of the important facts that relate to the sustainable rural development. SWOT (strengths, weaknesses, opportunities, and threats) analysis was used to carry out the strategic analysis of rural areas belonging to Rudnička Morava territory. In order to test the initial hypothesis the method of verification was used. The paper gives special attention to the relationship between theoretical and empirical approach to sustainable rural development. The socio-economic situation in rural areas of Rudnička Morava was identified by conducting primary and secondary research and applying quantitative and qualitative analysis. The paper also identifies strategic steps to be taken in order to strengthen the sustainable development of this microregion through tourism.

## Research results

### Rudnička Morava microregion – location and macroeconomic indicators

Rudnička Morava microregion belongs to the statistical region of Šumadija and Western Serbia and includes:

- Moravica District: the town of Čačak - 31 villages (Goričani, Katrga, Mršinci, Kukići, Mrčajevci, Bečanj, Bresnica, Zablacé, Baluga Trnavska, Vapa, Donja Gorevnica, Stančići, Mojsinje, Konjevići, Baluga Ljubićska, Donja Trepča, Ostra, Vujetinci, Gornja Trepča, Prislonica, Preljina, Ljubić, Sokolići, Rakova, Trbušani, Vranići, Milićevci, Prijedor, Vidova, Miokovci and Gornja Gorevnica).
- Raška District: the town of Kraljevo - 4 villages (Obrva, Cvetke, Ladevci and Tavnik).

Šumadija and Western Serbia statistical region covers an area of 26,493 km<sup>2</sup>. It consists of 2,112 settlements and the total population in this region is 2,003,118 (*Table 1*). This Region participates in the GDP of the Republic of Serbia with 19% (Statistical Office of the Republic of Serbia, 2014b). Average net salary per employee in Šumadija and Western Serbia statistical region compared to the national average and according to data from 2013 is 85.2%, i.e. Moravica District 86.4% - the Town of Čačak 86.5% and Raška District 82.3% - the Town of Kraljevo 85.1% (Statistical Office of the Republic of Serbia, 2014a).

**Table 1.** Key macroeconomic indicators of Šumadija and Western Serbia Region – Districts of Moravica and Raška

	<i>Šumadija and Western Serbia Region</i>	<b>Moravica District</b>	<b>Raška District</b>
<b>Total area (km<sup>2</sup>)</b>	26,493	3,016	3,923
<b>Number of settlements</b>	2,112	206	359
<b>Total population</b>	2,003,118	209,365	308,386
<b>Density/km<sup>2</sup></b>	76	69	79
<b>Number of cadastral municipalities</b>	1,935	194	305
<b>Agricultural land (%)</b>	59.9	58.6	48.3
<b>Persons employed at some legal entity (%)</b>	<b>72.1</b>	<b>72.3</b>	<b>70.2</b>
Manufacturing industry (%)	22.0	28.0	12.9
Trade (%)	7.4	8.7	7.3
Transportation (%)	4.0	4.1	5.0
Healthcare industry (%)	9.7	7.8	10.3
Education (%)	9.9	7.1	10.7
<b>Entrepreneurs and their employees (%)</b>	<b>27.9</b>	<b>27.7</b>	<b>29.8</b>

*Source:* According to data published by Statistical Office of the Republic of Serbia, 2014a.

Moravica District covers an area of 3,016 km<sup>2</sup>. It consists of 206 settlements and its total population is 209,365. There are 194 cadastral municipalities in this District. Agricultural land makes 58.6% of the total land area. There are 177 registered local com-

munity offices and 77 municipal branch offices. 72.3% of the total number of persons employed work for some legal entity, while 27.7% are entrepreneurs and their employees. Unemployed first-time job seekers account for 26.6% (Statistical Office of the Republic of Serbia, 2014a).

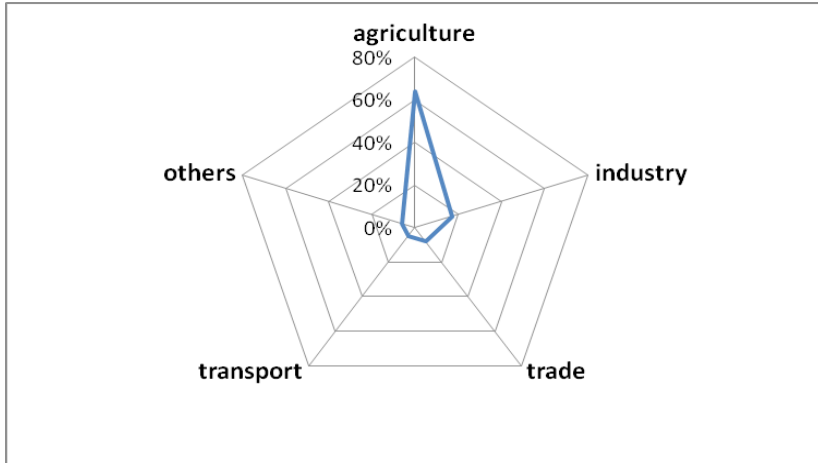
Raška District covers an area of 3,923 km<sup>2</sup>. It includes 359 settlements. Total population is 308,386. The District is divided into 305 cadastral municipalities. Agricultural land makes 48.3% of the total land. There are 149 registered local community offices and 81 municipal branch offices. 70.2% of the total number of persons employed work for some legal entity, while 29.8% are entrepreneurs and their employees. Unemployed first-time job seekers account for 51.1% (Statistical Office of the Republic of Serbia, 2014a).

### **Main characteristics of rural settlements belonging to the administrative unit the town of Čačak, their tourism infrastructure and products**

Territory of the Town of Čačak covers an area of 636 km<sup>2</sup>. This administrative unit has 58 settlements, 57 cadastral municipalities and the population of 114,141 people. There are 69 registered local communities and 29 municipal branch offices. 69.6% of the total number of persons employed work for some legal entity, while 30.4% are entrepreneurs and their employees. Unemployed first-time job seekers account for 26.2% (Statistical Office of the Republic of Serbia, 2014a).

Villages belonging to the administrative unit the Town of Čačak that are the part of Rudnčka Morava microregion are very heterogeneous in terms of the number of inhabitants, households and development level. The basic characteristics of these settlements, in terms of geographical and social structure are as follows: altitude of the villages ranges from 187 m to 642 m; population ranges from 57 to 2,761 people per village which makes a total of 28,252 people that live in 9,162 households in this microregion. The number of members per household ranges from 2.4 to 4; the number of registered farm businesses is 4,611, of which 3,543 are farms that are engaged in commercial production and 1,068 farms are non-commercial (Treasury of the Ministry of Finance, 2015). The population declined by 3,715 people compared to the 2002 census; rural economy and rural infrastructure are underdeveloped.

**Figure 1.** Employment by main activity



Source: Work of authors, based on research results.

Agriculture is the primary business activity in 26 rural settlements, while food processing industry is predominant only in 5 rural settlements (*Figure 1*). Due to the different level of development and the resources available, a single integral model of rural development cannot be applied to all areas (Njegovan, Crnokrak, 2012) - different development strategies and models must be combined. Those strategies that focus on recovery and revitalization, diversification and complementarity are the best strategies for rural development (Vasilevska, Ribar, 2007).

SWOT analysis of the rural settlements indicates that there are fewer weaknesses than strengths in terms of an integrated rural development and tourism development. Identified weaknesses may be significantly mitigated in the long term period through national development programmes, local initiatives and development of tourism value chain. Opportunities to be explored are related to the development of different forms of tourism, greater investments and more intensive development of households involved in tourism (*Table 2*).

**Table 2.** SWOT analysis of rural settlements

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• preserved rural landscapes of exceptional beauty</li> <li>• clean water, clean air, rich diversity of plants and animals</li> <li>• hospitality</li> <li>• cultural and historical heritage</li> <li>• adequate conditions for rural tourism development</li> </ul>	<ul style="list-style-type: none"> <li>• poor diversification of business activities</li> <li>• poor spatial and urban infrastructure</li> <li>• lack of funds</li> <li>• lack of business initiative</li> <li>• unfavorable age structure</li> </ul>

Opportunities	Threats
<ul style="list-style-type: none"> <li>• valorization of cultural events and festivals</li> <li>• improvement of institutional framework for rural development</li> <li>• utilization of funds given by rural development funding programmes</li> <li>• greater community participation in development projects</li> </ul>	<ul style="list-style-type: none"> <li>• inadequate development policy</li> <li>• environmental pollution</li> <li>• people leaving the villages</li> <li>• insufficient professional and development support services</li> <li>• lack of interest to invest in tourism</li> </ul>

*Source:* Work of authors, based on research results.

Tourism offer of Čačak and its surrounding villages is diverse thanks to various forms of tourism that are developed in this area. Cultural and historical monuments and archaeological sites are the subject of interest for many tourists. The Ovčar-Kablar Gorge of exceptional natural beauty together with its numerous monasteries (also called the Serbian Mount Athos) is the most attractive tourist destination. This region is also famous for its fertile soil, favorable climate, and drinking water of exceptional quality. Many rare plant species, as well as fruits and vegetables, are grown in this area. One of the best plum brandies in the world is made from plum varieties indigenous to Čačak, and this plum brandy is also the most famous brand from this region. By preserving cultural and historical heritage and folklore, the traditional crafts are also preserved – making of opanak (traditional footwear in the villages of Eastern Europe), traditional folk costumes, pottery, icons, clothing and souvenirs. The town of Čačak is rich in sports facilities, which enables the development of sports and recreational tourism. Tourism organization of Čačak is the organizer and co-organizer of many tourist, cultural and sporting events; the most visited ones are Kupusijada (food festival dedicated to traditional dishes made of cabbage) in the village of Mrčajevci and the Gathering of the Serbian Flute Players in the village of Prislonica (Strategy for Sustainable Development of the Town of Čačak, 2011). Villages belonging to Rudnička Morava microregion clearly have substantial potential for development of rural tourism. Based on the existing resources, possible directions of tourism development are: spa tourism, cultural tourism, event tourism, religious tourism, sports and recreation, hiking, culinary tourism and ethno-tourism.

**Accommodation capacity:** According to the data of the Tourism Organization, the town of Čačak has several hotels (accommodation capacity 344 beds), several motels (60 beds), resorts (40 beds), B&Bs - bed & breakfast (27 beds) hostels (120 beds), boarding houses (54 beds), camps (34 beds) and also private accommodation (2,000 beds). In the village Prislonica, two households – the household of the family Pravdić and the household of the family Vićović are engaged in rural tourism; their accommodation capacity is 6 and 9 beds, respectively.

**Overnight stays:** 27,192 tourists were registered in Čačak in 2013, of which 18,325 were domestic tourists (67.4%). Total number of overnight stays was 131,609 of which 78.6% were made by domestic tourists. The average length of stay was 5.6 days for domestic tourists and 3.3 days for foreign tourists. 9,814 tourists visited spa resort Gornja

Trepča in 2013, of which 8,528 were domestic tourists (86.9%). Total number of nights stayed was 104,300, where 84% of overnight stays were made by domestic tourists. The average length of stay was 10.3 days for domestic and 13 days for foreign tourists (Statistical Office of the Republic of Serbia, 2014a).

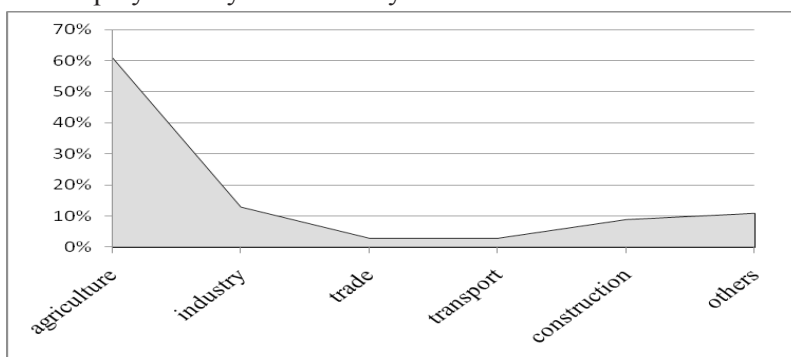
### Main characteristics of rural settlements belonging to the administrative unit the town of Kraljevo, their tourism infrastructure and products

Total area of the administrative unit the town of Kraljevo is 1,530 km<sup>2</sup>. This administrative unit consists of 92 settlements. There are 84 cadastral municipalities. There are 123,724 people living in this territory. 72.0% of the total number of persons employed work for some legal entity, while 28.0% are entrepreneurs and their employees. Unemployed first-time job seekers account for 31.9% (Statistical Office of the Republic of Serbia, 2014a).

Villages belonging to the administrative unit the town of Kraljevo that are the part of Rudnička Morava microregion are characterized by the following: altitude of the villages spans a range from 181 m to 308 m; population ranges from 651 to 1,125 people per village which makes a total of 3,841 people that live in 1,096 households; there are 816 registered farm businesses, of which 629 are farms that are engaged in commercial production and 187 farms are non-commercial (Treasury of the Ministry of Finance, 2015); the median age is 44.2 years; the population declined by 604 people compared to the 2002 census; the number of members per household ranges from 3.1 to 3.6. Rural economy and rural infrastructure are insufficiently developed.

Agriculture is the dominant activity and is followed by manufacturing, construction (especially in Tavnik), trade and transportation (*Figure 2*).

**Figure 2.** Employment by main activity



*Source:* Work of authors, based on research results.

SWOT analysis of the rural settlements belonging to the administrative unit the town of Kraljevo indicates that the moderate climate, favorable conditions for developing products with geographical indication, development of rural tourism products and other



products associated with this type of tourism represent main comparative strengths, while major weakness arise from the present development situation of rural settlements and their communities (*Table 3*).

**Table 3.** SWOT analysis of rural settlements

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>• natural resources</li> <li>• tourism events</li> <li>• resources for rural tourism development</li> <li>• hospitality, openness and hedonism</li> <li>• cultural and historical heritage</li> </ul>	<ul style="list-style-type: none"> <li>• poor diversification of business activities</li> <li>• poor infrastructure</li> <li>• lack of funds</li> <li>• lack of business initiatives</li> <li>• unfavorable age structure</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>• utilization of development funds</li> <li>• economic diversification</li> <li>• valorization of cultural events and festivals</li> <li>• development of local action groups</li> </ul>	<ul style="list-style-type: none"> <li>• lack of interest from local and foreign investors</li> <li>• people leaving the villages</li> <li>• lack of programmes to encouraging young people to return to live in the villages</li> <li>• environmental pollution</li> </ul>

*Source:* Work of authors, based on research results.

Development strategies that would be best implemented in this region are those that focus on recovery and revitalization and accelerated development (Bogdanov, 2007), in order to prevent migration from rural areas, boost diversification of the rural economy, encourage the creation of new jobs and improve rural well-being. It should be noted that the goals of rural development can be both agricultural and non-agricultural (Dunay, 2011; Simonović, Milanović, 2005; Đekić, 2000), in this respect sustainable tourism allows optimal use of resources, while maintaining essential ecological processes and helps to preserve the natural heritage and biodiversity at the same time respecting the socio-cultural uniqueness of local communities.

Tourism offer: The town of Kraljevo has sufficient resources for development of different types of tourism. Thermal and thermal mineral springs are most important natural resources for tourism development. As far as the cultural tourism is concerned, this region is rich in cultural and historical monuments, as well as monasteries that date back to medieval times. Numerous tourist and sporting events are held in Kraljevo and the nearby villages: Days of Lilacs, Silver Cauldron, car and motorcycle races, white water rafting (on the Ibar River), the Annual Hiker Gathering, Art Colony, Classical Music Festival, International Jazz Festival, Art Festival, Days of Honey and Beekeeping, Daffodils Revisited, Bean Festival, Corn Bread Festival, Days of Football, children’s and family festivals and etc. Rural tourism is more and more perceived as a form of escapism from the city life and return to nature. Tourists are given the opportunity to taste a wide range of local specialties, health food, famous cream from Kraljevo, cheese, fruit and vegetables, meat products, fruit brandies, etc. Villages Rudno, Lopatnica and Bogutovac are the leaders in terms of rural tourism development. Tourism offer is very diverse and attractive, thus, visitors can chose to go hunting, fishing, horseback riding, cycling, hiking along the marked trails, as well as to

gather wild berries and medicinal plants, help with the work on the farm, help prepare meals, cook food preserve and the like. Villages near Kraljevo are also famous for their natural and artificial beaches on the riverbanks, swimming pools and swimming ponds, which are ideal places for relaxation, entertainment and recreation during the summer months. Several households in the village of Rudno are engaged in rural tourism, these are: the household of Škeler family, the household of Dragan and Radina Milošević, the household of Predrag Ćirović-Peda and the household of Slađana Milikić-Sretović. Two households are engaged in rural tourism in the village of Lopatnica – the household of Ljubomir Milojević and the household of Gorana Vukićević. Ethno Village Bogut owned by Jovica and Darinka Filipović is situated in the village of Bogutovac. Villages near Kraljevo that belong to Rudnička Morava microregion have sufficient resources for development of rural, cultural, event, recreational and religious tourism, and they should be given priority in terms of the future development programmes. The economy of these villages is diversified, i.e. there are enterprises, grocery stores, craftsmen's shops, retail stores, bars and restaurants. Church of the St. Paul the Apostle is situated in Cvetke village and Monastery Voljavča is situated in Tavnik village. Art Colony and the Annual Horse Pulling event are held in Cvetke village, while Folk Music Festival and sports tournaments are regularly organized in Ladevci village. Based on the available resources, the possible directions of tourism development in this area are: spa tourism, hiking, cultural events and festivals, sports and recreation, adventure tourism, culinary tourism and rural tourism (Development Strategy of the Town of Kraljevo, 2015).

Accommodation capacity: Kraljevo has a large number of accommodation facilities. Namely, hospitality establishments and facilities have a total of 2,176 beds. The greatest accommodation capacity is that of spa resort Mataruška Banja (980 beds), followed by spa resort Bogutovačka Banja (545 beds), Goč (450 beds) and the town of Kraljevo with 140 beds (Development Strategy of the Town of Kraljevo, 2015).

Overnight stays: 25,368 tourists were registered in Kraljevo in 2013, of which 19,704 were domestic tourists (77.7%). Total number of overnight stays was 118,738, of which 90.6% were made by domestic tourists. The average length of stay was 5.5 days for domestic and 2 days for foreign tourists (Statistical Office of the Republic of Serbia, 2014a).

### **Development of key tourism products, infrastructure and destination marketing**

In terms of the next development period and based on the aforementioned, one can confidently say that Rudnička Morava microregion will strengthen its position on the tourism market through creation of distinctive, modern tourism product, adequate infrastructure, branding and improvement of the overall service quality of this destination. However, it is necessary to functionally connect this microregion with neighboring towns, cities and resorts. With this in mind, it is important to support the programmes/projects related to preserving local traditions and customs and local cuisine through improvement of existing traditional festivals; carry out valorization of forest resources in order to include them in the tourism offer; develop hunting tourism; develop birdwatching tours; build new recreation trails; build accommodation

facilities in the authentic villages; and work intensively on education and development of tourism.

Rudnička Morava, as a tourist destination, should build its long-term market position by taking into account the following aspects of the tourism market infrastructure: the need for innovation, differentiation and specialization; education, staff training and development and overall improvement of the service quality; development of destination management systems; branding of local delicacies; participation of local healthy food producers in distribution of products; food product innovation; modernize and improve local hospitality facilities serving food and beverages; organize various workshops for tourists; establish visitor information center; improve and protect older locations and settlements; put up information signs and signposts.

Advertising and promotion of Rudnička Morava are among the most important tourism development processes and are important determinants of tourism development in this microregion. In this regard, it is necessary to improve all aspects of tourism promotion that boost tourism development. People who live on the territory of Rudnička Morava and have relevant knowledge and qualifications, as well as sufficient experience, should play an important role in tourism development and promotion. In the context of further development of Rudnička Morava as a tourist destination, it is necessary to establish an adequate marketing system which includes at least four major areas, namely: marketing infrastructure and branding programmes; sales and commercialization systems; communication systems; and internal marketing.

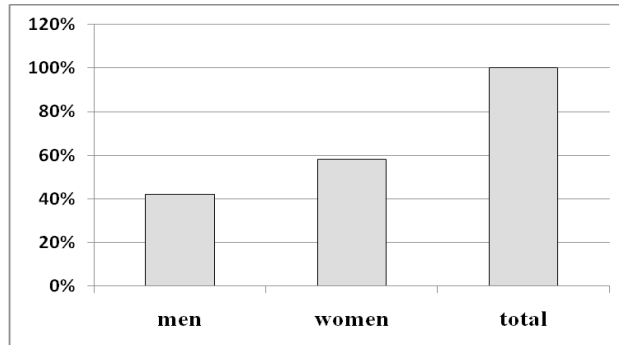
### **Positions of the key stakeholders on the effect of tourism on the development of rural areas**

Survey research was used to assess the attitudes of the respondents, for which purpose e-mail survey and personal interviews were conducted.

**a) Results of the research on the attitudes of tourists:**

Survey on the attitudes of tourists was conducted in order to identify elements of the tourism offer that should be improved so as to make this destination recognizable on the tourism market. The questionnaire is divided into two parts: the first part establishes the age structure, educational level and demographic structure of the respondents, while the second part of the questionnaire examines whether the respondents already visited this destination and what were the motives of their visit, as well as measures the level of their overall level of satisfaction.

**Figure 3.** Gender structure of the respondents

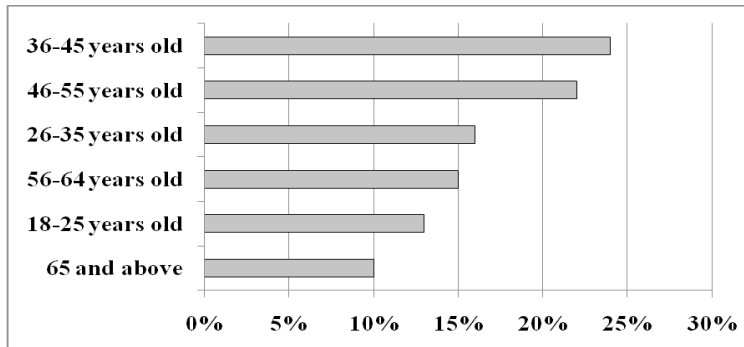


Source: Work of authors, based on research results.

In terms of the gender structure, of the total number of 60 people surveyed 58% are women (Figure 3).

The most common age group is that between 36-55 years, while the persons over 65 years of age are in the the least represented age group. The population aged 18-45 years makes 53% of the total number of respondents, 37% are people between 46-65 years of age, while people over 65 years represent only 10% of the sample (Figure 4).

**Figure 4.** Age structure of the respondents



Source: Work of authors, based on research results.

In terms of the level of education, the largest percentage of respondents have completed secondary education (36%), then follow the respondents with university degree (32%), while 27% of respondents completed some college.

The majority of respondents (52%) described themselves as persons interested in learning about new places and enjoying beauty of nature, 17% tourists interested in sports and recreational tourism, 13% culinary tourists, tourists interested in history and cultural heritage 10%, environmentally motivated tourists 8% and others. The largest percentage of respondents - 65% are new visitors, i.e. they visited this destination for the first time, while others are returning visitors who visited this destination between EP 2016 (63) 2 (665-680)

two and five times. As for the length of stay, 53% of respondents stayed for just two days, while 30% of respondents stayed for 10 days. The rest of the respondents stayed for more than 10 days. Of the total number of the respondents, 83% are self-organized tourists, while 17% use the services of some travel agency. The majority of visitors come with their friends and family - 72%. Most of the respondents learnt about this destination from articles in newspapers and magazines (27%), 21% were informed by word of mouth (usually from friends and relatives), Internet (20%), brochures (18%) or some other information source.

Average rating of the respondents' overall experience and the level of satisfaction during their visit on a scale of 1 to 5 is 3.56, therefore, it can be concluded that the respondents were generally satisfied. However, they were less satisfied with the following: souvenirs and local products, diversity of tourism products and infrastructure. They enjoyed in preserved environment, natural and cultural-historical heritage, hospitality of their hosts, food and beverage offer.

b) Results of the research on the attitudes of tourism organizations:

Tourism organizations on the territory of Rudnička Morava were surveyed primarily in order to determine their attitudes and opinions on the opportunities for development of tourism products in the region. Here are the results of the research:

- Tourism organizations put first event tourism and consider it the most important tourism product; then follow rural tourism, culinary tourism, cultural tourism, ecotourism, sports and recreation and hunting tourism;
- rural tourism, according to the views of tourism organizations, is less developed compared to other forms of tourism, although there are significant natural and human resources which are increasingly used for tourism development;
- Tourism organizations rate accommodation facilities in rural areas as unsatisfactory and are of the opinion that these should be significantly improved;
- according to the tourism organizations, cultural resources, including events and rich cuisine are solid basis for development of rural tourism;
- Tourism organizations identify the following as the main constraints in terms of development of rural tourism products: lack of funds and motivation for starting a tourism business, overlooking good practice examples and failing to register guests that tourism organizations send to rural households, infrastructure issues in villages, inadequate resources of the local community offices to stimulate tourism development.

c) The results of the research on the attitudes of rural tourism households are as follows:

Survey included 10 rural households and was conducted to determine their attitudes and opinions on the constraints and opportunities for development of rural tourism. The

obtained results indicate the following:

- in recent years there is an increase in the number of households that decide to become rural tourism providers;
- the dominant age structure for persons in this region is ages 35-50 years (60%);
- income from tourism and agriculture are the primary source of income for 40% of the surveyed households, while for other 60%, tourism, salaries paid by some employer and pensions are the primary source of income;
- the majority of households started their rural tourism businesses by investing their own savings and assets as the initial capital (80%);
- 70% of households see the small number of guests and the problems related to adaptation, registration and categorization of accommodation facilities as the main problem when starting the rural tourism business;
- 80% of respondents intend to expand the business in the future, primarily by investing in increasing the accommodation capacity or opening ethnic restaurants;
- most surveyed households rent 2-4 rooms to guests and these are mostly double rooms;
- all surveyed households offer accommodation and food services, also, guests are given the opportunity to buy or make some home-made products during their stay (fresh fruits and vegetables, different kinds of jams, fruit preserves, roasted pepper spread (ajvar), brandy, juices, meat products, eggs, cheese, cream, honey, wine, etc.) as well as handicraft products;
- most surveyed households had 100 to 500 overnight stays a year made primarily by domestic tourists from urban centers;
- most respondents completed some educational seminar in the field of rural tourism and they confirm that they could put into practice what they learned; some of the respondents attended some educational course abroad which they found useful.

### **Conclusion**

Rudnička Morava microregion is an area of very favorable natural resources for tourism development. Climate characteristics, geographical configuration and altitude allow the development of quality tourism products. Existing natural and cultural resources provide an opportunity for the development of year-round and diversified supply of tourism products; despite this tourism does not generate the expected economic effects. Entrepreneurial initiatives are the key to the successful development of tourism, as well as willingness of the investors to invest their funds in various projects and cooperation of the key development actors. Administrative and legal mechanisms regulating environmental protection are very important for the implementation of strategies for sustainable tourism development in this microregion. The condition of general and

tourism infrastructure must be continuously improved, as well as economic status of rural settlements. The lack of organized sale of local products and souvenirs indicates that a particular trading area should be established where handicrafts, souvenirs and products with protected designation of origin would be sold and which would adequately meet the tourists' demand for certain products and local produce. Due to the great tourism potential, the authorities must see that all cultural and historical monuments in this area are put under the highest level of protection, also, they must strictly control the processes of conservation of these monuments. The use of natural resources must be strictly controlled, particularly granting of concessions for use of natural resources for tourism purposes. Local governments have the primary task to create attractive conditions for attracting new investors and are responsible for establishing an adequate control mechanism which will ensure a balance between the three pillars of sustainable development - environmental protection, economic development and social development. And, to conclude this topic, it is vital to stress the role of tourists in the sustainable development of tourist destination Rudnička Morava.

#### Literature

1. Bogdanov, N. (2007): *Mala ruralna domaćinstva u Srbiji i ruralna nepoljoprivredna ekonomija*, UNDP - Program Ujedinjenih nacija za razvoj, Beograd, Srbija, (available at: [http://ruralinfoserbia.rs/publikacije/undp\\_mala\\_ruralna\\_domacinstva.pdf](http://ruralinfoserbia.rs/publikacije/undp_mala_ruralna_domacinstva.pdf)).
2. Bogdanov, N., Zečević, B., Versaci, A., Rohac, J. (2011): *Javno-privatno partnerstvo u ruralnom turizmu*, UNDP - Program Ujedinjenih nacija za razvoj, Beograd, Srbija.
3. Uprava za trezor Ministarstva finansija Republike Srbije (2015): *Broj registrovanih poljoprivrednih gazdinstava*, Beograd, Srbija.
4. Buhalis, D., Costa, C. (2006): *Tourism business frontiers*, Butterworth-Heinemann Elsevier, Oxford, United Kingdom.
5. Cozac, E. (2012): *The importance of rural tourism development in rural communities*, in Fascucula: Ecotoxicologie, Zootehnie și Tehnologii de Industrie Alimentară, pp. 19–22, Analele Universității din Oradea, Oradea, Romania, (available at: [http://protmed.uoradea.ro/facultate/anale/ecotox\\_zooteh\\_ind\\_alim/2012A/imapa/07.Cozac%20Elena.pdf](http://protmed.uoradea.ro/facultate/anale/ecotox_zooteh_ind_alim/2012A/imapa/07.Cozac%20Elena.pdf)).
6. Đekić, S. (2000): *Agrarni i neagrarni aspekti ruralnog razvoja*, Ekonomski horizonti, vol. 2, no. 1-2, pp. 53-59, Ekonomski fakultet Univerziteta u Kragujevcu, Kragujevac, Srbija, (available at: [http://www.horizonti.ekfak.kg.ac.rs/sites/default/files/casopis/2000/4\\_Snezana\\_Djekic.pdf](http://www.horizonti.ekfak.kg.ac.rs/sites/default/files/casopis/2000/4_Snezana_Djekic.pdf)).
7. Dunay, A. T. (2011): *Development of rural areas through the CAP 2020 and Europe 2020 strategies*, Szent István University, Gödöllő, Hungary, (available at: [http://www.wne.sggw.pl/czasopisma/pdf/PRS\\_2011\\_T11%2826%29\\_z3\\_s161.pdf](http://www.wne.sggw.pl/czasopisma/pdf/PRS_2011_T11%2826%29_z3_s161.pdf)).
8. Košić, K., Demirović, D., Pejanović, R., Lazić, L., Stamenković, I. (2015): *Key principles of rural tourism households development strategy – case of Vojvodina*, Ekonomika poljoprivrede, vol. 62, no. 4, pp. 975-989, The Institute

- of Agricultural Economics, Belgrade, Serbia (available at: <http://bsaae.bg.ac.rs/images/Ekonomika%20kompletna/2015/EP%20-%204%20-%202015%20-%20%20final.pdf>).
9. Njegovan, Z., Crnokrak, N. (2012): *Ruralni razvoj u ekonomskim teorijama razvoja*, Agroprivreda Srbije u pretpristupnom periodu, DAES - Društvo agrarnih ekonomista Srbije, Beograd, Srbija, pp. 89-109, (available at: [http://portal.zzbaco.com/mojo\\_baco/Data/Sites/1/thematicproceedings\\_agrarianeconomyofserbia....pdf](http://portal.zzbaco.com/mojo_baco/Data/Sites/1/thematicproceedings_agrarianeconomyofserbia....pdf)).
  10. Pejanović, R., Vujović, S. (2008): *Ruralni razvoj i agroturizam*, Agroekonomika, no. 37-38, pp. 5-15, Poljoprivredni fakultet Univerziteta u Novom Sadu, Novi Sad, Srbija, (available at: [http://agroekonomika.rs/images/arhiva/agroekonomika\\_37-38.pdf](http://agroekonomika.rs/images/arhiva/agroekonomika_37-38.pdf)).
  11. Republički zavod za statistiku (2014a): *Opštine i regioni u Republici Srbiji 2014*, Beograd, Srbija, (available at: <http://pod2.stat.gov.rs/ObjavljenePublikacije/G2014/pdf/G20142014.pdf>).
  12. Republički zavod za statistiku (2014b): *Statistički godišnjak Republike Srbije 2014*, Beograd, Srbija, (available at: <http://pod2.stat.gov.rs/ObjavljenePublikacije/G2014/pdf/G20142013.pdf>).
  13. Saarinen, J., Lenao, M. (2014): *Integrating tourism to rural development and planning in the developing world*, Development Southern Africa, vol. 31, no. 3, pp. 363–372, Routledge Taylor & Francis, Abingdon, Oxon, United Kingdom.
  14. Simonović, Z., Milanović, R. (2005): *Neki ekološki problemi poljoprivredne proizvodnje i ruralnog razvoja*, Multifunkcionalna poljoprivreda i ruralni razvoj, Institut za ekonomiku poljoprivrede, Beograd, Srbija.
  15. *Strategija održivog razvoja grada Čačka*, Skupština grada Čačka, 2011, Čačak, Srbija (available at: <http://www.cacak.org.rs/userfiles/files/Nacr%20Strategije%20odrzivog%20razvoja%20grada%20Cacka.pdf>).
  16. *Strategija razvoja grada Kraljeva 2015-2020*, Skupština grada Kraljeva, 2015, Kraljevo, Srbija, (available at: <http://www.kraljevo.rs/wp-content/uploads/2015/10/STRATEGIJA-RAZVOJA-GRADA-KRALJEVA.pdf>).
  17. Štetić, S., Šimičević, D. (2008): *How to develop sustainable tourism in rural destinations in Serbia*, Bulletin of the Serbian Geographical Society, vol. 4, no. 4, pp. 19–28, Serbian Geographical Society, Belgrade, Serbia, (available at: <http://www.doiserbia.nb.rs/img/doi/0350-3593/2008/0350-35930804019S.pdf>).
  18. Todorović, M., Bjeljic, Ž. (2007): *Osnove razvoja ruralnog turizma u Srbiji*. Glasnik Srpskog geografskog društva, vol. 1, no. 1, pp. 135–148, Srpsko geografsko društvo, Beograd, Srbija, (available at: <http://www.doiserbia.nb.rs/img/doi/0350-3593/2007/0350-35930701135T.pdf>).
  19. Todorović, M., Štetić, S. (2009): *Ruralni turizam*, Geografski fakultet Univerziteta u Beogradu, Beograd, Srbija.
  20. *Turistička organizacija Čačka*, (available at: <http://turizamcacak.org.rs/>)
  21. *Turistička organizacija Kraljeva*, (available at: <http://www.jutok.org.rs/>)
  22. Udovč, A., Perpar, A. (2007): *Role of Rural tourism for development of rural*



*areas*, Journal of Central European Agriculture, vol. 8, no. 2, pp. 223–228, Faculty of Agriculture - University of Zagreb, Zagreb, Croatia, (available at: [https://jcea.agr.hr/articles/471\\_ROLE\\_OF\\_RURAL\\_TOURISM\\_FOR\\_DEVELOPMENT\\_OF\\_RURAL\\_AREAS\\_en.pdf](https://jcea.agr.hr/articles/471_ROLE_OF_RURAL_TOURISM_FOR_DEVELOPMENT_OF_RURAL_AREAS_en.pdf)).

23. Vasilevska, Lj., Ribar, M. (2007): *Strateški pristup ruralnom razvoju – prednosti i ograničenja primene dopunskih aktivnosti*, Vlasinski susreti 2007-Tradicionalno i savremeno u radu i životu ljudi u selu, Srpsko udruženje za sociologiju sela i poljoprivrede, Zavod za proučavanje sela, Balkanska asocijacija za sociologiju sela i poljoprivrede, Beograd, Srbija, pp. 200-210.

## TURIZAM KAO FAKTOR ODRŽIVOG RAZVOJA RURALNIH PODRUČJA RUDNIČKE MORAVE

*Lela Ristić<sup>4</sup>, Milan Vujičić<sup>5</sup>, Miljan Leković<sup>6</sup>*

### Rezime

*Predmet istraživanja ovog rada je turizam, kao esencijalna komponenta održivog ruralnog razvoja područja Rudničke Morave. Cilj rada je da se, na osnovu analize modela ruralne razvijenosti na ovom području, ukaže na ulogu turizma u integraciji ruralnih oblasti u nacionalnu i međunarodnu ekonomiju, sa stanovišta efikasnijeg endogenog razvoja. Osnovna hipoteza od koje se polazi je da ruralna područja Rudničke Morave raspolazu značajnim prirodnim i antropogenim resursima za razvoj turizma, ali nedostaju integrisane strategije za njegov održivi doprinos jačanju konkurentnosti ruralne privrede. S obzirom na predmet, cilj i postavljene hipoteze, u radu je primenjena kvalitativna, kvantitativna i SWOT analiza, a za istraživanje stavova ključnih aktera razvoja turizma korišćen je anketni metod. Rad je strukturiran u osam delova. Ključni rezultat istraživanja je ukazivanje na neophodnost stavljanja fokusa na razvoj ruralnog turizma, kao bitne komponente revitalizacije sela i lokalnih zajednica.*

**Ključne reči:** *održivi turizam, ruralni razvoj, turistički proizvodi, marketing sistem destinacije, Rudnička Morava.*

---

4 Vanredni profesor, dr Lela Ristić, Univerzitet u Kragujevcu – Ekonomski fakultet, Ulica Đure Pucara Starog br. 3, 34000 Kragujevac, Republika Srbija, Telefon: +381 60 33 48 719, E-mail: [lristic@kg.ac.rs](mailto:lristic@kg.ac.rs)

5 Dr Milan Vujičić, Univerzitet u Kragujevcu–Filološko-umetnički fakultet, Ulica Jovana Cvijića bb, 34000 Kragujevac, Republika Srbija, Telefon: +381 60 33 77 404, E-mail: [vujicicm@yahoo.com](mailto:vujicicm@yahoo.com)

6 Asistent, Miljan Leković, Univerzitet u Kragujevcu – Fakultet za hotelijerstvo i turizam u Vrnjačkoj Banji, Vojvođanska bb, 36210 Vrnjačka Banja, Republika Srbija, Telefon: +381 64 358 23 04, E-mail: [m.lekovic@kg.ac.rs](mailto:m.lekovic@kg.ac.rs)

## HUMAN RESOURCE MANAGEMENT AT „AD IMLEK BELGRADE”<sup>1</sup>

*Maja Samardžić<sup>2</sup>, Dragić Živković<sup>3</sup>, Zoran Rajić<sup>4</sup>, Sreten Jelić<sup>5</sup>*

### Summary

*Human resources include overall human potential within an organisation: the available knowledge and experience, usable skills and abilities, possible ideas and creations, the level of motivation and interest in the achievement of organisational objectives, etc. The objective of this paper is to highlight the role and importance of human resource management (HRM) in achieving business success, based on the analysis of the most important theoretical and practical aspects of human resource management at the “Imlek” Company. This study required the use of different methods and techniques such as: content analysis, case study, observation, testing and systemic approach. The study showed that sale of the Imlek Company products was widespread in the country and the region. An ongoing market advantage is achieved due to a high quality standard of products, and primarily due to an effective management of human resources. Company management should make formalisation and unification, and implement a set of measures in order to improve discipline of the employees. Top workers should be motivated through incentives for performance and innovation.*

**Key words:** *management and/or managing, human resources, business improvement, career development, milk and dairy products.*

**JEL:** *J24, O15, Q130*

---

1 The paper is the part of the research on the Project: “Rural Labor Market and Rural Economy of Serbia - Income Diversification and Poverty Reduction” (ON 179028), funded by Ministry of Education, Science and Technological Development of the Republic of Serbia.

2 Maja Samardžić M.Sc., E-mail [maja.samardzicsl@gmail.com](mailto:maja.samardzicsl@gmail.com)

3 Dragić Živković Ph.D., Professor, University of Belgrade, Faculty of Agriculture, Nemanjina street no. 6, 11080 Belgrade, Phone: + 381 11 261 53 15 ext. 425, E-mail: [d.zivkovic@agrif.bg.ac.rs](mailto:d.zivkovic@agrif.bg.ac.rs)

4 Zoran Rajić Ph.D., Professor, University of Belgrade, Faculty of Agriculture, Nemanjina street no. 6, 11080 Belgrade, + 381 11 261 53 15 ext. 414, E-mail: [zorajic@agrif.bg.ac.rs](mailto:zorajic@agrif.bg.ac.rs)

5 Sreten Jelić Ph.D., Professor, University of Belgrade, Faculty of Agriculture, Nemanjina street no. 6, 11080 Belgrade, + 381 11 261 53 15 ext. 421, E-mail: [sjelic@agrif.bg.ac.rs](mailto:sjelic@agrif.bg.ac.rs)

## Introduction

Management approach known as “human resource management”, appeared for the first time in theory (especially in the American theory) during 1980s. Prior to that, it was mainly called personnel management. Use of the new term marked an essential new stage in the development of this discipline. Human resource (HR) management is a field of organisational science dealing with the study of all HR aspects in an organisation. Human resources include overall human potentials within an organisation: the available knowledge and experience, usable skills and abilities, possible ideas and creations, the level of motivation and interest in the achievement of organisational objectives, etc. (Suša, 2009). The term “manager” basically relates to a person who holds a managerial position (or performs managerial tasks) in an organisation (Lončarević, 2007).

The role and importance of human resource management (HRM) in achieving business success was presented by means of analysis of the most important theoretical and practical aspects of human resource management at the “Imlek” Company. Namely, with a share of 11% in the output value of agriculture milk production is one of the most important branches of agriculture in Serbia (Popović, 2009). Five biggest dairy plants process most of the purchased quantities of milk (about 380 million litres or nearly a quarter of all milk produced in Serbia). The “Imlek” Company processes by far the bulk of this quantity (Van Berkum, 2010). The “Imlek” Company is the highest capacity dairy company - estimated 600.000 litres of intake per day - 27.2% of total intake (Božić et al., 2009). It has the biggest share in entire milk production and market share in Serbia and a leading position in the region with facilities in Serbia, Bosnia and Herzegovina, FYR Macedonia and Montenegro (Veljković et al., 2009). Other dairies in Serbia are relatively small, and most of them can be categorised as handicraft dairies producing dairy products for the local market. Many of these dairy plants operate on a very small scale and would have great difficulties complying with today’s international quality and hygiene requirements (Van Berkum, 2009).

### **Paper objectives, research methods and data sources**

The main objective of this paper is to highlight the role and importance of human resource management in achieving business success by means of analysis of the most important theoretical and practical aspects of human resource management in a business system. Scientific and theoretical knowledge was studied for the purpose of drafting this paper, including relevant literature and modern business practice by using basic analytic and synthetic methods. This study required the use of different methods and techniques such as: content analysis, case study, followed by observation and testing. Systemic approach was also used. The purpose of this paper was to review the management of human resources especially as it is an important business and management function in an organisation in both theory and practice. The following data sources were used while drafting this paper: observation of the entire company, its administration and production, business operations, interviews with the company management representatives, production directors and company employees, direct insight into the company’s documentation and records. National and foreign professional and scientific literature was used.

### History, scope of work and production equipment owned by the company

The “Imlek” Company was founded in 1953 and it is comprised of several manufacturing plants and distribution centres in the region. Nowadays it is a company operating in the territories of Serbia, Bosnia and Herzegovina, Macedonia and Montenegro.

The first PKB (Agricultural Corporation Belgrade) dairy was built in, the “Lepušnica” holding in Glogonjski Ritand hence the Imlek dairy industry was formed. The company’s current name “Imlek” was first used in 1972. The “Imlek” joint stock milk and dairy products company Belgrade was founded on 12.03.1991. The “Imlek” Company was owned by the Salford Investment Fund in the period between 2003 and 2004 as the Serbian Government sold it thereto. In April 2010, the Danube Foods investment fund bought 80% shares thereof. The Danube Foods Group (DFG) is composed of the companies that are some of the most recognisable Serbian brands - Imlek, Mlekara Subotica, Bambi Banat and Knjaz Miloš. AD Imlek Beograd shareholders are shown in Table 1.

The “Imlek” Company became a joint stock company in the early 1990s when it became a unit separate from the Belgrade Agricultural Corporation (PKB). Following the approval by the Privatization Agency in 2003, the Dutch company Danube Foods BV acquired a 51% of the Imlek shares. Danube Foods BV today owns 80.88% of the Imlek shares. The remaining shares are in the possession of small shareholders.

**Table 1.** AD Imlek Belgrade shareholders

Business name/ name and surname of 10 biggest shareholders	Number of shares on 31.12.2013	Share in the base capital in % on 31.12.2013
1. Danube Foods Group B.V	6,510,545	80.88%
2. Akcionarski fond AD – Beograd – (Shareholder Fund AD – Belgrade)	120,456	1.50%
3. Imlek - AD	443,079	5.50%
4. Institute for Economic Research	68,018	0.84%
5. Banca Intesa AD - Belgrade	26,551	0.33%
6. Gustavia Fonder Aktiebolag	40,000	0.50%
7. Banca Intesa AD - Belgrade	47,171	0.59%
8. BDD M&V Investments AD	21,307	0.26%
9. PIO Fund RS	17,764	0.22%
10. VUČIĆEVIĆ Zoran	16,545	0.21%

Source: AD Imlek Company Belgrade documentation

**The scope of work of the company** refers to the process of production of milk and dairy products. AD Imlek Belgrade includes the production and distribution centres in Serbia. Production is located in Belgrade, while the production of cheese is in Zaječar. Distribution centres in Serbia are in Zemun, Subotica, Novi Sad, Kraljevo, Zaječar and Niš. The following processes are carried out in Padinska Skela in Belgrade : production (reception of milk and pasteurisation, UHT - sterilisation, KMN - cold storage and maintenance), raw material supply, quality control, storage of raw materials, finished goods warehouse (ambient temperature and

cold storage). Other services are located in Zemun, in Belgrade: Sales, Marketing, Financial Department, Human Resources Department, Procurement Department, Finished Goods Distribution Centre. About 80 different products are produced in the “Imlek” Company on a daily basis. The products can be seen in the Imlek catalogue of products. The catalogue includes the products that have the same name, but different weight, composition and other characteristics.

The City of Belgrade has the largest milk processing capacities thanks to the “Imlek” milk company in which over 500 thousand litres of milk are processed on a daily basis with a 16% share of the total milk production (Kljajić et al., 2011).

Production equipment in Padinska Skela in Belgrade;

- Lines for receiving of raw milk from trucks – tanks;
- Raw milk storage tanks;
- Pasteurisers;
- Pasteurised milk storage tanks;
- Sterilisers;
- Homogenisers;
- UHT beverage (chocolate milk) preparation equipment;
- Lines for filling and packaging of UHT milk;
- Fermentation tanks;
- Puffer tanks;
- Lines for filling and packaging of KMN products;
- Warm and cold chambers;
- Automatic UHT and KMN palletising systems;
- Butter packaging equipment.

Analysis of income and expenditure and other success factors of the AD Imlek Belgrade are presented in Table 2.

**Table 2.** Analysis of income and expenditure and other success factors of the AD Imlek Belgrade

<b>Analysis of income and expenditure and other success factors</b>		
<b>For the period between 01.12. and 31.12.</b>	<b>2013</b>	<b>2012</b>
Total income (000 rsd)	22,962,488	23,273,627
Total expenditure (000 rsd)	20,371,583	20,458,967
Profit before tax (000 rsd)	2,590,905	2,814,660
Net profit (000 rsd)	2,271,901	2,670,444

Return on equity %	24.76	26.57
Return on total assets %	9.63	11.85
Level of indebtedness %	61.10	55.39
Cost-effectiveness %	118	118
Profitability %	10.67	11.47

*Source:* AD Imlek Belgrade company documentation

Holders of the lowest educational level at the AD Imlek Belgrade company (III degree) are mainly dairy workers. The highest degree is a PhD degree. However, there are also unskilled workers. The total number of employees is 764. The qualification structure of the company is presented in Table 3.

**Table 3.** Qualification structure of the AD Imlek Belgrade Company

Qualification	Number of Employees	Share in %
Unqualified	22	2.9
III degree	191	25
IV degree	303	39.6
Semi-qualified	6	0.8
V - Highly-qualified	54	7.1
VI - First college degree	47	6.1
VII - Faculty	139	18.2
VIII - Doctorate	2	0.3
Total	764	100

*Source:* AD Imlek Belgrade Company documentation

The AD Imlek Belgrade Company had the biggest number of workers before the privatisation. In 2004, there were 1,500 workers. Today, AD Imlek Belgrade has 764 employees. The age structure of the AD Imlek Belgrade Company employees is presented in Table 4.

**Table 4.** Age structure of the AD Imlek Belgrade Company employees

Age	Number of employees	Share in %
18 - 24	0	0
24 - 34	88	11.5
35 - 45	302	39.5
46 - 55	313	41
56 - 66	61	8
Total	764	100

*Source:* AD Imlek Belgrade Company documentation

The youngest employee is 24 years old and the oldest one is 66 years old. The largest number of workers (313 workers) belongs to an age group varying between 46 and 55 years of age approximately 302 workers belong to an age group varying between 35 and 45 years of age, while there are no workers younger than 24 years of age.

## Main characteristics of Human Resource Management

A number of national and international authors are dealing with the definition of human resource management and mainly two different meanings are used. One meaning describes the activities of the management, i.e. personnel management, while the second term is used to tackle a specific approach to management of people, i.e. human resource management. The functions of human resource management in an organisation are as follows: work analysis, HR supply and demand planning, recruitment of candidates for offered job vacancies, selection of candidates, staff training, professional development, employee performance evaluation, rewarding of employees, work relations and collective bargaining, occupational health and safety, and employee leave management system.

**Work analysis** - the process of collection of relevant information about work and definition of knowledge, skills and abilities required to perform a specific job.

**Human resource planning** is usually conducted once a year, but it is possible to modify plans throughout the entire calendar year. AD Imlek Belgrade uses human resource planning to identify a need for the new employees, and what skills are needed at all organisational levels. The first step in any form of human resource planning is data collection. After gathering all relevant information, the next planning stage will commence and it requires a forecast of supply and demand as regards the number of people and types of occupation needed within an organisation. Quality management is most closely related to customer satisfaction, and to employee satisfaction (Čamilović and Vujić, 2011). After planning the supply and demand, it is necessary to examine whether there is a balance between them. The imbalance between supply and demand can yield two results; surplus - when supply exceeds the anticipated demand and deficit - when predicted demand exceeds the anticipated supply.

**When forecasting a demand for human resources** we should be able to determine the number of employees and types of occupation that will be needed by an organisation during the planning period in order to achieve the planned objectives.

**Annual turnover rate or fluctuation of employees** is sometimes called employee number reduction rate expressed as a percentage and calculated by using the formula (Živković, 2012);  $(\text{number of employees leaving an organisation in a year}) / (\text{average number of employees on duty in a year}) \times 100 = \text{employee number reduction rate in \%}$ . Annual turnover rate or fluctuation of employees at the AD Imlek Belgrade in 2011 amounted to =  $(64/858) \times 100 = 7.45\%$ .

Unlike fluctuation rate, **stability index** shows the total number of employees remaining in the organisation (Bogićević-Milikić, 2011).  $(\text{number of employees that spent more than one year in the organisation}) / (\text{number of employees in the previous year}) \times 100 = \text{stability, expressed in \%}$ . The stability index of the AD Imlek Belgrade in 2013 amounted to =  $(771/794) \times 100 = 97.1\%$

## HR recruitment and selection

Commencement of the recruitment process is twofold - the recruitment process begins either with an individual having appropriate traits, skills and knowledge necessary for the organisation or with identified gaps in knowledge, i.e. vacant post in the organisation (Đorđević-Boljanović, Pavić, 2011).

Recruitment sources can be internal (promoting employees to higher hierarchical positions, transfer employees to other positions, temporary job rotation among employees) or external (advertising, cooperation with employment agencies, recruitment through schools and colleges, affirmative recruitment). The AD Imlek Belgrade searches for the candidates internally to fill vacancies. If there are no appropriate internal candidates, i.e. those from within the organisation, candidates are recruited through employment agencies.

**Selection process** implies that traits needed for efficient performance of a specific job (defined on the basis of a job analysis) must be determined first, and then each candidate is evaluated to determine the extent to which they fulfil the required traits (Bogićević-Milikić, 2011). There are three sets of criteria that need to be fulfilled in the selection process: criteria to be met by selection methods, criteria that candidates must meet and criteria to be fulfilled by an organisation. The most important instruments and methods for the collection of biographical information about candidates are as follows: application form, CV, interview, psychological tests, recommendations, and other selection tools. Applications and CVs are mainly used for the collection of data on the previous experience of the candidates. Sources of candidate information required at the AD Imlek Belgrade are (CV), whereas the application is completed at the company. The most important tools and methods for the collection of data on skills and personal traits of candidates are tests and interviews. Professional orientation includes selection of the most appropriate job for an individual as opposed to the professional selection aiming at the selection of the best candidate for a specific job. Negative outcomes occur if a candidate who could perform well is turned down or if the wrong candidate who would perform poorly is accepted, (Mašić, 2010). Compliance as regards the professional selection and orientation at the AD Imlek Belgrade includes the following: if the company puts the focus on the professional selection and if it observes the company's rules, it will be deemed successful. At the AD Imlek Belgrade professional orientation is not conducted during the selection of personnel as it is expensive and there are agencies that have expert psychologists who drafted a set of tests that are tests are sold to companies. In Serbia, there is a growing number of such agencies the services of which were used by the AD Imlek Belgrade Company during the selection process in case of executives and some other profiles. However, those candidates were not employed as the tests showed that they were not suitable for that position.

Foreign companies, just like the AD Imlek Belgrade Company here, carry out internal audits as solely owners can benefit therefrom. In our case that would be the Supervisory Board as it controls all levels and sectors within the company. In our country, such structure is not regulated by law and in case of large systems such as the AD Imlek Belgrade it would be necessary to have such an independent organ that would protect the interests of



the company. Expertise in one field does not provide a guarantee that a person would be a good manager or leader. Companies that conduct professional orientation activities can demonstrate suitability for the position and not for the profession.

**Test** is a measuring instrument used to compare candidates by a particular characteristic that is measured by the test. The following types of tests are used to gather information on the abilities and personal traits of the candidates:

- Written tests: capability tests, personality tests, achievement tests.
- Work sample tests - aiming at measuring of the candidate's ability to perform part of the work he/she applied for.
- Measurement centres - mainly used to measure how well candidates would behave when holding managerial positions.
- Medical, physical and polygraph tests.

The AD Imlek Belgrade Company mainly employs candidates with a university degree and intelligence and uses standardised personality tests. General computer skills and general knowledge are tested, including English language proficiency test. Tests are not eliminated and they are used enable the company to learn more about the candidate.

**Interview** is a selection instrument used to predict business performance of a candidate on the basis of oral replies to orally posed questions. The aim of the interview is to gather information about candidates and it is an opportunity for candidates to learn something about the company and the people they will work with. There are three criteria for distinguishing between the interviews:

- structuring level: unstructured, semi-structured and structured interview.
- scoring system - all candidates are evaluated against the same criteria;
- number of people conducting the interview: individual, panel and team interviews.

The AD Imlek Belgrade Company mainly uses individual interviews - direct conversation between the candidate and the interviewer. If it comes to a managerial position, the candidate will be interviewed more than once when panel interviews would be conducted.

**Socialisation of new employees** is a process in which a new employee accepts the values, attitudes and behavioural norms of other employees in the company. The socialisation process is just as important for the company as it is for the new employee (Štangl-Šušnjar, Zimanji, 2005). The main promoters of socialisation need to be line managers. Some of the socialisation activities need to be performed by other employees in the organisation, including the HR Department. The HR Department has a task to introduce newly admitted candidates to the organisation, its code of conduct, organisational culture, job expectations, and to deliver induction training to candidates. All these activities together constitute the process of socialisation of the new employees. Socialisation of the new employees at the AD Imlek Belgrade Company differs between sectors and in some sectors it takes less time,

while in other sectors it takes more time. An immediate supervisor meets the candidate and they go through the organisation together, then the candidate is introduced to his/her workplace and colleagues with whom he/she will work and he/she is slowly inducted. The socialisation process ends when the employee becomes capable of performing the assigned tasks on his/her own.

**Training of employees** implies the needs for specific knowledge, abilities, skills, attitudes or behaviour of employees necessary for preparing them to perform their current job better (Živković, 2012). Both theory and practice distinguish between the employee training and professional development of managers. Not only that the training is needed to perform the job effectively and efficiently, but it also provides a possibility for the company to adapt to the changing environment by having its employees trained in accordance with the market demands, service users and the organisation itself (Đorđević-Boljanović, Pavić, 2011). Identification of training needs is carried out at three levels: organisational level, workplace level and individual level. Training can be classified according to the place where training is delivered and it includes training at the workplace, training at the organisation - outside the workplace and training delivered outside the company. The AD Imlek Belgrade Company pays special attention to training and professional development of employees and their education. At the end of the year, managers/supervisors at the AD Imlek Belgrade Company define, together with the interested employee or employee who is obliged to finish the training or re-training, the Annual Training Plan in accordance with the needs. This plan defines type of the training (external and internal), title of the training, training delivery schedule, target groups, number of participants, planned duration of the training, training costs, the sector where training is planned to be delivered. If possible, expectations of successfully delivered training should be defined.

**Performance of the employees** - Each organisation needs to evaluate the employees' performance. This part of the evaluation is called setting of the performance standards or determination of the level of performance that is expected at the workplace. In practice, the most commonly used six basic dimensions of work are as follows; quality, quantity, meeting the deadlines, cost-effectiveness, the need for supervision or instructing, interpersonal influence. Evaluation of the work performance can most often be carried out by line managers, employees, associates and other evaluators (senior level management, customers, external evaluators). Evaluation of work performance of employees is performed at the AD Imlek Belgrade Company and each department carries out work performance evaluation. Evaluation is performed by sector managers or line managers depending on the type of work.

**Development of the employees** - Development of the employees should be distinguished from the training. Development of the employees imply that the employees are being prepared for the future requirements of current and/or some new activities through educational programmes, evaluation of the development potential, gaining of work experience and social interaction. The development is mainly related to the employees who have development potential. HR managers are authorised and have a responsibility to advise line managers (such as production and sales managers) in case of areas such as

recruitment, employment and payment of workers (Dessler, 2007).

The AD Imlek Belgrade Company pays great attention to the HR development through delivery of theoretical and practical training to all employees interested in professional development and promotion, in order to support further development of the company and increase market share. In addition to profitability, the achieved market share is one of the most common ways of measuring competitiveness at the company level (Jeffrey et al., 2001). The company follows innovations related to technology, training, selection, employee development, etc. The AD Imlek Belgrade company provides training opportunities for all those who want them. The Company follows courses, symposiums, various types of lectures to a certain extent depending on the importance to the success of the company.

### **The salary earning system and strategic aspects of payment**

The system of salaries is a part of an employee rewarding system that includes all the material rewards that the employer provides to the employees in exchange for their work. The system includes two types of earnings: direct (in the form of salaries, stimulations and bonuses) and indirect (in the form of financial benefits such as vacations and insurance funded by the employer). At the AD Imlek Belgrade Company a salary is composed of a salary for performed work and time spent at work, earnings based on employee contribution to employer's business success (rewards, bonuses, etc.) and other income on the basis of the employment and in accordance with the collective bargaining agreement.

Employee's earnings for the performed work and time spent at include;

- Basic earnings;
- Part of the earnings for work performance
- Increased earnings.

Basic salary of an employee is the value measured in hours which is established once in six (6) months and in accordance with the collective bargaining agreement, the coefficient of performance and the average of 174 hours per month. Coefficient of performance for the lowest positions is 1.8 and 2.0. The basic salary of an employee is adjusted on the basis of the portion of earnings, whereas the basic earnings can be increased by up to 30% or reduced by up to 20% in line with the job performance and in accordance with the Regulation on Work Norms and Standards approved by the General Manager in accordance with the collective bargaining agreement. An employee is entitled to increased earnings if he/she works on: a holiday day which is a non-working day - 20% of the base salary; in the third or night shift - 30% of the base salary; on Sundays - 5% of the base salary; in the second shift - 26% of the base salary; overtime work - 26% of the base salary; shift work in accordance with the collective bargaining agreement; on the basis of time spent at work for each year spent at work - 0.5% of the base salary, whereas a basis for the calculation of increased earnings represents the basic salary of an employee calculated in accordance with the collective bargaining agreement. In the observed company earnings of lower category workers are calculated by the labour law, general collective bargaining agreement

and a collective bargaining agreement defined by the employer, whereas earnings shall be determined by the coefficient and performance. Salaries of directors, managers and executives are determined by the labour law and collective bargaining agreement defined by the employer, and the salary is fixed. Earnings based on the performance are the element of earnings which implies the contribution of the individual by the achievement of the organisational results, the result of the organisational unit or a team in which the employee works. An increasing number of companies uses this element of earnings for awarding the employees in order to motivate them, especially those holding managerial positions. Short-term incentives - are intended to encourage employees to achieve the defined short-term results usually for a period of one year. These incentives include: raises, bonuses, special awards. Individual incentives are paid to the employees if they achieve the defined objectives within a defined time period. There are two types of such incentives: individual incentives which are calculated per hour spent at work and individual incentives that are paid per unit of produced goods. Group incentives are measured at the team level, organisational unit and/or entire organisation. The most common types of group incentives are: team incentives, share in profits, and share in benefits. Long-term incentives are given for a period longer than one year. The main types of these incentives include share in ownership, options, gifts in stocks under certain conditions, the right to profit due to the increase in prices of shares and phantom shares. At the AD Imlek Belgrade Company they reward managers for their work (for some innovation) and it usually occurs at the end of the year. Those managers are paid in cash. Currently, the observed company has no continuous monitoring of individual performance results or throughout a period of time. Monitoring of the results is reflected through evaluation of work performance and work results by gaining certain incentives. Understanding of employee motivation at work is to key to understanding of business success of the organisation. Needs of the employees are diverse and changeable and are of different value for each employee (Vujić, 2008). Employees at the AD Imlek Belgrade Company are mostly motivated by salaries and incentives, but also by promotion, especially in case of young employees.

### **Labour Relations and Collective Bargaining**

Labour relations and employment are precisely stipulated by law in all countries. Collective bargain refers to the fulfilment of mutual obligations of an employer and employees' representatives to negotiate about salaries, working hours and employment conditions. The Labour Law regulates different areas of labour and labour relations: basic rights, duties and responsibilities of the employees, employment, working hours, vacations and leaves, protection of employees, salaries and other employee income, prohibition of competition, termination of employment, realisation and protection of rights of employees, temporary and occasional engagement, self-employment, and collective bargaining. Work-related rights, obligations and responsibilities can be also stipulated by the secondary legislation such as the Rules of Procedure, collective bargaining agreement (general acts) and employment agreement. An employment agreement is a document that establishes the working relationship between the employer and the employee, and it defines their mutual rights and obligations and is concluded in writing. Workers must not be unlawfully discriminated on the following

EP 2016 (63) 2 (681-697) 691

grounds; sex, marital status, ancestry, ethnic affiliation, disability, membership in a trade union, part-time employee, former convict who has served a sentence, religion, political affiliation, etc.

**The Union** is an organisation that presents to the employer the interests of employees in terms of salaries, working hours and working conditions. The AD Imlek Belgrade Company has a union that is called the “AD Imlek Union Organisation “. It was founded in 1993 and is composed of about 80% of the total number of workers. The Union is a legal entity with its headquarters in Belgrade. The Union participates in the drafting of the collective bargaining agreement that is changed every four years. Conditions agreed between the employer and employees - Union are determined through collective bargaining that precedes the conclusion of the collective bargaining agreement between the employer, on the one hand, and employees - Trade Union, on the other hand. Collective bargaining agreements are usually concluded for a period of two to three years after which it may come to re-negotiation regarding the elements of the agreement. The most important aspects of the collective bargaining process are: negotiation behaviour, bargaining power, negotiation topics; termination of negotiations.

### **Occupational Health & Safety and Welfare of Employees**

Improvement of occupational health and safety conditions is a basic moral and legal task of each manager. Working conditions significantly affect the overall health status of people, quality of life and their work achievements. Occupational safety is an integral part of work organisation and execution of the work process, and is enabled through performance of occupational safety activities by using the prescribed, contracted and acknowledged rules, measures and instructions. The Law on Occupational Health and Safety can be divided into two parts: one is related to criminal and the other to civil matters. At the AD Imlek Belgrade Company occupational safety training is delivered immediately after the arrival of employees to the company. The employee is entitled to compensation for injuries or occupational diseases in accordance with the collective bargaining agreement on occupational health and safety. The employees regularly undergo sanitary health checks in order to monitor the health of employees coming into contact with food, to prevent contamination of food, and to ensure product health safety during production. All employees are insured against accidents through Delta Generali Insurance Company, including the company itself. The AD Imlek Belgrade Company decided long time ago that maximum support should be provided to children and socially handicapped structures. The company regularly donates to the Centre for Youth Integration, and has been helping various refugee camps for years, including healthcare institutions and other social welfare institutions such as institutions for children with special needs. The company supports and organises sports events. In addition to the market value, they significantly address the issues of society and improvement of the collective consciousness.

### **Complaints, Discipline, Staff Keeping and Leaving the Organisation**

An appeal or complaint is any dissatisfaction expressed by worker in relation to work and working conditions. The main requirement of the procedure for the resolution of appeals and complaints explains that strikes and labour terminations are not needed after signing the collective bargaining agreement (Wren, Voich, 1994). The main characteristics of the

complaint procedure include justice, advocacy, procedures, appeal resolution time. Discipline includes regulation of human activities in order to achieve the controlled results. There are several types of discipline: managerial, teamwork and self-discipline. Typical forms of penalties include: warning, drawing someone’s attention, notice, disciplinary transfer, suspension, fines. At the AD Imlek Belgrade Company employees are introduced to the disciplinary measures that are implemented when they start working if the worker can be penalised for any violation of rules. The company applies all of the above forms of penalties by sending the application to the legal department when a decision is made whether the employee will be penalised or not and what type of penalty should be applied. Workers of the observed company generally do not lodge job-related appeals.

**Staff Keeping** - from the perspective of an organisation it is the best to keep the best performance employees, and after dismissing redundant employees they are usually allocated different tasks, i.e., their work scope is expanded. At the AD Imlek Belgrade Company employees are kept by increasing their salaries, and employees are offered promotion.

**Leaving the organisation** - This can be the result of the employee’s initiative - to voluntarily leave the organisation, or this can be the employer’s initiative - to leave the organisation reluctantly. The costs associated with leaving the organisation depend on whether the intention of the organisation is to permanently terminate the position or to hire a new employee who will just replace the employee who left the organisation. Analysis of fluctuation is used to determine why employees leave the company and it is carried out as part of the assessment of future needs for new employees. It is very important as high level of fluctuation creates additional high costs and points to the dissatisfaction of employees with the situation in the company. Forms of a willing abandonment are as follows: termination of employment by employee and retirement. Forms of involuntary leaving of the organisation are as follows; employee dismissal, dismissal of employees who were made redundant. At the AD Imlek Belgrade Company most employees leave the company for personal reasons that include: a better job and career prospects in another company, better salaries, better working conditions, etc. The AD Imlek Belgrade Company now employs only permanent employees, and only those holding university degrees because of the lay-offs. As the company was privatised in 2003, the voluntary layoff programme was created and was made available to all employees.

Interview Form to be completed when leaving the Ad Imlek Belgrade Company

<i>Date:</i>	<i>Form 19 / Exit Interview Form</i>
--------------	--------------------------------------

*Please fill in the following questionnaire and thus help us improve the business operations in our company. We wish you every success in your new job! Thank you for being honest.*

Name and surname-----  
 Sector -----  
 Department -----  
 Position -----

Time spent at the company -----  
Did you feel comfortable while working at our company? Yes No  
Did anyone explain you the obligations and duties related to your job at the Company?  
Yes No  
Did anyone fully explained you the working and payments conditions? Yes No  
What is your opinion about the orientation process?-----  
Do you think that the delivered training was sufficient for successful performance of your job?  
Yes No  
Who delivered the training? -----  
In your opinion, what could make the training even better?-----  
Was the periodic evaluation of your performance presented to you by your supervisor  
in a timely manner? Yes No  
How would you evaluate (descriptively) the information you received during the  
orientation process?-----  
Were you sufficiently controlled by the supervisors? Yes No  
Were you satisfied with the working conditions (office space, salary, etc.)? Yes No  
Is there any company rule or procedure that you deem incorrect? -----  
Which colleague or supervisor was the easiest one to communicate with, and which one  
was the hardest one to communicate with?-----  
Please state the main reason for leaving our organisation?-----

Source: AD Imlek Belgrade Company documentation

**Pensions (forms of pensions) and benefits.** One of the forms of voluntary abandonment of the organisation is the retirement, which is becoming an increasingly important issue in recent years as the average age of the working age population increases. Individuals may retire involuntarily - forced into retirement by law (by reaching the appropriate retirement age and years of work experiences or due to an illness) voluntarily - retirement when they meet the legal requirements in terms of years of work experience. Employees of the AD Imlek Belgrade Company are entitled to receive the severance pay upon retirement, social aid in case of socially vulnerable employees, reimbursement of funeral services in the event of death of an immediate family member, jubilee awards for service, reimbursement of costs and other benefits in accordance with the collective bargaining agreement. The AD Imlek Belgrade company provides various types of benefits: health and safety benefits (accident insurance); leisure time (days off in the form of awards); service for the employees (loans and special incentives when awarded).

### Conclusion

Privatisation enabled the AD Imlek Belgrade Company to become a strategic partner of the company, whereby access to technological innovations and long-term investments was provided. The AD Imlek Belgrade Company offers about 80 different products made of milk, yogurt and cheese. The company is dealing with the procurement of raw materials, production and sale including the accompanying sectors, while the remaining sectors of the company are mainly engaged in service activities. The milk is taken from 30,000 manufacturers covering

50% of the territory of Serbia, about 500,000 litres of milk are processed on a daily basis. Most of the packaging material is purchased on the Serbian market, part of the packaging material for Tetra Pak filling machine is imported from Germany, Italy and Sweden. Production consists of: milk intake and pasteurisation, sterilisation, cold store and maintenance. Production is carried out according to the prescribed technological procedures. High quality raw materials and packaging material are used for the production and these are controlled by the Quality Control Department. Regular monitoring of technological processes, tracking of all scheduled parameters and laboratory analysis of samples are carried out during production in order to obtain high quality and healthy products. Purchase of modern equipment and investments in modern computerised lines also reduces the production time. The AD Imlek Belgrade Company covers 40% of the total milk production in Serbia. Ongoing market advantage is achieved primarily due to the high quality standard products and modern design of the new packaging material types. Sales of finished products are widespread in the country and in the region, while distribution centres have the wholesale network. The AD Imlek Belgrade Company sells 80% of its production on the domestic market, whereas 20% is sold on foreign markets. Effective HR management is a key source of competitive advantage of the organisation.

The role and importance of HR management is reflected in the fact that the proper organisation of activities allows the organisation to hire the right person for the right position at the right time, to enable employee training and development, to properly motivate and reward employees, and to achieve successful performance of the organisation by proper coordination of all these activities. All of the activities are reviewed starting from HR planning, recruitment, selection, socialisation, training, education, employees performance evaluation, motivation, rewards, health and safety care, and to career management and their lay-off. It is noticed that the AD Imlek Belgrade Company gives highest importance to the recruitment, candidate selection and training of employees. It is necessary to make adequate selection by using the company rules in order to attract more and better candidates and that training programmes are designed for those who need them in order to get adequately trained candidates for the job they perform. Performance of employees should be rewarded in the future, whereas the reward system covering benefits and incentives should be upgraded. It is necessary for the management to define formalisation and unification so that rewarding can start from the lower-level management to the highest level management. Management of the company should implement a set of measures that would improve discipline of the employees in the entire company. The best workers should be motivated through performance incentives, while managers should be motivated for a particular innovation and performance.

### Literature

1. Dessler, G. (2007): *Osnovi menadžmenta ljudskih resursa*, Data status, Beograd, Republika Srbija, p. 3.
2. Wren, A. D., Voich, Jr. D. (1994): *Menadžment*, Beograd, Republika Srbija, p. 331.
3. Bogičević-Milikić, B. (2011): *Menadžment ljudskih resursa*, Ekonomski fakultet, Univerzitet u Beogradu, Beograd, Republika Srbija, p. 400, 127.



4. Vujić, D. (2008): *Menadžment ljudskih resursa i kvalitet*, Centar za primijenjenu tehnologiju, Beograd, Republika Srbija, p. 388.
5. Vujić, D. (2011): *Upravljanje ljudskim resursima*, Fakultet za pravne i poslovne studije, Novi Sad, Republika Srbija.
6. Đorđević-Boljanović, J., Pavić, Ž. (2011): *Osnove menadžmenta ljudskih resursa*, Univerzitet Singidunum, Beograd, Republika Srbija, p. 97, 147.
7. Živković, D. (2012): *Menadžment ljudskih resursa*, Poljoprivredni fakultet, Univerziteta u Beogradu, Beograd, Republika Srbija, p. 29, 73.
8. Lončarević, R. (2007): *Menadžment*, Univerzitet Singidunum, Fakultet za finansijski menadžment i osiguranje, Beograd, p. 29.
9. Mašić, B. (2010): *Menadžment*, Univerzitet Singidunum, Beograd, Republika Srbija, p. 265, 266.
10. Suša, B. (2009) : *Menadžment ljudskih resursa*, Cekom – books d.o.o. Novi Sad, Republika Srbija, p. 21.
11. Čamilović, S., Vujić, V. (2011): *Osnove menadžmenta ljudskih resursa*. Tekon, Beograd, Republika Srbija, p. 14.
12. Štangl-Šušnjar, G., Zimanji, V. (2005): *Menadžment ljudskih resursa*, Univerzitet u Novom Sadu, Ekonomski fakultet Subotica, Republika Srbija, p. 180.
13. Kljajić, N., Savić, M., Arsić, S. (2011): *Proizvodnja mleka i mlečnih proizvoda u Republici Srbiji*, <https://agroekonomija.wordpress.com/?s=imlek>, December, 2014.
14. Jeffrey, S., Grant, H. (2001): *An economic analysis of productive efficiency in Alberta dairy production*, Project report, Department of rural economy, University of Alberta, Edmonton, Canada
15. Popović, R. (2009): *Strukturne promene na tržištu mlečnih proizvoda u Srbiji*, Prehrambena industrija – Mleko i mlečni proizvodi, vol. 20, No. 1-2, Savez hemičara i tehnologa, Tehnološki fakultet, Novi Sad, p. 7-12.
16. Veljković, B., Vico, G., Koprivica, R. (2010): *Srbija u spoljnotrgovinskoj razmeni mleka i mlečnih proizvoda sa BiH i Hrvatskom*, Agrosym, Jahorina, Poljoprivredni fakultet Istočno Sarajevo i Poljoprivredni fakultet Beograd, p. 171.
17. Božić, D., Munčan, P., Ševarlić, M. (2009): *An Assessment of the competitiveness of the dairy food chain in Serbia*, Agri Policy Enlargement Network for Agripolicy Analysis, [www.agripolicy.net](http://www.agripolicy.net).
18. Van Berkum, S. (2010): *Integrating into the EU: Challenges for the Serbian Dairy Supply Chain*, Chapter for the Monograph - Agriculture in Late Transition - Experience of Serbia, Serbian Association of Agricultural Economists – DAES (SAAE), Belgrade, Republic of Serbia.
19. Van Berkum S. (2009): *Dairy chain competitiveness in EU's new member states, candidate and potential candidate countries*. Agrarwirtschaft 59 Heft 7, p. 314-323

## UPRAVLJANJE LJUDSKIM RESURSIMA U “AD IMLEK BEOGRAD”

*Maja Samardžić<sup>6</sup>, Dragić Živković<sup>7</sup>, Zoran Rajić<sup>8</sup>, Sreten Jelić<sup>9</sup>*

### Sažetak

*Ljudski resursi uključuju ukupne ljudske potencijale unutar organizacije: dostupno znanje i iskustvo, upotrebljive veštine i sposobnosti, moguće ideje i kreacije, nivo motivacije i interesovanja u ostvarivanju ciljeva organizacije, itd. Cilj ovog rada je da ukaže na ulogu i značaj koji upravljanje ljudskim resursima (ULjR) ima na poslovanje i ostvarivanje uspeha, i to na osnovu analize teorijski i praktično najznačajnijih aktivnosti upravljanja ljudskim resursima u kompaniji “Imlek”. U pripremi ove studije korišćeni su različiti metodi i tehnike, kao što su: analiza sadržaja, studija slučaja, posmatranje, ispitivanje i sistemski pristup. Studija je pokazala da je prodaja proizvoda kompanije Implek široko rasprostranjena u zemlji i regionu. Postojeća prednost na tržištu postignuta je standardnim proizvodima visokog kvaliteta, ali pre svega, efikasnim upravljanjem ljudskim resursima. Menadžment kompanije treba da ostvari formalizaciju i ujedinjenje, i sprovede niz mera u cilju poboljšanja discipline zaposlenih. Najbolje radnike treba motivisati putem podsticaja za ostvarene rezultate i inovacije.*

**Ključne reč:** *menadžment i/ili upravljanje, ljudski resursi, unapređenje poslovanja, razvoj karijere, mleko i mlečni proizvodi.*

---

6 Master Maja Samardžić, E-mail [maja.samardzicsl@gmail.com](mailto:maja.samardzicsl@gmail.com)

7 Profesor, dr Dragić Živković, Poljoprivredni fakultet Univerziteta u Beogradu, Ulica Nemanjina br. 6, 11080 Beograd, + 381 11 261 53 15 lokal 425, E-mail: [d.zivkovic@agrif.bg.ac.rs](mailto:d.zivkovic@agrif.bg.ac.rs)

8 Profesor, dr Zoran Rajić, Poljoprivredni fakultet Univerziteta u Beogradu, Ulica Nemanjina br. 6, 11080 Beograd, + 381 11 261 53 15 lokal 414, E-mail: [zorajic@agrif.bg.ac.rs](mailto:zorajic@agrif.bg.ac.rs)

9 Profesor, dr Sreten Jelić, Poljoprivredni fakultet Univerziteta u Beogradu, Ulica Nemanjina br. 6, 11080 Beograd, + 381 11 261 53 15 lokal 421, E-mail: [sjelic@agrif.bg.ac.rs](mailto:sjelic@agrif.bg.ac.rs)



**COOPERATIVES AND FARMERS ASSOCIATION AS A MODEL OF  
ENTREPRENEURSHIP IN SERBIAN AGRICULTURE REGARDING THE  
CASE OF NISAVA DISTRICT<sup>1</sup>***Zoran Simonović<sup>2</sup>, Branko Mihailović<sup>3</sup>, Zoran Milovanović<sup>4</sup>***Abstract**

*The authors gave a brief overview on the situation of cooperatives in Serbia. They introduce us to the cooperative legislation which will be, in the current period, important factor in the development of agricultural cooperatives. Serbia is obligated to harmonize its laws with the laws of European Union. The process of harmonization should be done with the cooperative legislation, too. In the current conditions, the survival of the cooperative is threatened by transition. In the transition process it is required from agricultural cooperatives to return forcefully confiscated land to their rightful owners or their heirs. It is also necessary to return the land taken away from its members and given to the cooperatives to manage it. This process has largely been completed. Some agricultural cooperatives ceased to exist in the transition. At the end, the authors have made a study on the situation in cooperatives in Nišava district. The aim of the research is to analyze the results of the application of the concept of cooperative organization and association of farmers in the transition process.*

**Key words:** cooperatives, farmers' associations, cooperatives legislation.

**JEL:** Q1, Q13, Q18.

---

1 Paper is a part of the research at the project no. III 46006 - Sustainable agriculture and rural development in the function of accomplishment of strategic goals of the Republic of Serbia within the Danube region financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

2 Zoran Simonović, Ph.D., Research Associate, Institute of Agricultural Economics, Volgina Street no. 15, 11060 Belgrade, Serbia, Phone: +381 11 697 28 58, E-mail: [zoki@medianis.net](mailto:zoki@medianis.net)

3 Branko Mihailović, Ph.D., Senior Research Associate, Institute of Agricultural Economics, Volgina Street no. 15, 11060 Belgrade, Serbia, Phone: +381 11 697 28 42, E-mail: [brankomih@neobee.net](mailto:brankomih@neobee.net)

4 Zoran Milovanović M.A., Regionalna agencija za razvoj istočne Srbije – RARIS, Trg Oslobođenja no. 1, 19000 Zaječar, Phone: +381 64 85 10 263, E-mail: [zoran.milovanovic@raris.org](mailto:zoran.milovanovic@raris.org)

## **Introduction**

Currently, cooperatives in Serbia are the practical organizations. The most of the members, in the modern way of doing business, are inclined to think about meeting their current obligations. This way of thinking influences the cooperative associations to properly examine the way into the future. The cooperative associations are now focused on a pragmatic turn (inclusion), and react to the options in order to adapt to the alterations. The restructuring of our economy is good opportunity for one positively affirmed cooperative association. Certain number of cooperatives are sufficiently large and capable to play important role in this transformation.

Economic reconstruction of agricultural producers can also have influence on the events related to social changes. Cooperatives can help in reducing of restructuring economy costs. Under such conditions, the cooperatives offer its traditional capacity that can reduce social and economic divisions in the fairer manner.

Modern business conditions of farmers in many ways contribute to their strategic thinking, primarily focused on the function of more efficient cooperative associations. Joining farmers in cooperatives facilitate their joint appearance on the increasingly demanding market. The joining can be viewed through multiple dimensions. Joining resources and financial strengthening are two essential components important for the long-term strategy of the cooperative association. It is suggested certain kind of discipline that will not be easily accomplished. In addition to these two elements of strategic thinking, there are other elements which include the preservation of the security of the cooperative association in general in all situations, in cooperation with government institutions. On the other hand the role of the Government in predicting the future of the cooperative association is in some way in the steady decline. However, the importance of national legislation and policy of determining cooperative organizations implemented by the Government can not be underestimated.

## **Methodology and data sources**

The authors of this paper used the methods that best reflect the character of the analysis given in the subject. In a study of cooperatives and associations of farmers as a model of entrepreneurship in the agriculture of the Republic of Serbia dominated the quantitative method of economic analysis. These are primarily in the first place the various legal texts, statistical data and literary sources of the cooperative organization. Particularly noteworthy is the empirical research in the area of Nišava District by the method of statistical sample. It should be noted that they used the internet information are numerous and significant.

The contribution of this work is reflected in the review and analysis process of the cooperative organization in the Republic of Serbia. It points to the fact that it is necessary to cooperatives preserve it from further collapse, and that it is necessary to improve its operation and business, and to cooperatives performed its function, it is necessary to stop the decline of agricultural production. It can be more efficient implementation of

measures of agricultural policy in the creation must be attended by representatives of cooperatives, as the only indigenous organizational segment of farmers in the Republic of Serbia. As the text of this paper believe confirms.

The paper shows that the farmers' association is an advantage, and that means that today it should be like that, especially given the contemporary understanding of agrarian development. The result of this research is as seen in the work of getting to know the full text of the role and importance of full co-operative organization as a potential model for faster start economic activity.

A special contribution is part of the research, which was taken on the basis of empirical research in the area of Nišava District.

The authors have tried to give an insight into the current situation in the Serbian cooperatives. This is deemed necessary today, when the Serbian agriculture is in the final phase of transition and when preparing for accession to the European Union.

### **Conditions of the cooperative legislation in Serbia since 1989 until today**

After 1989 Serbia has entered in new stage of the cooperatives development. This period is characterized by profound changes in our economic, social and political system. These changes created more favorable conditions for the development of cooperatives. The place and role of cooperatives in the development of economy and society have been determined in a new way. In agriculture, the cooperative is determined as the only and the most important form of economic farmers organization. The main task of cooperatives is to contribute to the strengthening of agriculture, rural households as producers of goods with their activities, to enable them easier engaging in market commodity/money relations and to survive on the markets. (Simonovic et al., 2009).

In Serbia, in 1989, was adopted the Law on Cooperatives and the Law on agricultural cooperatives. At the level of the Yugoslav federation in 1990 was brought federal law on cooperatives. The newly formed Yugoslavia in 1996 brought its own Law on Cooperatives.

According to the law from 1989 cooperatives were formed by farmers, members of their households, working people and citizens and cooperative members, in order to achieve their aims. According to the Federal Law on Cooperatives from 1990 cooperatives are voluntary organizations whose members perform joint operations, achieve economic self-interests and decide on common issues.

According to the Law on Cooperatives of 1996 cooperatives can be established by individuals, on its own initiative, driven primarily by economic as well as other interests. Funds of the work of cooperatives provide members of the cooperative and its members. They guarantee business cooperatives its property and its assets. Through management bodies, cooperative members themselves manage the cooperative affairs. According to this law cooperative ownership is clearly defined. The mechanisms for the protection and reproduction are defined. For the first time the cooperatives audit was

introduced in the practice, with the aim to create conditions for the uniform application of the cooperative working principles and to eliminate the negative phenomena that accompany the work of cooperative members. (Simonović, et al., 2008).

In light of the current changes in our society, the Ministry of Economy in cooperation with the representatives of other relevant ministries in whose scope of work act different types of cooperatives (agricultural, fishing, consumer, housing, handicraft, savings-credit, service etc.) prepared new version of the Draft law on cooperatives, which was the subject of debate in middle of July 2006, in the Assembly of Vojvodina. On this occasion, representatives of cooperatives and cooperative unions presented number of objections to the draft law. The proposal that immovable property in social ownership, which cooperative or cooperative unions have the right to use, will become state owned asset was especially negatively assessed. Cooperative workers qualified this as new attempt of cooperative ownership nationalization.

After these complaints Ministry of Economy has prepared new, improved version of the Draft Law on Cooperatives. This proposal allows cooperatives and cooperative unions to, within three years from the entry of this law, if they have evidence that the real estate was acquired by work and business or in some other way (a gift, legacy, donation, the final judgment of the State Authority and etc.) translate it from social ownership and enroll it in the land and other public books as cooperative property. This latest version of the law represents improved version of the previous proposal of the Draft Law on Cooperatives.

The Assembly of Serbia on 29 December 2015 adopted new Law on Cooperatives. According to the Law on Cooperatives cooperative represents the voluntary form of organization in which every member participates directly and with joint operations based on cooperative principles application, promote and protect their economic, social, professional, cultural and other interests, in accordance with the law and rules of the cooperatives.

The new law still does not address issues such as the rights of employees and workers in relation to members and the role of cooperative associations. On the other hand, more attention is devoted to financial basis of the cooperatives and cooperatives accounts checkings.

We can freely say that the new law allows easier establishments, management, closure and transparency in the operations of cooperatives in compliance with all of the cooperative principles and rules. The improvements that were made in the legal regulation of cooperative organizations are good and desirable. The cooperatives should be organized as family farms organizations. This means that the founders of the cooperative are members of one or two - three households. Otherwise, it can happen that one establishes cooperative with members of his immediate and extended family for speculative purposes. In this way the cooperative would be operated out of the cooperative rules and principles. (Simonovic, Cvijanovic. 2008). According to the new law now cooperatives can be established by at least five founders with the provisio that

can not live in the same household with the founder.

It is our opinion that the legislator should encourage the establishments of cooperatives by providing greater facilities for an initial period of cooperatives work.

Appropriate training for cooperative managers would create a possibility that the company survives the initial trials and to be included in the job, as soon as possible. (Pejčić 2004).

Cooperative legislation in the current period will be an important factor for the development of agricultural cooperatives. It is our obligation to harmonize our laws with those of the international community. In the European Union, the rule is that all problems have to be solved by legislation. In the European Directorate of the International Cooperative Alliance, was formed a special group of lawyers that will assist in creating legal projects in the field of cooperatives.

### **Cooperatives in the last phase transition**

The question about the expected response of cooperatives to social and economic changes represents a kind of confrontation with the future of the cooperatives. The cooperative association, in this way, searches for the way to even more people learn about the benefits that can be achieved through a co-operative organizations. This allows for a greater number of people find ways to help themselves and not to be helped in the form of donor dependency. In this way, many worldwide accepted trends are concentrated. These trends are particularly relevant to countries in transition. We will name some of these trends:

- Population growth,
- Increasing concentration of economic power,
- Sustainable development of mankind,
- Increasing difficulties in the normal functioning of the human community,
- Youth employment,
- The issue of social justice. (Zakić, 2001).

Joining farmers because of the structure of farms is the imperative. Cooperatives are most often misused by “civil cooperatives” that do not give producers the ability to completely manage and control the work of the cooperatives. This type of cooperative also has large passive capital. On the other hand “private cooperatives” use the term of the cooperative, but in fact, represent private company, in which producers have no influence. In both cases the idea of cooperatives is destroyed. However, recently, the modern type of cooperatives have been established, in which manufacturers fully participate in decision-making and where they are willing to accept the risk of conquering new markets. However, this type of cooperative has not yet developed enough to have a significant role in the development of the market.



State cooperatives have processing and storage capacities in its property. State cooperatives manage these capacity on the same or similar manner as they would have done with agrarian combines. The survival of cooperatives in agriculture was threatened by the transition. The transition process requires that agricultural cooperatives return the forcibly seized land to their rightful owners or their heirs. It is also necessary to return the land taken away from cooperative members to cooperatives. This process has largely been completed. Some agricultural cooperatives have disintegrated in transitional movements. However, the most of the agricultural cooperatives continued to exist on the farm land belonging to its members, as well as on land that they purchased over the years. Lately, there has been a loss of motivation for further restructuring of cooperatives. There are needs, on the other side, for modernization of cooperatives operating modes, as well as for Cooperative Union to introduce more modern legislation.

Agricultural cooperatives if they are not as big as agro-conglomerates have the same problems related to the management. These problems are management, lack of investments and redundant, and are faced with the same problems, on the road leading toward profitability.

Agricultural cooperatives are one of the means of agricultural development in the developed economies, especially in the field of marketing, processing and input supplying. Serbia has long tradition of using agricultural cooperatives. However, agricultural cooperatives that were once operated successfully are now close to the state of insolvency or remained completely out of business. Old state agricultural cooperatives provided services to agricultural community during the socialist period by supplying them with agricultural inputs, purchasing and processing the primary products from the private agricultural sector. These cooperatives were unable to achieve the transition to the new market conditions. National cooperatives were cooperatives in name only, while in its essence and by the working methods were, in fact, agricultural enterprises.

The main problem in Serbian cooperatives today is that the largest number of cooperatives fail to comply with the rules, i.e. cooperatives are not managed by cooperative members but either employes in cooperatives in which the workers - cooperative members, in terms of management, overcame the producers and continued to self-manage. In private cooperatives cooperative the rules also are not respected because they are registered as cooperatives, but actually in the real sense of the word are private companies owned by one or several individuals. These cooperatives hut overall development of the cooperative sector in Serbia because the most of them do not intend to turn into true cooperatives. Their main goal is to maintain the current status. Cooperative alliances neither want nor are able to deal with this problem that has emerged within the alliance, mainly because they were in alliance structures represented mainly by directors of cooperatives that do not adhere to cooperative rules. The cooperative unions on the other hand have a few manufacturers. Management of Cooperative corresponds to this position and does not want changes. In the cooperative unions there is no clear picture about the situation in the institutional structure. Also, there is no vertical and horizontal integration of cooperatives.

After the closure of a large number of cooperatives, farmers in the vast number of villages are not mutually commercially organized. In order to alliances to be able to do more for cooperatives in the cooperative organization, it is necessary to be more technically and personally organized. When all of these questions are regulated then one can to seek for cooperative alliances responsibility for the development of cooperatives. (Pejčić, 2004). The transformation of the existing cooperative sector should be carried out in accordance with the principles of the ICA and the EU.

On their land, cooperatives should organize a modern production. In current practice, the situation is quite reverse. Cooperatives have lost important land areas by applying various laws on restitution of land that has been transformed into social property. Due to objective inability to return land to farmers because the land changed its purpose, or was sold, the cooperatives plunged into very bad financial situation.

The situation relating to cooperatives in the whole observed period, which covers the period from 1991 to 2011, did not changed considerably. There is continuing trend of cooperative decreasing the from year to year. We noted that the number of cooperatives which did not have land in its own property is the most reduced. Leasing and renting of the land by these cooperatives have led them to unfavorable poston in relation to the cooperatives with their own land property. (Table 1).

**Table 1.** Agricultural Cooperative according to the size of land

Year	In total	landless	to 50 hectares	51-100	101-300	301-500	501-1000	1001-2500	2500-5000	Over 5000
1991	783	454	60	64	91	30	41	32	8	3
1995	750	416	91	55	78	31	38	32	7	2
2000	575	278	83	32	72	32	43	26	7	2
2001	536	241	78	37	69	34	40	29	7	1
2002	510	208	84	38	70	35	39	28	7	1
2003	467	187	69	36	65	38	35	29	7	1
2004	460	173	77	29	70	38	37	28	7	1
2008	260	23	64	40	60	27	24	15	6	1
2009	264	2	56	37	57	38	43	25	5	1
2010	257	43	62	31	59	22	23	12	4	1
2011	218	32	52	22	59	17	21	11	3	1

Source: Statistical Yearbook RS, 2011

Agricultural cooperatives in Serbia are located in a specific position which is caused by the transition process. The general assessment is that the cooperatives and agriculture fell into great difficulties. In Serbia, there are currently only 218 agricultural cooperatives with thousands of members and few hundred thousand subcontractors. The falling trend of cooperatives is still present. Besides the Cooperative Association of Serbia there are two provincial and twelve district associations. Some of these cooperatives are traditionally known as companies with long tradition of cooperatives. Due to the poor economic situation that is present, many cooperatives have stopped

working. The inadequate agricultural policy has also contributed to many cooperatives have lost their jobs. Cooperatives, which based its activity on the resources of farmers – cooperative members, have managed to avoid difficulties. They represent strong and stable organizations. (Govedarević, 2004).

The safe way to improve the cooperative organization is to improve the quality of agricultural products, which is reflected in the use of modern technological know-how, in the production and marketing innovation strategies, in order to offer quality in a quality manner accessible to customers both at home and abroad. We do not have good marketing for domestic goods. We do not know how to brand what we produce and to firmly bound it to the consumers. (Hamović, et al., 2006).

The expected improvement in the business environment should be derived from the new Law on Cooperatives. The new law should be of basis for a simple and clear manner of the field regulation and to contribute to increasing the motivation and interest in the establishment of cooperatives. In addition, improvement of the cooperative sector will be achieved through the inclusion of advisers for agricultural associations in order to assist in the creation, establishment and effective functioning of cooperatives in Serbia. (Chroneos-Krasavac, Petković, 2015).

The National Assembly of Serbia adopted the new law on cooperatives on the 29.12.2016. The biggest changes compared to the previous law are related to the role of cooperatives, cooperative audit and registration of cooperative property.

### Cooperatives in Nišava district

In order to show the state of cooperatives in Nišava district we have done the research. The aim of the research is to analyze the results of the application of the concept of cooperative organization and association of farmers in the transition process. We prepared a special questionnaire, for this survey.

Nišava district has, according to the state from 2012, 31,709 farms. If one takes sample of 0.5% then there are 159 households to be interviewed (see Table 2).

**Table 2.** Number of households Nišava district according to the state 2012th

Municipality	Agricultural holdings	The required number of polling 0,5%
Aleksinac	7116	36
Gadžin Han	2159	11
Doljevac	3733	19
Merošina	3074	15
Niš	10244	51
Ražanj	2332	12
Svrljig	3051	15
In total	31709	159

Source: Statistical Yearbook RS and Calculation of the authors based on survey.

Good number of survey sheets were filled by the author himself on the field. When filling out surveyes he interview for the surveyed persons and became acquainted with the state instruments of labor, buildings, orchards, etc. That is to say that besides the method of surveying, the interview method is, to some extent, presented (interview as a method of direct observation and insight in the household).

On the first question: Are you a member of an association or subcontractor of a farmers and agricultural cooperatives? We got the following answers:

**Table 3.** Belonging to a cooperative or an association of farmers

Answers of respondents	Share in%
Yes	40,88
No	57,23
without answer	1,89
In total $n=159$	100,0

*Source:* Calculation of the authors based on survey.

Almost half of the surveyed household's owners are members of one of the associations in their area.

We asked surveyed farmers that are members of associations or cooperatives to which assosiation or cooperative they belong. We got the list of a large number of associations. One gets the impression that all these associations and cooperatives have small number of members. This is probably their main problem when entering the market.

Cattlemen's Beef Association Čokot

Agro product Donje Međurovo

Cattlemen's Beef Association Lalinac

Association of Fruit and Wine Gabrovac

Agricultural Cooperative Gabrovac

Agricultural Cooperative Čegar Donji Matejevac

Fruit Association Čegar Gornji Matejevac 2

Goat Breeder Association Milky way Gabrovac

Association of Fruit Matejevac 2

Association of farmers and growers Oreovac

Association of Fruit Growers, vintners and growers Pantalej Donji Matejevac 3

Association of pig breeders „Three pigs“ Hum

Niški Association farmers and seed Hum 2

Cattlemen's Beef Association "Ada" Sečanica 2

Association "105 +" Sečanica

The snail cooperatives “Helix” Supovac  
 Groups of women farmers Gornja Trnava  
 Association “Future” Leskovik  
 Association “Euro milk” Hum  
 Association “Progress” Trupale

Joining farmers through cooperatives and other associations is diverse. Most of joined farms are in Merošina 87% and 50% of Niš, the least in Gadžin Han and Doljevac, over 80% of households are not members of any association.

Nearly 40% of respondents that are members of the associations gave their written comments in the survey when completing and related to the advantages of the surveys.

**Table 4.** Written comments on the benefits of farmers association membership of only those farms that belong to them

Answers of respondents	Share in%
did not write	61,01
write	38,99
In total $n=159$	100,0

*Source:* Calculation of the authors based on survey.

About 23% of those who are members of the associations gave their written comments in the survey when completing, related to disadvantages of the surveys.

**Table 5.** Written comments on disadvantages of farm cooperative membership only from those households that belong to them

Answers of respondents	Share in%
did not write	76,73
write	23,27
In total $n=159$	100,0

*Source:* Calculation of the authors based on survey.

More than 60% of the surveyed farm holders claimed that there was no cooperatives and associations on their territory, although the number of farm holders who claim that they cannot benefit from them is not small.

**Table 6.** What are the reasons to belong to an association or cooperative farmers?

Answers of respondents	Share in%
I can realize significant benefits	28,24
no associations	50,59
no cooperatives	16,47
something else	4,706
In total $n=159$	100,0

*Source:* Calculation of the authors based on survey.

On the question how do you sell your products? the largest number of surveyed farm holders stated that marketing of agricultural products is a major constraint, also it is not small number of those who identified the lack of support from the agricultural budget of the country as the biggest limitation.

**Table 7.** Methods of sales of agricultural products

Answers of respondents	number of holdings	Share in%
through cooperatives	17	10,7
in person at the market	97	61,0
companies	17	10,7
middlemen	14	8,8
directly to processors	9	5,7
in total	154	96,9
without answer	5	3,1
in total	159	100,0

*Source:* Calculation of the authors based on survey.

When it comes to sales carried out by farms that used incentives, placed their products mainly (in 50% of cases) on markets, through cooperatives (18%), companies and processors (15%). The farms that did not use programs for agriculture, made more than 70% of the sale on the markets and through dealers (12%). The users of incentives and those who are not claimed that in more than 60% of the cases product placement is the main limiting factor. We note interesting fact reflected in the fact that the beneficiaries of the measures for agriculture are less satisfied with financial support from the agricultural budget than those who did not benefit from incentives.

**Table 8.** The major limitations of agricultural production

	Number of farms	Share in%
placement	102	64,2
source of funding	16	10,1
not belonging to an association or cooperative	6	3,8
low support from the agricultural budget	35	22,0
in total	159	100,0

*Source:* Calculation of the authors based on survey.

Also, on the basis of the survey, we noted that more than half of the farms that have used incentives are members of an association of farmers, while those who did not use measures of support in over 70% of cases, unfortunately, are not. As regarding to territorial representation the largest number of users is in Aleksinac municipality (30%), the City of Nis (20%) and the smallest number is in municipalities of Gadzin Han and Doljevac, below 5%. Almost all farms registered in the unified register of agricultural farms used one of the measures for agriculture, it cannot be said for non-registered farms. The biggest beneficiaries of incentives are agricultural and mixed farms. The users of incentive funds have mainly used the funds of the improvement in animal husbandry, horticulture, farming and vegetable growing.

## Conclusion

In the future times cooperatives need to be face with two issues. First, how to become more effective and second how to respond to social and economic changes. At the time when Serbia is in the process of transition and accession to the European Union these are questions most frequently asked by members of the cooperatives, elected leaders, managers and employees.

According to many parameters, they are unique organizations. Cooperatives in its basic structure and elements of ideology carry their own success. Parameters of cooperative success are: priority of the cooperative membership, cooperative diversity, strengthening the economic power of people, careful management of resources, the creation of the financial power of the people, strategic thinking.

All of this is supposed to represent the future of what could real and achievable in the system of allocating strategic association with farmers.

The reasons for the failure of cooperatives can be found in the disadvantages of the previous Law on Cooperatives, which was adopted in 1996 and amended in 1998. Previous fifteen years are characterized by ruining the cooperative associations, evolving away from the cooperative principles and market economy. The state, with its repeated interventions, not only in the cooperative, but also in other areas of economic activity has contributed to reducing the farmers confidence in cooperatives, as well as the connection and association of farmers in general.

In order to preserve the cooperatives from further collapse and to improve their work and business, and to perform its functions, it is necessary to stop the decline in agricultural production - as much as possible by implementing more efficient measures of agricultural policy, which creation must be attended by representatives of cooperatives, as the only indigenous organizational segment of farmers in our Republic. Adequate implementation the agricultural policy includes the implementation of the goals of development and security, which practically means that the state provides incentives for the development of agriculture, must reach the right customers - primary agricultural producers - members.

The new law on cooperatives is the attempt to rescue cooperatives and the cooperative associations in our country. Time will tell whether this law was adopted with large delay. On the basis of all that we exposed, it can be emphasized that it is necessary to adopt strategy for the development of cooperatives in Serbia.

## Literature

1. Chroneos-Krasavac, B., Petković, G. (2015): *Cooperatives in Serbia: Evolution and current issues*. Ekonomika poljoprivrede, vol. 62, no. 3, pp.723-735.
2. Zakić Z. (2001): *Agrarna ekonomija*, CID, Ekonomski fakultet Beograd.
3. Gnjatović, D. (2010): *Zemljoradničke kreditne zadruge - prve institucije za finansiranje razvoja poljoprivrede u Srbiji*. Bankarstvo, vol. 39, no. 3-4, pp.14-35.
4. Govedarević D. (2004): *Stanje i razvojne mogućnosti poljoprivrednog zadrugarstva Srbije*, Zadrudni savez Srbije, Beograd.

5. Iliopoulos, C. (2013): *Public policy support for agricultural cooperatives: an organizational economics approach*. Annals of Public and Cooperative Economics, 84(3), pp. 241-252.
6. Marković, K. (2007): *Poljoprivredno zadrugarstvo u Republici Srbiji - stanje i perspektive*. Letopis naučnih radova Poljoprivrednog fakulteta, vol. 31, no. 1, pp. 114-121.
7. Nilsson, J. (1998): *The emergence of new organizational models for agricultural cooperatives*. Swedish Journal of agricultural research, vol. 28, no. 1, pp. 39-47.
8. Nilsson, J., Svendsen, G. L., & Svendsen, G. T. (2012): *Are large and complex agricultural cooperatives losing their social capital?* Agribusiness, vol. 28, no. 2, pp. 187-204.
9. Ortmann, G. F., King, R. P. (2007): *Agricultural cooperatives I: History, theory and problems*. Agrekon, vol. 46, no. 1, pp. 18-46.
10. Österberg, P., & Nilsson, J. (2009): *Members' perception of their participation in the governance of cooperatives: the key to trust and commitment in agricultural cooperatives*. Agribusiness, vol. 25, no. 2, pp. 181-197.
11. Pejčić H. (2004): *Ekonomika poljoprivrede*, Ekonomika, Niš.
12. Pejčić, H. (2004): *Današnje poljoprivredno zadrugarstvo*. Ekonomika, vol. 50, no. 6, pp. 134-138.
13. Simonovic Z., Mihailovic B., & Hamovic V., (2009): *The Serbian System of Co-operative Society in Conditions of Evolution and Transition*, Simpozionul International cu tema, Competitivitatea agriculturii Romanesti in procesul de integrare Europeana, ARS Academica, Bucuresti, pp. 534.
14. Simonović, Z., Cvijanović, D. (2008): *Neki aktuelni problemi zadrugarstva Srbije u tranzicionim kretanjima*. Ekonomika, vol. 54, no. 1-2, pp. 131-138.
15. Simonović, Z., Arsenijević, Ž., Mihailović, B. (2008): *Zadrugarstvo Srbije u uslovima evolucije i tranzicije*. Ekonomika poljoprivrede, vol. 55, no. 3, pp. 319-328.
16. Simonović, Z. (2005): *Zemljoradnička zadruga u uslovima tranzicije*. Ekonomika, 51(4), pp. 31-36.
17. Hamović V., Paraušić V., Mihailović B. (2006): *Konkurentnost srpske privrede u funkciji podsticanja izvoznih aktivnosti*, Ekonomika poljoprivrede, 53 Tematski broj, Beograd, pp. 449 – 451.
18. Zakić, N., Vukotić, S., Cvijanović, D. (2014): *Organizacioni modeli u poljoprivredi sa posebnim osvrtom na male poljoprivrednike*. Ekonomika poljoprivrede, vol. 61, no. 1, pp. 225-237.
19. *Zakon o zemljoradničkim zadrugama*, Službeni glasnik SR Srbije, br. 59/1989.
20. *Zakon o zadrugama*, Službeni list SFR Jugoslavije br 3/1990.
21. *Zakon o zadrugama*, Službeni list SR Jugoslavije br. 41/1996.
22. *Nacrt zakona o zadrugama*, Republika Srbija, Ministarstvo privrede, (available EP 2016 (63) 2 (699-712)



at: <http://www.privreda.gov.rs/wp-content/uploads/2015/09/Nacrt-Zakona-O-Zadrugama2.pdf> )

23. Zeuli K., Cropp R., (2004), *Cooperatives: Principles and Practices in the 21st Century*, University of Wisconsin, Extension – Madison.

## ZADRUGE I UDRUŽENJA POLJOPRIVREDNIKA KAO MODEL PREDUZETNIŠTVA U POLJOPRIVREDI SRBIJE SA OSVRTOM NA STANJE U NIŠAVSKOM OKRUGU<sup>5</sup>

*Zoran Simonović,<sup>6</sup> Branko Mihailović<sup>7</sup> Zoran Milovanović<sup>8</sup>*

### Apstrakt

*Autori u radu daju kratak prikaz stanja u zadrugarstvu Srbije. Upoznaju nas sa zadržnim zakonodavstvom koje će u postojećem periodu biti važan faktor u razvoju zemljoradničkog zadrugarstva. Srbija se nalazi u obavezi da harmonizuje svoje zakone sa zakonima Evropske unije. Taj postupak harmonizacije je potrebno uraditi i sa zadržnim zakonodavstvom.*

*U postojećim uslovima opstanak zadruga bio je ugrožen tranzicijom. U procesu tranzicije zahteva se od poljoprivrednih zadruga da vrate nasilno oduzetu zemlju njihovim praviim vlasnicima ili njihovim naslednicima. Takođe je neophodno da se vrati i zemljište oduzeto od zadrugara, a dato je na upravljanje zadrugama. Ovaj proces je u velikoj meri već završen. Pojedine poljoprivredne zadruge su prestale da postoje u tranziciji.*

*Na kraju rada autori su dali istraživanje o stanju zadrugarstva u Nišavskom okrugu. Cilj istraživanja je da se sagledaju rezultati primene koncepta zadržnog organizovanja i udruživanja poljoprivrednika u procesu tranzicije.*

**Ključne reči:** *zadruga, udruženja poljoprivrednika, zadržno zakonodavstvo*

---

5 Rad je deo istraživanja na projektu broj III 46006: „Održiva poljoprivreda i ruralni razvoj u funkciji ostvarivanja strateških ciljeva Republike Srbije u okviru dunavskog regiona“ koji finansira Ministarstvo prosvete, nauke i tehnološkog razvoja Republike Srbije u periodu 2011-2014.

6 Dr Zoran Simonović, Naučni saradnik, Institut za ekonomiku poljoprivrede, Volgina ulica br. 15, 11060 Beograd, Srbija, Telefon: 011 697 28 58, E-mail: [zoki@medianis.net](mailto:zoki@medianis.net).

7 Dr Branko Mihailović, Viši naučni saradnik, Institut za ekonomiku poljoprivrede, Volgina ulica br. 15, 11060 Beograd, Srbija, Telefon: 011 697 28 42, E-mail: [brankomih@neobee.net](mailto:brankomih@neobee.net).

8 Magistar Zoran Milovanović, Regionalna agencija za razvoj istočne Srbije – RARIS, Trg Oslobođenja br. 1, 19000 Zaječar, Telefon: +381 64 85 10 263, E-mail: [zoran.milovanovic@raris.org](mailto:zoran.milovanovic@raris.org)

## TAXATION OF AGRICULTURAL AND FOREST LAND: COMPARATIVE PERSPECTIVE AND PRACTICE IN SERBIA

*Dušan Vasiljević*<sup>1</sup>

### Summary

*This paper discusses contradiction between theoretical preferences for using land as an object of taxation and modest revenues collected through property taxes imposed on agricultural and forest land. The paper starts with a summary of specificities of the land as an object of the property tax; then, classical economists' preferences for the wide use of the land tax are confronted with the comparative research finding numerous examples of exemptions and favorable treatment enjoyed by agricultural and forest land.*

*The second part of the paper builds on a database of average square meter prices of agricultural and forest land determined by local governments for fiscal years 2014 and 2015. The quantitative research provides evidences of inconsistency and volatility of land value assessments at significantly higher level than we find for structures, indicating that key principles of tax equity are undermined, placing disproportionately high burden on certain categories of land owners.*

**Keywords:** *agricultural land, forest land, property tax, property assessment, land valuation.*

**JEL:** *H21, N50, Q15*

### Introduction

Land is the most commonly used basis of the property tax. There are systems that apply property taxes on land only, but there is no case of a system that taxes structures (objects) and not the land. Our goal is to examine advantages and disadvantages of land taxation in general and to assess the practice of agricultural and forest land taxation in Serbia.

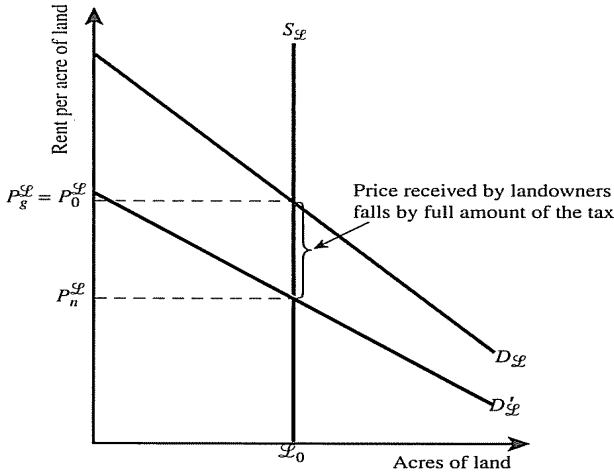
Land has one defining characteristic that sets it apart from other types of property tax bases: that is its fixed supply. With some negligible exceptions, land cannot be produced, nor destroyed. This fixed supply of land has profound implications, primarily in the sense of the tax incidence (meaning who effectively bears the burden of a tax). Rosen and Gayer used following two graphs to present difference in the property tax incidence between the land

---

1 Dušan Vasiljević, M.A., PhD candidate, US AID Business Enabling Project: Director for Business Regulation and Economic Governance; University of Singidunum, Faculty of Economics, Finances and Administration, Francuska street no. 6, 11000 Belgrade, Serbia, Phone: +381 60 13 000 18, E-mail: [dvasiljevic@bep.rs](mailto:dvasiljevic@bep.rs)

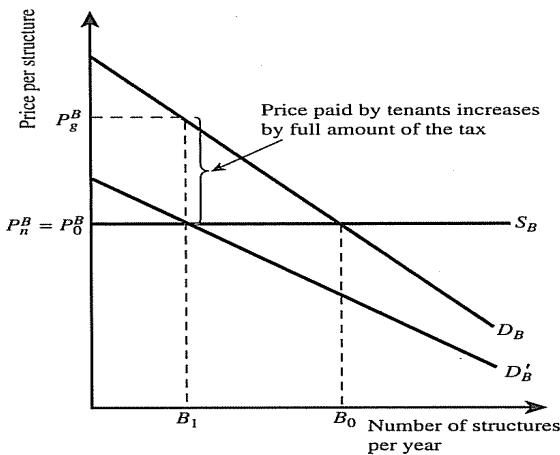
and structure. Key underlining concept behind those graphs is that supply of land is near perfectly inelastic, while supply of structures (objects) is near perfectly elastic. The later part of the concept is based on an assumption that structures are just one of many alternative uses of the capital. If a particular use of the capital (investment in structures) became more costly, the rational market participants would invest their capital in alternative uses, keeping the supply downside.

**Figure 1.** Incidence of the tax on land



Source: Rosen, Gayer, 2008.

**Figure 2.** Incidence of the tax on structures



Source: Rosen, Gayer, 2008.

These graphs show that full burden of the introduction of the property tax on the land, its supply being near perfectly inelastic (vertical line on the Figure 1), is borne by owners of the land, while users (renters) of the land do not feel consequences of the introduction of the tax<sup>2</sup>. Conversely, full burden of the introduction of the property tax on structures, whose supply is perfectly elastic (horizontal line on the Figure 2), is borne by renters of structures, even if owners are legally responsible for paying the tax. Owners of structures simply pass on the tax amount to renters, as any reduction in demand would be offset by capital outflow from construction to other uses, resulting in the same compensation that owners of the structures would receive from tenants, everything else being equal. However, those who bear the burden are not necessarily owners of the land at the moment of the payment of the property tax, but the owners at the moment when the tax was introduced, or when its introduction became imminent and widely known fact. From the moment of introduction, or credible announcement of the tax, all future payments of the property tax are capitalized in the value of the land, reducing what can be received for the sale of the land in the open market.

The key tax-related quality of the land is that taxing it does not change economic incentives of taxpayers, as their response to the tax cannot be to produce less land. Thus, low or no deadweight burden of the land tax is one of its key features. Together with the fact that land cannot be moved from one tax jurisdiction to another and that cannot be concealed, its fixed supply makes the land an ideal property tax base.

### **Materials and methods**

Key methods used in the research are method of quantitative statistical analysis and the method of normative analysis of land taxation policy in Serbia. The basis for the research is the Standing Conference of Towns and Municipalities' (Kahn, 2001) (national association of local governments in Serbia) database of municipal ordinances on base prices of different types of properties for fiscal years 2014 and 2015. The database includes ordinances from 138 cities and municipalities – a vast majority of the total of 145 units of local self-government in Serbia, making it by far the most complete database of this kind. For analytical purposes, we have divided all local governments into municipalities (118), cities (19) and City of Belgrade. Our approach in analyzing the database was to compare results obtained for agriculture and forest land with results obtained for other types of properties, and particularly for the construction land and apartments. We compared results on several aspects: dispersion of data within the same property type and the same zone between different local governments; difference between base prices of properties defined for 2015 with values determined for fiscal 2015; differences in determined prices between different zones for the same types of properties.

---

2 Kahn holds that the tax on land can be shifted to tenants or lessees if (i) the land market is not competitive; (ii) the supply of land is relatively limited; and (iii) the tenants and workers are not well organized.

Other sources of data include the Ministry of Finance's Treasury Administration data on public sector revenues and of the Republic Statistics Office's data on the gross domestic product.

### **Taxation of agricultural and forest land: theoretical foundations and comparative practice**

Unique qualities of the land as a tax basis gave rise to the schools of political economy that argued that there should be only one tax – tax on the land. Sources of this concept can be traced back to John Locke and later on to the French physiocrats, which believed that all wealth is primarily derived from the agriculture and advocated introduction of the *impôt unique* – the single tax on land. David Ricardo famously developed the concept of Ricardian rent, as a difference between productive potential of the land and productive potential of the best freely available land (Hollander, 1895). Tax implications of this concept are fundamental: Ricardian rent could be taxed with up to 100% rate, and owners still would not have an incentive to change the purpose of the land.

“The land-tax-only utopia” has limited policy applicability, but it helps us grasp vast underutilized importance of the land in most public finance systems. Henry George's intentions when putting forward suggestion of a single tax in his 1879's “Progress and Poverty” were to relieve labor and capital from taxation burden (George, 1935). His argument was that value of the land is at least determined by its owner's action, as it mostly depends on natural characteristics (mostly relevant for agricultural land) or actions of the rest of society, such as access to infrastructure or proximity to costumers (most relevant in the case of construction land). Currently, one of the prevailing arguments in favor of land tax is that such tax reduces speculation with the land and motivates owners to put it into most productive use. Ethics of land taxation is traditionally one of fundamental considerations in relation with this tax, often influenced by the views of the land rent as an unearned income (Brown, 1917).

Land tax has an effect of reducing its market value, making it more affordable to potential investors. Result of a simulation of a revenue neutral replacement of the property tax with the land tax (meaning exempting the improvements on the land) show increase in both total employment and gross state product indicators (England, 2003).

Land value fundamentals consist of four components: a) the agricultural land value, as the capitalized value of the agricultural rent stream, b) the value of expected rent increases caused by population growth, c) value of accessibility to the city center, and d) the cost of development conversion, capturing the investment in capital improvements to the land (Anderson, 2012). Tax burden influence on the land value must take into consideration combined tax reliefs, which were in the US estimated to pay for 80-90% of farmers' property taxes and raise land values by almost 10% (Anderson, Bunch, 1989).

One of the key principles in assessment activities is that properties are valued in accordance with its best and highest use, regardless of the fact that current use might be different. However, agricultural land is granted an exemption from this rule in many tax systems. For example, in most of federal states of the USA, there is a requirement to assess the agricultural land based

on its current use (Bell et al., 2009). Reason for this policy is twofold: social aspect intends to provide a relief to often poor farmer families that use as agricultural land parcels that are designated for development (and therefore significantly more expensive); environmental aspect is reflected in the policy that favors use of the land in a manner that has smaller environmental footprint. Although widely used, the policy of assessing the agricultural and forest land based on its current use has some drawbacks – firstly, it discourages using the land in its most productive use, thus reducing the benefits for overall society; secondly, it incentivizes using the land for speculative purposes.

Agricultural land is exempt from taxation in many property tax systems. Reasons for that are similar as ones we presented in relation with the mandate to assess the agricultural land in accordance with its current use – combination of social and environmental considerations. However, there is another reason, which stems from the very nature of the property tax. Its key purpose is to generate necessary revenues for maintaining local infrastructure and providing municipal services. Given the fact that agricultural land is often completely neglected in terms of municipal infrastructure and that it is a negligible consumer of local government services compared with construction land and structures, there are arguments that it should not be taxed at all. Counterarguments point out to locally financed systems and services that are less visible, but still important for the use of agricultural land – anti-hail systems, local roads, melioration systems, local police etc.

Systems with partial exemptions or different methods of providing preferential treatment to the agricultural land are numerous: in France, agricultural properties are exempt from the land and building tax; in Germany, agricultural land values are not indexed, thus resulting in effective tax rates being significantly below other types of properties; in Hungary, land plots below municipality-determined thresholds are exempt; in Ireland, agricultural land is exempt as a result of a court decision; in Italy, rural properties are exempt from the tax on immovable property; in the Netherlands, agricultural (including horticultural) land is exempt from the municipal tax (but not from contributions to polder boards); the properties of agricultural enterprises are exempt in Russia; in United Kingdom, agricultural land are exempt; in Estonia agricultural lands is valued on the profits basis (UN Habitat, 2013); in Ontario, Canada, the farm tax rate is set by provincial law at only 25% of the residential tax rate (Slack, Bird, 2014).

Exemptions applicable on agricultural land are usually applied on forest land as well, mostly on the grounds of the same argument. However, the forest land has its particular set of considerations when it comes to the question whether it should be subject of property taxation. Value of the forest land itself, when the value of standing timber is excluded, is rather low. Additionally, owners of the forest land need to pay property tax for number of years before being able to raise any income by harvesting the timber.

The broad scope of exemptions related with agricultural and forest land appears to be in contradiction with earlier considerations of the land tax as an almost ideal tax. Skinner addresses this contradiction in a paper of a very telling title (Skinner, 1991):

- a) Current landowners object to land taxation because the tax capitalizes in the form of

reduction of the land value.

- b) The land tax does not accommodate for the risks of agricultural production. The land tax must be paid annually, even if the year was so bad that not even the investment costs were recovered.
- c) Thirdly, the land tax is administratively very challenging. Costs of inventorying the land, assessing it, producing the tax bill and collection are high compared with other taxes.

Other researcher point out to additional issues with the land tax, including the difficulty to determine the value of land net of improvements (Cohen, Coughlin, 2005). With these considerations in mind, we move to the current practice of taxation of agricultural and forest land in Serbia.

### **Taxing the agricultural and forest land in Serbia – key features**

Annual property tax is own source revenue of local governments, which means that cities and municipalities set the tax rates, within limits established by the law, and receive all yields of the tax. Local governments also administer the tax: decide on zoning for property tax purposes, determine average square meter prices of different types of properties, assess the properties, send out tax bills and collect the tax.

Importance of the property tax for cities and municipalities increased significantly in recent years: from 7.6% of total local government revenues in 2013 to 14.1% in 2015. However, level of land tax revenues remains rather very modest.

**Table 1.** Importance of the land tax in the public finance system

	Year 2009	Year 2010	Year 2011	Year 2012	Year 2013
Land tax	835,218	979,715	1,124,211	1,189,314	1,256,118
Land tax share in the property tax (%)	5.0	4.9	5.3	5.4	5.3
Property tax share in GDP (%)	0.58	0.65	0.62	0.61	0.61

*Source:* Author's calculations based on Treasury Administration data on revenues and Republic Statistics Office's GDP data;

*Note:* revenue data are in thousands of RSD

Property tax is imposed on owners and holders of the usage rights on the land, but not on holders of the leases. In 2012, out of 2,480 million hectares of agricultural land enlisted in the Register of Agricultural Holdings, 773,603 hectares was leased land, out of which 40% is publicly owned agricultural land (Cvjetković et al., 2015). That means that more than 12% of land enlisted in the Register of Agricultural Holdings is tax exempted.

Land in Serbia is object of property taxation if its area exceeds 10 ares. If land area is 12 ares, not only 2 ares will be taxed, but all 12 ares. If a land is designated as a construction (urban) land in the spatial or zoning plans, but it is used as agricultural land, for the purpose of

property taxation it will be treated as construction land, and therefore subject of higher taxes. This is an important deviation from the widespread practice to assess the agricultural land in accordance with its current use.

The legislation provides a partial exemption for the land that is being re-used as agricultural or forest land, during five years following conversion to that types of use. Another exemption benefits large number of potential and tax payers: for properties valued below 400,000 RSD (approximately EUR 3,300). However, this exemption is applicable only if all properties of a tax payer on the territory of one municipality fall below this threshold. For a payer who owns a house, however modest, and a piece of land, this exemption most likely will not be applicable. Consequently, this exemption is more likely to benefit an owner who resides in one municipality and owns (often by inheritance) a land in another municipality – exactly the category of owners that prudent policy would not intend to protect from property taxes.

With regards to the land tax rates, land is favored in two ways: maximum tax rate for land is 0.3%, while for other types of properties can be up to 0.4%; additionally, structures can be object of progressive tax rates for values assessed at more than 10 million RSD, with rates going up to the level of as much as 2%. For the land, however, no progressive rates are allowed.

Serbia has legislated in 2013 (Official Gazette of the Republic of Serbia”, no. 47/2013) a comprehensive reform of assessment methodology for the property tax purposes. Most profound changes were implemented in the segment of land valuation. Cadaster value of the land was finally abolished as a basis for the property tax on agricultural and forest land.<sup>3</sup> Two models of land value assessment were introduced, depending on the type of tax payer. For businesses that keep books in accordance with international accounting standards, basis of the property tax is value of the property as recorded in company’s books; for all other payers, the value of land is determined by multiplying area of the land and the average price of the given type of property in a given zone. Next, we focus on the method of assessment of the land value for tax payers that do not keep books in accordance with the international accounting standards, as this is by far bigger share of the total number of land tax payers.

### **System of zones for determining average property prices**

For the property assessment purposes, the key concept is the average price of the given type of property in a given zone. Each type of property is assigned its own average price in a given zone. That means that different average prices are determined for agricultural and for forest land. Average prices are determined by zones. Each local government has to define at least two zones, which are the same for all types of properties.

As the Table 2 shows, the second zone is the one where majority of local governments determine average prices of both agricultural and forest land, followed by the first zone. More municipalities have determined average prices of agricultural and forest land in first

---

3 This reform was long overdue. Cadaster values have not been updated for many years, producing assessments that have been only a fraction of the market value of the land.



than in third zone. It can be explained by a fact that number of municipalities exercised its legal right to determine only two zones. As the column “Total” shows, municipalities have much less frequently determine average prices for agriculture land and forest land per zones (247 and 191 instances respectively) than for other types of properties. Expectedly, more municipalities have determined average prices of agricultural land, than the forest land. However, it was unexpected to find out that three municipalities have agricultural land and two have forest land in their extra zones.

**Table 2.** Number of municipalities that determined specific zones for the 2015 fiscal year

	Extra zone	I Zone	II Zone	III Zone	IV Zone	V Zone	Total
Construction land	7	104	100	41	42	15	309
Houses	7	112	104	47	42	14	326
Apartments	7	118	98	44	38	10	315
Business premises	8	112	101	44	44	13	322
Agricultural land	3	65	81	36	44	18	247
Forest land	2	48	61	26	38	16	191
Total <sup>1</sup>	41	668	644	280	289	98	2,020

*Source:* Database of the Standing Conference of Towns and Municipalities and author’s calculations

In cities, situation is somewhat different than in municipalities, primarily because cities tend to define larger number of zones on their territories: most cities determined average prices of agricultural land in the Zone IV (16 cities), followed by Zone III (13) and Zone II (9); for forest land, Zone IV is also the leading one (11 cities), followed by Zones II and III (9 cities).

### Determination of average prices of the agricultural and forest land

The Law on Property Taxes envisages that average prices per zones, differentiated between seven types of properties, should be determined based on the transactional data originated in the period of January-September preceding the year for which the average prices are determined. At least three transactions are required for each type of property for each zone. If there are no data on at least three transactions, calculation for that type of property is made based on average prices in neighboring zones that have records of three or more transactions – regardless of the fact whether those zones are in the same or a different local government.

**Table 3.** Key findings in relation with the average prices of agricultural land in municipalities

	Extra zone	I Zone	II Zone	III Zone	IV Zone	V Zone
Number of municipalities that determined average price for 2015	3	65	81	36	44	18
Lowest average price for 2015	60	10	9	10	4	8

Highest average price for 2015	137	2,319	909	868	529	137
Average price for 2015	90	131	90	79	152	46
Ratio of average prices 2015/2014	1.16	1.85	1.03	1.08	2.23	0.87
Ratio of average prices in 2015/14 above 2 (%)	0	7	12	0	0	0
Ratio of average prices in 2015/14 below 0.5 (%)	0	0	2	3	9	0

*Source:* Database of the Standing Conference of Towns and Municipalities and author's calculations

*Note:* prices are in RSD/m<sup>2</sup>

One of the key findings based on the analysis of the administratively set average prices of agricultural land in municipalities is that average prices for 2015 per different zones show no consistency. As seen in the Table 3, average prices for 2015 are highest in the zone IV, followed by the zone I. The lowest prices are in the zone V. Ratio between the averages for the fourth and fifth zone are more than 1 to 3. Difference between highest and lowest prices determined for a whole zone is staggering: from 4 to 2,319 RSD per square meter of agricultural land (1:780 ratio). It is difficult to assume that difference in productivity of the land could account for such a difference in assessed value of the land. Example of Bajina Basta municipality is rather illustrative: price for the zone I and zone II of 462 RSD determined for the year 2015 is more than 12 times higher compared to 2014 prices in the zone II and almost 9 times more than price determined for the neighboring zone III for the same year 2015.

Next, we went another level deeper in our analysis and compared average prices of agricultural land per zones determined in 2015 with average prices determined by same municipalities for same zones in 2014, looking for major increases or decreases, only to find even more worrying evidences. As many as 12% of municipalities more than doubled prices in their zones II, and 7% of municipalities did the same in the zone II. Significantly lesser number of local governments made a similar move in opposite direction, by more than halving prices in 2015 compared with 2014 – most of them for the zone II: 9% of all municipalities. Volatility is visible in the ratio of averages of prices set by local governments in 2015 versus 2014: in zone I prices in 2015 are almost double that from 2014 and in zone II prices are more than double than just a year ago. Needless to say, there were no market reasons that would justify any similar changes in prices of the land in just a year's time, so the only explanation is that different values are direct result of administrative decisions based on the legal framework for land assessment.

Situation in cities is rather similar in terms of inconsistency and volatility of land values assessments, only perhaps more radical. While 9% of prices per zones between 2014 and 2015 in municipalities were radically changed (increased by more than double or decreased by a half at least), that share in cities was 17.5%. Example of the City of Kraljevo is illustrative in terms of volatility of the land value assessments. Kraljevo for the zone I did not determine the average prices for 2015, while for the zone II determined price of 86 RSD (almost five time less than the value determined for the same zone for 2014); the price for zone III is almost double (192), only to fall to the level of 47 RSD in the zone IV.

City of Belgrade also features an interesting practice in terms of land assessment. Highest prices determined for fiscal 2015 are 750 RSD/m<sup>2</sup>, in four out of its 14 zones. Those prices in the four zones are only a third of the values determined for the previous year. Ratio of prices for 2015 compared with those determined for 2014 are in the scope between 0.26 and 1.47. Volatility of land assessments in the City of Belgrade is well illustrated by the fact that prices in six out of 14 zones got reduced by more than a half in just a year period, without any significant development on the land market.

The forest land data on property tax follows similar patterns as the agricultural land does. Difference between lowest and highest price determined per zones in municipalities goes between 4.34 and 250 RSD/m<sup>2</sup>, which is 1:55 ratio – hardly a difference that productivity of the forest land can account for. Average prices per zones are more consistent, spanning from 46 dinars in the zone III to 60 RSD in the zone I.

**Table 4.** Key findings in relation with the average prices of forest land in municipalities

	Extra zone	Zone I	Zone II	Zone III	Zone IV	Zone V
Lowest price 2015	30.00	9.95	9.95	10	4.34	7.11
Highest price in 2015	75.00	240	206	206	137	200
Average price in 2015	53	60	50	46	47	49
Average price 2015/2014	0.90	1.40	1.22	0.92	1.23	0.96
Share of 2015/14 above 2 (%)	0	6	7	4	16	13
Share of 2015/14 below 0.5 (%)	0	0	4	7	5	13

*Source:* Database of the Standing Conference of Towns and Municipalities and author's calculations;

*Note:* prices are in RSD/m<sup>2</sup>

Changes in prices between 2014 and 2015 are excessive by any account. For Zone IV, as many as 16% of municipalities have determined for 2015 prices that are at least double than the 2014 prices. For the zone V, 13% of municipalities for 2015 reduced prices of the forest land by more than a half. Database shows evidence of the municipalities increasing prices between 2014 and 2015 by more than 8 times and others reducing prices by almost 90%.

Findings regarding forest land are similar in cities as well. There were drastic changes between 2014 and 2015 with regards to prices determined by local governments in 30% of all cases, while that share was 13% in the case of municipalities. Cases of individual cities also exhibit lack of consistency: for the zone I prices, we found that Novi Pazar had a value of 1,960 RSD, Smederevo 125 RSD, Cacak 70 RSD and Sabac 42 RSD. Even within same city, we found evidences of differences that are difficult to explain in economic terms: price of forest land in Novi Pazar was set at the level of 73 RSD in the zone VI, and 1,120 RSD/m<sup>2</sup> in the zone II.

For the forest land, City of Belgrade has followed same pattern as for agricultural land and determined highest price (700 RSD/m<sup>2</sup>) in four out of 14 zones, and lowest price (of 70 RSD/m<sup>2</sup>) in the zone VIII; also, prices in four most expensive zones have been reduced for 2015

by two thirds compared with 2014 levels. In other zones, ratio between 2015 and 2014 prices span from 0.26 to 1.20, against all expectations that could be grounded on market tendencies.

Table 5 provides additional evidence on the lack of reliability of the agricultural land valuations by comparing coefficients of variation (CoV)<sup>4</sup> for all prices of the agricultural land determined by local governments, per zones, with that of apartments<sup>5</sup>.

**Table 5.** Coefficients of variation of prices per zones for selected types of properties

		Extra zone	Zone I	Zone II	Zone III	Zone IV	Zone V
Apartments	Municipalities	0.53	0.51	0.44	0.49	0.52	0.55
	Cities	0.16	0.22	0.22	0.27	0.46	0.50
Agricultural land	Municipalities	0.37	2.32	1.59	1.61	4.36	0.71
	Cities	-	1.66	2.10	2.35	2.36	0.36

*Source:* Database of the Standing Conference of Towns and Municipalities and author's calculations

As the Table 5 shows, CoV values for agricultural land are rather excessive compared with the apartments. All CoV values for the apartments fall in the interval between 0.16 and 0.55; at the same time, all but three values for agricultural land are above the 1.5 level, going all the way up to 4.36. High levels of dispersion of the administratively determined prices of the agricultural land and volatility in the data series indicate systemic lack of reliability of assessed values.

What makes prices determined for agricultural and forest land so gravely unreliable compared with apartments? Primarily fewer transactions data are available for calculations of the average prices per a zone. As the case of apartments so effectively proves, central zones of both cities and municipalities, where traditionally most transactions are taking place, have lowest CoVs. Going towards the periphery, CoV values rise for both cities and municipalities, as those zones feature fewer transactions that could be used for calculations of averages. When it comes to agricultural land, we see that CoV values are rather high in all zones – because determination of average prices based on transactional data is hampered by insufficient number of transactions in all zones.

What is the result of the rule that prices per zones are determined based on calculation of average square meter value based on available transaction data in the context of limited number of available data? If less than three valid transactions are available, local government must seek transaction data from neighboring zones with three or more transactions. That puts land tax payers in disadvantageous position since zones that are likely to have more transactions are zones with more dynamic land market, and those are most often zones with

4 Coefficient of variation (CoV) is widely used as a measure of the dispersion of a data series around the mean. Higher values of CoV indicate higher level of volatility in a data series.

5 Apartments were deliberately chosen for this comparison exercise as most transaction data are available for that type of property, making assessments based on transactional data for apartments most reliable among all types of property.

higher prices than zones with stagnant market with few or no transactions. As a result, prices from higher-value zones with more transactions are being “copied” to lower-value zones.

Alternatively, a certain zone can have enough transaction data for the calculation of the average price of the land in a zone (it could be only three transactions). But such a system is also systemically flawed, as one transaction of a land that is untypical in the context of other land in the zone can “contaminate” the whole sample and predominately influence the average price. This syndrome of “outlier transaction” dominating final result is not just a theoretical possibility. Agricultural land that is most likely to be object of a transaction is either most attractive land in a zone or parcel that is expected to be rezoned to construction use. In most of the cases, owners of typical land are likely to be “victims” of more attractive land – either from higher value zones or from more desirable land parcels in the same zone.

### **Conclusion and recommendations**

It has been often suggested, more in political economy literature than in public policy discourse, that land is an optimal tax base. The land is not mobile, it is not easily concealed, its supply is fixed and thus taxing does not result in decrease in production, so there are no deadweight costs. At the same time, agricultural and forest land in many comparative systems enjoy full or partial exemptions or otherwise preferential tax treatment – through lower tax rates, special assessment rules etc. This is primarily result of attempts to benefit large number of small properties’ owners, who often make vulnerable categories of the society.

With the reform of property assessment rules for tax purposes in 2013, land taxation pendulum in Serbia has moved from the land being virtually untaxed to becoming arguably overtaxed. This paper presents evidence that legal framework for land taxation produces volatile and unreliable assessments for the agricultural and forest land, especially compared with other types of properties. Data on transactions of higher-value land in the same or neighboring zones artificially increases land value assessment for typical land in a given zone. These systemically flawed assessments undermine some key principles of tax equity, jeopardize the notion of equality of actors on the market and impose an excessive burden on tax payers – often particularly on the very categories of the population that other public policies aim to protect: the poor, elderly and rural families.

Based on presented findings, we believe that following changes to the property taxation system should be considered: abolishing determination of average prices for the agricultural land based on transactions in neighboring zones when not enough transactions data are available for the given zone; providing for an effective mechanism for owners of the agricultural land to challenge local tax administrations’ assessments, possibly by making individual valuations of certified appraisers an evidence in the tax assessment process; assessing agricultural land that was re-zoned to the construction land use as the agricultural for five years, if used for agricultural production in that period; replacement of the forest tax with the charge on harvested timber.

### Literature

1. Anderson, J. (2012): *Agricultural Use-Value Property Tax Assessment: Estimation and Policy Issues*, Public Budgeting & Finance, vol. 32, no. 4, pp. 71-94, Public Financial Publications, Inc,
2. Anderson, J., Bunch, H. (1989): *Agricultural Property Tax Relief: Tax Credits, Tax Rates, and Land Values*, Land Economics vol. 65, no. 1, University of Wisconsin Press, Wisconsin, USA.
3. Almy, R. (2014): *Valuation and Assessment of Immovable Property*, OECD Working Papers on Fiscal Federalism, No. 19, OECD Publishing, Paris, France, (available at: <http://dx.doi.org/10.1787/5jz5pzvr28hk-en>).
4. Arsić, M., Randelović, S., Bučić, A., Vasiljević, D. (2012): *Reforme poreza na imovinu u Srbiji: Rezultati i perspektive*, Fondacija za razvoj ekonomske nauke, Beograd, Srbija.
5. Begović, B., Bisić, M., Ilić-Popov, G., Mijatović, B., Popović, D. (2004): *Reforma poreskog sistema (2)*, Centar za liberalno-demokratske studije, Beograd, Srbija.
6. Bell, M., Bowman, J., German, J. (2009): *The Assessment Requirements for a Separate Tax on Land*, in Land Value Taxation: Theory, Evidence, and Practice, ch. no 8, pp. 171–194, Lincoln Institute of Land Policy, Cambridge, USA.
7. Brown, H. (1917): *The Ethics of Land-Value Taxation*, Journal of Political Economy, vol. 25, no. 5, pp. 464-492, The University of Chicago Press, Chicago, USA.
8. Cvjetković, C., Veselinović, J., Nikolić, I. (2015): *Tax Treatment of Farmers in the Republic of Serbia*, Economics of Agriculture 3/2015, Vol. 62, pp. 737-749, IEP, Belgrade, Serbia.
9. Cohen, J., Coughlin, C. (2005): *An Introduction to Two-Rate Taxation of Land and Buildings*, Federal Reserve Bank of St. Louis Review, May/June 2005, vol. 87, no. 3, pp. 359-74, Saint Louis, USA.
10. England, R. (2003): *State and Local Impacts of a Revenue-Neutral Shift from a Uniform Property to a Land Value Tax: Results of a Simulation Study*, Land Economics, vol. 79, no. 1, pp. 38-43, University of Wisconsin Press, Wisconsin, USA.
11. George, H. (1935): *Progress and Poverty*, Robert Schalkenbach Foundation, New York, USA.
12. Hollander, J. (1895): *The Concept of Marginal Rent*, The Quarterly Journal of Economics, vol. 9, no. 2, pp. 175-187, Oxford, United Kingdom.
13. Kahn, M. (2001): *Agricultural taxation in developing countries: a survey of issues and policy*, Agricultural Economics, vol. 24, pp. 315-328, Elsevier, Amsterdam, Netherlands.
14. McCluskey, W., Bell, M. (2008): *Rental Value versus Capital Value: Alternative Bases for the Property Tax*, International Studies Program Working Paper 08-18, Andrew Young School of Political Studies, Atlanta, USA.
15. Official Gazette of the Republic of Serbia, the Law on Property Taxes, no. 26/2001, 80/2002, 135/2004, 61/2007, 5/2009, 78/2011, 47/2013 and 68/2014.
16. Rosen, H., Gayer, T. (2008): *Public Finance*, McGraw-Hill/Irwin, New York, USA.
17. Skinner, J. (1991): *If agricultural land taxation is so efficient, why is it so rarely used?*, the World Bank economic review, vol. 5, no. 1 (January 1991), pp. 113-133, Washington,

- DC, USA.
18. Slack, E., R. Bird (2014): *The Political Economy of Property Tax Reform*, OECD Working Papers on Fiscal Federalism, no. 18, OECD Publishing, Paris, France (available at <http://dx.doi.org/10.1787/5jz5pzvzv6r7-en>).
  19. Tiits, T. (2008): *Land Taxation Reforms in Estonia*, in Roy Bahl, ed., *Making Property Tax Work*, chapter no. 14, pp. 395-410, Lincoln Institute of Land Policy, Cambridge, USA2008.
  20. United Nations Human Settlements Programme (UNHABITAT) (2013): *Property Tax Regimes in Europe*, Nairobi, Kenya.
  21. Youngman, J. (2006): *Legal Issues in Property Valuation and Taxation: Cases and Materials*, Lincoln Institute of Land Policy, Cambridge, USA.

## **OPOREZIVANJE POLJOPRIVREDNOG I ŠUMSKOG ZEMLJIŠTA: KOMPARATIVNA PERSPEKTIVA I PRAKSA U SRBIJI**

*Dušan Vasiljević*<sup>6</sup>

### **Sažetak**

*U ovom radu se razmatra kontradiktornost između teorijske sklonosti ka korišćenju zemljišta kao predmeta oporezivanja i relativno skromnih prihoda koji se ubiraju po osnovu poreza na poljoprivredno i šumsko zemljište. Izlaganje u radu počinjemo pregledom specifičnosti zemljišta kao predmeta oporezivanja; zatim preferencijama klasične ekonomske škole u pravcu šireg oslanjanja na porez na zemljište suprotstavljamo rezultate komparativnog istraživanja o brojnim oslobađanjima i drugim poreskim pogodnostima koje uživaju poljoprivredno i šumsko zemljište.*

*Drugi deo rada se temelji na formiranoj bazi podataka o prosečnim cenama različitih vrsta nepokretnosti utvrđenih od strane lokalne samouprave za 2014. i 2015. godinu. Kvantitativno istraživanje pruža dokaze o postojanju nedoslednosti i sklonosti drastičnim odstupanjima kod procena vrednosti zemljišta, i to na značajno višem nivou nego kod objekata, ukazujući na podrivanje ključnih principa poreske jednakosti i neproporcionalno opterećenje poreskim obavezama pojedinih kategorija vlasnika zemljišta.*

***Ključne reči:*** poljoprivredno zemljište, šumsko zemljište, porez na imovinu, procena vrednosti nepokretnosti, vrednovanje zemljišta.

---

6 Dušan Vasiljević, magistar Fakulteta političkih nauka, doktorand, direktor za regulatorne reforme u privredi USAID Projekta za bolje uslove poslovanja; Univerzitet Singidunum, Fakultet za finansije, ekonomiju i administraciju, Francuska ulica br. 6, 1100 Beograd, Telefon: +381 60 13 000 18, E-mail: [dvasiljevic@bep.rs](mailto:dvasiljevic@bep.rs)

**DETAIL INSTRUCTIONS TO AUTHORS WITH TEMPLATE FOR THE  
ARTICLES THAT WILL BE PUBLISHED IN JOURNAL ECONOMICS OF  
AGRICULTURE**

The ECONOMICS OF AGRICULTURE is an international scientific journal, published quarterly by Balkan Scientific Association of Agricultural Economists (BSAAE) in cooperation with Institute of Agricultural Economics Belgrade (IAE) and Academy of Economic Studies Bucharest (ASE), in which are published original scientific papers (double reviewed), review articles, pre-announcements, book reviews, short communications and research reports. Research reports and book reviews will be accepted after previous consultation/invitation with/from either a journal Editor, or Editor of the book review, in accordance with the journal submission criteria.

**The journal ECONOMICS OF AGRICULTURE accepts only articles submitted electronically on English language, as e-mail attachment to the following e-mail address: [economicsofagriculture@ea.bg.ac.rs](mailto:economicsofagriculture@ea.bg.ac.rs) and [epoljoprivrede@gmail.com](mailto:epoljoprivrede@gmail.com)**

The articles have to be submitted in duplicate, providing one copy without information about author(s), in order not to violate double-blind review process. In the second copy of the article must be specified all information about author(s) (in required format) that are necessary for further correspondence and full transparency of published article.

Submission of articles to the ECONOMICS OF AGRICULTURE implies that their content has not been published previously in English, or in any other language. Also, submitted papers should not be under consideration for their publication elsewhere (in some other journal) and their publication has to be approved by all authors with signed declaration. Publisher reserves right to verify originality of submitted article by use of specialized software for plagiarism detection.



## REVIEW PROCESS

The articles submitted to the journal ECONOMICS OF AGRICULTURE will be double blind (peer) reviewed and must have two positive reviews consistent to the generally accepted scientific standards. The reviewer independently and autonomously evaluates the article and could give a positive review, suggest some corrections, or give a negative review. In case that the review reports are antagonistic (one is positive and the second one is negative) the final decision will be on third review. Manuscript returned to the author(s) for revision does not guarantee the publication acceptance after article correction. The final decision for publication will be made after repeated review of the revised manuscript. If the article is evaluated positively and accepted for publication, each author has to sign the warranty of paper originality and confirm the copyright transfer to the journal ECONOMICS OF AGRICULTURE.

## RULES FOR TECHNICAL PREPARATION OF ARTICLES

These Instructions will give all necessary information to author(s), as well as template for the articles preparation before their submission for publication in the journal Economics of Agriculture. We are asking you to use this document with a maximal attention, in other words to realize it as a set of instructions and practical example that will contribute to easier and more efficient operation under your article within the all phases of journal editing. Articles that deviate from mentioned template are not be taken into consideration.

**Page setup:** **Paper size:** *width* 170 mm x *height* 240 mm; **Margins:** top/bottom 20 mm, left/right 18 mm; **Layout:** *header* 1,25cm, *footer* 1,25cm; **Orientation:** Portrait. Paper volume up to 30.000 characters (without spaces) or 15 pages is preferable. Articles should not be shorter than 10 pages. Depending on papers' quality, Editorial Board could also accept longer articles. Article has to be prepared electronically (on computer), in program **Microsoft Word XP** or some later version of this program.

Below is a detail **Template** (technical instructions) for correct preparation of articles that will be submitted to the journal Economics of Agriculture. You are asked to maximum possible follow the technical instruction given by the following template.

**TEMPLATE: TITLE OF THE ARTICLE (CENTRED, TNR, SIZE 12, BOLD, ALL CAPITAL LETTERS, MAXIMUM IN TWO LINES)<sup>1</sup>**

*Andela Marković<sup>2</sup>, Petar Petrović<sup>3</sup>, Mirko Mirković<sup>4</sup>*

**Summary**

*It is desirable that Summary contains up to 150 words, as well as to contain all essential paper elements, such as goal(s), used method(s), important results and general authors' conclusion(s).*

*During the summary writing, it should be used font Times New Roman (TNR), font size 11, Italic, alignment text Justify, line spacing single, with interspace of 6 pt between paragraphs, without indentation of the first line.*

*Please, avoid the use of the indexes and special symbols within the Summary, and define all abbreviations whenever they are used for first time. Do not cite references in Summary.*

*Author(s) from Serbia are submitting article title, summary, key words and information about themselves on Serbian language at the end of the article, after the list of used literature. Text of the Serbian and English version of Summary must match in every sense.*

**Key words:** *note, maximally, five, key, words.*

**JEL:** *Q16, M24* ([www.aeaweb.org/jel/jel\\_class\\_system.php](http://www.aeaweb.org/jel/jel_class_system.php))

---

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.***

2 Andela Marković, Ph.D., Principal Research Fellow, Institute of Agricultural Economics, Volgina Street no. 15, 11060 Belgrade, Serbia, Phone: +381 11 444 444/int 112, E-mail: [andjela.markovic@iep.bg.ac.rs](mailto:andjela.markovic@iep.bg.ac.rs)

3 Petar Petrović, Ph.D., Full Professor, University of Belgrade, Faculty of Agriculture, Nemanjina Street no. 6, 11080 Zemun, Serbia, Phone: +381 11 222 222, E-mail: [petar.petrovic@gmail.com](mailto:petar.petrovic@gmail.com)

4 Mirko Mirković, M.A., Assistant, University in Belgrade, Faculty of Forestry, Kneza Visaslava Street no. 1, 11000 Belgrade, Serbia, Phone: +381 64 33 33 333, E-mail: [mirko.mirkovic@yahoo.com](mailto:mirko.mirkovic@yahoo.com)

## Introduction

Please strictly follow the instructions on article formatting, as well as styles provided in this template. Do not change font size, interspace between paragraphs and line spacing to insert more text into a conditionally limited number of pages.

Editorial Board organizes process of review of submitted articles and selects papers for publication based on the performed review, in other words according to estimated quality of the articles by the appointed reviewers. However, the ultimate responsibility for the views, originality and stands within the articles is exclusively on author(s) of manuscripts.

Please follow the basic principles of scientific papers structuring and try as much as possible to write a paper with next segments: Introduction, Paper goals, Data sources, Methodology, Results with Discussion, Conclusion (with Recommendations), Literature, etc.

During the article writing, it should be used font **Times New Roman (TNR)**, **font size 11**, alignment text **Justify**, **Line Spacing Single**, with **interspace of 6 pt between paragraphs, without indentation of the first line**. Articles should be written only in English. It is advisable to write the article in the third-person singular or plural with the use of active form. Before paper submission, please check grammatical and spelling mistakes by the spellchecker for the English language.

**Sub-headings** should be written by font **Times New Roman**, **font size 11, bold, centred**, only first letter capital, interspace between sub-heading and paragraph above 12 pt (**before 12 pt**), and interspace between sub-heading and paragraph below 6 pt (**after 6 pt**). Please use the writing style presented in this template.

Please define **abbreviations and acronyms** during their first occurrence within the text, even in case that they were previously defined in article summary. Do not use abbreviations in article title, unless they can not be avoided.

For **equations and formulas** use the Microsoft Equation Editor or addition for equations writing MathType ([www.mathtype.com](http://www.mathtype.com)). Use of built-in equation editor within the program Word 2007 is not recommended. Please check if all symbols within the equations/formulas are defined (forthwith after equation/formula).

**Reference** (author(s) of quotes) has to be entered directly in the text of article in next form (Petrović, 2012; or Petrović, Marković, 2012; or Mirković et al., 2012). Please do not write them as indexes in square brackets [3] or in footnote. Try to use a footnote only in the case of closer explanation of certain terms, or clarification of real and hypothetic situations. Do not numerate the pages.

**Tables** have to be created within the text of article, not taken in the form of images from other documents. Tables should be numerated according to order of their appearance. Titles of the tables have to be given immediately above the table to which they relate.

Please use following style during their formatting. Title of the table should be set with the interspace 6 pt - before and 3pt - after, in font TNR, font size 11, alignment Justified. Text within the table should be written in the font TNR, font size 9. Bold the text in the heading. Sources and possible notes should be set with the interspace 3 pt above table (before). Sources and notes should be written in font TNR, font size 10, alignment Justified. Start with next paragraph at the interspace of 6 pt from the table source or note (after). During the article writing please mark in the main text all calls to a certain table (*Table 5.*). Try to fit all tables in article within the specified format of the page (Table properties – preferred width – max 97% - alignment: center). Complete text within the table cells has to be entered in next form (paragraph - spacing: before/after 0 pt, line spacing: single). In case when table breaks on next page, broken part of the table on next page has to be accompanied by a table header.

**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)

**Graphs, dendrograms, diagrams, schemes and pictures** should be entered within the text of article (do not use option Float over text) and numerated according to order of their appearance. Their titles have to be positioned immediately above the graph, dendrogram, diagram, scheme or picture to which they relate. Please, have in mind that all titles, sources and notes have to be written by identical style which was used for tables formatting. During the article writing please mark in the main text all calls to a certain graph, dendrogram, diagram, scheme or picture (*Graph 2.*). All graphs, dendrograms, diagrams, schemes and pictures within the paper have to fit the specified format of the page, as well as they have been centrally positioned. Photos and images are not desirable in the paper, but if they can not be avoided, please use an optimal resolution (low resolution can bring to pixelization and worn edges, while to high resolution only increase file size without any contribution to article readability).

During the writing of the article conclusion, please have in mind that **Conclusion** can provide a concise overview of the main results of the article. Do not repeat parts of Summary in this place. Conclusion can explain the importance of article, or it can give recommendations for further action, or it can suggest further work on exposed theme.

**Literature** has to be set at the end of article (for authors from Serbia before summary in Serbian language), in alphabetical order, according to the author's surname. *All references should be cited in original language (in the language on which are published before), in the volume in which are used within the manuscript preparation.* Literature units have to be written in font TNR, font size 11, alignment Justified, with mutual interspace of 3 pt - before/after. In all literature units only surnames are written as a whole, while all authors' names has to be shorten on to initial (initials have to be set after surnames). Please, write surnames of all authors (do not use the style Petrović et al.). Do not combine literature units (under each ordinal number can be only one literature unit) and always write complete titles of used literature units. If used/cited literature was taken over from the internet publication, after adequate writing of literature unit, in brackets has to be noted complete link from which material was taken over (available at: [www.petarpetrovic.pdf](http://www.petarpetrovic.pdf)). Please follow the presented examples for the proper writing of different types of literature units.

### Literature

1. Marković, A. (year): *Title of the Book*, Publisher, City of Publisher, Country of Publisher.
2. Petrović, P., Mirković, M. (year): *Title of the book chapter*, in Book – title of the book, ch. no. x, pp. xxx–xxx, Publisher, City of Publisher, Country of Publisher.
3. Petrović, P., Mirković, M., Marković, A. (year): *Title of the paper*, Title of Journal, vol. x, no. x, pp. xxx-xxx, Publisher, City of Publisher, Country of Publisher, (available at: [www.petarpetrovic.pdf](http://www.petarpetrovic.pdf)).
4. Petrović, P., Mirković, M. (year): *Title of the conference paper/presentation*, Proceedings from the conference - Title of the conference, City, Country, vol. xx, pp. xx-xx.
5. Marković, A. (or name/abbreviation of the Institution/company, for example FAO/UN/IAE) (year): *Title of report/yearbook*, no. of report xxx, City and Country of publisher/institution/company, (available at: [www.fao.org/pdf](http://www.fao.org/pdf)).
6. Petrović, P., Mirković, M. (date): *Title of the newspaper article*, Newspaper title, City, Country, no. xx, (available at: [www.politika.com/nauka/20%/srbija](http://www.politika.com/nauka/20%/srbija)).
7. Petrović, P. (year): *Title of Ph.D. dissertation*, Ph.D. dissertation, Name of Faculty, Name of University, City, Country.
8. Marković, A. (or name/abbreviation of the Institution/company that develop patent, for example Faculty of Agriculture/IAE) (year): *Title of the patent*, Name of the institution that was registered patent, reg. no. of patent x xxx xxx, City, Country.
9. *Title of the Law/regulation*, Official Gazette, Country, no. and year.
10. *Title of Standard*, Standard no. xxx, standard developer, year, City, Country.

## **DETALJNO UPUTSTVO AUTORIMA I ŠABLON ZA RADOVE KOJI SE OBJAVLJUJU U ČASOPISU EKONOMIKA POLJOPRIVREDE**

EKONOMIKA POLJOPRIVREDE je međunarodni naučni časopis, koji kvartalno publikuje Naučno društvo agrarnih ekonomista Balkana (NDAEB) u saradnji sa Institutom za ekonomiku poljoprivrede iz Beograd (IEP) i Univerzitetom ekonomskih nauka iz Bukurešta (ASE). U časopisu se publikuju originalni naučni radovi (dvaputa recenzirani), pregledni članci, prethodna saopštenja, prikazi knjiga, kratki osvrti i izveštaji istraživanja. Izveštaji istraživanja i prikazi knjiga se prihvataju nakon prethodne konsultacije/poziva od strane urednika časopisa, ili urednika prikaza knjige, usklađeni sa kriterijumima podnošenja radova.

**Časopis EKONOMIKA POLJOPRIVREDE prihvata samo radove na engleskom jeziku, podnešene E-mejlom (kao attachment) na adresu: [economicsofagriculture@ea.bg.ac.rs](mailto:economicsofagriculture@ea.bg.ac.rs) i [epoljoprivrede@gmail.com](mailto:epoljoprivrede@gmail.com)**

Radovi se dostavljaju u duplikatu, s tim da se na jednom primerku uklonjeni podaci o autorima, kako se ne bi narušio proces anonimnosti recenzije. U drugom primerku rada navode se sve informacije o autorima (u zahtevanom obliku) neophodne za dalju korespondenciju i punu transparentnost publikovanog rada.

Radovi koji se dostavljaju časopisu EKONOMIKA POLJOPRIVREDE moraju posedovati sadržaj istraživanja koja prethodno nisu publikovana na engleskom ili nekom drugom jeziku. Takođe, podnešeni radovi ne smeju biti u procesu razmatranja za publikovanje u nekom drugom časopisu, te njihova publikacija mora biti odobrena od strane svih autora potpisanom izjavom. Izdavač zadržava pravo provere originalnosti dostavljenog rada specijalizovanim softverom za otkrivanje plagijata.

## PROCES RECENZIJE

Radovi podnešeni časopisu EKONOMIKA POLJOPRIVREDE podležu duploj anonimnoj (double-blind) recenziji i moraju imati obe pozitivne recenzije usaglašene sa opšteprihvaćenim naučnim standardima. Recenzent samostalno i anonimno ocenjuje rukopis, te može dati pozitivnu recenziju, predlog dorade rada, ili negativnu recenziju. U slučaju antagonističnih recenzija (jedna je pozitivna, a druga negativna) konačna odluka se donosi na osnovu treće recenzije. Rad vraćen autorima na ispravku ne garantuje njegovo objavljivanje po urađenim korekcijama. Konačna odluka o publikovanju će biti donešena nakon ponovljenog procesa recenzije rukopisa. Ukoliko je rad pozitivno ocenjen i prihvaćen za publikovanje, svaki od autora mora potpisati garanciju originalnosti rada i odobrenje za prenos autorskih prava na časopis EKONOMIKA POLJOPRIVREDE.

## PRAVILA TEHNIČKE PRIPREME RADOVA

Ovo uputstvo za autore daje sve neophodne informacije, kao i šablon za pripremu radova pre podnošenja za publikovanje u časopisu Ekonomika poljoprivrede. Molimo Vas da maksimalno pažljivo pristupite korišćenju ovog dokumenta, odnosno da ga shvatite kao skup uputstava i praktičan primer koji u mnogome doprinosi lakšoj i efikasnijoj manipulaciji nad Vašim radom u svim fazama uređivanja časopisa. Radovi koji odstupaju od datog šablona se neće uzimati u razmatranje.

**Format strane (paper size):** *Width* 170 mm x *Height* 240 mm; **Margine:** gore/dole 20 mm, levo/desno 18 mm; **Layout:** *Header* 1,25cm, *Footer* 1,25cm; **Orientation:** Portrait. Preferira se **obim radova** do maksimalnih 30.000 karaktera (bez razmaka), odnosno 15 stranica. Radovi ne bi trebalo da budu kraći od 10 stranica. U zavisnosti od kvaliteta rada Uredništvo može prihvatiti i duže radove. Molimo Vas da radove pripremate na računaru u programu **Microsoft Word XP** ili nekoj kasnijoj verziji ovog programa.

U nastavku sledi detaljan **Šablon** (tehničko uputstvo) za pravilnu pripremu radova za časopis Ekonomika poljoprivrede. Molimo Vas da maksimalno moguće poštujuete tehnička pravila data sledećim šablonom.

**ŠABLON: NASLOV RADA (CENTRIRAN, TNR SIZE 12, BOLD, SVA SLOVA VELIKA, MAKSIMALNO DVA REDA)<sup>1</sup>**

*Anđela Marković<sup>2</sup>, Petar Petrović<sup>3</sup>, Mirko Mirković<sup>4</sup>*

**Summary**

*Poželjno je da rezime sadrži do 150 reči, te da sadrži sve bitne činjenice rada, poput cilja rada, korišćene metode, najvažnijih rezultata i osnovnih zaključaka autora.*

*Tokom pisanja rezimea treba koristiti slova Times New Roman (TNR), veličina fonta (font size) 11, Italic, ravnanje teksta Justify, a tekst rezimea pisati bez proreda (Line Spacing Single), sa razmakom od 6 pt između pasusa, bez uvlačenja prvog reda.*

*Izbegavajte korišćenje indeksa i specijalnih simbola u apstraktu, odnosno definišite sve skraćenice u apstraktu kada se prvi put upotrebe. Nemojte citirati reference u apstraktu.*

*Autori iz Srbije šalju naslov rada, rezime rada, ključne reči i podatke o sebi i na srpskom jeziku na kraju rada, ispod listinga korišćene literature. Tekst srpske i engleske verzije apstrakta i ključnih reči se moraju podudarati u svakom pogledu.*

**Key words:** *navesti, maksimalno, pet, ključnih, reči.*

**JEL:** *Q16, M24 ([www.aeaweb.org/jel/jel\\_class\\_system.php](http://www.aeaweb.org/jel/jel_class_system.php))*

- 
- 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. ***Ovaj segment nije obliigoran u radu.***
  - 2 Anđela Marković, Ph.D., Principal Research Fellow, Institute of Agricultural Economics, Volgina Street no. 15, 11060 Belgrade, Serbia, Phone: +381 11 444 444/int 112, E-mail: [andjela.markovic@iep.bg.ac.rs](mailto:andjela.markovic@iep.bg.ac.rs)
  - 3 Petar Petrović, Ph.D., Full Professor, University of Belgrade, Faculty of Agriculture, Nemanjina Street no. 6, 11080 Zemun, Serbia, Phone: +381 11 222 222, E-mail: [petar.petrovic@gmail.com](mailto:petar.petrovic@gmail.com)
  - 4 Mirko Mirković, M.A., Assistant, University in Belgrade, Faculty of Forestry, Kneza Visoslava Street no. 1, 11000 Belgrade, Serbia, Phone: +381 64 33 33 333, E-mail: [mirko.mirkovic@yahoo.com](mailto:mirko.mirkovic@yahoo.com)



## Introduction

Molimo Vas da striktno poštujuete uputstva o formatiranju i stilove date u ovom šablonu. Ne menjajte veličinu fonta ili razmak redova da biste ubacili više teksta u uslovno ograničeni broj stranica.

Uredništvo organizuje proces recenziranja pristiglih radova i vrši odabir radova za publikovanje na osnovu urađenih recenzija, odnosno procenjenog kvaliteta radova od strane imenovanih recezenata. Međutim, krajnja odgovornost za poglede, originalnost i tvrdnje iznete u radovima počiva isključivo na autorima rada.

Molimo Vas da poštujuete osnovna načela strukturiranja naučnih radova, odnosno trudite se koliko je to moguće da Vaš rad ima sledeće segmente: Uvod, Cilja rada i korišćena metodologija, Rezultati rada sa diskusijom, Zaključak, Literatura.

Tokom pisanja rada treba koristiti slova **Times New Roman (TNR)**, veličina fonta (**font size**) **11**, ravnanje teksta **Justify**, a tekst rada pisati bez proreda (**Line Spacing Single**), sa razmakom od **6 pt između pasusa, bez uvlačenja prvog reda**. Radovi se pišu isključivo na engleskom jeziku. Preporučljivo je rad pisati u trećem licu jednine ili množine uz korišćenje aktivnog oblika. Pre slanja rada, obavezno proveriti pravopisne greške putem spellchecker-a za engleski jezik.

**Podnaslovi** se pišu fontom **Times New Roman**, veličina fonta (**font size**) **11, bold, centrirano**, samo prvo slovo veliko, razmak podnaslova i teksta iznad 12 pt (**before 12 pt**), a razmak podnaslova i teksta ispod 6 pt (**after 6 pt**). Molimo Vas koristiti prikazani stil pisanja u ovom šablonu.

Molimo Vas da definišete **skraćenice i akronime** prilikom prvog pojavljivanja u tekstu rada, čak i u slučaju da su već bili definisani u apstraktu rada. Ne koristite skraćenice u naslovu rada osim ukoliko se one apsolutno ne mogu izbeći

Radi unosa **jednačina i formula** u rad, koristite Microsoft Equation Editor ili dodatak za pisanje jednačina MathType ([www.mathtype.com](http://www.mathtype.com)). Ne preporučuje se korišćenje ugrađenog editor jednačina iz programa Word 2007. Proverite da li ste definisali sve simbole u jednačini (neposredno posle jednačine).

**Reference** (autori citata) se navode direktno u tekstu rada u sledećem obliku (Petrović, 2012; ili Petrović, Marković, 2012; ili Mirković et al., 2012). Ne navodite ih kao indekse u četvrtastoj zagradi [3] ili u fusnoti. Trudite se da fusnotu koristite samo u slučaju bližih objašnjenja određenih pojmova, odnosno razjašnjenja realnih ili hipotetičkih situacija. Nemojte vršiti numeraciju stranica.

**Tabele** moraju biti formirane u tekstu rada, a ne preuzete u formi slika iz drugih materijala. Tabele unositi u sam tekst rada i numerisati ih prema redosledu njihovog pojavljivanja. Nazivi tabela moraju biti dati neposredno iznad tabele na koju se odnose. Koristite dole prikazani stil tokom njihovog formatiranja. Naslov tabela pisati sa razmakom 6 pt – iznad/before i 3pt – ispod/after, u fontu TNR, font size 11, ravnanje Justified. Tekst unutar tabela pisati fontom TNR, font size 9. Tekst u zaglavlju tabela boldirati. Izvor i potencijalne napomene pisati sa razmakom 3 pt ispod tabela (before). Izvore i napomene pisati u fontu TNR, font size 10,

ravnanje Justified. Naredni pasus početi na razmaku od 6pt od izvora tabele ili napomene (after). Tokom pisanja rada u originalnom tekstu treba markirati poziv na određenu tabelu (Table 5.). Trudite se da se sve tabele u radu veličinom uklapaju u zadati format strane (Table properties – preferred width – max 97% - alignment: center). Sav tekst u poljima tabele treba unositi u formi (paragraph – spacing: before/after 0pt, line spacing: single). U slučaju da se tabela lomi na narednu stranicu, molimo Vas da prelomljeni deo tabele na narednoj stranici bude propraćen zaglavljem tabele.

**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)

**Grafike, dendrograme, dijagrame, šeme i slike** treba unositi u sam tekst rada (ne koristiti opciju Float over text) i numerisati ih prema redosledu njihovog pojavljivanja. Njihovi nazivi se moraju pozicionirati neposredno iznad grafika, dendrograma, dijagrama, šeme ili slike na koju se odnose. Kod navođenja naslova, izvora i napomena koristiti isti stil koji je predhodno prikazan za formiranje tabele. Tokom pisanja rada u originalnom tekstu treba markirati pozive na određeni grafik, dendrogram, dijagram, šemu ili sliku (*Graph 2.*). Svi grafici, dendrogrami, dijagrami, šeme i slike u radu se svojom veličinom moraju uklapati u zadati format strane, te moraju biti centralno postavljeni. Fotografije nisu poželjne u predmetnom radu, a ukoliko se one ne mogu izbeći molimo Vas da koristite optimalnu rezoluciju (preniska rezolucija dovodi do pikselacije i krzavih ivica, dok previsoka samo povećava veličinu fajla bez doprinosa čitljivosti rada).

Kod pisanja zaključka rada, molimo Vas imajte na umu da iako **Zaključak** može dati sažeti pregled glavnih rezultata rada, nemojte ponavljati apstrakt na ovome mestu. Zaključak može objasniti značaj rada, dati preporuke za dalje delovanje ili predložiti dalji rad na obrađivanoj temi.

**Literatura** se navodi na kraju rada (kod autora iz Srbije pre rezimea na srpskom jeziku), abecednim redom, prema prezimenu autora. **Molimo Vas da reference navodite u originalu (na jeziku na kome su objavljene) u obimu u kom su korišćene/citirane tokom pisanja**

**rada.** Literaturu navoditi u fontu TNR, font size 11, ravnanje Justified, sa međusobnim razmakom 3pt – iznad/before i 3pt – ispod/after. U svim literaturnim jedinicama samo se prezimena daju u punom obimu, dok se sva imena autora skraćuju na inicijal i stavljaju posle prezimena. Molimo Vas da navodite prezimena svih autora, a ne da koristite stil navođenja Petrović et al. Nemojte kombinovati literaturne jedinice (pod jednim rednim brojem može biti samo jedna referenca) i uvek pišite pune naslove u radu korišćenih literaturnih jedinica. Ukoliko je korišćena/citirana literatura preuzeta iz internet publikacija, posle pravilno izvršenog imenovanja literaturne jedinice u zagradi se mora navesti kompletan link sa koga je materijal preuzet (available at: [www.petarpetrovic.pdf](http://www.petarpetrovic.pdf)). Molimo Vas pridržavajte se dole navedenih primera navođenja različitih tipova literaturnih jedinica i referenci.

### 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.
3. Petrović, P., Mirković, M., Marković, A. (godina izdanja): *Naslov rada*, Časopis, vol. x, br. x, str. xxx-xxx, Izdavač, Mesto i Zemlja izdavača, (dostupno na: [www.petarpetrovic.pdf](http://www.petarpetrovic.pdf)).
4. Petrović, P., Mirković, M. (godina izdanja): *Naslov konferencijskog rada/prezentacije*, Zbornik radova sa konferencije – Naziv konferencije, Mesto, Zemlja, vol. xx, str. xx-xx.
5. Marković, A. (ili ime/skraćenica Institucije/Kompanije, na primer FAO/United Nations/IEP) (godina izdanja): *Naslov izveštaja/godišnjaka*, br. izveštaja xxx, Mesto i Zemlja izdavača/institucije/kompanije, (dostupno na: [www.fao.org/pdf](http://www.fao.org/pdf)).
6. Petrović, P., Mirković, M. (godina izdanja): *Naslov novinskog članka*, Naziv novina, Mesto, Zemlja, br. xx, (dostupno na: [www.politika.com/nauka/20%/srbija](http://www.politika.com/nauka/20%/srbija)).
7. Petrović, P. (godina izdanja): *Naslov doktorske disertacije*, doktorska disertacija, Fakultet, Univerzitet, Mesto, Zemlja.
8. Marković, A. (ili ime/skraćenica Institucije/Kompanije koja je razvila patent, na primer Poljoprivredni fakultet/IEP) (godina registracije patenta): *Naziv patenta*, Institucija koja je registrovala patent, reg. br. patenta - x xxx xxx, Mesto, Zemlja.
9. *Naziv zakona/uredbe*, Službeni glasnik, Zemlja, br. i godina izdanja.
10. *Naziv standarda*, Standard br. xxx, izdavač standarda, godina izdanja, Mesto, Zemlja.

---

#### Technical preparation, prepress and printing:

DIS PUBLIC D.O.O., Braće Jerković 111-25, Belgrade, phone/fax: 011/39-79-789

#### Number of copies:

300 copies



Published quarterly

**Journal is registered in major scientific databases:**

- EBSCO,
- AgEcon Search,
- Social Science Research Network (SSRN),
- ProQuest,
- Ulrich's Periodicals Directory,
- CABI,
- J-Gate,
- The World Wide Web Virtual Library for European Integration,
- SCIndeks,
- EconLit

**Journal is indexed in major scientific databases:**

- Index Copernicus Journals Master List (ICV2013: 5,22).

CIP - Каталогизација у публикацији  
Народна библиотека Србије, Београд

33:63(497.11)

ЕКОНОМИКА пољопривреде = Economics of  
Agriculture / editor-in-chief Drago  
Свијановић. - Год. 26, бр. 5 (1979)- . -  
Београд : Научно друштво аграрних економиста  
Балкана : Институт за економику пољопривреде  
; Букурешт : Академија економских наука,  
1979- (Belgrade : Dis Public). - 24 cm

Тромесечно. - Је наставак: Економика  
производње хране = ISSN 0352-3454. - Друго  
издање на другом медијуму: Економика  
пољопривреде (Online) = ISSN 2334-8453  
ISSN 0352-3462 = Економика пољопривреде  
(1979)  
COBISS.SR-ID 27671

---

The Ministry of Education, Science and Technological Development of the Republic  
of Serbia provides financial support for publishing of the quarterly journal  
ECONOMICS OF AGRICULTURE

