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PROFITABILITY OF FOOD INDUSTRY COMPANIES IN THE REPUBLIC OF SERBIA

Violeta Domanović¹, Milica Vujičić², Lela Ristić³

Summary

Food industry is an important segment of manufacturing industry. The EU food industry is the world's leader. An important characteristic of the food sector of the Republic of Serbia is its pronounced dual structure, with a large number of small and medium-sized and a small number of large companies. It is believed that the relatively modest funds for investment in modern technology and increasing production efficiency, despite foreign direct investment, have an unfavourable effect on the perspective of this sector. Based on the number of companies, capacities, volume of production, export potential, and number of employees, confectionery industry is assessed as a significant segment of food industry and economy of the Republic of Serbia. The research objective is to examine whether reputable companies in the food industry of the Republic of Serbia are profitable and assess their profitability growth in the past four-year period. The research results show that the values of the relevant profitability indicators vary considerably in the observed period, regardless of their reputation and the competitive position on the market.

Key words: *food industry, confectionery industry, profitability.*

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Introduction

Food industry is an important segment of manufacturing industry. Food production includes (SORS, 2017): production of biscuits, cookies, preserved pastry goods and cakes, production of cocoa, chocolate, and confectionery products, processing and

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preserving meat, fruit, and vegetables, production of oil and fat, milk processing, production of mill products, bread, pastry and cakes, sugar production, tea and coffee processing, spice production and other food products. When it comes to confectionery industry products, they are known to be very diverse (Dalton, 2015; Gavrilović, 2011).

The EU food industry is the largest among the representative countries, judging by turnover, companies, and employment. More precisely, there are three leading regions in food production: the EU – about 44% of turnover, the USA – about 20%, China – about 19%. Nevertheless, the European Commission is working to improve the competitiveness of the food industry in the European Union. This also implies the creation of new trade opportunities for food and beverages in the European Union (EC, 2017).

The share of food industry in the structure of GVA of the Republic of Serbia is about 4%. The share of food products, beverages, and tobacco in the manufacturing industry GVA is over 30%. The share of food industry in the total number of employees in the manufacturing sector is about 17%, and in the manufacturing industry investment about 16%. The utilization rate of existing food industry capacity is below 65%, which also indicates low efficiency. An important characteristic of the food sector is its dual structure, with a large number of small and medium-sized companies and a small number of large companies. The relatively modest funds for investment in modern technology and increasing production efficiency have an unfavourable impact on the perspective of many existing food companies. In some cases, foreign direct investment has initiated certain shifts. However, technical and technological equipment still varies across subsectors, with larger companies being in a better position. This primarily refers to the milling and bakery industry, sugar producers, confectionery industry, and dairies. Confectionery industry, according to the number of companies, capacities, volume of production, export potential, and number of employees, constitutes a significant part of the food industry of the Republic of Serbia. Bearing in mind that this industry is expanding the production program, introducing new lines, and raising new factories, the capacities are constantly increasing (SPRR, 2014). Serbian Industry Development Strategy and Policy states that the sector of food products, beverages, and tobacco is very important for the future economic activity of the whole country, and an important export sector for all areas, agriculture, trade, catering, etc.

In addition to a large number of foreign and domestic authors who explore factors that directly or indirectly affect the financial performance and its improvement in food industry, i.e. confectionery industry, for further practical improvement in this area in the Republic of Serbia, examples of good practice are of special importance, which especially refers to domestic companies with a long tradition and exceptional quality in the production of food products, such as Soko Štark, Bambi-Požarevac, Swisslion, earlier Takovo-Gornji Milanovac, and others. Hence, the research subject in this paper is profitability of food industry companies in the Republic of Serbia. The research objective is to determine whether food industry, i.e. confectionery industry in the Republic of Serbia, is in the growth phase, expressed by profitability dynamics

of companies in the previous four-year period, i.e. from 2013 to 2016. The starting hypothesis is that reputable companies in confectionery industry in the Republic of Serbia recorded profitability growth in the observed period.

The work is structured in several parts. *The first part* gives a theoretical background on the assessment of food industry in the European Union, the USA, post-socialist countries, and the Republic of Serbia. *The second part* describes the research method, followed by research results and discussion. Finally, *conclusion* follows, with specified limitations and future research directions.

Theoretical background

Manufacturing industry is at a maturity phase, going through a turbulent period, due to the growing global requirements regarding food safety, quantity, and the like (Entrena-Durán, 2015). In addition, confectionery industry faces many challenges. The global market for confectionery products is experiencing moderate growth. The growth of this market is expected to accelerate over the period 2016-2021. Chocolate is the most dominant product of the global confectionery market, with around 55% of the total market value. Sugar confectionery products account for 31.9% of the confectionery market. Europe occupies 38.4% of global market of confectionery products, Asia-Pacific 24.2%, USA 23.6%, Middle East 1.9%, and the rest of the world 11.8%. Mondelez International, Inc. is the leader on the global confectionery market, with 14.2% of market share, followed by Mars, Incorporated with 14%, Nestlé S.A. with 8.7%, The Hershey Company with 5.9%, and others with 57.3% (Market Line, 2017b). The European confectionery market is also experiencing moderate growth and is expected to accelerate its development. Germany occupies 17.7% of the European market of confectionery products, the United Kingdom 14.5%, France 11.3%, Italy 9.0%, Spain 4.9%, and the rest of Europe 42.6% (Market Line, 2017a). The European Union's food industry is generally competitive on the global stage and produces healthy and safe high-quality food.

Bearing in mind the importance of food industry, i.e. confectionery industry, both globally and at the level of Europe, i.e. the EU and the Republic of Serbia, there are numerous studies in this area, especially when it comes to financial performance and its improvement. Baker (2003) studies several manufacturing industry entities in order to examine the relationship between financial strategic planning and financial performance. He analyzes different companies in the manufacturing sector: pastry, confectionery, dairy products, jams, jellies and spreads, preserved and frozen vegetables. The most frequently used indicators, such as return on assets (ROA), return on equity (ROE), and return on sales (ROS) are taken as indicators of financial performance. The research results have shown that formal strategic planning is a tool that can be used to increase financial performance of a wide range of food products. This is in line with most studies confirming positive correlation between strategic planning and performance. Grigg & Walls (2007) study the development of statistical thinking to improve food industry performance. The authors find that statistical quality control methods (SQC) are of

great importance for this industry. Lyons & Ma'aram (2014) examine the multiple supply chain strategy in food industry. They point out that thorough understanding of supply chain management (SCM) is crucial to achieving and maintaining competitive advantage. They conclude that, in order to achieve the best possible performance, it is necessary to establish a strong link between supply chain strategy, business strategy, and market requirements. Saitone & Sexton (2017) study concentration and consolidation in the food supply chain, with particular reference to implications for consumers, farmers, and policy makers in the United States. The authors point out that modern global food system faces the challenges of feeding the population, with an increasing number of food products expected in many highly concentrated industries. In addition, the food system is characterized by growing vertical coordination between different phases and participants. The authors evaluate food sector performance from the standpoint of contemporary challenges and discuss implications of various food industry policy proposals. Their focus is on sectors downstream from the farm, i.e. food processing, distribution, and retailing. Pervan & Mlikota (2013) discuss what determines the profitability of companies, highlighting the case of food and beverage industry in Croatia. The authors emphasize that food and beverage industry is an important segment of any economy. In addition, they explain that company profitability is always in the interest of both academics and business people, especially with the aim of discovering the main factors that affect the business success of the company. The authors also introduce and test a profitability model that includes structural factors and factors specific to a particular company. Szymanski, Gorton & Hubbard (2007) perform a comparative analysis of company performance in post-socialist countries, specifically in the food industry in Poland. They compare the performance of companies with different equity structure, taking return on total assets (ROTA) as the performance indicator. The results show that the type of ownership is a significant determinant of company profitability. The Polish experience can be very instructive for other post-socialist countries. Dalton (2015) analyzes the perception of confectionery consumers on the market of the Republic of Serbia, based on a case study. Given a large number of domestic and foreign confectionery products on the market of the Republic of Serbia, the author emphasizes that it is important to evaluate the position of significant products and to formulate the appropriate strategy for the future development of this area.

Research method

In order to test the starting hypothesis, a case study of food industry companies is applied – Soko Štark d.o.o. Belgrade, Bambi a.d. Požarevac, and Swisslion d.o.o. Belgrade. The profitability of companies in the period 2013-2016 is analyzed.

Soko Štark is part of Atlantic Group, a multinational company that combines production, development, sale, and distribution of consumer goods in its business, with presence on the markets of more than 30 countries around the world. This synergy within a large business system has enabled the opening of new markets, stronger distribution, better positioning and placement – which is the basis for further development of Štark

and Atlantic Group as a whole. Investing in well-known brands, some of which have significant potential, contributes to the creation of value added and ambitious business plans. Continuous technological advancement and marketing activities serve the purpose of constant innovation, monitoring, and application of modern trends in the field of technology and relations with the market and consumers. As a result of tracking global trends and continuous investment in quality and development, new products are emerging. In 1966, following the integration of the Soko Bakery and the Chocolate and Candy Factory Nada Štark, a Factory of Biscuits, chocolates, and Candies Soko-Nada Štark emerged, the forerunner of today's modern factory. In 2001, ownership transformation gave rise to a joint-stock company for the production of confectionery products Soko-Nada Štark, Belgrade, with the abbreviated name AD Štark. In 2005, by public takeover, Grand Kafa, the leading coffee manufacturer and distributor in the region, became the majority owner of AD Štark (with around 94%). By merging Grand Kafa and Droga Kolinska, as the finale of the agreement on strategic integration of these companies, Soko Štark became a member of Droga Kolinska Group. Within this Group, Soko Štark operates as a Business Unit Sweet and Salty. The essence of this organization is division into product programs, sales areas, and local administrations, with the tendency of developing key brands. By acquisition of Droga Kolinska, in 2010, Soko Štark became part of Atlantic Group (Soko Štark d.o.o. Belgrade, 2017).

Bambi a.d. Požarevac started as a children's biscuit factory with only 37 employees and annual production of 167 tons per year in 1967. Bambi is the leader on the domestic confectionery market, with significant regional market share, and one of the 30 most successful companies in the Republic of Serbia. A large number of consumers evaluate Bambi products as the best-quality products. Corporate social responsibility is an integral part of Bambi's identity and business culture, and Bambi is among the leaders in the Republic of Serbia in this field. Bambi a.d. Požarevac strives to be the leading confectionery industry in the Western Balkans region. In 1997, Bambi became the first confectioner in former Yugoslavia to introduce ISO 9001 quality system. In 2000, Bambi was proclaimed the "20th Century Champion of Quality" at Novi Sad Fair. It was the first and only one in former Yugoslavia to introduce the latest quality management system – ISO 9001:2000. In 2002, Bambi received a HACCP hygiene management certificate, being the first company in Yugoslavia and the first company outside the German speaking area to receive it. In 2004, Bambi received a flattering recognition, "Best Brand of Serbia 2004", for Plazma biscuits, awarded by the Ministry of Trade, Tourism, and Services of the Republic of Serbia and the economic daily Pregled. In 2014, Bambi received an award in the field of corporate social responsibility from the Serbian Chamber of Commerce, as well as the CSR Virtus Award for contribution to the local community. In addition, Plazma was declared the favorite domestic brand in the past decade by the Serbian Chamber of Commerce in the action "Best of Serbia". The BAMBI Group is, therefore, a synonym for lasting value. Knowledge and technology, commitment to customers and consumers, and continuous investment in building strong and recognizable brands are the basics that build confidence and strengthen the

competitive position. Bambi understands and follows the needs of its customers and always seeks to satisfy their expectations through a diverse range of high-quality and delicious confectionery products (Bambi a.d. Požarevac, 2017).

Swisslion, limited liability company, food industry Belgrade (Savski Venac), was founded on 4 April 2008. The main company activity is the production of chocolate and confectionery products. The story of Swisslion began in 1997. At that time, the first factory was put into operation and SL Technology introduced – a symbol of top-quality natural and healthy food, controlled origin of raw materials, and perfect flavour. From 1997 to 2004, Swisslion launched a total of 11 new production lines, ten in the Republic of Serbia and one in Macedonia. In 2003, the Swisslion factory in Vršac first introduced and implemented a HACCP and hygiene system, based on the recommended international code of practice. It is important to point out that in 2004, in the tender sale of PIK Takovo from Gornji Milanovac, Swisslion entered into the possession of this economic giant. Takovo was integrated into the Swisslion business system, and thus established Swisslion-Takovo Group. By integrating Takovo into Swisslion-Takovo Group, Juvitana baby food manufacturing plant became part of it as well. In 2008, the biscuit factory Sisak became part of the company, producing biscuits under Euro Jaffa brand. In April 2011, ice cream factory started operating. In a completely new plant, as Greenfield investment, modern processing equipment was implemented. The whole range of products now relies on a rich assortment of certified confectionery brands. The plant capacity is 30 million liters per year, and it is equipped with automated lines for the production of 54 types of ice cream in all shapes and forms (Swisslion d.o.o. Belgrade, 2017).

In order to analyze the profitability of confectionery industry companies, the most frequently used indicators of company profitability in the period 2013-2016 will be calculated, i.e. return on sales – ROS, return on assets – ROA, and return on equity – ROE. Return on sales is obtained as the ratio of net profit and operating revenue. Return on assets is calculated as the ratio between operating profit and average total assets of the company. Return on equity is calculated as the ratio between net profit and average company equity in the observed year. The dynamics of profitability indicators will be monitored using base and chain indices.

Table 1 shows elements of Soko Štark d.o.o. Belgrade profitability in the period 2013-2016.

Table 1. Elements of Soko Štark profitability in the period 2013-2016 in thousands of dinars

Years	Operating profit	Net profit	Operating revenue	Average value of total assets	Average value of equity
2013	1 032 658	779 743	8 357 904	8 779 396	770 634,5
2014	595 674	149 024	9 227 271	9 683 478	879 535,5
2015	964 984	705 983	10 462 098	10 728 435,5	1 163 882
2016	1 176 002	778 104	10 950 933	11 215 488,5	1 859 143,5

Source: SBRA, 2017

Table 2 shows Bambi a.d. Požarevac profitability in the period 2013-2016.

Table 2. Elements of Bambi a.d. Požarevac profitability in the period 2013-2016 in thousands of dinars

Years	Operating profit	Net profit	Operating revenue	Average value of assets	Average value of equity
2013	1 869 353	1 718 238	9 113 945	8 284 912	4 673 070,5
2014	1 937 597	1 725 793	9 244 763	8 927 934,5	5 790 414
2015	1 695 642	1 336 941	8 716 887	10 352 396	7 470 699
2016	2 079 093	1 566 746	9 579 452	11 283 414,5	8 617 634,5

Source: SBRA, 2017

Table 3 shows Swisslion d.o.o. Belgrade profitability in the period 2013-2016.

Table 3. Elements of Swisslion d.o.o. Belgrade profitability in the period 2013-2016 in thousands of dinars

Years	Operating profit	Net profit	Operating revenue	Average value of assets	Average value of equity
2013	636 203	144 232	9 428 563	9 088 613,5	6 964 676,5
2014	602 077	697 470	8 794 616	9 956 593	7 719 994
2015	578 224	494 435	9 612 731	11 272 857	8 271 242,5
2016	354 319	232 463	9 333 111	11 933 394,5	8 647 822

Source: SBRA, 2017

Results and discussion

Table 4 shows Soko Štark d.o.o. Belgrade profitability indicators in the period 2013-2016.

Table 4. Soko Štark profitability indicators in the period 2013-2016

Years	Return on sales (ROS)	Return on assets (ROA)	Return on equity (ROE)
2013	9,33	11,76	101,18
2014	1,62	6,15	16,94
2015	6,75	8,99	60,66
2016	7,11	10,49	41,85

Source: Authors, based on SBRA data, 2017

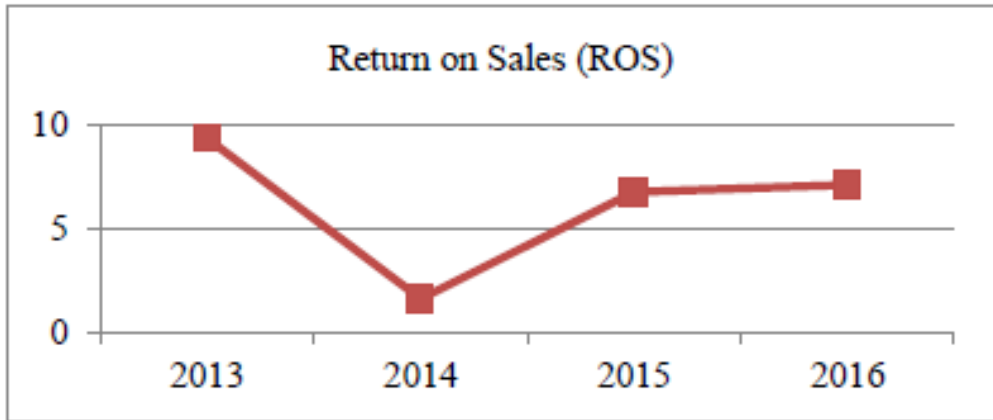
Table 5. Soko Štark d.o.o. Belgrade return on sales dynamics in the period 2013-2016.

Years	Return on sales (ROS)	Fixed base indices	Chain indices
2013	9,33	100	/
2014	1,62	17,4	17,4
2015	6,75	72,3	417
2016	7,11	76,2	105

Source: Authors, based on SBRA data, 2017

Table 5 and Graph 1 show Soko Štark d.o.o. Belgrade return on sales dynamics in the period 2013-2016.

Graph 1. Soko Štark return on sales dynamics in the period 2013-2016



Source: Authors, based on SBRA data, 2017

Comment 1: Table 5 and Graph 1 show that Soko Štark’s return on sales (ROS) varies in the observed period. Observed in comparison with 2013, as the base year, return on sales decreased in the observed period, i.e. by 82.6% in 2014, by 27.7% in 2015, and by 23.8% in 2016. Judging by chain indices, return on sales increased by as much as 317% in 2015, compared to 2014, and only by 5% in 2016, compared to 2015.

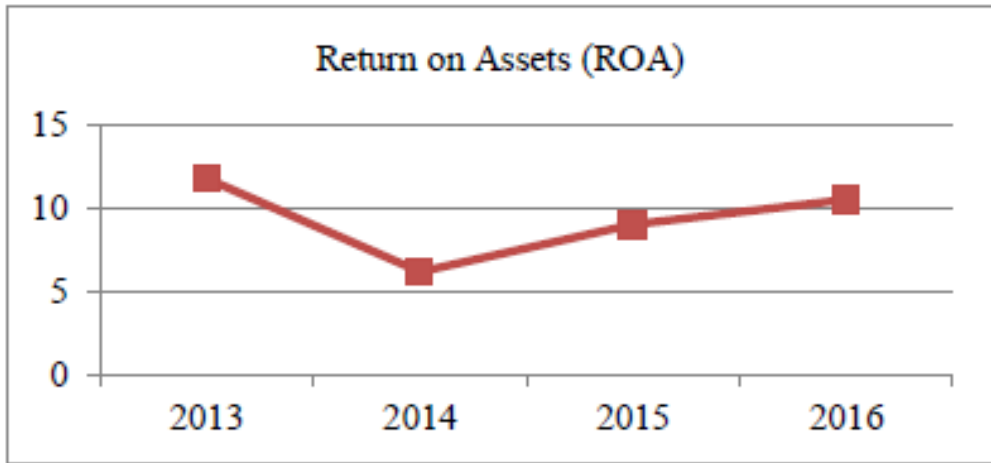
Table 6 and Graph 2 show Soko Štark d.o.o. Belgrade return on assets (ROA) dynamics in the period 2013-2016.

Table 6. Soko Štark d.o.o. Belgrade return on assets (ROA) dynamics in the period 2013-2016

Years	Return on assets (ROA)	Fixed base indices	Chain indices
2013	11,76	100	/
2014	6,15	52,3	52,3
2015	8,99	7,65	146,2
2016	10,49	89,2	116,7

Source: Authors, based on SBRA data, 2017

Graph 2. Soko Štark return on assets dynamics (ROA)



Source: Authors, based on SBRA data, 2017

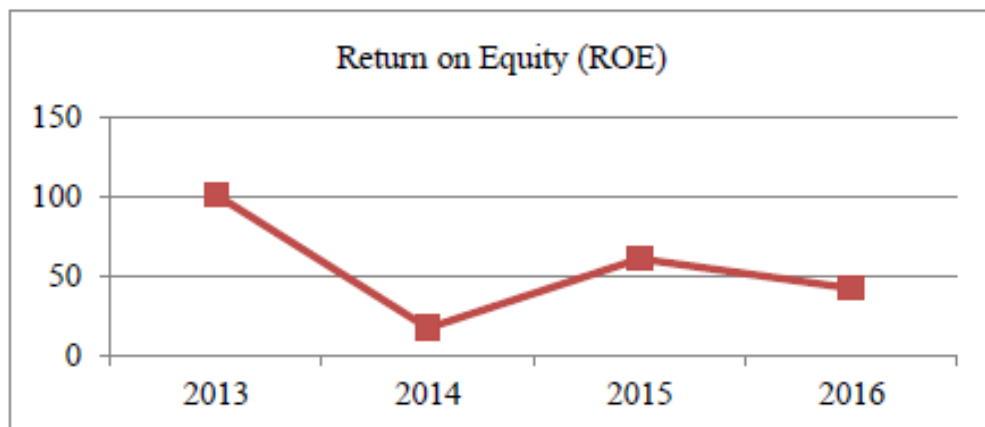
Comment 2: Table 6 and Graph 2 show, that, compared to 2013, as the base year, return on assets declined by 47.7% in 2014, even by 92.35% in 2015, and by 10.8% in 2016. Judging by chain indices, return on assets increased by 46.2% in 2015, compared to the previous year, and by 16.7% in 2016, compared to 2015.

Table 7 and Graph 3 show Soko Štark d.o.o. Belgrade return on equity (ROE) dynamics in the period 2013-2016.

Table 7. Soko Štark d.o.o. Belgrade return on equity (ROE) dynamics in the period 2013-2016.

Years	Return on equity (ROE)	Fixed base indices	Chain indices
2013	101,18	100	/
2014	16,94	16,74	16,74
2015	60,66	59,95	358
2016	41,85	41,36	68,99

Source: Authors, based on SBRA data, 2017

Graph 3. Soko Štark return on equity (ROE) dynamics

Source: Authors, based on SBRA data, 2017

Comment 3: Table 7 and Graph 3 show that, compared to 2013, as the base year, return on equity declined by 83.26% in 2014, by 40.05% in 2015, and by 58.64% in 2016. Judging by chain indices, return on equity increased by 258% in 2015, compared to 2014, but it declined in 2016 by 31.01%, compared to 2015.

Table 8 shows Bambi a.d. Požarevac profitability indicators in the period 2013-2016.

Table 8. Bambi a.d. Požarevac profitability indicators in the period 2013-2016

Years	Return on sales (ROS)	Return on assets (ROA)	Return on equity (ROE)
2013	18,85	22,56	36,77
2014	18,67	21,70	29,80
2015	15,34	16,38	17,9
2016	16,36	18,43	18,18

Source: Authors, based on SBRA data, 2017

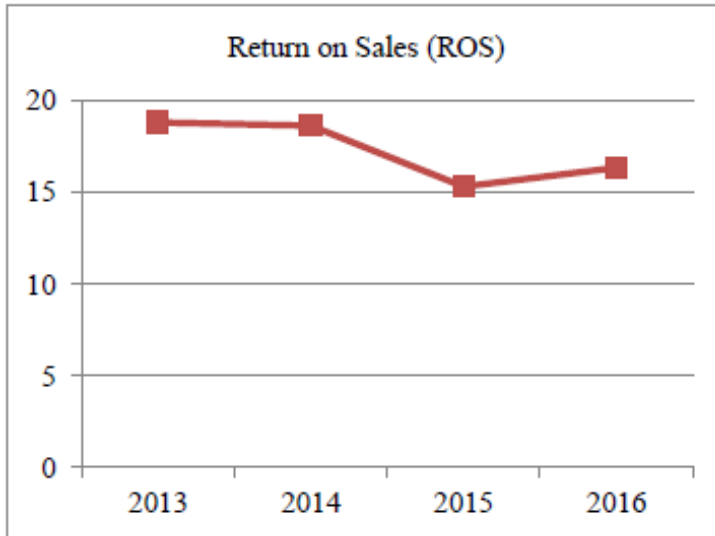
Table 9 and Graph 4 show Bambi a.d. Požarevac return on sales dynamics in the period 2013-2016.

Table 9. Bambi a.d. Požarevac return on sales dynamics in the period 2013-2016

Years	Return on sales (ROS)	Fixed base indices	Chain indices
2013	18,85	100	/
2014	18,67	99	99
2015	15,34	81,4	82,2
2016	16,36	86,8	106,6

Source: Authors, based on SBRA data, 2017

Graph 4. Bambi a.d. Požarevac return on sales dynamics in the period 2013-2016



Source: Authors, based on SBRA data, 2017

Comment 4: Table 9 and Graph 4 show that, compared to 2013, as the base year, return on sales fell by only 1% in 2014, by 18.6% in 2015, and by 13.2% in 2016. Judging by chain indices, return on sales fell by 17.8% in 2015, compared to 2014, but slightly increased by 6.6% in 2016, compared to 2015.

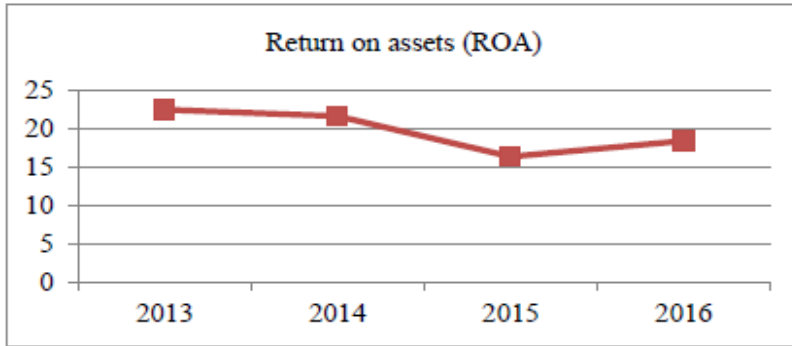
Table 10 and Graph 5 show Bambi a.d. Požarevac return on assets dynamics in the period 2013-2016.

Table 10. Bambi a.d. Požarevac return on assets dynamics (ROA) in the period 2013-2016

Years	Return on assets (ROA)	Fixed base indices	Chain indices
2013	22,56	100	/
2014	21,70	96,2	96,2
2015	16,38	72,6	75,5
2016	18,43	81,7	112,5

Source: Authors, based on SBRA data, 2017

Graph 5. Bambi a.d. Požarevac return on assets dynamics in the period 2013-2016



Source: Authors, based on SBRA data, 2017

Comment 5: Table 10 and Graph 5 show that, compared to 2013, as the base year, return on assets decreased in the observed period, by 3.8% in 2014, by 27.4% in 2015, and by 18.3% in 2016. Judging by chain indices, return on assets fell by 24.5% in 2015, compared to 2014, but increased by 12.5% in 2016, compared to 2015.

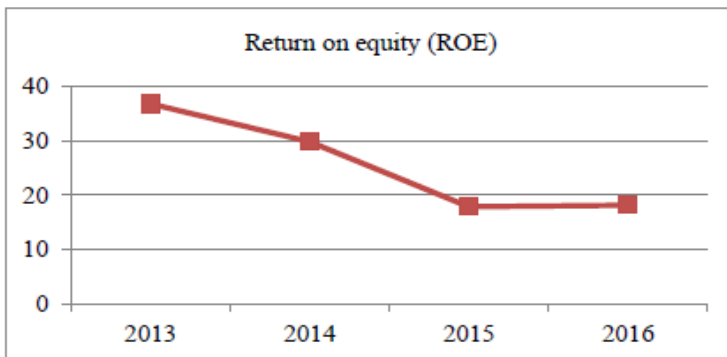
Table 11 and Graph 6 show Bambi a.d. Požarevac return on equity dynamics in the period 2013-2016.

Table 11. Bambi a.d. Požarevac return on equity (ROE) dynamics in the period 2013-2016

Years	Return on equity (ROE)	Fixed base indices	Chain indices
2013	36,77	100	/
2014	29,80	81,04	81,04
2015	17,9	48,68	60
2016	18,18	49,44	101,6

Source: Authors, based on SBRA data, 2017

Graph 6. Bambi a.d. Požarevac return on equity dynamics in the period 2013-2016



Source: Authors, based on SBRA data, 2017

Comment 6: Table 11 and Graph 6 show that return on equity decreased, compared to 2013, as the base year, by 18.96% in 2014, by 51.32% in 2015, and by 50.56% in 2016. Judging by chain indices, return on equity declined by as much as 40% in 2015, compared to 2014, but slightly increased by 1.6% in 2016, compared to 2015.

Table 12 shows Swisslion d.o.o. Belgrade profitability indicators in the period 2013-2016.

Table 12. Swisslion d.o.o. Belgrade profitability indicators in the period 2013-2016

Years	Return on sales (ROS)	Return on assets (ROA)	Return on equity (ROE)
2013	1,53	7	2,07
2014	7,93	6,05	9,03
2015	5,14	5,13	5,98
2016	2,49	2,97	2,69

Source: Authors, based on SBRA data, 2017

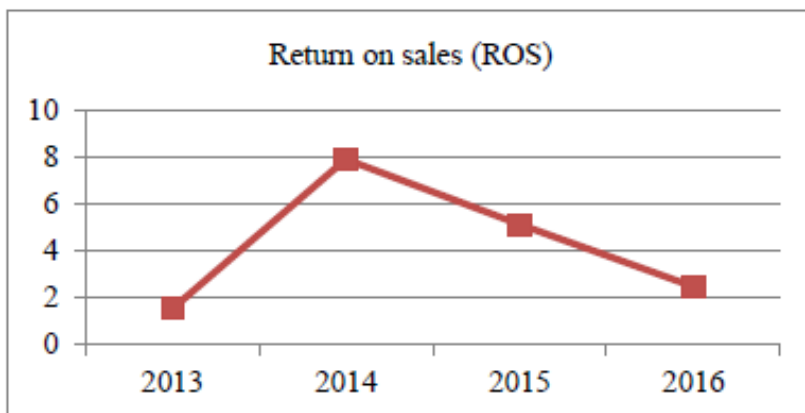
Table 13 and Graph 7 show Swisslion d.o.o. Belgrade return on sales dynamics in the period 2013-2016.

Table 13. Swisslion d.o.o. Belgrade return on sales (ROS) dynamics in the period 2013-2016

Years	Return on sales (ROS)	Fixed base indices	Chain indices
2013	1,53	100	/
2014	7,93	518	518
2015	5,14	336	64,8
2016	2,49	163	48,4

Source: Authors, based on SBRA data, 2017

Graph 7. Swisslion d.o.o. Belgrade return on sales dynamics in the period 2013-2016



Source: Authors, based on SBRA data, 2017

Comment 7: Table 13 and Graph 7 show that return on sales of the observed company increased in the observed period, even by 418% in 2014, compared to 2013, by 236% in 2015, and by 63% in 2016, compared to 2013. Judging by chain indices, return on sales fell by 35.2% in 2015, compared to 2014, and by 51.6% in 2016, compared to 2015.

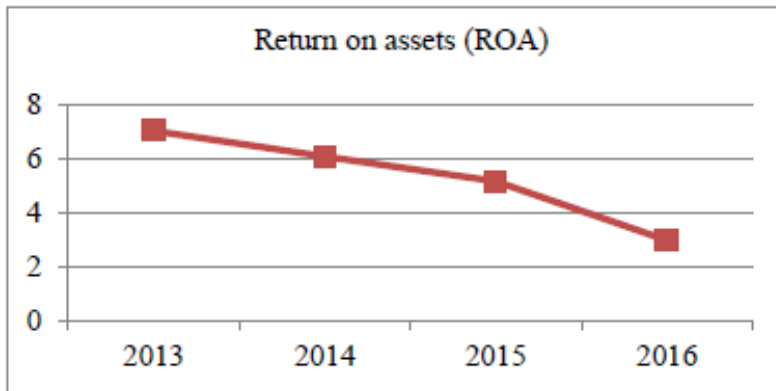
Table 14 and Graph 8 show Swisslion d.o.o. Belgrade return on assets dynamics in the period 2013-2016.

Table 14. Swisslion d.o.o. Belgrade return on assets dynamics (ROA) in the period 2013-2016

Years	Return on assets (ROA)	Fixed base indices	Chain indices
2013	7	100	/
2014	6,05	86,4	86,4
2015	5,13	73,3	84,8
2016	2,97	42,4	57,89

Source: Authors, based on SBRA data, 2017

Graph 8. Swisslion d.o.o. Belgrade return on assets dynamics in the period 2013-2016



Source: Authors, based on SBRA data, 2017

Comment 8: Table 14 and Graph 8 show that return on assets declined in the observed period. Observed in comparison with 2013, as the base year, return on assets declined by 13.6% in 2014, by 26.7% in 2015, and by 57.6% in 2016. Judging by chain indices, return on assets fell by 15.2% in 2015, compared to 2014, and by 42.11% in 2016, compared to 2015.

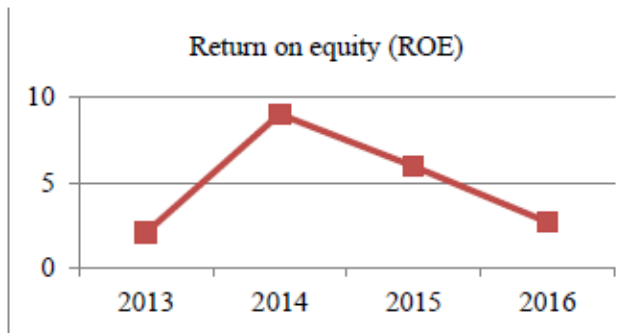
Table 15 and Graph 9 show Swisslion d.o.o. Belgrade return on equity dynamics in the period 2013-2016.

Table 15. Swisslion d.o.o. Belgrade return on equity (ROE) dynamics in the period 2013-2016

Years	Return on equity (ROE)	Fixed base indices	Chain indices
2013	2,07	100	/
2014	9,03	436,23	436,23
2015	5,98	289	66,22
2016	2,69	129,95	44,98

Source: Authors, based on SBRA data, 2017

Graph 9. Return on equity dynamics (ROE)



Source: Authors, based on SBRA data, 2017

Comment 9: Table 15 and Graph 9 show that return on equity increased by 336.23% in 2014, compared to 2013, by 189% in 2015, and by 29.95% in 2016, compared to 2013, as the base year. Judging by chain indices, return on equity fell by 33.78% in 2015, compared to 2014, and by 55.02% in 2016, compared to 2015.

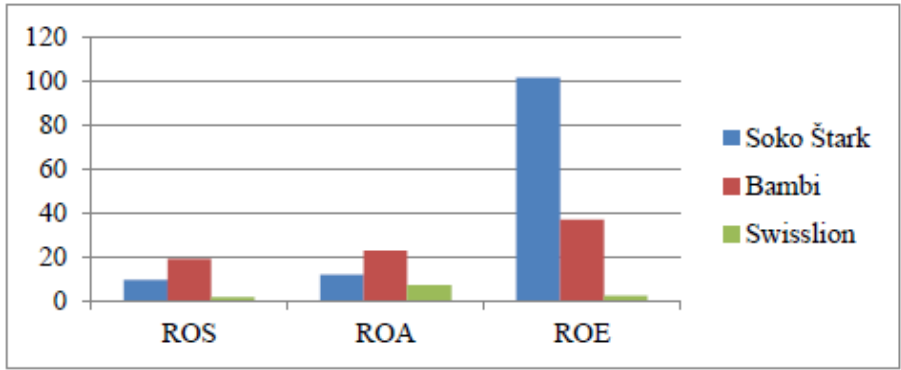
Table 16 and Graph 10 compare profitability indicators of the observed companies in 2013. It can be concluded that, in the observed year, Bambi a.d. Požarevac had the highest return on sales, while Swisslion d.o.o. Belgrade had the lowest. Bambi a.d. Požarevac had the highest return on assets, and the lowest rate was again recorded in Swisslion d.o.o. Belgrade. Soko Štark d.o.o. Belgrade had the highest return on equity, and the lowest rate was again in Swisslion d.o.o. Belgrade.

Table 16. Profitability indicators of observed companies in 2013

Companies	ROS	ROA	ROE
Soko Štark	9,33	11,76	101,18
Bambi	18,85	22,56	36,77
Swisslion	1,53	7	2,07

Source: Authors, based on SBRA data, 2017

Graph 10. Profitability dynamics of the observed companies in 2013



Source: Authors, based on SBRA data, 2017

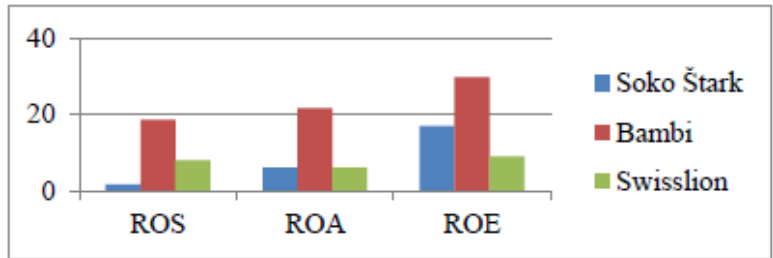
Table 17 and Graph 11 give a comparative overview of profitability indicators in 2014. Bambi a.d. Požarevac had the highest return on sales, the highest return on assets, and the highest return on equity. Soko Štark had the lowest return on sales, and Swisslion had the lowest return on assets and return on equity.

Table 17. Profitability indicators of observed companies in 2014

Companies	ROS	ROA	ROE
Soko Štark	1,62	6,15	16,94
Bambi	18,67	21,70	29,80
Swisslion	7,93	6,05	9,03

Source: Authors, based on SBRA data, 2017

Graph 11. Profitability dynamics of the observed companies in 2014



Source: Authors, based on SBRA data, 2017

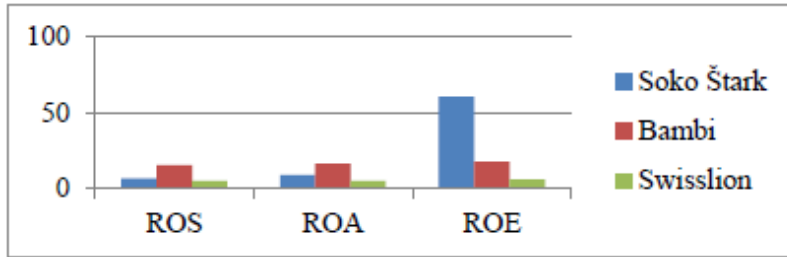
Table 18 and Graph 12 compare companies' profitability indicators in 2015. Bambi a.d. Požarevac again had the highest return on sales and the highest return on assets, while Swisslion d.o.o. Belgrade again had the lowest return on sales, the lowest return on assets and return on equity. Soko Štark d.o.o. Belgrade had the highest return on equity.

Table 18. Profitability indicators of observed companies in 2015

Companies	ROS	ROA	ROE
Soko Štark	6,75	8,99	60,66
Bambi	15,34	16,38	17,9
Swisslion	5,14	5,13	5,98

Source: Authors, based on SBRA data, 2017

Graph 12. Profitability dynamics of observed companies in 2015



Source: Authors, based on SBRA data, 2017

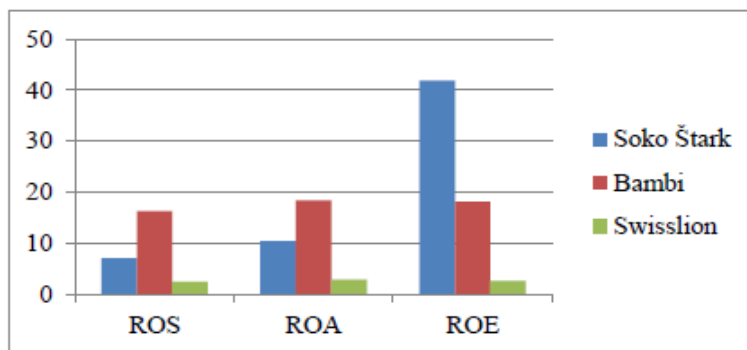
Table 19 and Graph 13 compare the observed companies' profitability indicators in 2016. Bambi a.d. Požarevac again had the highest return on sales and return on assets. Soko Štark d.o.o. Belgrade has the highest return on equity. Swisslion d.o.o. Belgrade again had the lowest return on assets and return on equity.

Table 19. Profitability indicators of observed companies in 2016

Companies	ROS	ROA	ROE
Soko Štark	7,11	10,49	41,85
Bambi	16,36	18,43	18,18
Swisslion	2,49	2,97	2,69

Source: Authors, based on SBRA data, 2017

Graph 13. Profitability dynamics of observed companies in 2016



Source: Authors, based on SBRA data, 2017

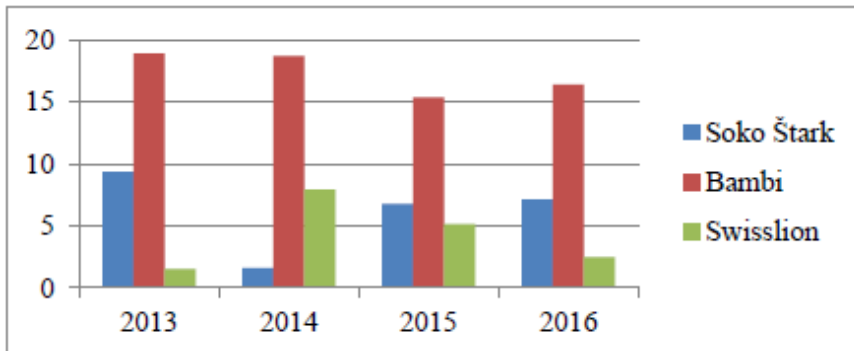
Tables 20–22 and Graphs 14–16 show the dynamics of individual company profitability indicators in the period 2013–2016, on the basis of which it is clearer which company is the most profitable, and which is least profitable. In general, it can be concluded that, based on return on sales and return on total assets, Bambi a.d. Požarevac was the most profitable, while Swisslion d.o.o. Belgrade was the least profitable. From the point of view of return on equity, Soko Štark d.o.o. Belgrade was the most profitable company, while Swisslion d.o.o. Belgrade was again the least profitable.

Table 20. Return on sales (ROS) dynamics of observed companies in the period 2013–2016

Years	Soko Štark	Bambi	Swisslion
2013	9,33	18,85	1,53
2014	1,62	18,67	7,93
2015	6,75	15,34	5,14
2016	7,11	16,36	2,49

Source: Authors, based on SBRA data, 2017

Graph 14. Return on sales (ROS) dynamics of observed companies in the period 2013–2016



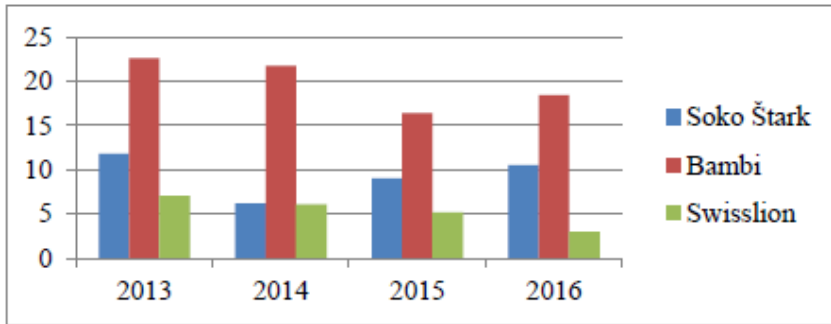
Source: Authors, based on SBRA data, 2017

Table 21. Return on assets (ROA) dynamics of observed companies in the period 2013–2016

Years	Soko Štark	Bambi	Swisslion
2013	11,76	22,56	7
2014	6,15	21,70	6,05
2015	8,99	16,38	5,13
2016	10,49	18,43	2,97

Source: Authors, based on SBRA data, 2017

Graph 15. Return on assets (ROA) dynamics of observed companies in the period 2013-2016



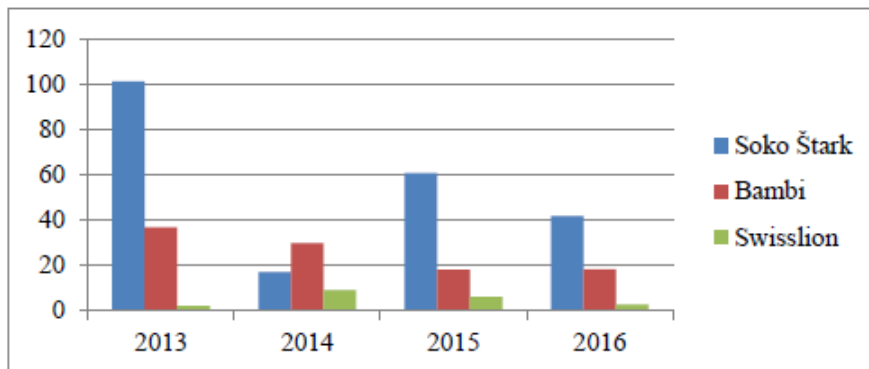
Source: Authors, based on SBRA data, 2017

Table 22. Return on equity (ROE) dynamics of observed companies in the period 2013-2016

Years	Soko Štark	Bambi	Swisslion
2013	101,18	36,77	2,07
2014	16,94	29,80	9,03
2015	60,66	17,9	5,98
2016	41,85	18,18	2,69

Source: Authors, based on SBRA data, 2017

Graph 16. Return on equity (ROE) dynamics in the period 2013-2016



Source: Authors, based on SBRA data, 2017

Conclusion

Based on the conducted research, it can be concluded that profitability of renowned food industry companies in the Republic of Serbia has significantly varied in the last four-year period.

In *Soko Štark d.o.o. Belgrade*, return on sales (ROS) declined, compared to 2013, while, judging by chain indices, it increased. Return on assets (ROA) declined in relation to

2013, and, in terms of chain indices, it increased. Return on equity (ROE) declined in relation to 2013, increased in 2015, compared to 2014, but declined in 2016, compared to 2015.

In *Bambi a.d. Požarevac*, return on sales (ROS) also declined, compared to 2013, as the base year. Observed by chain indices, this ratio dropped in 2015, in relation to 2014, and slightly increased in 2016, compared to 2015. Return on assets (ROA) declined, compared to 2013, as the base year. In chain terms, return on assets declined in 2015, compared to 2014, but increased in 2016, relative to 2015. Return on equity (ROE) declined relative to base year, 2013. By chain indices, return on equity declined in 2015, relative to 2014, but slightly increased in 2016, compared to 2015.

In *Swisslion d.o.o. Belgrade*, return on sales (ROS) increased in the observed period, compared to the base year, 2013. In chain terms, return on sales declined in 2015, compared to 2014, and in 2016, compared to 2015. Return on assets (ROA) declined in the observed period, both in terms of base and chain indices. Return on equity (ROE) increased in base index terms. Under chain indices, return on equity declined in 2015, relative to 2014, and in 2016, compared to 2015.

Comparatively, the highest return on sales in 2013 was recorded in *Bambi a.d. Požarevac*, and the lowest in *Swisslion d.o.o. Belgrade*. *Bambi a.d. Požarevac* had the highest return on assets, and the lowest rate was again in *Swisslion d.o.o. Belgrade*. *Soko Štark d.o.o. Belgrade* had the highest return on equity, and the lowest rate was in *Swisslion d.o.o. Belgrade*. In 2014, *Bambi* had the highest return on sales, the highest return on assets, and the highest return on equity. *Soko Štark* had the lowest return on sales, while *Swisslion* had the lowest return on assets and return on equity. In 2015, *Bambi a.d. Požarevac* again had the highest return on sales and the highest return on assets, while *Swisslion d.o.o. Belgrade* again had the lowest return on sales, the lowest return on assets and return on equity. *Soko Štark d.o.o. Belgrade* had the highest return on equity. In 2016, *Bambi a.d. Požarevac* again had the highest return on sales and return on assets, *Soko Štark d.o.o. Belgrade* had the highest return on equity, and *Swisslion d.o.o. Belgrade* again had the lowest return on assets and return on equity.

In general, it can be concluded that, based on return on sales and return on total business assets, the most profitable company was *Bambi a.d. Požarevac*, while the least profitable was *Swisslion d.o.o. Belgrade*. From the point of view of return on equity, *Soko Štark d.o.o. Belgrade* was the most profitable, and the least profitable was *Swisslion d.o.o. Belgrade*. Bearing in mind the results obtained, it can be concluded that the starting hypothesis cannot be accepted, because food industry companies of the Republic of Serbia did not record profitability growth in the last four-year period. The research limitation is reflected above all in the number of analyzed food industry companies. In the future, the research sample should be increased and consideration should be given to overcoming the unsatisfactory profitability trend of the observed companies.

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PROFITABILNOST PREDUZEĆA PREHRAMBENE INDUSTRIJE U REPUBLICI SRBIJI

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Sažetak

Prehrambena industrija je važan segment prerađivačke industrije. Prehrambena industrija EU je vodeća u svetu. Kao važna karakteristika prehrambenog sektora Republike Srbije navodi se izražena dualna struktura, sa mnogo malih i srednjih i manjim brojem velikih privrednih društava. Smatra se da relativno skromna finansijska sredstva za ulaganje u savremenu tehnologiju i povećanje efikasnosti proizvodnje, i pored stranih direktnih investicija, nepovoljno deluju na perspektivu ovog sektora. Konditorska industrija se, prema broju privrednih društava, kapacitetima, obimu proizvodnje, potencijalima za izvoz i broju zaposlenih, ocenjuje kao značajan segment prehrambene industrije i privrede Republike Srbije. Cilj istraživanja je da se ispita da li su renomirana preduzeća u prehrambenoj industriji Republike Srbije profitabilna i da li je reč o rastućoj profitabilnosti ili ne, u poslednjem četvorogodišnjem periodu. Rezultati istraživanja pokazuju da vrednosti relevantnih pokazatelja rentabilnosti značajno variraju u posmatranom periodu naviše i naniže, bez obzira na njihovu reputaciju i konkurentsku poziciju na tržištu.

Ključne reči: *prehrambena industrija, konditorska industrija, profitabilnost.*

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RESEARCHING CONSUMER HABITS REGARDING FOOD LABEL READING

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Summary

The research on the knowing of the significance and contents of the food product label as well as understanding the data on the label is presented in this paper. The research used the Pearson's chi-square test of homogeneity and Pearson's chi-square test of independence. The research was conducted on a representative sample of 598 respondents from 10 cities in the Republic of Serbia. Research results show that more than half of the respondents always or often read the label, then, that men and women have a similar relation to the frequency of reading the label and its contents. Respondents with special dietary regime frequently read the data on the label than with conventional regimens. Consumers that are more educated are more likely to read the label and know more about its contents. Respondents who know what the label should contain pay more attention to it.

Key words: *food, consumer behavior, label, consumerism*

JEL: *Q13, D12, M31*

Introduction

Proper labeling of food is a fundamental precondition for realizing the rights of consumers, as defined by the Law on Consumer Protection. Paper indicates the basic guidelines and the objective of emphasis data on the label food products. Informing consumers about all-important characteristics of the food is a necessary precondition for the nation's health. Lack of information or misinformation on the labeling of food products can lead to unpredictable consequences and undermine the numerous rights of consumers as a social being.

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The subject of paper is the analysis of the contents and importance of the label on the food product, then, how often it is read, how much is believed in the accuracy of its data, and if it is an integral part of product quality. It examined and determined the dependence of above-mentioned parameters in relation to sex and age structure, acquired education and place of residence of the consumer.

The data were processed by means of causal statistics (mostly) and descriptive statistics (to a lesser degree). We used a representative sample of 598 respondents.

The importance of the paper, apart from scientific contribution, comes from its practical applicability, i.e., the research results point to the state in a very important area of consumer protection. Relation to the label on the food product implies a number of consumer rights guaranteed by the Law on Consumer Protection.

The transformation of Serbian national legislation in the process of country's accession to the European Union (EU) is a complex phenomenon and its scope and depth can significantly vary in different fields (Ćemalović, 2016).

As in other areas, it is necessary to harmonize regulations on the labeling of food products of the Republic of Serbia with the European Union. The legislative framework in Serbia governing this area:

- Law on Food Safety;
- Rules on food description, labeling and promoting;
- Rules on previously packaged products;
- Additional demands for labeling – vertical regulation).

The European Union with its common policies contributed to greater cooperation between member states in all aspects of agricultural production. Creating Economic Union, therefore, is fraught with the establishment of a developed concept of agricultural policy (Cvijanović, Simonović, Mihailović, 2011).

Labeling of food products in the European Union is governed inter alia by means of:

- Regulation (EU) No. 1169/2011 on the provision of food information to consumers;
- Regulation (EC) No. 1924/2006 on nutrition and health claims made on foods;
- Regulation (EC) 983/2009 on the authorisation and refusal of authorisation of certain health claims made on food and referring to the reduction of disease risk and to children's development and health;
- Regulation(EU) No. 432/2012 establishing a list of permitted health claims made on foods, other than those referring to the reduction of disease risk and to children's development and health;
- The weight and measures (Packaged goods) Regulation SI 2006/659.

U.S. Department of Health and Human Services - Food and Drug Administration and the Center for Food Safety and Applied Nutrition announced in January 2013. A Food Labeling Guide which are illustrated in detail all the characteristics of the declaration on the label of a food product.

Rules on food description, labeling and promoting in the Republic of Serbia (in Article 4) specifies that the “declaration must be done in a manner which does not deceive the final consumer, in particular with regard to:

- Characteristic staple food, especially its nature, identity, properties, composition, quantity, durability, origin and mode of production;
- Ascriptions characteristics and properties that food do not possess and emphasizing the characteristics of the food, which own some other foods of the same type.”

Today, four factors compete in the ideological space of consumers: individual autonomy, social equality, consumer sovereignty and the dominance of corporations (Paul, 2010). Consumption and consumer behavior on the market are determined by a number of factors whose interaction led economic theorists to conclusions about the existence of regular phenomena which create supply and demand movements, and have influence on consumer behavior. In economic literature, among the most famous theoretical analyses of regularity in consumption, the following are mentioned: (1) Engel’s laws, (2) Giffen’s paradox, (3) Veblen effect, and (4) Kuznetsov phenomenon (Vujović et al., 2011).

Consumer protection organizations in Serbia have worked with varying degrees of success and in different circumstances. In recent years, however, there have been made significant efforts from the perspective of the legislative and legal regulations with the aim of harmonizing relations in this area (Božidarević, Salai, 2007). In this regard, starting from 2002, when the Serbian and Montenegrin Law on Consumer Protection was passed, significant actions aimed at improving consumer protection and its harmonization with European Union standards were taken in Serbia. According to the Law on Consumer Protection, Article 3, the basic rights of the consumer are as follows: meeting basic needs, safety, awareness, choice, voice of the consumer, compensation, consumer education, healthy environment (Simonović, 2006).

In that respect the indicated rights of consumers are similar to the regulations of other countries, so in general, there are no major differences. Differences arise in the practical implementation of legal guidelines. Countries with developed democracies insist more on the genuine realization of the specified consumer rights.

Even Payne Happer indicated in his paper that, regardless of the type of goods, the information on the label must be fully and accurately presented. It is necessary, in this regard, to standardize the information on the label (Payne, 1947).

Trade Law of the Republic of Serbia - Article 40 stipulates mandatory elements which the goods label must have in retail trade. These data are: the name and the type of goods, ingredients and quantity, as well as others in accordance with specific regulations and

the nature of goods, and especially the data about the manufacturer, country of origin, date of production and expiry date, the importer, the quality (class), and a warning about the potential risk or harm of goods (Official Gazette of RS No. 53/2010). The label must be displayed on the goods i.e. the packaging or point of sale (in the case of the sale of bulk goods) prominently and legibly in the Serbian language. The label may also contain information in foreign languages.

According to the research conducted by Hieke and Newman (2015), consumers will make healthier food choices if the information on the label is emphasized more directly than in the case when the consumer needs to perform complex mathematical calculations.

Interesting is the research which shows a link between the power of a brand and the importance of label information indicating that the food is organic. The stronger and more famous the brand, the more the label of organic food loses its significance (Larceneux, Benoit, Renaudin, 2012). The label size can affect the perception of the product. A large label may make a smaller packaging seem larger than that which is actually smaller. In addition, consumers have more confidence in smaller rather than larger labels (Aydinoglu, Krishna, 2011).

The movement for the protection of consumer rights is called consumerism. Basically, consumerism is a set of activities undertaken by individuals, independent organizations, government agencies, businesses and other entities in order to protect consumers from unethical marketing practices (Maričić, 1999).

Despite the prescribed mandatory elements of the label, it often happens in practice that customers are misled by labels with semi-truthful data or data presented in a way which can lead consumers astray. In such cases, consumers may contact directly the authorized inspector or an association for the protection of consumers which will then institute proceedings for the protection of consumer rights and the sanction of unscrupulous traders.

Materials and methods

There are three main methods of collecting primary data on consumer behavior: an observational method, a testing method and an experimental method (Hanić, 2002, Trandafilović, 2008). During this fieldwork the testing method was applied.

The application of the methodology of field research on consumer attitudes in this study:

- In the field research a direct structured personal interview was used. The personal interview involves direct contact with the respondent;
- Field research in this paper uses the following sampling: the sample of consumers in 10 cities in Serbia without Kosovo and Metohija. The sample consisted of 598 consumers from: Vlasotince, Blace, New Belgrade, Pirot, Prokuplje, Šabac, Raška, Kruševac, Zrenjanin and Leskovac;

- Answers were given in closed form. The questionnaire was filled out by circling one of the offered answers;
- SPSS and EDUSTAT statistical software packages were used in the calculation. The researchers used two approaches to data analysis:
 - a. Descriptive statistics (analysis of proportions);
 - b. Causal statistics (Pearson's chi-square test of homogeneity and Pearson's chi-square test of independence).

Analysis of survey results

The structure of respondents by sex, consists of a sample of interviewed consumers of 60.4% females and 39.6% males.

The age of the respondents is as follows: among women there are 15.56% of the respondents under 18 years of age; 17.50% between 18 and 30 years of age; 45.00% between 31 and 50 years of age and 21.94% over 50 years of age. Among men there are 12.24% of the respondents under 18 years of age; 23.21% between 18 and 30 years of age; 36.28% between 31 and 50 years of age and 28.27% over 50 years of age.

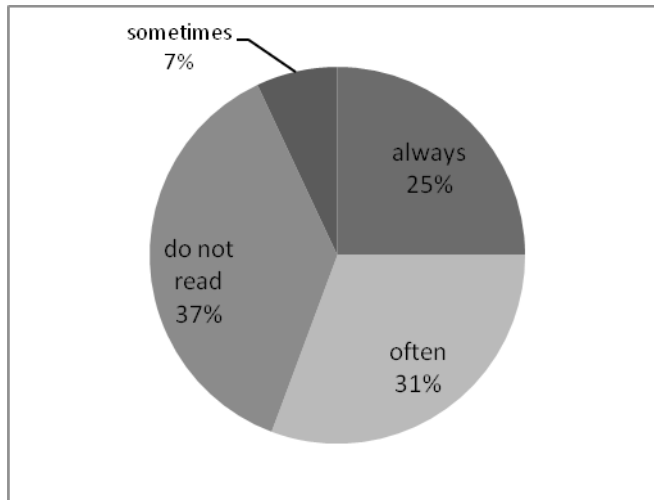
Table 1. Structure of respondents by sex and place of residence

		Sex			
			Male	Female	Total
Place	Vlasotince	Number	21	29	50
		%	42%	58%	100%
	Blace	Number	25	25	50
		%	50%	50%	100%
	N.Beograd	Number	43	56	99
		%	43.4%	56.6%	100%
	Pirot	Number	18	32	50
		%	36%	64%	100%
	Prokuplje	Number	21	28	49
		%	42.9%	57.1%	100%
	Šabac	Number	16	34	50
		%	32%	68%	100%
	Raška	Number	11	39	50
		%	22%	78%	100%
	Kruševac	Number	15	35	50
		%	30%	70%	100%
	Zrenjanin	Number	27	23	50
		%	54%	46%	100%

	Leskovac	Number	40	60	100
		%	40%	60%	100%
Total		Number	237	361	598
		%	39.6%	60.4%	100%

The level of education of respondents: Among respondents there were 11.0% who completed primary school; 44.4% with secondary education; 22.7% with a college degree; 21.9% with a university degree.

Graph 1. Structure of consumer-respondents with respect to the frequency of reading the label



Graph 1. indicates that more than half of the respondents always or often read the label.

Sex of the respondents in relation to the frequency of reading the product label: ($\chi^2_e = 6,172 < \chi^2_t (DF = 3 \text{ and } 0.05) = 7,817 \Rightarrow P > 0.05 \Rightarrow H_0$). Data analysis did not detect a statistically significant difference in these two groups. It can be concluded that: men and women have a similar relationship to the frequency of reading the label.

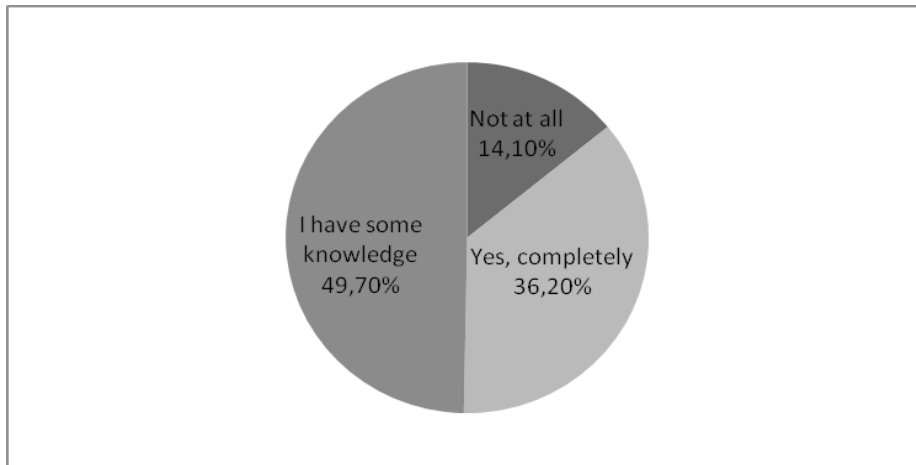
Age group with respect to the frequency of reading the label: ($\chi^2_e = 39,833 > \chi^2_t (DF = 9 \text{ and } 0.05) = 16,919 \Rightarrow p < 0.05 \Rightarrow H_1$). From presented results we can see that there is a significant statistical correlation between the age group and frequency of reading the label. Age groups of 31 and older, always and often read the label in relation to younger age groups - a test of homogeneity.

The level of education of consumers with respect to frequency of reading the label: ($\chi^2_e = 40,585 > \chi^2_t (DF = 9 \text{ and } 0.05) = 16,919 \Rightarrow p < 0.05 \Rightarrow H_1$). From the data it is concluded that there is a significant statistical correlation between these two parameters. This means that the education of the respondents influences the frequency of reading the label. In other words with these data it is statistically confirmed that the higher the educational level of the consumer, the more he uses his right to information.

Frequency of reading the label in relation to the place of residence of the consumer: ($\chi^2_e = 60,090 > \chi^2_t$ (DF = 27 and 0.05) = 40,113 $\Rightarrow p < 0.05 \Rightarrow H_1$). From the data it is evident that the relation to the frequency of reading the label varies according to the place of residence of the respondents.

A dietary regime in relation to frequency of reading the label: $\chi^2_e = 48,474 > \chi^2_t$ (DF = 3 and 0.05) = 7,817 $\Rightarrow p < 0.05 \Rightarrow H_1$). The data show that there is a significant statistical correlation between a dietary regime and the incidence of reading the label. Respondents with a special dietary regime more often read the data on the label than those with a conventional dietary regime.

Graph 2. Structure of the respondents' responses in relation to knowledge about the required contents of the label



Graph 2. shows that the majority of respondents believe that they have some knowledge of what the label should contain.

Sex of the respondents in relation to what the label should contain: ($\chi^2_e = 2,287 < \chi^2_t$ (DF= 2 and 0.05) = 5,991 $\Rightarrow P > 0.05 \Rightarrow H_0$). Among members of different sexes there was not noticed any difference in the degree of how much they believe they know what the label should contain.

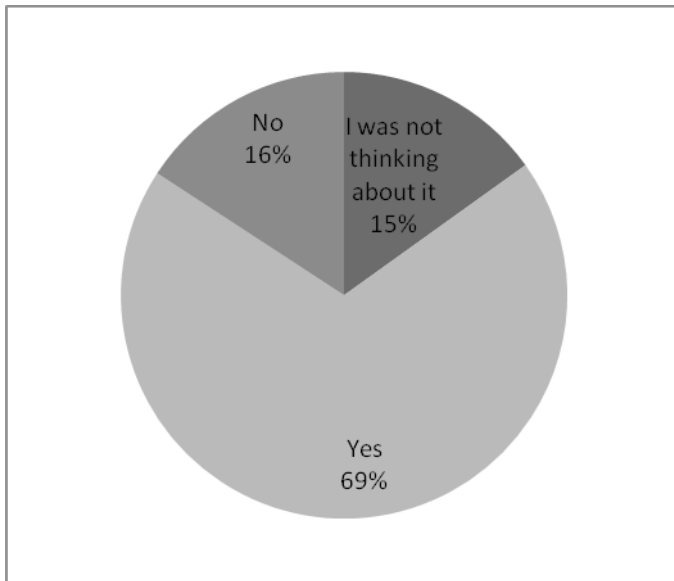
Age group in relation to knowledge of the contents of the label: ($\chi^2_e = 12,926 > \chi^2_t$ (DF = 6 and 0.05) = 12,592 $\Rightarrow p < 0.05 \Rightarrow H_1$). The data show that there is a significant statistical correlation between age group and knowledge of what the label should contain. Respondents with over 30 years of age have a higher level of knowledge of the contents of the label.

The level of education of consumers in relation to the knowledge of what the label should contain: ($\chi^2_e = 28,258 > \chi^2_t$ (DF = 6 and 0.05) = 12,592 $\Rightarrow p < 0.05 \Rightarrow H_1$). The data show that there is a significant statistical correlation between the level of education of respondents and knowledge of what the label should contain. Educated respondents have more information.

Knowledge of what the label should contain in relation to the residence of the consumer: ($\chi^2_e = 42,787 > \chi^2_t$ (DF = 18 and 0.05) = 28,869 $\Rightarrow p < 0.05 \Rightarrow H1$). From the data it can be seen that the relation to knowledge of what the label should contain varies according to place of residence of the respondents.

A dietary regime in relation to knowledge of what the label should contain: ($\chi^2_e = 13,175 > \chi^2_t$ (DF = 2 and 0.05) = 5,991 $\Rightarrow p < 0.05 \Rightarrow H1$). From the data it can be seen that there is a significant statistical correlation between a dietary regime and knowledge of what the label should contain. Respondents with a special dietary regime have more knowledge of what the label should contain compared to those with a conventional dietary regime.

Graph 3. Is proper labelling an integral part of product quality?



Graph 3. shows that more than two-thirds of respondents believe that proper labelling is an integral part of product quality.

Age group in relation to the question whether proper labelling is an integral part of product quality: ($\chi^2_e = 20,773 > \chi^2_t$ (DF = 6 and 0.05) = 12,592 $\Rightarrow p < 0.05 \Rightarrow H1$). The data show that there is a significant statistical correlation between age group and the attitude that proper labelling is an integral part of product quality. In particular, respondents over 30 believe that proper labelling is an integral part of the product quality.

The level of education in relation to the opinion that proper labelling is an integral part of product quality: ($\chi^2_e = 40,930 > \chi^2_t$ (DF = 6 and 0.05) = 12,592 $\Rightarrow p < 0.05 \Rightarrow H1$). From the data it can be noted that there is a significant statistical correlation between the level of education of the respondents and knowledge about whether proper labelling is an integral part of product quality. More educated respondents believe that more than the less educated.

A dietary regime in relation to the attitude that proper labelling is an integral part of product quality: ($\chi^2_e = 3,794 < \chi^2_t$ (DF = 2 and 0.05) = 5,991 $\Rightarrow p > 0.05 \Rightarrow H_0$). Displayed values are approximately equal according to the dietary regime of the respondents and the attitude that proper labelling is an integral part of product quality, so that the statistics did not detect statistical significance for the two groups of questions.

Age group in relation to confidence in the veracity of label information: ($\chi^2_e = 4,161 < \chi^2_t$ (DF = 6 and 0.05) = 12,592 $\Rightarrow p > 0.05 \Rightarrow H_0$). The data show that the percentages of answers are nearly equal and that the statistics did not detect a significant difference between these two parameters.

The level of education of consumers in relation to confidence in the veracity of label information: ($\chi^2_e = 22,401 > \chi^2_t$ (DF = 6 and 0.05) = 12,592 $\Rightarrow p < 0.05 \Rightarrow H_1$). From the data it can be noted that there is a significant statistical correlation between the level of education of respondents and the doubt about the veracity of the label information. Respondents with higher education have more confidence in the veracity of information on labels.

Confidence in the veracity of the label information in relation to the place of residence of the consumer: ($\chi^2_e = 41,383 > \chi^2_t$ (DF = 18 and 0.05) = 28,869 $\Rightarrow p < 0.05 \Rightarrow H_1$). The data show the relation of the doubt about the veracity of the label information which varies according to the place of residence of the respondents.

A dietary regime in relation to confidence in the veracity of label information: ($\chi^2_e = 10,361 > \chi^2_t$ (DF = 2 and 0.05) = 5,991 $\Rightarrow p < 0.05 \Rightarrow H_1$). From the data it can be seen that there is a statistical correlation between a dietary regime and the doubt about the veracity of the label information. Respondents who are on a special dietary regime have more confidence in the veracity of information on labels than those on a traditional dietary regime.

Sex of the respondents in relation to the importance of labels on food products: Nearly 70% of both sexes believe that the label on food products is very important. ($\chi^2_e = 1,512 < \chi^2_t$ (DF = 3 and 0.05) = 7,817 $\Rightarrow P > 0.05 \Rightarrow H_0$). Even here are the values approximately equal according to the sex of the respondents so that the statistics did not detect statistical significance for these two groups of respondents.

Age group and the importance of the label on food products: ($\chi^2_e = 42,291 > \chi^2_t$ (DF = 9 and 0.05) = 16,919 $\Rightarrow p < 0.05 \Rightarrow H_1$). The data show that there is a significant statistical correlation between age group and knowledge of the importance of the label on food products. Respondents aged over 30 are more likely to consider the label on food products very important compared to younger respondents.

The level of education of consumers in relation to the opinion of the importance of the label on food products: ($\chi^2_e = 54,244 > \chi^2_t$ (DF = 9 and 0.05) = 16,919 $\Rightarrow p < 0.05 \Rightarrow H_1$). From the data it can be noted that there is a significant statistical correlation between the level of education of respondents and knowledge of how important is the

label on food products (more educated respondents are more likely to believe that it is important).

The opinion about the importance of the label on food products in relation to the place of residence of the consumer: ($\chi^2_e = 141,466 > \chi^2_t$ (DF = 27 and 0.05) = 40,113 $\Rightarrow p < 0.05 \Rightarrow H_1$). From the data it can be seen that the respondents' attitude towards the importance of the label on food products varies among respondents' according to the place of residence.

A dietary regime and opinion about the importance of the label on food products: ($\chi^2_e = 4,560 < \chi^2_t$ (DF = 3 and 0.05) = 7,817 $\Rightarrow P > 0.05 \Rightarrow H_0$). The data show that between a dietary regime and the importance of the label on food products no statistical differences were found in terms of homogeneity of responses to questions.

Frequency of reading the label in relation to the opinion of what the label should contain: ($\chi^2_e = 97,862 > \chi^2_t$ (DF = 6 and 0.05) = 12,592 $\Rightarrow p < 0.05 \Rightarrow H_1$). According to the data it can be seen that the frequency of reading the label and knowledge of what the label should contain stand in a significant statistical correlation. Respondents who always read the label fully know what the label should contain.

Frequency of reading the label and the opinion about whether proper labelling is an integral part of product quality: ($\chi^2_e = 43,772 > \chi^2_t$ (DF = 6 and 0.05) = 12,592 $\Rightarrow p < 0.05 \Rightarrow H_1$). According to the data it can be seen that the frequency of reading the label and the opinion that proper labelling is an integral part of product quality stand in a significant statistical correlation. Respondents who always read the label believe that proper labelling is an integral part of product quality.

Frequency of reading the label in relation to the confidence in domestic and foreign producers: ($\chi^2_e = 36,478 > \chi^2_t$ (DF = 9 and 0.05) = 16,919 $\Rightarrow p < 0.05 \Rightarrow H_1$). According to the data it can be seen that the frequency of reading the label and the confidence in domestic and foreign producers stand in a significant statistical correlation. Respondents who always and often read the label trust domestic more than foreign producers.

Frequency of reading the label in relation to the confidence in the veracity of the label information: ($\chi^2_e = 48,275 > \chi^2_t$ (DF = 6 and 0.05) = 12,592 $\Rightarrow p < 0.05 \Rightarrow H_1$). According to the data it can be seen that the frequency of reading the label and the confidence in the veracity of the label information stand in a significant statistical correlation.

Frequency of reading the label in relation to the opinion about the importance of the label on food products: ($\chi^2_e = 50,579 > \chi^2_t$ (DF = 9 and 0.05) = 16,919 $\Rightarrow p < 0.05 \Rightarrow H_1$). According to the data it can be seen that the frequency of reading the label and knowledge of the importance of the label on food products stand in a significant statistical correlation. Respondents who believe that the label on food products is very important always or often read the label.

Knowledge of the contents of the label in relation to the opinion that proper labelling is an integral part of product quality: ($\chi^2_e = 73,987 > \chi^2_t$ (DF = 4 and 0.05) = 9,488 $\Rightarrow p < 0.05 \Rightarrow H1$). The data show that there is a significant statistical correlation between the observed values. Respondents who think that they know what the label contains believe that a proper labelling is an integral part of product quality.

Knowledge of the contents of the label in relation to confidence in domestic and foreign producers: ($\chi^2_e = 14,598 > \chi^2_t$ (DF = 6 and 0.05) = 12,592 $\Rightarrow p < 0.05 \Rightarrow H1$). The data show that there is a significant statistical correlation between the opinion about what the label should contain and the confidence in domestic and foreign producers. Respondents who know what the label should contain trust more domestic producers.

Knowledge of the contents of the label in relation to the confidence in the veracity of the label information: ($\chi^2_e = 35,817 > \chi^2_t$ (DF = 4 and 0.05) = 9,488 $\Rightarrow p < 0.05 \Rightarrow H1$). The data show that there is a significant statistical correlation between the opinion of what the label should contain and doubt in the veracity of the label information.

Knowledge of the contents of the label in relation to the importance of the label on food products: ($\chi^2_e = 53,970 > \chi^2_t$ (DF = 6 and 0.05) = 12,592 $\Rightarrow p < 0.05 \Rightarrow H1$). The data show that there is a significant statistical correlation between knowledge of what the label should contain and the importance of the label on food products. Respondents who know what the label should contain believe that it is very important.

Proper labelling in relation to the confidence in domestic and foreign producers: ($\chi^2_e = 38,706 > \chi^2_t$ (DF = 6 and 0.05) = 12,592 $\Rightarrow p < 0.05 \Rightarrow H1$). The data show that there is a significant statistical correlation between the opinion that proper labelling is an integral part of product quality and confidence in domestic and foreign producers. Respondents who believe that proper labelling is an integral part of product quality have more confidence in domestic producers.

Proper labelling in relation to food products: ($\chi^2_e = 75,866 > \chi^2_t$ (DF = 6 and 0.05) = 12,592 $\Rightarrow p < 0.05 \Rightarrow H1$). The data show that there is a significant statistical correlation between the opinion that proper labelling is an integral part of product quality and the importance of the label on food products. Respondents who think that proper labelling is an integral part of product quality, consider the label on food products to be important.

Confidence of consumers - respondents in domestic and foreign producers in relation to the importance of the label on food products: ($\chi^2_e = 34,379 > \chi^2_t$ (DF = 9 and 0.05) = 16,919 $\Rightarrow p < 0.05 \Rightarrow H1$). According to these data it can be seen that consumer confidence in relation to the importance of the label on food products are in a significant statistical correlation.

Confidence in the veracity of the label information in relation to the opinion of the importance of the label on food products: ($\chi^2_e = 68,611 > \chi^2_t$ (DF = 6 and 0.05) = 12,592 $\Rightarrow p < 0.05 \Rightarrow H1$). From the given data it can be seen that the doubt about the veracity of the label information and the opinion of the importance of the label on food products stand in a significant statistical correlation. Respondents who believe

in the veracity of the label information consider the label on food products to be very important.

Among the available data on the label respondents most often check: expiry date, then the name of the producer, ingredients, method of preparation and products storage.

Discussion

The research results can be useful to different participants in the field of consumer rights protection in order to educate consumers about their rights and insist on the compliance with prescribed procedures by the companies which appear on the market.

Consumer protection organizations should consistently insist on informing consumers about their rights as well as ways to fight for those rights. If we take into account that a right carries with it obligation, citizens would be in some way obliged to know the basic contents of the label. Socially responsible behavior of companies implies business activity which is in a function of appreciating and harmonizing interests of different interest groups (stakeholders) of the company, such as consumers, employees, investors, the community (Stanković, Djukić, 2006).

Conclusions

This research showed that more than half of the respondents always or often read the label. Men and women have a similar relationship to the frequency of reading the label and its contents.

A different study was conducted to assess the use of food labels in making choices on packaged snack and its associated factors among adolescents. A cross-sectional study was conducted in 2012 among 542 Grade 12 students in Sri Lanka. Adolescents' use of labels was assessed by practices (label reading frequency and attention paid to label contents). The majority (74.5 %) was frequent ('always' or 'most often') label readers with female predominance ($p < 0.05$). The majority (84 %) had good knowledge (obtaining more than the 75(th) percentile mark) on interpreting labels. Although not statistically significant, 'unsatisfactory' label use was higher among males (73 %), purchasing power (70.4 %) and unhealthy snacking behaviour (73 %). Among the marketing strategies, identifying known brands (73.2 %) and imported products (75.8 %) as 'good' products were significantly associated with 'unsatisfactory' label use ($p < 0.05$). Despite having good knowledge and positive attitudes, food label use is unsatisfactory among adolescents. (Talagala, Arambepola, 2016)

The obtained results also show that more educated consumers are more likely to read the label and know more about its contents. These consumers are more likely to consider the label information an integral part of product quality and have more confidence in the veracity of information on the label.

Results of this research were similar to the results of research conducted by Viola et al. (2016). To evaluate the consumers' knowledge and perception about food-labels a

brief questionnaire was developed and shared on Facebook between January-March 2016. Most of the participants were young adults with higher education. They declared to read the food labels quite often. Despite owing limited knowledge in basic nutrition principles and food-labelling they were generally able to recognize healthier products looking over their nutritional fact tables.

Respondents who know what the label should contain, pay more attention to it.

The conducted research yielded many new insights and opened some new issues for further elaboration and research. Further research should be focused on the following aspects:

- checking the conclusions of this study with a larger sample;
- implementation of continuous research in this area, which would be conducted by the Ministry of Trade and tourism services;
- examination of consumer behavior by other methods other than surveys;

In accordance with the conclusions of Viola et al. (2016), despite the fact that consumers have significant knowledge of the importance of the label and consider it an integral part of product quality, there is room for further improvement in terms of insisting on the consistent implementation of the legislative and legal regulations and other regulatory requirements in companies on the one hand and consumer education on the other.

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ISTRAŽIVANJE NAVIKA POTROŠAČA U KORIŠĆENJU DEKLARACIJE NA PREHRAMBENIM PROIZVODIMA

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Summary

U radu je prezentovano istraživanje poznavanja značaja i sadržine deklaracije na prehrambenom proizvodu, kao i odnos prema podacima na deklaraciji. U istraživanju su korišćeni Pirsonov hi kvadrat test homogenosti i Pirsonov hi kvadrat test nezavisnosti. Uzorak je sačinjen od 598 ispitanika iz 10 gradova Republike Srbije. Rezultati pokazuju da više od polovine ispitanika uvek ili često čita deklaraciju. Muškarci i žene imaju sličan odnos prema učestalosti čitanja deklaracije i njenom sadržaju. Ispitanici sa specijalnim režimom ishrane češće čitaju podatke na deklaraciji od onih sa klasičnim režimom. Obrazovaniji potrošači češće čitaju deklaraciju i više znaju o njenom sadržaju. Ispitanici koji znaju šta deklaracija treba da sadrži češće smatraju da je jako važna.

Ključne reči: *prehrambeni proizvodi, ponašanje potrošača, deklaracija na proizvodu, konzumerizam*

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COMPETITIVENESS OF FOOD MANUFACTURING OF REPUBLIC OF SERBIA

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Summary

The subject of paper is export competitiveness of food manufacturing of Republic of Serbia during the period 1996-2016. The analysis of export competitiveness was realised by using the following indicators: Revealed comparative advantage (RCA), Competitiveness growth index (RCA1), Index of net business performance (RCA2), Index of contribution to the trade balance (CTB), Grubel-Lloyd index (GLI) and Michaely index (MI). The results show that RCA values were positive in all years, which speaks of comparative advantage of this industry on the domestic market. Since the RCA1 values were higher than one, they revealed export competitiveness. The positive values of RCA2 during the period 2005-2016 bear witness of contribution of food manufacturing in foreign trade balance of Serbian economy. The average value of CTB index was 3.998 and its positive annual values showed that the contribution of food manufacturing in the total trade balance was positive. The change of GLI values pointed to the loss of ability of the sector to create surplus of national trade balance. Positive annual values of MI confirmed the competitiveness of food manufacturing, but also its insufficient specialisation.

Key words: *Export competitiveness, indicators of competitiveness of an industry, food manufacturing, Republic of Serbia*

JEL: L66

Introduction

Although characterised by long history of development, food manufacturing is in the constant process of structural adjustment, conditioned by globalisation, liberalisation of world trade and national markets of food products, rapid development of individual markets of developing countries (e.g. India and China), fast development of technology (information-communication technology, biotechnology, genetic engineering etc.) in the domain of (primary and final) agricultural production, distribution and sale, as well as the changes of customers' preferences due to income growth, change of

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structure (ageing) of the population and life and nourishing habits. All these factors influence development and competitiveness of food manufacturing in the world. The scope of traditional agricultural products is permanently increasing, together with the development of new products and methods of production and organisation of supply chains within food manufacturing.

Favourable geographic position (favourable climate) and relatively large areas of high-class agricultural soil, long tradition of production and relative preservation of productive agricultural and industrial capacities create favourable conditions for further development of food manufacturing in Serbia and larger export on global market.

Food manufacturing is a domain in which Serbia has significant export potential. However, as comparative advantage is not enough per se, export potential of domestic food manufacturing is not adequately exploited due to low competitiveness of domestic food companies and the products themselves.

The subject of research in this paper is export competitiveness of food manufacturing of Serbia during the period 1996-2016. Food manufacturing products are mostly the subject of international trade, which is the reason why their technological characteristics, quality and prices are permanently tested in open economy on both domestic and foreign markets.

Due to the lack of generally accepted synthetic indicator of the achieved level of competitiveness of an industry, the aim is to reach the appropriate answer to the issue of achieved level of competitiveness of food manufacturing of Serbia during the observed period, by using the most frequently applied partial indicators.

In the paper, the competitiveness of food manufacturing of Republic of Serbia was considered with the help of most significant partial indicators of export competitiveness at the level of industry. The calculation of individual indicators respects the fact that many products of food manufacturing differ by their raw origins, degree of procession, i.e. technological complexity and value added such as food and live animals, beverages and tobacco, oil seeds and oleaginous fruits and animal and vegetable oils, fats and waxes. In accordance with Standard International Trade Classification (SITC) Revision 3, food manufacturing includes the following sections:

- 0 - Food and live animals (*00 - Live animals, 01 - Meat and meat preparations, 02 - Dairy products and birds' eggs, 03 - Fish, crustaceans, molluscs and preparations thereof, 04 - Cereals and cereal preparations, 05 - Vegetables and fruits, 06 - Sugar, sugar preparations and honey, 07 - Coffee, tea, cocoa, spices, and manufactures thereof, 08 - Feedstuff for animals (excluding unmilled cereals), 09 - Miscellaneous edible products and preparations*);
- 1 - Beverages and tobacco (*11 - Beverages, 12 - Tobacco and tobacco manufactures*);
- 22 - Oil seeds and oleaginous fruits;
- 4 - Animal and vegetable oils, fats and waxes (*41 - Animal oils and fats, 42 - Fixed vegetable oils and fats, crude, refined or fractionated, 43 - Processed Animal and vegetable oils and fats*).

The input data for assessment of export competitiveness of food manufacturing of Serbia for the period 1996-2016 are taken over from UNCTADstat database (http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx?sCS_ChosenLang=en). The selected database makes possible the research related to export and sector competitiveness of food manufacturing of Serbia on domestic and global markets according to SITC Revision 3 International Trade Classification of Products.

Calculation of statistical variables for measuring export competitiveness of food manufacturing was done by using the application in MS Excel, created for this case. By applying appropriate statistical methods the competitiveness of food manufacturing of Serbia was analysed. The interdependence of the selected data was analysed by statistical methods of correlation analysis. The strength and direction of mutual dependence between the selected variables was analysed by calculating the coefficient of correlation.

The obtained data, ordered in statistical series were analysed in order to reveal the structure and mutual influences of structural factors. The aim of statistical analysis was directed towards the detection of “frequency distribution”, i.e. detection of distribution of frequency of occurrence of specific properties of numerical expressions. In addition to statistical, correlation analysis was also used, which revealed the existence and important characteristics of relations between data, i.e. different data groups. Correlation analysis cannot describe all properties of the detected relations, but only their existence and frequency.

The paper includes six sections. After the Introduction, the second section analyses the position food manufacturing of Serbia on global market. After the review of the concept of competitiveness at the level of an industry, the third section presents most often used indicators of export competitiveness in certain manufacturing industries. The fourth presents the indicators of competitiveness in Serbia during the period 1996-2016. In the fifth section the obtained results are discussed. Finally, certain conclusions are sublimated in the sixth section.

Position of food manufacturing of Republic of Serbia on global market

In the conditions of open market and global competitiveness, competitive position of domestic food manufacturing can be considered by using indicators of export competitiveness, i.e. based on export potential, participation of the sector in total export-trade exchange and follow-up of other export performances of the food manufacturing sector.

During the period 1996-2016 Serbian food manufacturing made the greatest export in 2016, while significant scope of export was recorded in 2014 as well. After gradual decrease of value of export during the period 1996-2000, Serbian food manufacturing permanently recorded increase, which was interrupted in 2009 due to negative effects of global economic crisis. However, in 2010, the value of export increased again until 2015, when it slowed for a while, to reach its highest value in 2016.

The import mostly followed the dynamics of export until 2008. In 2010, after a significant fall in comparison to 2009, the import firstly stagnated and gradually recovered in the next four years. Gradual increase of import lasted until 2015 and 2016, when it repeatedly decreased.

Serbian food manufacturing realised the largest scope of foreign trade exchange in 2014, after continuous growth which, with a mild slowdown in 2005 and 2009 began as early as in 2001, with considerably advanced scope of foreign exchange during the period 2010-2014. After the highest recorded value in 2014, the score of Serbian food manufacturing foreign exchange decreased in 2015, but it recovered in 2016 and approached the highest level in 2014.

Table 1. Export characteristics of food manufacturing of Republic of Serbia during the period 1996-2016

	1996	2000	2005	2010	2011	2012	2013	2014	2015	2016
Export*	519	290	885	2,189	2,407	2,638	2,711	2,985	2,806	3,124
Import*	584	345	740	983	1,259	1,408	1,533	1,557	1,508	1,345
Foreign trade exchange*	1,103	636	1,626	3,172	3,666	4,046	4,244	4,542	4,314	4,469
Trade balance*	-65	-55	145	1,205	1,147	1,230	1,178	1,428	1,298	1,779
Coverage of import by export	88.9	84.0	119.6	222.6	191.1	187.4	176.8	191.7	186.1	232.3
Share in the export economy**	28.2	17.0	17.5	22.3	20.4	23.5	18.6	20.1	21.0	21.0
Share in import economy **	14.2	9.3	7.1	5.9	6.3	7.4	7.5	7.6	8.3	7.0

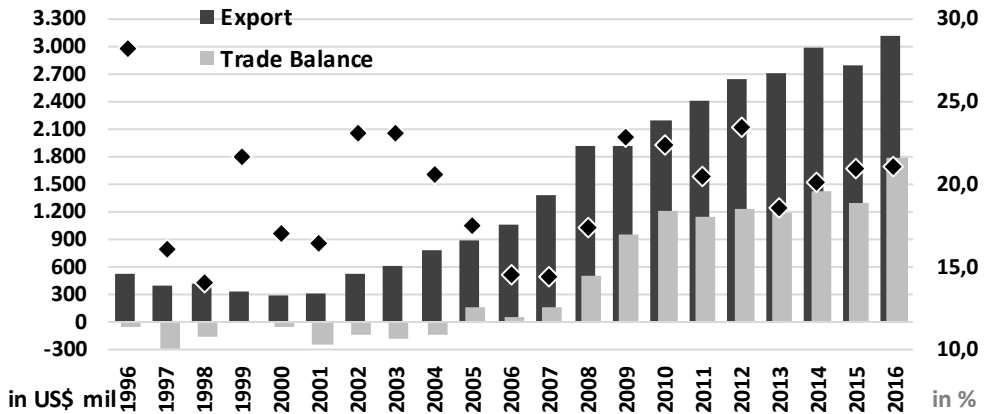
Note: * in thousands US\$, ** in %.

Source: Calculation of the author based on the data obtained from UNCTADstat database

During the period 1996-2005 Serbian food manufacturing had negative foreign trade balance (deficit). Beginning with 2005 it realised surplus which significantly increased during the period 2007-2010. The value of surplus in foreign-trade exchange had a slightly cyclic movement during the period 2011-2015, to increase significantly in 2016.

The share of food manufacturing in total export had pronounced cyclic trend and it reached 19.7% on average. The greatest share of food manufacturing in total export was in 1996 (28.2%), while the lowest was in 1998 (14.1%), and in 2006 and 2007 (14.5% and 14.4%, respectively). After the low value which was recorded in 2007, the share of food manufacturing in total export economy in the following two years significantly rose (in 2009 it was 22.8%) and in the subsequent period in ranged from 18.6% in 2013 to 23.5% in 2012. In 2016, the share of food manufacturing in total export was 21.0%, which was approximate to the share noted in 1999 (21.6%); 2004 (20.6); 2011 (20.4); and 2014 (20.1%).

Graph 1. The position of food manufacturing in foreign-trade exchange of Republic of Serbia



Source: Calculation of the author based on the data obtained from UNCTADstat database

The share of food manufacturing in the total import was 8.7% on average during the period 1996-2016. Food manufacturing recorded the greatest share in import in 1996 and 1997 (14.2%, respectively), while the lowest was during the period 2007-2010, when the share of food manufacturing in the import ranged from 5.9% to 6.1%. In 2005, the share of food manufacturing in the import was 8.3%, to decrease to 7.0% in 2016, which was approximate to the level in 2005 and 2006, and below the level in 2012-2015.

During the observed period from 1996 to 2016, the value of the exported products of food manufacturing of Serbia exceeded the value of the imported products in the same sector, thus the coverage of import by export was 131% on average, i.e. the value of export exceeded the value of import by 31%. Unlike the period 1996-2004, when the coverage of export by import was negative due to higher import than export, during the period 2005-2016, the export exceeded import to reach its highest coverage in 2010 and 2016, when the coverage of import by export amounted 222.6% and 232.6%, respectively.

Competitiveness at the level of the industry: concept and indicators

In contemporary globalised economic conditions the necessity for realisation of business activities on the international market has become increasingly pronounced. It is becoming crucial factor of economic development for a great number of countries, including the Republic of Serbia as a small open economy.

In order to realise export activities it is necessary to create and develop international competitiveness. It is not possible to build and improve competitiveness only single dimensionally because it is a pronouncedly complex and dynamic phenomenon. Therefore, the development of competitive advantages is necessary for not only specific products and economic subjects, but also economic and manufacturing industries and

national economy as a whole. In the greatest number of countries today, the essence of competitiveness includes structure and development of industry together with the method by which enterprises acquire and maintain their competitive advantages.

The concept of international competitive advantage involves the capability of enterprises, industries and economies to build own competitive position within the national market by using international criteria and key factors of competitiveness which dominate over specific activities. In this concept, the most significant drivers of competitive advantages are permanently created and searched for. Therefore, international competitiveness implies the capability of an enterprise, a sector and whole economy to develop individual competitive position within a national market, but according to international criteria. At microeconomic level the methodology of measuring competitiveness is mainly harmonised; it refers to the analysis of certain indicators related to specific market segments where an individual enterprise is active, as well as to its market position. The indicators of competitiveness of an enterprise that are related to its market share at given moment and the change of market share are most often used. Other significant indicators include the growth of profit, increasing number of employees, growth and efficiency of investments, growth of productiveness, improvement of innovativeness, use of information technologies, growth of shares, changes of sales on domestic and foreign markets and evaluation of capability of an enterprise to maintain and develop during long term in the conditions of growing international competitiveness.

On the other hand, various attitudes about measuring national competitiveness can be found. The level of competitiveness of counties can be analysed by using different methodologies and indicators. The quantification of competitiveness was relatively simple when it was reduced to production capabilities with lower expenses. Then, comparative analysis of expenses was used as a base in consideration of competitiveness.

In economic literature a greater number of export competitiveness can be found, i.e. quantitative, qualitative and structural changes of export. The starting point is that quantitative evaluation of international competitiveness is possible to achieve by follow up of the share of national economy on international market, export share in world export, the export per capita, current payment balance, changes of exchange rate, productivity or the cost of labour. The used indicators are directed on results or inputs.

The indicators that are directed towards results provide the detection of ex-post competitive position and are used for determination of competitiveness at the level of sectors and on international market. The following indicators of export competitiveness of a country and specific manufacturing industry are specifically pronounced for their significance: Revealed comparative advantage (Balassa index or specialisation index) – RCA, Competitiveness growth index - RCA1, Index of net business performance-RCA2, Index of contribution to the trade balance – CTB, Grubel-Lloyd index – GLI and Michaely index – MI (Sujová, Hlaváčková, Marcinekovića, 2015).

RCA is the most often used indicator of export competitiveness. It quantifies comparative advantage of a country in international exchange of a certain product,

i.e. comparative advantage of production in certain industry. (Rybakovas, 2009). It exists in a few forms. In accordance with the methodology of International World Centre UNCTAD and processing of World Trade Organisation (WTO), the analysis in the domain of development of trade considers the difference between net export, existing specialisation, trade deficit and theoretical net export. It does not include the analysis of reasons that lead to comparative advantages of a country in the international exchange, but detects present comparative advantages based on data on export results of certain groups of products in the world export, while by comparing various periods, it determines whether the change of export structure is realised, and whether comparative advantages change by groups of products with more or less value added.

The formula for calculation of indicators of comparative advantages was developed by Bella Balassa, presenting the so-called “Balassa index” or “Revealed Comparative Advantage” (RCA) in 1965, which was later readjusted and modified (Hinloopen, Marrewijk, 2001). This index is still most frequently used method for measuring comparative advantages of economies of specific countries in the international trade (Amighini, Leone, Rabellotti, 2011). Balassa index shows comparative advantage or lack of export and its competitive capability. Thus the following formula is obtained:

$RCA = \ln[(x_{sc}/m_{sc})/(X_c/M_c)]$, whereby:

x_{sc} – is export value of sector “s” of the country “c”,

m_{sc} – is import value of sector “s” of the country “c”,

X_c – is the value of total export of the country “c”,

M_c – is the value of total import of the country “c”.

$RCA < 0$ points to comparative disadvantages of a product; $RCA > 0$, points to the existence of certain comparative advantage in the export of product or industry to which the product belongs, and $RCA > 1$ points to internationally competitive product and industry (Klodt, 1993).

More significant modification of Balassa RCA formula was done by Austrian Institute for Economic Research – WIFO Vienna, in order to enable the expression of competitiveness at national level (Aiginger, Landesman, 2002). Based on WIFO methodology, Competitiveness growth index - RCA1 was obtained, which enables measuring the competitiveness of economy on regional and global markets.

Competitiveness growth index - RCA1 is obtained by comparison of export of certain commodity group in total export of the observed country in relation to the value of global export of the observed commodity group and total global value of export, and is calculated by using the formula $RCA1 = (x_{sc}/X_c)(X_s/X)$. When $RCA1 > 1$ it reveals comparative advantage of industry on global market and when $RCA1 < 1$, the group of commodities has no competitive capability on the relevant market.

X_{sw} – export value of the sector s in the world,

X_s – total value of the export in the world.

Index of net business performance - RCA2 quantifies the contribution of a certain sector to creation of active trade balance, i.e. comparative advantage of export industry or a product and its competitive capability (Balassa, 1965). It is obtained as a percentage difference between export and import sector and sum of export and import of those sectors, and is calculated by using the formula $RCA2 = (x_{sc} - m_{sc}) / (x_{sc} + m_{sc})$. When $RCA2 = -1$, it means that no export exists ($x_{sc} = 0$), and when $-1 < RCA2 < 0$, it points to comparative disadvantages. When $RCA2 = 0$, export = import, when $0 < RCA2 < 1$, it points to the revealed comparative advantage and when $RCA2 = 1$ it means that no import exists ($m_{sc} = 0$).

Index of contribution to the trade balance – CTB measures the contribution of certain sectors to national trade balance. It is obtained as difference between real and expected balance in economy (Melisek, 2012) and is calculated by using the following formula

$$CTB = \frac{x_{sc} - m_{sc}}{x_c + m_c} - \frac{x_c - m_c}{x_c + m_c} \times \frac{x_{sc} + m_{sc}}{x_c + m_c} \times 100$$

The left part of equation is a real trade balance of the industry which is pondered by its share in total foreign exchange of a country, which is inter-sector trade. The right part of equation measures the expected trade balance of a sector, if each sector contributes to the total trade balance according to its share in total trade. The difference between the real and expected trade balance quantifies specific contribution to total trade balance. $CTB > 0$ means that real surplus is higher than expected and relative trade deficit is lower than expected, thus the sector has positive contribution to total trade balance; $CTB < 0$ means that the sector has negative contribution to total trade balance, and real results in comparison to the expected are negative or insufficient.

Grubel-Lloydov index – GLI is most often applied in the quantification of intra-manufacturing trade, i.e. capacity of countries to utilise economy of scope (Grubel, Lloyd, 1971). GLI measures export capability on macroeconomic level, i.e. analyses the degree of presence of commodities with inter-sector character in foreign trade, whereby higher degree of presence points to higher degree of national competitiveness. The index is modified for evaluation at the level of industry and its calculation shows a degree of presence of commodities in inter-sector foreign trade exchange of a country.

It is calculated by using the formula:

$$GLI = 1 - \frac{\frac{x_{sc}}{x_c} - \frac{m_{sc}}{m_c}}{\frac{x_{sc}}{x_c} + \frac{m_{sc}}{m_c}}$$

(Grubel, Lloyd, 1971).

GLI value moves within the interval from 0 to 1 ($0 < GLI < 1$). The closer it is to 1 it reveals approximately the same structure of production and export, i.e. higher complementarity of the two markets and vice versa. The comparing value should be mean value of GLI for all sectors in the country, or global value of the given sector (commodity group).

Michaely index - MI shows the degree of specialisation or the lack of specialisation of the country in commodity group or industry (Michaely, 1962). It measures the share of commodity group in total national export and share of commodity group in total national import. It is calculated by using the formula

$$MI = \frac{x_{sc}}{\sum_{i=1}^n X_c} - \frac{m_{sc}}{\sum_{i=1}^n M_c}$$

When the value of index ranges $0 < MI < 1$ it points to a certain degree of specialisation of a country in the commodity group, while when the value ranges $-1 < MI < 0$, it points to insufficient specialisation of the country in the commodity group.

Coefficient of correlation - r is a statistical method of correlation analysis by which the degree of mutual dependence of two connected variables is measured and calculated by using the formula:

$$Correl(X, Y) = r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}}$$

Where x is dependent and y is independent variable.

The strength of connection between variables is expressed in numerical values of coefficient of correlation which range from +1, 0 to -1, 0, so the closer the coefficients are to 1 (+1, 0 and -1, 0), the stronger connection between the variables is.

Research results

Measuring export competitiveness of food manufacturing begins with the capability of domestic enterprises to successfully recognise and satisfy the needs of domestic and foreign customers in the conditions of fair competitive competition with the enterprises from other countries, i.e. to sell their products on domestic and international markets and use production factors more efficiently and better adapt to the conditions in their surroundings (macroeconomic, social, ecological, political etc.).

The selection of indicators of competitiveness at the level of food manufacturing is determined by an attempt to achieve the answer to the issue whether food manufacturing of Serbia is competitive on domestic and international markets. The proof of competitiveness is in greater amount of domestic products which are placed on foreign markets, in comparison to the scope of foreign products in the same sector of food manufacturing that are placed on domestic market, in the conditions of free trade exchange and fair competition. The information about these facts can be obtained by calculating the coefficients RCA, RCA1 and RCA2, as well as coefficients CTB, GLI and MI. Time analysis of change of competitiveness indicator value shows the change of competitiveness of food manufacturing of Serbia regarding its increase or decrease during the considered time interval of twenty years (Table 2).

Table 2. Indicators of competitiveness of food manufacturing of Serbia during the period 1996-2016

Indicator/ year	1996	2000	2005	2010	2011	2012	2013	2014	2015	2016	Average of the period
RCA	0.683	0.600	0.904	1.336	1.170	1.150	0.911	0.979	0.929	1.101	0.841
RCA1	3.097	2.537	2.665	3.016	2.731	3.132	2.410	2.542	2.552	2.429	2.610
RCA2	-0.059	-0.087	0.089	0.380	0.313	0.304	0.278	0.314	0.301	0.398	0.081
MI	0.139	0.077	0.104	0.165	0.141	0.161	0.111	0.126	0.127	0.140	0.110
CTB	7.046	4.314	3.648	3.173	2.996	3.465	2.073	2.124	2.130	1.737	3.998
GLI	0.671	0.709	0.577	0.416	0.474	0.481	0.574	0.546	0.566	0.499	0.610

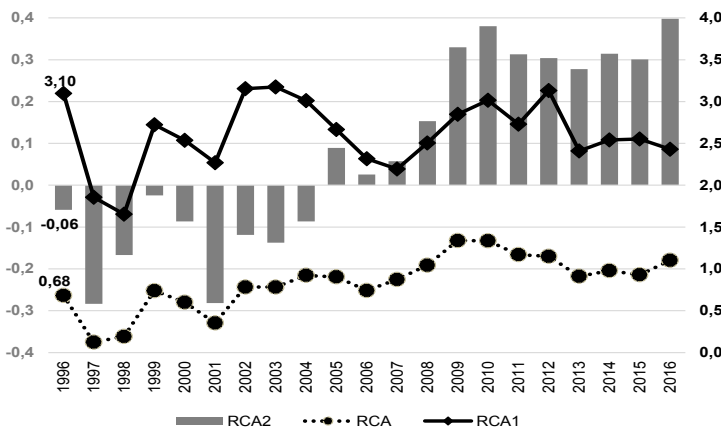
Source: Calculation of the author based on the data taken from the UNCTADstat database

The average value of RCA index during the period 1996-2016 was 0.841. The fact that in all the observed years the values of RCA were positive shows that food manufacturing in Serbia has certain comparative advantages on domestic and export markets.

The index of growth of competitiveness had higher value than 1 (the average value was 2.610) during whole period, which points to significant degree of competitiveness of Serbian food manufacturing on the international market, while cyclic changes of values of indicators show that open competitive advantage was not based on sufficiently strong basis, i.e. the issue of its long-term sustainability is reasonably questioned.

Positive values of the indicator of net trade exchange (ECA2) during the period 2005-2016 show positive contribution to foreign trade balance of economy and the existence of revealed comparative advantage of domestic food manufacturing on domestic market. It was not the case during the period 1996-2004, when food manufacturing had negative influence on the change of foreign trade balance due to significant comparative shortcomings (Graph 2)

Graph 2. Change of values of indicators RCA, TCA1 and RCA2 for food manufacturing in Serbia during the period 1996-2006

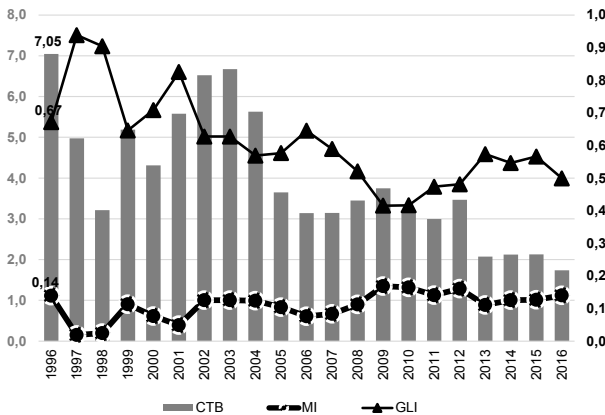


Source: Calculation of the author based on the data taken from UNCTADstat database

The indicator of net trade exchange (RCA2) is connected with the index of contribution to trade balance (CTB) which points to positive contribution of the sector in creation of active national trade balance and economic growth during the period 2005-2006, i.e. negative influence of the sector of food manufacturing in the creation of foreign trade balance during the period 1996-2004.

The average value of CTB index of food manufacturing (CTB=0.9362) and positive annual values of CTB in food manufacturing show positive contribution of the sector in total trade balance and presence of real surplus, which exceeded the expectations, with relative deficit lower than expected, which is especially noticeable during the period 1996-2004 (Graph 3).

Graph 3. Change of values of indices CTB GLI and MI for food manufacturing in Serbia during the period 1996-2016

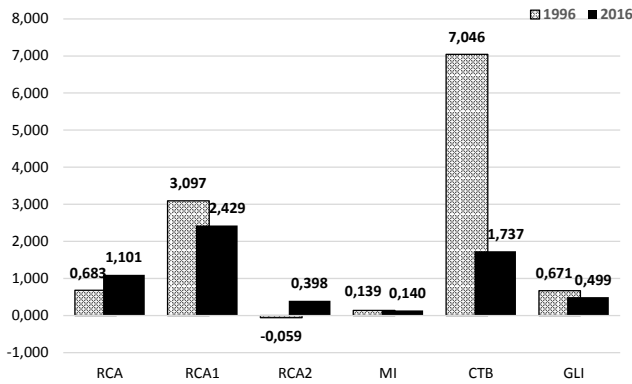


Source: Calculation of the author based on the data taken from UNCTADstat database

The average (MI=0.110) and positive annual values of Michaely index confirmed certain competitiveness of domestic food manufacturing, but also its low specialisation as a whole during the observed period.

The values of GLI show first high and then decreasing degree of presence of products of food manufacturing in inter-sector foreign exchange. This points to the decrease of capability of a sector to create surplus of national trade balance (the average value of GLI index of food manufacturing in Serbia is 0.610).

Figure 4. Indicators of competitiveness of food manufacturing in Serbia



Source: Calculation of the author based on the data taken from UNCTADstat database

In order to reveal factors which influence comparative values of food manufacturing in Serbia, by using the statistical method of correlation analysis the coefficients between y (RCA, RC1, RC2, CRB and MI) and x (MI, GLI, Export FI RCA) were calculated, whose values showed the degree of dependence between the selected indicators of competitiveness of food manufacturing in Serbia (Table 3).

Table 3. Coefficients of correlation

Correlation x	y				
	RCA	RCA1	RCA2	CTB	MI
MI	0.9091	0.8262	0.7328	-0.0959	
GLI	-0.9975	-0.6282	-0.8553	0.3770	-0.9121
Export FI	0.4686	0.8410	0.2942	0.3748	0.7894
RCA		0.6110	0.8657	-0.3897	0.9091

Source: Calculation of the author based on the data taken from UNCTADstat database

The presented coefficients of correlation in Table 3 show both positive and negative connection between certain indicators of foreign trade competitiveness of food manufacturing of Serbia in the period 1996-2016. Also, it is noticed that strong mutual connection of the analysed indicators of foreign trade competitiveness of food manufacturing in Serbia is predominant. Namely, out of the total of eighteen presented coefficients of correlation, five show very high correlation (above 0.91), eight show high correlation (0.71-0.90), three show significant correlation (0.41-0.70), one shows low (0.21-0.40) and one is nearly without correlation (0-2.0)

Discussion

In the period 1996-2009, although with pronounced cyclic deviation, the increasing values of RCA index show that comparative advantage of food manufacturing of

Serbia gradually increased on both domestic and foreign markets. However, after 2011, comparative advantage of domestic food manufacturing permanently decreased, with certain recovery in 2016.

The previous results are largely confirmed by the average value and changes of values of RCA1 index. The obtained values of this indicator point to relatively high but changeable competitiveness of food manufacturing of Serbia on the international market during the whole observed period.

During the period 2005-2016, positive values of net trade exchange (RCA2) show positive contribution of food manufacturing to foreign trade balance of the country, unlike the period 1996-2004, when that influence was negative.

The index of trade balance (CTB) shows positive contribution of the food manufacturing sector in total trade balance, even real surplus exceeded the expected, i.e. relative deficit was lower than expected, which was the case during the period in 1996-2004, while after 2004, real surplus permanently decreased although the sector made surplus, since the real surplus was lower than the really possible.

During the period 1996-2016, the constant fall of GLI was present with obvious cyclic changes (e.g. from 0.968 points in 1997 to 0.49 points in 2016), which undoubtedly points to the necessity of change in the structure of food manufacturing in Serbia and its turn towards the trend of higher specialisation and production of groups of food products with higher value added, in order to achieve increased GLI. The countries with higher Grubel-Lloyd index have better manufacturing differentiation and growth of productivity due to economy of scope. Significant increase of share of intra-manufacturing trade in total trade would mean sustainable manufacturing development and decrease of technological gap in food manufacturing and Serbian economy as a whole in relation to the developed countries.

The change of MI values shows certain increase in specialisation of production in food manufacturing of Serbia during the period until 2010, and also its decrease after 2012. However, a pronounced cyclic character of annual evaluation of indicators, together with the fact that in 2016 the specialisation of production was realised at the same level as in 1996 point to an insufficient degree of specialisation of domestic food manufacturing and strong need for higher specialisation on qualitatively higher bases.

The results of analysis of dependence between the selected indicators by using the method of statistical correlation show that the competitiveness of the sector of food manufacturing is under a strong influence of the following factors:

- The level of specialisation of the country for the products of sector,
- High level of inter-sector foreign trade exchange of the country,
- Export performances of the sector at national level,
- The share of sector in export of the country which has mainly positive contribution, of the sector to active foreign trade balance of the country.

Since the research in competitiveness of food manufacturing is insufficiently focused on the methods by which the enterprises in this sector should improve the activities which create higher value added and thus increase their competitiveness, the development of those activities within the chain of values is still the basis for improvement of total competitiveness of enterprises of food manufacturing, both in the country and worldwide.

Bearing in mind the fact that food industry is a set of complementary, but often mutually technologically various activities (Food and live animals; Beverages and tobacco; Oil seeds and oleaginous fruits; and Animal and vegetable oils, fats and waxes) with various roles in the chain of values, it follows that various activities have various bearers of competitiveness. Therefore the development of long-term competitiveness in the domain of food manufacturing cannot be based on the exploitation of natural resources only, but it has to be increasingly established on production and market realisation of technologically complex products and services with higher value added which, only in their basis, rely on intensive exploitation of various kinds of raw materials of vegetative and animal origin.

Conclusion

Food manufacturing produces a wide range of internationally exchangeable products of various technological complexity, life span and monetary value. At the same time, these products satisfy existential needs of people, and on the other hand, their consumption is under a significant influence of various social and religious norms, and increasingly fashion trends, which makes competitiveness of food manufacturing mainly different from the competitiveness of other sectors of economy. Pronounced fragmentation of its structure and its increasing exposure to pressure of progressively concentrated and globally profiled retail sector only complicate already rigorous conditions for competitiveness in food manufacturing.

Although with the most significant comparative advantages, export competitiveness of food manufacturing of Serbia is at significantly lower level in comparison to the really possible and necessary level. Weakness of competitiveness of food manufacturing of Republic of Serbia is seen in the fact that it is predominantly realised on the basis of extensive production and export of primary agricultural products (cereals, raspberries, apples etc.) of low price and value added, not on the basis of manufacturing complex food products of high quality and high value added.

In order to improve competitiveness of food manufacturing on domestic and global markets, it is necessary for domestic food enterprises to adopt the latest productive, managing and marketing techniques, whose consistent application will contribute to the growth of manufacturing and export of food products and maintain the existing level of employment with favourable labour conditions and higher income level. This will enable domestic food enterprises to fulfil increasing needs of domestic and foreign customers more efficiently, faster and more effectively react to changeable conditions in global environment, significantly increase the scope and quality of production and export, and make domestic food manufacturing competitive on global market for a long time.

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KONKURENTNOST PREHRAMBENE INDUSTRIJE REPUBLIKE SRBIJE

Duška Jovović³, David Jovović⁴

Sažetak

Predmet rada je izvozna konkurentnost prehrambene industrije Republike Srbije u periodu 1996-2016. Analiza izvozne konkurentnosti je realizovana pomoću indikatora Revealed comparative advantage (RCA), Competitiveness growth index (RCA1), Index of net business performance (RCA2), Index of contribution to the trade balance (CTB), Grubel-Lloydov indeks (GLI) and Michaely index (MI). Rezultati su pokazali da su vrednosti RCA bile pozitivne u svim godinama, što govori o komparativnoj prednosti ove grane industrije na domaćem tržištu. Budući da su vrednosti RCA1 veće od jedan, znači da je ona bila i izvozno konkurentna. Postojanje pozitivnih vrednosti RCA2 u periodu 2005-2016. svedoči o doprinosu prehrambene industrije spoljnotrgovinskom bilansu srpske privrede. Prosečna vrednost CTB indeksa iznosi 3,998 i njegove pozitivne godišnje vrednosti pokazuju da je doprinos prehrambene industrije ukupnom trgovinskom bilansu pozitivan. Kretanje vrednosti GLI ukazuje na gubitak sposobnosti sektora da stvori višak nacionalnog trgovinskog bilansa. Pozitivne godišnje vrednosti MI potvrdile su konkurentnost prehrambene industrije, ali i njenu nedovoljnu specijalizaciju.

Ključne reči: *izvozna konkurentnost, pokazatelji konkurentnosti grane, prehrambena industrija, Republika Srbija.*

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THE IMPORTANCE OF BANK CREDITS FOR AGRICULTURAL FINANCING IN SERBIA

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Summary

Agricultural loans present unutilized bank credit market segment in Serbia. This is not only missed profit opportunity for banks, but also serious deficiency that slows down the development of agriculture and rural areas. Paper uses FADN, NBS and bank balance sheet data in order to analyse supply and demand side of this credit market segment, with the aim to better understand the conditions for its development. Paper recommends better education of producers and lenders. Banks should better understand the requirements of agricultural producers and risks of the production to be able to create tailored credits. Insurance has very important role in specific risk hedging and can facilitate agricultural loans. There is also a need to adjust the conditions for obtaining subsidized loans, while the land size is considered as a key prerequisite for obtaining loans in the situation of large fragmentation of properties.

Key words: bank credits, subsidized loans, financing the agriculture, subsidies

JEL: G21, Q14, H71, R51

Introduction- characteristics and the most important problems of agricultural production in Serbia

Agricultural sector has an important role in Serbian economy. The share of agriculture, forestry and fishing in gross value added in 2016 was 6.5%. It employed 18.5% of the total number of employed persons in 2017 and has a share of 7% in total export. Additionally if we add data for manufacture of food products, beverages, tobacco, than the share of such production in Serbian export is much more significant, around 22% (Statistical Office of the Republic of Serbia). Besides, agriculture plays an important role in the socio-economic and political context, since the government declares agriculture

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as sector of strategic importance. Despite its importance, Serbian agricultural sector is faced with numerous problems, which significantly limit the utilization of its potentials.

The reform of the agricultural sector was one of the most problematic parts of the transition process. The economic and social problems of rural areas in Serbia stayed out of the main focus of policy makers. The systematic and comprehensive efforts for creating efficient mechanisms to activate and exploit their potentials are still missing. That is why this process caused social tensions and the growth of rural poverty and inequality. During the privatization of cooperatives and state agricultural enterprises, employment was not in the focus. At the same time, there was no systematic effort to encourage the growth of entrepreneurship and private initiative in rural areas, which significantly reduced opportunities for alternative employment and led to rising poverty among rural population. Rural areas make 90% of Serbian territory with almost 2/3 of total population (Manić, Popović, Stojanović, 2017). Nearly 52% of rural households have no other income, except agricultural (Cvijanović, Subić, Paraušić, 2014). Inadequate economic structure of rural areas, high unemployment, low earning capacity, bad infrastructure and similar, caused a serious process of depopulation (depopulation process in Serbia is the most severe in Europe). Rural population, between two censuses decreased for almost 11%, and the worst situation is in the South and East Serbia where decrease of 20% was recorded (Manić, Popović, Molnar, 2012). Young people leave rural areas and there is a decreasing rate of population growth, which resulted in deterioration in the age structure. According to the census data, two thirds of the rural population is older than 65, while the participation of young people up to 14 years is less than 14%. In the future Serbia will be faced with a problem of lack of rural labour.

When it comes to agriculture, the main problems in rural areas could be summarized as follows: small farm size, outdated production technologies and machinery, and thus low productivity, the lack of adequate infrastructure (e.g. storage/cooling facilities, inadequate irrigation and drainage systems), insufficient, inadequate and inconsistent state support, limited economic activity, bad demographic and education structure of rural population, lack of entrepreneurship and initiatives, limited membership in cooperatives or associations of producers, and inadequate planning by local government. In many areas of production, producers are faced with uncertainty - price for their products isn't set in advance, they are variable, which make long term planning and investment difficult. Since the majority of producers are small and fragmented their bargaining power is very weak. Furthermore, one of the most important obstacles to the growth and development of agricultural sector is the lack of adequate financing.

Financing of agriculture in Serbia

Serbian agricultural sector has a range of different financial products available. They could be obtained from banks, state funds, leasing companies, microfinance organisations and integrators (large food processing companies that finance the agricultural production sector in the form of production inputs such as seeds, fertilizers

and pesticides) (USAID, 2013). On the other side, the access to those funds is very limited for the majority of small producers, since they don't meet the loan conditions.

Main sources of financing of the agriculture in Serbia encompass the following: (1) Agrarian budget of the Republic of Serbia, Vojvodina and local municipalities; (2) Specialized state financial institutions' loans - Development Fund of the Republic of Serbia, Vojvodina's Development Fund for Agriculture, Vojvodina's Development Fund, and partly the Capital Investment Fund of Vojvodina followed by guaranties from Vojvodina's guaranty fund; (3) Subsidized loans of the Ministry of Agriculture; (4) Commercial bank loans; (5) Financial leasing; (6) IPARD program.

As in more developed countries financing in Serbia demands state support.⁴ Agricultural policy is still characterized by low allocation of resources to agrarian budget. Budget for the agriculture as a form of state support to agriculture is implemented dominantly through subsidization of agricultural production and investments. Budget for the agriculture presents 4.78% of the planned budget revenues of the Republic of Serbia in 2017 and is planned to be higher in 2018, reaching RSD 44 billion (Ministarstvo poljoprivrede, šumarstva i vodoprivrede. 2017). Financing of agriculture is, in addition to state budget, provided from development funds and municipalities' budgets.

Subsidized loans of the Ministry of agriculture are from 2004 provided from agricultural budget via commercial banks and were characterized by low interest rates. In 2017 the Ministry of agriculture subsidizes the part of the interest on the loans provided by commercial banks. Loans with maturity of 1-3 years with grace period of one year, or 3-5 years to maturity are provided in local currency without FX clause. Fixed interest rate is 3% p.a. or in special occasions 1%.⁵ A physical person - the owner of a commercial family farm and an entrepreneur can exercise the right to credit support, provided that the total loan amount is up to RSD 6,000,000. A legal entity can exercise the right to credit support provided that the total loan amount is up to RSD 18,000,000 (Subvencije u poljoprivredi, 2017).

Commercial bank loans for agriculture were for years characterized by high interest rates, FX indexation, short term maturities often without grace period, with high pledge and insurance costs. Now, loans are provided with lower interest rates due to significant fall of the reference interest rate of the NBS in the previous period. Financial leasing is relevant financing vehicle from 2003 predominantly for procurement of agricultural machinery and equipment.

By becoming the candidate country in 2012 Serbia can apply for pre-accession funds. The relevant program for financing of the agriculture is the IPARD program with an aim to help the accessing counties to prepare for the implementation of the Common

4 e.g. CAP measures in EU and affordable agricultural loan financing in USA.

5 For physical person with a place of residence in an area with difficult working conditions in agriculture, that has reached a maximum of 40 years of age in the current year, or which is of a female sex.

Agricultural Policy. The financing of agriculture from IPARD funds is realized on the principle of co-financing and pre-funding. The part of funds is provided from this fund and the rest should be financed from domestic public and private funds. According to the Ministry of Agriculture, the first tender for European funds is announced at the end of December 2017 for the purchase of tractors and other mechanization. Agricultural producers will have at their disposal 8.3 million euros, and they can count on the refund of 60 percent of the money invested. According to announcements from the Ministry, Serbia will be able to use a total of EUR 175 million from IPARD funds by 2020 (Ministarstvo poljoprivrede, šumarstva i vodoprivrede, 2015).

In order to test for the relevance of the subsidies in Serbian agricultural financing, we referred to FADN data. The analysis was made on the available FADN data on total subsidies (except for investments) for available years 2014 and 2015. Both years' samples were analysed (1,052 households in 2014 and 1,247 in 2015). Out of the total number of farms in both years, those who didn't receive subsidies in one year were excluded, and only the farms that exist in both samples were observed. The total number of analysed data was then reduced to 877 per year. From the total number of observed farms, there were 323 that faced the increase in subsidies in 2015 compared to 2014, which represents 37% of all observed farms recipients of subsidies. The fall in subsidies occurred in 461 out of 877 farms, which represents 53% of observed farms.

Table 1. The results of testing the significance of the difference in the average amount of subsidies in 2014 and 2015

	Sample 2015	Sample 2014
Average value of subsidies, in RSD	357721.9789	470708.3
Variance	3.7227E+11	4.61E+11
Number of observations	877	877
Pearson's correlation coefficient	0.764087615	
Number of degrees of freedom	876	
t statistics	-7.477851428	
P(T<=t) value one-sided test	0.00	
t critical value, one-sided test	1.646594942	
P(T<=t) value double-sided test	0.00	
t critical value, two-sided test	1.962675695	

Source: Calculation of the authors based on the FADN data

By testing the hypothesis on the equivalence of average value of subsidies in 2014 and 2015, it has been confirmed that there are statistically significant differences in the average level of subsidies in the observed two years for the observed farms. In addition, there was a decline in the average value of total subsidies in 2015 compared to 2014. This is a consequence of the change in subsidies per hectare, farms up to 20 hectares may be beneficiaries of these measures (earlier also larger farms had possibility to apply for

subsidies per hectare). This also may indicate reforms of the state support - budget related payments will be governed toward institutional and structural reforms with the aim to create market environment for agricultural competitiveness growth in the future.

Offer of bank loans for financing agricultural production

From 30 banks that operated in Serbia in 2017, special offers for agricultural producers have 10 banks. Out of that number, Poštanska štedionica has only cash credits for agricultural producers and NLB bank offers only loans from the subsidy program of the Ministry of Agriculture. This means that only 8 banks have offers of agricultural credits. List of those banks is given in the table 2:

Table 2. List of banks that have special offers of agricultural credits

	The bank	Rank in the first ten banks according to the size of bank assets
1	AIK Banka (Agroindustrijsko komercijalna banka)	5
2	Banka Intesa	1
3	Credit Agricole	
4	Komercijalna Banka	2
5	Opportunity Banka	
6	OTP Banka	
7	ProCredit Banka	
8	Sberbank	

Source: Web sites of banks; NBS (2017), *Bankarski sektor u Srbiji, Izveštaj za IV tromesečje 2016. godine, Sektor za kontrolu poslovanja banaka, jun*

Two largest banks in Serbia according to the size of bank assets (Intesa and Komercijalna banka) offer products specialized for agricultural needs, and AIK bank that is ranked as the 5th. Other banks are small, they don't belong to the group of the first ten. This means that banks didn't find their interest in creating loans for agricultural producers, so that this market niche is not very interesting to them. Only around 3.1% of total bank loans granted are to registered agricultural producers (NBS). The level of market in the farm business should increase, they should rely more on their own capacities and market sources of funds, and not just on the state support, in any aspect of business. That is why it is important to find ways to overcome this situation, to analyse main obstacles for the development of agricultural loans market and discover ways to motivate profit oriented banks to exploit this market opportunities, in the situation where non-performing loans (NPL) to business are very high (15.6%). Among the key industries, agriculture has the smallest level of non-performing loans- 4.7% (NBS, 2017).

Farms can obtain different short and long term loans from banks. These loans are designed for meeting short-term liquidity needs, purchasing working capital, as well as long-term investments in equipment and land. Usual minimal conditions for getting a bank loan are to have a registered farm with a minimum 1 year of farming experience and to have regular credit history (in the past 12 months, the client can't have reported active or historical delay in servicing its obligations to banks longer than 60 days). Sometimes other conditions exist as well, like the minimum surface of the land being cultivated, minimum annual income or production contract signed with a processor (Web sites of banks).

Agricultural producers can take loans with the purpose of financing working capital in agriculture (seeds, seedlings, fertilizers, protective chemicals, fuels, animal feed, livestock stock, and other raw materials in agriculture). These loans are with short term, up to 24 months, in dinars, dinars with a currency clause or in euros; minimal amount is 100,000 dinars (in some banks it goes up to 5,000 euros) and maximum 70% of the value of contracted production. Some banks offer grace period (when only interest is paid) of 12 months. Interest rate varies, it depends on the loan currency and exchange rate risk, whether it is fixed or variable, and different bank costs and fees. The overview of interest rates from banks' offer (only interest rates shown on web sites of banks) is given in the table 3:

Table 3. Interest rates on bank short term credits for financing working capital for farms (an excerpt from the offer of banks)

	Fixed interest rate		Variable interest rate	
	Nominal	Effective*	Nominal	Effective*
Credits in dinars	6.5%	6.75		
	9.5%	14.23%	5.75%+3M belibor	15.88%
	9.45%	16.05%	6.17%+6M belibor (9.88%)	
	24%	27.05%		
	24.75%	33.06%	(Special program) Reference interest rate NBS+4 p.p.	11.55%
Credits in dinars with the currency clause	6.5%	6.75		
	11.5%	12.22%		
	7.95%	12.27%		
	17.95-26%			
Credits in Euros	12-14%		6.95%+3M belibor	12.72%

* Effective interest rate depends on the amount of a loan, while some costs are fixed, and thus the same independent of the amount of a loan. Beside, bank fees and other costs could differ.

Source: Bank's web sites

For financing the permanent working capital, loans with longer maturity are also available, up to 5 years, (they are designed for animals breeding over 12 months, financing the production of perennial plants, restructuring of liabilities, permanent working capital to expand production and refinancing of loans in other banks). They could go up to 300,000 euros, in dinars or dinars with the currency clause, with grace period up to 6 months (in the case of perennial plants grace period could be up to 24 months). Interest rate goes from 14% nominal or 40.36% effective interest rate for credit in dinars and 9.95% nominal or 28.97% effective interest rate.

Agricultural producers could obtain also investment loans, designed for financing of construction/adaptation/reconstruction of economic facilities; infrastructure works on the holding; formation/extension of the basic herd, reproductive livestock fund; raising perennial plantations; irrigation and anti-hail protection systems; greenhouses, cold storages, dryers, storage capacities and related equipment; equipment for processing of primary agricultural products; purchases of used machinery and equipment; purchase of agricultural land and economic facilities; and refinancing of existing loans. Credit could be in dinars, dinars with currency clause or Euros, with the maturity up to 120 months (in some cases with the maturity of 15 years) depending on the purpose and currency clause, grace period is up to 24 months, available amount is from 5,000 (somewhere 10,000) -100,000 Euros or maximal amount depends on the credit capacity of the borrower. Interest rate depends on the currency of the loan, whether it is fixed or variable, as shown in the table 4 (only interest rates shown on web sites of banks):

Table 4. Interest rates on bank investment credits for agriculture (an excerpt from the offer of banks)

	Fixed interest rate		Variable interest rate	
	Nominal	Effective	Nominal	Effective
Credits in dinars	8.95% first 36 months, after 5.5%+3m Belibor	10.58%	5.25%+3m Belibor	10.27%
	13%	13.83%		
	18%	19.61%		
Credits in dinars with the currency clause	6.5%	6.7%	6M Euribor+6.5%	6.48%
	12%	12.7%	6M Euribor+12.5%	13.02%
	14% up to 36months	24.95%	7.25%first 36months, after 7.25%+6m Euribor	10.8%
	6%+6m Euribor (4.76%)		5.75% (variable, tided to 3m Euribor)	
Credits in Euros	12-20%		6.45%+3m Euribor	7.27%
	19.95-28%			

Source: Banks' web sites

Agricultural producers can also obtain loans to satisfy their short term liquidity needs, in form of liquidity loan or overdraft. Overdraft is designed for securing the daily liquidity of the client. Money can be used at any moment, without prior notice, and

can be used repeatedly if necessary and returned until the expiration date. One bank offers fixed nominal interest rate on overdraft of 31.76% (effective interest rate is 32.64%). Liquidity loan could be received in the amount of 50,000-300,000 dinars with the repayment period of 12 months and nominal fixed interest rate of 16% (effective interest rate is from 21.35%).

Some banks offer loans in cooperation with the Guarantee Fund of AP Vojvodina for financing of registered agricultural holdings, residing in the territory of AP Vojvodina. Loans are designed for various purposes, like the purchase of agricultural machinery and equipment, agricultural land, purchase of energy efficient equipment and equipment for using renewable energy sources. Available amount, depending on the purpose of credit is from 5,000 (in some banks 10,000 Euros)-250,000 Euros, maturity is up to 10 years, grace period is 12 months, in dinars or dinars with currency clause.

Banks have also some specific offers of agricultural loans like revolving credits, credits with the possibility of changing the repayment plan, credits with the insurance (like Generali), refinancing loans, loans in the cooperation with some development funds (like German development fund KfW) etc.

Agricultural credits - Demand side analysis

Analysis of agricultural credits market would be incomplete without the analysis of the demand side - what amount of credits has been granted to farms, with what purpose, how important those credits are for banks and who are the main creditors. It is also interesting to analyse who are the main users of bank loans.

Table 5. Banks- main agricultural lenders in Serbia, 2016

	The bank	Amount of granted loans to agricultural producers, in 000 dinars/ (share of bank credit portfolio)	Bank share in total amount of agricultural loans granted, 2016
1	ProCredit Banka	24,647,397/ (34.31%)	43.58%
2	Banca Intesa	13,935,439/ (5%)	24.64%
3	Komercijalna Banka	6,549,353/ (13%)	11.58%
4	Sberbank	5,519,392/ (3.6%)	9.76%
5	Credit Agricole	4,133,884/ (4%)	7.31%
6	OTP Banka	1,035,118/ (3.2%)	1.83%
7	AIK Banka	691,085/ (0.6%)	1.22%
8	Opportunity Banka	45,400/ (0.45%)	0.08%

Source: Banks' financial reports, author's calculation

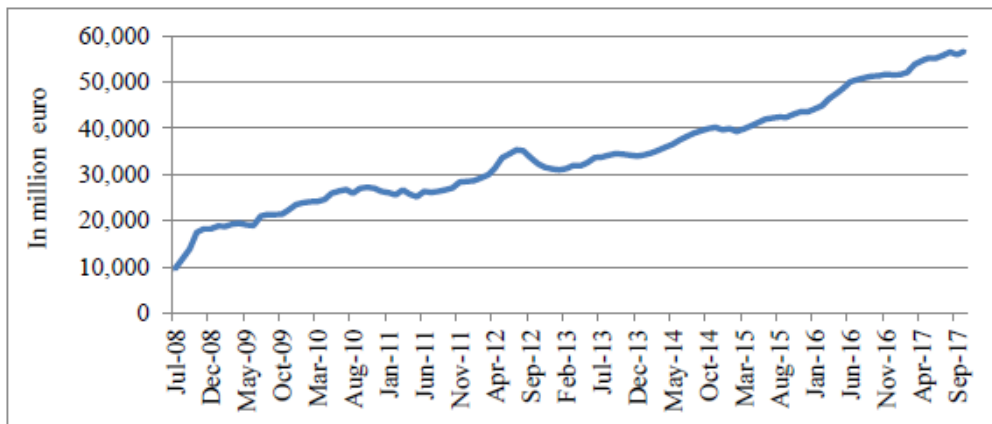
The most important agricultural lender in Serbia is ProCredit bank that granted almost 45% of total agricultural loans in 2016. Since those loans make slightly above a third

of banks' loan portfolio, one could say that this bank is specialized for financing the agricultural sector. On the second place is Intesa with almost a quarter of the total sum of granted agricultural loans. However those loans make only 5% of banks' credit portfolio. Komercijalna banka is on the third place according to the share in total agricultural loans, that make 13% of credit portfolio of the bank. Sberbank had a share of almost 10% in bank agricultural loans in 2016, while the share of those loans in bank credit portfolio is 3.6%. Credit Agricole granted 7.3% of agricultural loans, which made 4% of bank credit portfolio. Remaining 3 banks have insignificant share on the market of agricultural loans.

Only three banks have the share of agricultural loans higher than 10%, which proves that banks are unwilling to penetrate this market. Banks perceive agricultural loans as riskier than loans to other industrial sectors. It is not so easy to estimate creditworthiness of applicants from agricultural sector, especially if they are small farmers. Very often there is a problem of collateral and how to evaluate it. Also, the value of future production is uncertain, as well as future revenues due to unsure price of the final product and repurchase, great dependence on weather conditions, uncertainty of production, etc.

On the other side, in the past few years banks that are the largest agricultural creditors recorded significant growth of those loans. The sum of bank claims on registered agricultural producers grew strongly since the mid of 2008, as showed on the graph 1.

Graph 1. Bank claims on registered agricultural producers



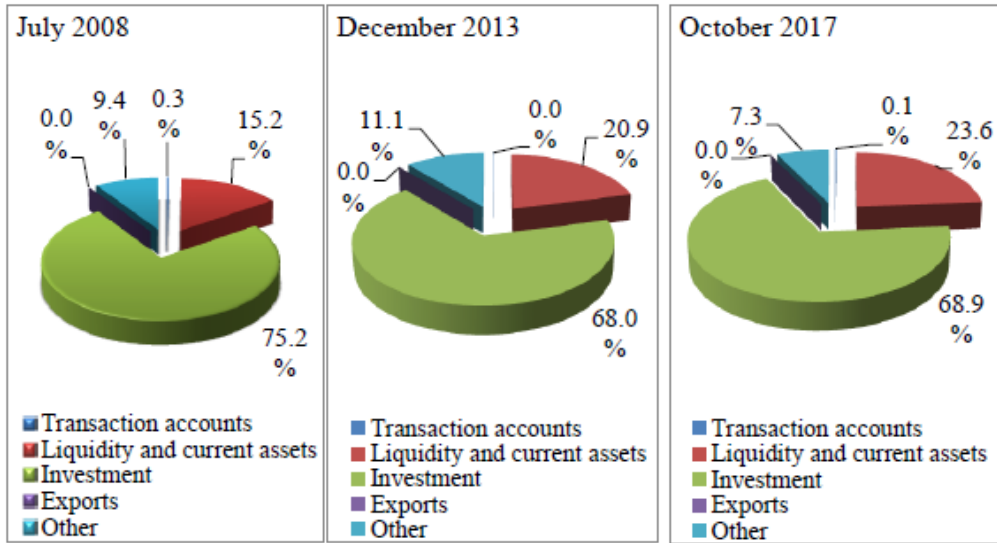
Source: NBS, Statistics

The amount of granted loans to agricultural producers increased 6 times in observed period. This is partly due to the fact that banks are trying to replace a smaller volume of operations in other credit markets and find new unexploited or insufficiently exploited market segments. Some banks in their strategic goals for the next period include more extensive crediting of agriculture. Still, there is a problem of adequate financing of small and medium farms, since in the focus of agricultural growth strategy are clients with bigger holdings and greater creditworthiness from Vojvodina (banks are already active in

lending to farms in Vojvodina) and parts of Central Serbia. Some banks plan to introduce new products that are better suited to specific needs of agricultural producers, like credit lines for the purchase of land with a maturity of 10 years or more, as well as loans for the purchase of equipment with more flexible collateral (Komerčijalna banka, 2016).

Analysis of the structure of bank claims on registered farms helps better understanding the purposes for which agricultural loans have been granted. It is given in the graph 2:

Graph 2. Bank credits to registered agricultural producers, by purpose



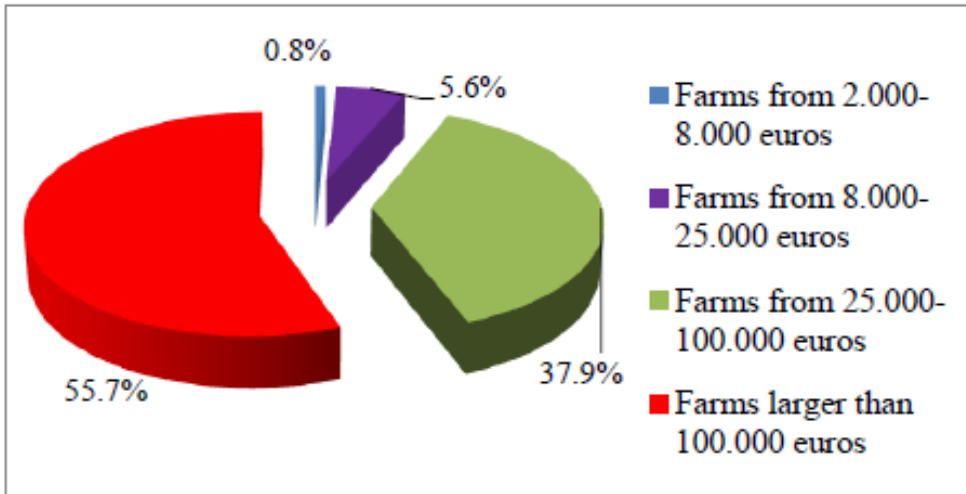
Source: NBS, Statistics

Registered agricultural producers used bank credits mostly for investment purposes. According to Vučković, Veselinović, Drobnjaković (2017) part of assets in inventories should be also financed with long-term loans. In 2008, $\frac{3}{4}$ of total bank loans were with investment purpose. After that, their share decreased and now it is around $\frac{2}{3}$. Farms increasingly used credits for covering liquidity needs. While the share of these loans in 2008 was around 15%, at the end of 2017 it was almost 24%. The share of cash loans is very small, in 2017 it was only 0.3%. The share of overdraft loans is also insignificant. These are the most expensive loans, so we can't expect higher farm reliance on these loans in the future. Unfortunately, increasingly reliance on liquidity loans shows the shortage of revenues, so that current income is insufficient to cover the needs for financing the current assets. These are also very expensive loans. Share of export loans is almost zero. This is probably due to the fact that producers are not selling their products directly to foreign importers, but to (few) larger domestic exporters.

Farm accountancy data network gives indication about the main beneficiaries of agricultural loans, according to the size of agricultural holding, type of production and purpose. Although data were collected based on the sample (not all producers are

included) the use of a stratified sample should accurately demonstrate the structure of these loans. Graph 3 shows the share of farms of different size in obtained bank credits.

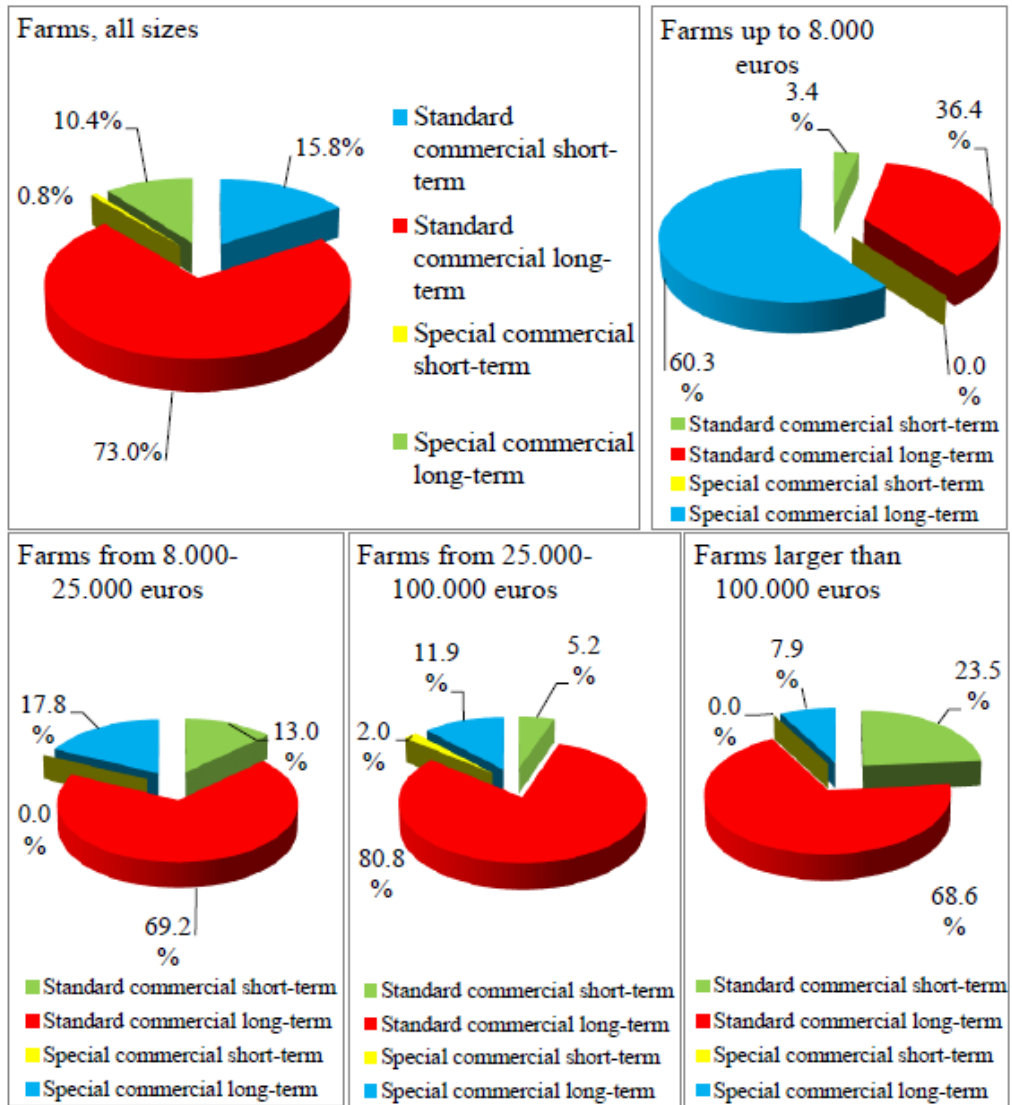
Graph 3. Farm size and bank credits



Source: Farm accountancy data network, 2015

FADN data prove previous statement that vast majority of bank credits are granted to larger farms. Farms with economic size larger than 25,000 Euros participate with almost 94% in obtained credits, out of that, the largest farms with almost 60%. The participation of the smallest farms, with the economic size up to 8,000 Euros is negligible. These conclusions are similar to ones found in Sedlar et al. (2016, p.1225). There is obvious need for the improvement of financing of smaller farms, since average economic size of Serbian family farm is 4,990 Euros (family farms present 99.5% of farms in Serbia), and almost 86% of the total number of farms has economic value up to 8,000 Euros (Cvijanović, Subić, Paraušić, 2014). Graph 4. shows the term structure of loans obtained by interviewed farmers, depending of farm size.

Graph 4. Term structure of used agricultural loans, according to farm size



Source: Farm accountancy data network, 2015

The standard long-term commercial loans count for almost $\frac{3}{4}$ of their credit obligations. Long term commercial credits are used by the most interviewed farms which economic size is from 25.000-100.000 Euros, slightly above 80%. Opposite, small farms with economic size up to 8.000 Euros relied much less on standard commercial loans. Special commercial loans are predominantly used by small farms- more than 60%, these loans are also important source for farms from 8.000-25.000 Euros, but larger farms tend to use it less. Special commercial short term loans are the least popular in satisfying financial needs of farms of all sizes, their share in obtained bank loans is

zero or close to zero. Small farms don't use too much standard commercial short-term loans, but for larger enterprises they are very important, almost a quarter of obtained bank loans. It is also interesting to mention the structure of used credits according to the type of the production. According to FADN data, farms that produce vegetables, crops and flowers used the largest part of bank credits, while the smallest share was used by producers of livestock and in dairy sector.

Conclusion

Agriculture in Serbia is characterized by low profitability due to specific seasonal and extensive production cycle, low specialization of production, low capacity utilization, low turnover ratio, higher exposure to natural hazards in latest years, and inadequate financing vehicles. Although there are different financial sources, their characteristics and conditions are not well tailored-made to satisfy needs of agricultural producers.

Agricultural production is still dependant on the state support- through subsidies from the agrarian budget, but this is insufficient. Besides, the agricultural development policy hasn't been consistent. Agricultural sector support and regulations have been changed a lot of times (even in the same year) and payments to producers have been delayed, which backed unstable and unfavourable economic environment for agriculture. There is a need for farms to rely more on their own capacities and market sources of funds- where bank credits have significant role.

Agro-crediting in Serbia is not even close to its full potential. Small number of banks deals with this type of lending (effectively only 5 banks) mostly due to the lack of recognition of the potential of this market segment, as well as the lack of the necessary technology and methodology for processing credit claims and assessing the risks of the business of agricultural producers. Business analysis is more demanding and implies knowledge of all agricultural processes and technologies grown by certain crops and livestock production.

Specific risks on this market segment are mostly related to an open air production, a very high impact of climate factors and weather conditions. Insurance would significantly reduce risks, but this type of insurance is still unpopular with agricultural producers, largely due to the number of claims denied or inadequately paid by insurance companies. Majority of agricultural production is uninsured. Adequate insurance can significantly reduce the risks and increase banks' interest in lending to this sector. This can be used as a potential motivator for agricultural producers in the future, by lowering interest rates when processing the credit claim for insured production.

Banks are dominantly oriented towards larger producers and agricultural companies (larger than 25,000 Euros), smaller producers are "removed" from the market. This is economic and social problem, since slightly above 97% of total number of farms has economic value up to 25,000 Euros. Term structure of granted bank loans is favourable, while $\frac{3}{4}$ is the share of investment loans. On the other side, there is a negative tendency of increasing the use of liquidity loans- for financing the current assets. These are

among the most expensive loans, together with overdraft and cash credits, and their usage increases the production costs. Overall, bank loans are characterized by high interest rates, FX indexation (only very short-term loans are in dinars without currency clause), high pledge, insufficiently long terms.

Subsidized loans are the most attractive both for the banks and the producers, but they are granted on the basis of the land that the farm is cultivating, and there is a problem of property fragmentation. The vast majority of smaller producers do not satisfy the conditions for those loans. Additionally, agricultural policy measures should be more governed toward institutional and structural reforms with the aim to create market environment for agricultural competitiveness growth in the future. The role of the commercial banks might be crucial in co-financing of agricultural investments based on the IPARD scheme.

It is necessary to work on the education of agricultural producers as well as creditors in order to improve the functioning of agricultural loans market. Agricultural producers must be properly informed about all the benefits of insuring the production, lending, and advancement of technological processes in order to further develop the production. On the other hand, lenders need to understand the needs of agricultural producers, to analyse previous production results and anticipate future production to be able to adequately respond to credit needs and ensure timely and adequate crediting without the risk of over-indebtedness of agricultural producers- and earn profit on this unutilized market segment.

Finally, the future of financing of the Serbian agriculture should rely more on financial instruments such as commercial papers, warehouse receipts trading and longer term debt instruments. In addition, commodity derivatives could be used as instruments for hedging the relevant price risks.

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ZNAČAJ BANKARSKIH KREDITA ZA FINANSIRANJE POLJOPRIVREDE U SRBIJI

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Sažetak

Poljoprivredni krediti predstavljaju neiskorišćeni segment kreditnog tržišta u Srbiji. Za banke to je promašena prilika za realizaciju profita, a za državu ozbiljan nedostatak koji usporava razvoj poljoprivrede i ruralnih područja. Rad analizira ponudu i tražnju na ovom segmentu kreditnog tržišta, kako bi utvrdio uslove za njegov razvoj, na bazi FADN, NBS i podataka iz bilansa stanja banaka. Autori ističu potrebu za boljom edukacijom proizvođača i zajmodavaca. Banke bi trebalo da bolje razumeju potrebe poljoprivrednih proizvođača i rizike ove proizvodnje, kako bi kreirale potrebama prilagođene kredite. Proizvođači treba da budu obavešteni o prednostima osiguranja njihove proizvodnje, jer osiguranje ima veoma važnu ulogu u zaštiti od rizika specifičnih za poljoprivrednu proizvodnju. Takođe postoji potreba za prilagođavanjem uslova za dobijanje subvencionisanih kredita, jer je veličina zemljišta ključni uslov za dobijanje ovih kredita, a postoji velika fragmentacija zemljišta.

Key words: *bankarski krediti, subvencionisani zajmovi, finansiranje poljoprivrede, subvencije*

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ANALYSIS OF OPTIMAL COSTS FOR RESERVES OF SPARE PARTS FOR AGRICULTURAL MACHINES

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Summary

Managing reserves of spare parts for agricultural machinery in agricultural farms represents one of the most important activities in securing smooth functioning, especially having in mind the imperative of continuous agricultural production. Aims of this study were to show how efficiency of the agricultural farms as a business subject can be secured by determining timely purchase of spare parts by using a stochastic model of supplies on one side and reduce the time of malfunction of agricultural machinery on the other. Study of optimal inventory level was conducted in agricultural holdings on the territory Banat in 2015 based on data on spare parts purchase and malfunction of agricultural machinery. Acquired data was related to frequency of defects and the need for spare parts, as well as the price of spare parts, where the data was processed with the use of stochastic model of supplies. The optimal number of spare parts for the observed equipment in the observed period was $y^=4$ with the probability of 85% that this amount of spare parts will be sufficient for all malfunctions on the equipment to be eliminated, while taking a 15% risk that one or two spare parts*

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will be acquired with emergency procurements in case of extraordinary circumstances. The model of managing supplies represented in such a way provides an opportunity to be easily applied in agricultural farms, where the values of an optimal solution would be effectively got with previously chosen values of suitable parameters, thus minimizing total expected costs, which would include fixed costs, expenses caused by unsatisfied requests, where the time of waiting for the observed equipment to be fixed would be taken into account.

Key words: *Stochastic model of supplies, spare parts, agricultural machinery, farm.*

Introduction

In the last 50 years, the importance of agriculture in macroeconomic conditions has been reduced. In favour of this is the fact that in the middle of the 20th century, 50% of the EU population worked in agriculture, and primary agricultural production was a traditional source of income in rural areas. In the meantime, this share is continuously decreasing, so today only 7% of the EU population is engaged in agriculture. This is the result of major technical and structural changes in the global market resulting in the globalization of agricultural production and strong competition in the primary agricultural sector (Milić, 2011)

Such processes are strongly present especially in the countries in transition, where they have resulted in very negative trends and today's unfavorable situation characterized by numerous problems: small and non-competitive production, a large number of old farms, fragmented agricultural land, small production plots, extensive and low technological basis of production, insufficient use of agro-technical measures, poor productivity, etc. Such agriculture is poorly income, non-competitive and unprofitable, and in the current state it can not be a condition of a sustainable military.

This state of affairs is unsustainable, since in small environments it causes more severe living and working conditions, the deterioration of existing agricultural holdings, unemployment, and major structural disorders: depopulation, loss of agricultural land function, social decline, loss of identity of local communities, and exposure to harmful phenomena such as endangering the environment, etc.

Quality realization of agricultural production also depends on contemporary of the households with modern means and equipment. It is very important for this equipment not to be faulty in order to insure continuity in work and to ensure that the needs of ever increasing production are met (Harrington, 2007). In accordance with that is reducing time of defectiveness of these devices, which is achieved by the possibility of faster repairs and returning it in functioning state. The successful realization of this request (Vukoje, 2013) is achieved by the existence of adequate inventory of spare parts, which is realized through the system of supplying material resources which, in principle represents the set of diverse elements of connected information and material flow in a unified whole.

The supply system can perform its function only with the existence of certain inventory and spare material assets. They are a component of the system and represent one of the sources of supplying (Riveiro, 2010)

Stocks of spare parts, located at appropriate locations, can prevent long downtimes of technical systems that are used in primary processes of their users (Milojević, Mihajlović, Cvijanović, 2012). Since such downtimes are typically very expensive, generally system-oriented service measures are used in spare parts reserve control. Examples of such measures are system availability and the expected number of backorders over all spare parts (Karugia, 2017; Kranenburg, 2006).

Managing supplies is surely one of the most important logistic assignments of every agricultural farm. Problems that make finding the optimal policy of managing supplies difficult are: the unpredictability of demand, long time period of delivery, unreliability of suppliers, large number of articles, short time period of demand for certain products.

Obviously, having adequate numbers of spare parts is of key importance for this repair-by-replacement policy to be effective. However, spare parts stocks may tie up a lot of capital: commercial airlines are estimated to have over \$40 billion worth of spare parts, a single company such as ASML, which builds lithography equipment used in semiconductor manufacturing, owns spare parts worth tens of millions of euros, and the US Coast Guard Aircraft owns inventories worth over \$700 million (Smith, Pitt, 2007).

Managing supplies is often a neglected activity in a large number of systems even though it is of crucial importance for realizing assigned missions and tasks. Having in mind that managing supplies is too complex of a problem for thorough, detailed analysis, by using superficial analysis we can come to the conclusion that it is best to have as much supplies as finances allow (Walczak, Caban, Marczuk, 2017; Guillermo, 2017). However, even though keeping high level of supplies is sometimes followed by great expenses, comparing those costs with costs that occur due to emergency procurements, it can be seen that it is significantly more responsible to have an appropriate level of supplies. It is especially in this case, having in mind the significance⁹ of agricultural machinery for undisturbed production.

Methods

Researching supplies of spare parts undisturbed production was performed on in rural farms in Banat. The research was conducted due to the need to improve the work of farm and to rationalize the spending of approved budget assets (Basten, Houtum, 2014) which imposes the request to analyse the expenses of maintaining agricultural machinery s in farms, because data from previous years show a growth in these costs (Božić, Aćimović, 2010). This situation is conditioned by non-existence of adequate supplies of spare parts, which often leads to a standstill in work of certain wholes of farms. Creation of the right model of managing supplies of spare parts for agricultural machinery needs to answer two basic questions: how and in what amount should these parts be ordered from the supplier (Brown, 2008). Research that was conducted showed

us that the answer to these questions depends on: a) total cost of holding supplies, b) cost of storing supplies and c) cost of handling supplies.

When managing replenishment of supplies, two general approaches are used (Backović, Vuleta, Popović, 2014):

1. Continuous replenishment system, which implies that the level of supplies is tracked continuously and its replenishment is done when it falls under the specified level, with fixed amounts of newly delivered goods. In this case the amounts that are delivered are fixed, and the variable is the period between two procurements. This is why this system is known as the system of fixed orders.
2. Periodical replenishment system which implies that orders are done in fixed intervals, irrelevant of the available stocks, where the ordered amount is determined in the amount to secure a predefined volume of supplies. In this case the interval between orders is fixed and the amount ordered is the variable. This is why this system is called the system of fixed intervals. The level of supplies in this system is determined by taking a periodical inventory in objects in which supplies are present.

During purchase of such supplies such as, parts for an ultrasound apparatus etc., there can be a dilemma: is it cost-effective to secure spare parts for maintenance of a device with its purchase or is it cost-effective for those spare parts to be ordered when a malfunction occurs. In the first case there will be storage costs, while in the other case there will be a problem in the form of inability for the farms to provide services to a patient in a particular time period, and costs of emergency procurement which is done so that malfunction is dealt with as soon as possible.

The fact that all costs, i.e. total costs are tied to securing reserves of spare parts should be as small as possible. In order for the set problem to be solved, it is necessary to formulate the corresponding mathematical problem of supplies (Caffaro, Mirisola, Cavallo, 2017) and then determine the minimal total cost of supplies by solving it. To form such mathematical model of supplies it is necessary for the following conditions and assumptions to be solved: (Backović, Vuleta, Popović, 2014).

- In the given time period T , the demand for spare parts, i.e. frequency of failure occurrences agricultural machinery, marked with x , which is a stochastic variable with the known law of probability $p(x)$;
- Cost of supplies of spare parts per unit, if they are acquired through regular channels are C_1 ;
- Cost of supplies per unit, if they are acquired in urgent situations are C_2 . These costs can include costs of agricultural machinery holdup due to lack of supplies. It is common in practice for costs C_2 to be significantly greater than costs C_1 ;
- Initial supplies are equal to zero;
- If x marks demand and y supply, then: if $x \leq y$, i.e. when the level of supplies greater

than demand, cost of supplies that will be paid is $C_1(y - x)$; if $y > x$, i.e. when demand is greater than available supply, cost of emergency procurement that will be paid is $C_1(y - x)$.

Having in mind that demand x is stochastic and that the probability of malfunction on a agricultural machinery (Gauchan, Shrestha, 2017) is known $p(x)$ which means that that expected total costs will be obtained by adding individual expenses for each x , multiplied by corresponding probability $p(x)$, so that the function of total expenses, marked with $F(y)$, reduced to an expected value can be written in the following form:

$$F(y) = C_1 \sum_{x=0}^y (y - x)p(x) + C_2 \sum_{x=y+1}^{\infty} (x - y)p(x) \tag{1}$$

In order to determine minimal expected total expenses for the presented problem of supplies, it is necessary to determine the minimum of this function. Having in mind that this model relates to securing supplies of spare parts for agricultural machinery, minimization of this function (Gościński, Kośmicki, Mielec, 2005) will be conducted under the assumption that the variables can be taken only as individual and whole numbered, nonnegative values. In that case, if there is a value y^* where the previously specified function takes its minimal value then the following condition must be met

$$F(y^* - 1) > F(y^*) < F(y^* + 1) \tag{2}$$

If functions $F(y-1)$ and $F(y+1)$ are formed then condition under which $y = y^*$ should be determined.

Starting from function (1) in which the variable y is replaced with $y-1$ then we get

$$F(y - 1) = C_1 \sum_{x=0}^{y-1} (y - 1 - x)p(x) + C_2 \sum_{x=y}^{\infty} (x - y + 1)p(x) \tag{3}$$

respectively

$$F(y - 1) = C_1 \sum_{x=0}^{y-1} (y - x)p(x) + C_2 \sum_{x=y}^{\infty} (x - y)p(x) - C_1 \sum_{x=0}^{y-1} p(x) + C_2 \sum_{x=y}^{\infty} p(x) \tag{4}$$

Based on the connection between functions $F(y)$ and $F(y - 1)$, the connection between functions $F(y)$ and $F(y + 1)$ can be established, which can be written in the form of the following double inequality ¹⁶

$$p(x \leq y^* - 1) < \frac{C_2}{C_1 + C_2} < p(x \leq y^*) \tag{5}$$

This means that if there is a value y^* that minimizes the function of expected total expenses, then y^* must fulfil the conditions given by the relation (5). Relation (5) is important, not only because conditions of optimality that the variable y must fulfil are determined by it, but because it can be used to determine the optimal value of supplies y^* that minimizes expected expenses of supplies.

This is achieved by firstly forming a table in which one row or column represents the cumulative of probabilities $p(x=y)$, and then based on known values for C_1 and C_2 the quotient is calculated:

$$k = \frac{C_2}{C_1 + C_2} \quad (6)$$

After this, cumulative probabilities between which the quotient k can be found are determined based on cumulative probability in the row or column. There is one value y that corresponds to each of these cumulative probabilities $p(x=y)$. Value that corresponds to the greater value of cumulative probabilities for y , represents the sought optimal solution y^* .

By using the relation (5), analysis of the optimal solution can be performed, i.e. limits can be determined, within which expenses C_1 и C_2 can be found, without causing a change to the optimal solution.

$$C_1 < \frac{p(x \geq y^*)}{p(x \leq y^* - 1)} \quad (7)$$

$$C_1 > \frac{p(x \geq y^* + 1)}{p(x \leq y^*)} \cdot C_2 \quad (8)$$

because

$$p(x \leq y^*) = 1 - p(x > y^*) = 1 - p(x \geq y^* + 1) \quad (9)$$

Inequalities (7) and (8) can be unified in one dual inequality

$$\frac{p(x \geq y^* + 1)}{p(x \leq y^*)} \cdot C_2 < C_1 < \frac{p(x \geq y^*)}{p(x \leq y^* - 1)} \cdot C_2 \quad (10)$$

where the lower and upper limit are determined within which expenses C_1 can be found, without causing a change in the optimal solution.

The lower and upper border within which expenses C_2 can change, without causing a change in the optimal solution are

$$\frac{p(x \leq y^* + 1)}{1 - p(x \leq y^* - 1)} \cdot C_1 < C_2 < \frac{p(x \leq y^*)}{1 - p(x \leq y^*)} \cdot C_1 \quad (11)$$

Or written differently

$$\frac{p(x \leq y^* + 1)}{p(x \geq y^*)} \cdot C_1 < C_2 < \frac{p(x \leq y^*)}{p(x \geq y^* + 1)} \cdot C_1 \quad (12)$$

Results

Research was conducted by reviewing 125 agricultural machinery where the average cost of acquisition and storing spare parts during purchase of agricultural machinery, per part was $C_1=1.500$ €. In the case when spare parts weren't acquired at the time

of purchase of agricultural machinery but when a malfunction occurred, the period of putting the device out of use was averagely two months and the expenses for emergency procurement were in average $C_1=1.500$ €. By reviewing the data during the research period, the probabilities of replacing spare parts in the exploitation period of the agricultural machinery were calculated. These probabilities can be expressed in a table in the following way:

Table 1. Probability of replacing spare parts

Number of replaced spare parts x	0	1	2	3	4	5	6	7
Probability of replacement $p(x)$	0	0,25	0,30	0,20	0,10	0,10	0,05	0

Source: authors' calculations;

During the application of the mentioned model, the problem of determining the optimal size of order of spare parts y^* was set, in a regular way, for which total expenses of securing supplies will be minimal, then determining the amount of those minimal expenses and the limit within which expenses C_1 и C_2 can change, while leaving the optimal solution unchanged (Cruz, Rincon, 2012).

Starting from initial sizes $C_1=1.500$ € and $C_2=6.000$ €, the following can be determined

$$k = \frac{6.000}{1.500 + 6.000} = 0,8$$

After this it is necessary to make the table in which the row of cumulative probabilities $p(x \leq y)$ will exist.

Table 2. Probabilities and cumulative probabilities of changing spare parts

y	0	1	2	3	4	5	6	7
x	0	1	2	3	4	5	6	7
$p(x)$	0	0,25	0,30	0,20	0,10	0,10	0,05	0
$p(x \leq y)$	0	0,25	0,55	0,75	0,85	0,95	1,00	1,00

Source: authors' calculations;

Based on the data from the table we received

$$0,75 < k < 0,85$$

for cumulative probabilities $p(x \leq y)$ which means that

$$y^* = 4$$

because this value corresponds to greater cumulative probability for y .

This result indicates that with regular procurement $y^* = 4$ spare parts should have been supplied, where it can be determined with the probability of 85% that this amount of

spare parts will be sufficient to eliminate all malfunctions on the observed agricultural machinery while taking the risk of 15% that one or two spare parts will have to be acquired by regular procurement in the case of nonexistence of supplies. In that case minimal expenses would be

$$F(y^* = 4) = 1.500 \sum_{x=0}^4 (4-x)p(x) + 6.000 \sum_{x=5}^{\infty} (4-x)p(x)$$

respectively

$$F(y^* = 4) = 1.500(3 \cdot 0,25 + 2 \cdot 0,30 + 1 \cdot 0,20) + 6.000(1 \cdot 0,10 + 2 \cdot 0,05) = 3.525\text{€}$$

In order to be assured that these are indeed minimal expenses, a crosscheck was performed and expenses $F(y^* - 1 = 3)$ and $F(y^* + 1 = 5)$ were calculated,

$$F(3) = 1.500(2 \cdot 0,25 + 1 \cdot 0,30) + 6.000(1 \cdot 0,10 + 2 \cdot 0,10 + 3 \cdot 0,05) = 3.900\text{€}$$

and

$$F(5) = 1.500(4 \cdot 0,25 + 3 \cdot 0,30 + 2 \cdot 0,20 + 1 \cdot 0,10) + 6.000(1 \cdot 0,05) = 3.900\text{€}$$

since

$$F(3) > F(4) < F(5)$$

These are indeed minimal expenses for $y^* = 4$, so the only thing left is to determine the limits of change for expenses C_1 and C_2 , for which there will not be a change in the optimal solution. These limits can be determined by relations (8) and (12), which means that for the borders of change for expenses C_1 it can be written

$$\frac{p(x \geq 5)}{p(x \leq 4)} \cdot 6.000 < C_1 < \frac{p(x \geq 4)}{p(x \leq 3)} \cdot 6.000$$

respectively

$$\frac{0,15}{0,85} \cdot 6.000 < C_1 < \frac{0,25}{0,75} \cdot 6.000$$

where the asked limits for the change in expenses C_1 are finally determined

$$1.058,82 < C_1 < 2.000,00$$

Just as in the previous case, the limits within which expenses C_2 can be found without changing the optimal solution $y^* = 4$ will be

$$\frac{0,75}{0,25} \cdot 1.500 < C_2 < \frac{0,85}{0,15} \cdot 1.500$$

where we get

$$4.500,00 < C_2 < 8.500,00$$

In order to perform the crosscheck, it can be assumed firstly that $C_1 = 1200$, and then that $C_2 = 1.890$.

In the first case

$$k = \frac{6.000}{1200 + 6.000} = 0,8333$$

and in the second

$$k = \frac{6.000}{1.890 + 6.000} = 0,7604$$

thus in both cases it is

$$0,75 < k < 0,85$$

Which means that the mentioned changes in expenses C_1 didn't influence the change in the optimal solution $y^* = 4$.

A similar crosscheck can be performed for expenses C_2 , which means that the changes in expense C_2 will not lead to a change in the optimal solution $y^* = 4$.

Discussion

There are not many references comparing or discussing questions tied to supply of spare parts for agricultural machinery, especially applying a mathematical model in reviewing economic management of the same. Many authors point to the significance of agricultural machinery, especially its functioning. However there are only a few who model expenses that occur due to maintenance of agricultural machinery and equipment.

Considering that there isn't an ideal level of functional agricultural machinery and with it spare parts, it is necessary to conduct a large number of studies in order to help managers of farm when projecting the amount of financial assets intended to the mentioned use (Deshpande, Iyer, Cho, 2006). Considering the specificity of every farm, with an emphasis on the quality of agricultural machinery, there is a possibility for eventual savings in their maintenance.

Managing is a strategic function and makes a positive contribution to business growth and organization success. This is a diverse profession whose main aim is to provide quality environment, which is fit for the purpose it's designed for. It also involves a constant balancing act between the competing pressures of time, cost and quality (Zekić, Šegrt, 2015)

Savings that would be achieved with the purchase of spare parts during the acquisition of agricultural machinery in relation to expenses that occur in the case of nonexistence of supplies of spare parts in the observed sample of 125 agricultural machinery are great. Also unrealized revenue due to defects additionally increases loss.

In our research it was shown that funds can be saved if optimal amount of spare parts would be acquired $y^*=4$ over 12,000 € with the probability of malfunction on the observed agricultural machinery of 85%. In this case there is a risk with the probability of 15% for a malfunction to occur without having a previously acquired spare part in

favourable conditions. On the other hand, existence of supplies would expedite repair of agricultural machinery in the shortest possible period which would reduce the time in which the observed device has a defect and additionally influence an increase in trust of patients in farms and of course increase revenue.

This type of systematic approach to determining the level of supplies has shown significant results in other areas as well. Rustenburg et al.²¹ show that for one system, spare parts holding costs would reduce by about 60% under the system approach, while attaining a slightly higher spare parts availability; for another system, the spare parts holding costs would reduce by 9%, while bringing the availability up from 56% to 90% (Rustenburg et al., 2013).

Conclusion

Based on the aforementioned it can be concluded that preventive maintenance agricultural machinery which is manifested in the form of timely procurement of spare parts, a significant form of achieving efficient and cost-effective operating of farms.

Results of our study indicate that mathematical modelling of expenses of supplies of spare parts for agricultural machinery can contribute to successful reviewing of the best way of acquiring the same. Therefore it is necessary for the management of farms to take appropriate steps to achieve planned savings and an increase in quality of agricultural products.

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ANALIZA OPTIMALNOSTI TROŠKOVA ZALIIHA REZERVNIH DELOVA POLJOPRIVREDNIH MAŠINA

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Sažetak

Upravljanje zalihama rezervnih delova poljoprivrednih mašina u poljoprivrednm gazdinstvima predstavlja jednu od najvažnijih aktivnosti u obezbeđivanju nesmetanog funkcionisanja naročito imajući u vidu imperativ kontinuirane proizvodnje. Cilj ove studije bio je da se prikaže kako jednim stohastičkim modelom zaliha može da se utvrdi da pravovremenom nabavkom rezervnih delova može da se obezbedi sa jedne strane ekonomičnost poslovanja poljoprivrednog gazdinstva kao poslovnog subjekta, a sa druge strane smanji vreme neispravnosti poljoprivrednih mašina. Studija optimalnosti nivoa zaliha sprovedena je u poljoprivrednim gazdinstvima na teritoriji Banata u 2015. godini na osnovu podataka o nabavkama rezervnih delova i neispravnostima poljoprivrednih mašina. Prikupljeni podaci su se odnosili na učestalost javljanja neispravnosti i potrebe za rezervnim delovima, kao i cene rezervnih delova, pri čemu su obrađeni primenom stohastičkog modela zaliha. Rezultati: U posmatranom periodu optimalni broj rezervnih delova za posmatranu opremu je iznosio $u^*=4$ pri čemu se, sa verovatnoćom od 85%, može tvrditi da će ova količina rezervnih delova biti dovoljna da se otklone svi kvarovi na opremi, dok se preuzima rizik od 15% da će se jedan ili dva rezervna dela nabaviti hitnim nabavkama u slučaju vanrednih okolnosti. Ovako predstavljen model upravljanja zalihama pruža mogućnost da se lako primeni u poljoprivrednm gazdinstvima, gde bi se uz prethodno izabrane vrednosti odgovarajućih prametara efektivno dobile vrednosti optimalnog rešenja, tako da se minimizira ukupan očekivani trošak, koji bi obuhvatao fiksne troškove, troškove izazvane sa nezadovoljenim zahtevima i gde bi se uzelo u obzir vreme čekanja popravke posmatrane opreme.

Key words: stohastički model zaliha, rezervni delovi, poljoprivredne mašine, poljoprivredno gazdinstvo.

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THE IMPACT OF RELATIONSHIP MARKETING WITH CUSTOMERS ON THE FINANCIAL PERFORMANCE OF THE SUNFLOWER OIL MANUFACTURERS IN SERBIA

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Summary

The purpose of this study is to investigate empirically how determinant attributes of price and brand, based on relationship marketing concept, influence customer-perceived value as well as long-term profit in the Serbian sunflower oil industry. For the purpose of this study, a self-administrated questionnaire was distributed to 125 respondents. This questionnaire has been created to collect primary data and it has a structure that reflects statements which show customers' satisfaction determinant attributes. A descriptive and multiple regression analysis was used to identify which factors of determinant attributes of customers' satisfaction influenced customer-perceived value. Therefore, we perceive the influence of satisfaction and its attributes as non-financial measures on financial measures which are related to enterprise performance. This study found that factors of determinant attributes of price and brand significantly and statistically influenced the satisfaction, whereas the manufacturer's brand has the greatest influence. Furthermore, analyzing the loyalty of customers as a second key factor of relationship marketing, the results of this study undoubtedly confirmed that only the brand significantly influenced customers' loyalty. The price represents a significant factor in providing immediate customers' satisfaction. But, in the long run, the focus of customers is on those oil manufacturers who have a powerful brand (corporate reputation). The study opens possibilities of discussion in the existing literature due to the fact that it reveals how determinant attributes of customers' satisfaction and loyalty influences the creation of superior value for the customer as well as the creation

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of long-term value for the enterprise. This study found that the process of creation enterprise's value was not based on a traditional formula, where it began with input and ended with the output. The mere input for the creation of enterprise's output emerges from interaction with customers. In this context, it's very important to take into account the economic effect between the consistent creation of superior value for the customer and long-term profit. Moreover, the importance of this study emerges from research results which show that modern market conditions impose the need for tailoring financial statements that are based on various interest groups. In this way, additional non-financial measures of success are provided as well as information in relation to those that can be obtained from existing basic financial statements.

Keywords: *sunflower oil, price, brand, relationship marketing, satisfaction, financial performances.*

JEL: *M31, Q14, C81*

Introduction

Managing relationship marketing in relation to customers represents one of the most important the twenty-first century management processes. It is aimed at obtaining a value for the customer (Gummesson, 2008; Kotler, 2000). The implications of this relationship have an impact on edible oils manufacturers' financial performances. Therefore, the value of a relationship with customer ought to be analyzed in the same manner as the value of business enterprise (value chain) (Lukić and Nikolić, 2009). In the context of global competition, a customer is offered a product or service that have a superior value and which is believed to represent the best way for gaining a competitive advantage (Woodruff, 1997). This approach to marketing strategy in creating superior value for a customer is of utmost importance for sunflower oil manufacturers in Serbia. This value should provide them with economic growth and development.

Besides forecasting the sales volume of one product, it is of vital importance to forecast the profit from customers as well in order to carry out strategic management of one enterprise. Taking into account the profit as a criterion for segmentation, Marinkovic (2012) argued that for the purpose of identifying strategically important customer categories one can implement various analysis methods and indicators such as RFM method, marketing ROI analysis, CLV (customer lifetime value). Customer lifetime value encompasses total financial contribution of customers, i.e. it includes future income expectations and costs, the rate of customer retention as well as a discount rate (Kumar, 2006a). In addition to Kumar's definition, Gupta and Lehmann (2006) define CLV as a value which encompasses all existing and future profits gained from customers throughout their relationship (cooperation) with the enterprise. In this context, the aim of research in this study is focused on applying various procedures, techniques and methods for measuring customers' performances in order to emphasize the sunflower oil manufacturers' necessity and feedback for developing close and lifelong (long-term) relationship with customers. By doing so, the manufacturers will be capable of getting

customers' loyalty which will also enhance their satisfaction. Therefore, all above-mentioned techniques and methods ought to contribute to higher enterprise value that will lead to the increase of its profitability too. According to value chain concept, some elements that are related to customers' satisfaction, loyalty, retention, and profitability represent important guidelines in view of relationship marketing with customers (Gupta and Lehmann, 2006a). Moreover, by applying Balanced Scorecard methodology (Kaplan and Norton, 1992; Wu et al., 2009) the contribution of non-financial measures to financial measures of Serbian sunflower oil manufacturers' performances is clearly and explicitly determined. The methodological aim of this research tries to determine customers' attitude to crucial elements of customers' satisfaction and loyalty that are related to brand and price of sunflower oil manufacturers' products. According to the goal set, the following hypotheses are set out in this paper:

H1. Prices are an important factor in providing immediate customers' satisfaction and loyalty. On the other hand, in the long run, product brand i.e. sunflower oil manufacturers' reputation represents a crucial impetus (trigger) for creating superior value for a customer as well as a long-term profit.

H2. Input for creation the sunflower oil manufactures' output emerges from customers i.e. interaction with customers.

For the purpose of supporting (proving) these hypotheses, the research results of this study are presented by applying descriptive statistics and multiple regression analysis. In the introductory section of this study, the relationship between marketing and financial dimensions are explained as well as customers' satisfaction and loyalty implications that have an impact on financial performances of an enterprise.

Relationship between marketing and financial dimension

Kaplan and Norton developed "balanced scorecard" concept which was originally presented in Harvard Business Review in 1992. Later on, this concept was thoroughly developed in their books (Kaplan and Norton, 1996, 2003, 2004). Looking at aims from different perspectives, the adjusted list (Djurićin et al., 2010) creates the balance between general indicators (financial consequences of previous decisions) and starting indicators (the measures of future indicators which show ways of creating value by investing in customers, suppliers, employees, technology, innovations and other forms of non-material assets). Nowadays, managing the enterprise that is based on its long-term goals and visions is feasible only if parameters that are used for it, contain indicators which reflect not only the past but also information about future development. Kaplan and Norton's Balanced Scorecard instrument doesn't take into consideration only financial, but also non-financial indicators as well. Furthermore, they divided parameters into four different perspectives (dimensions): financial perspective, customer perspective, internal processes perspective, learning, and development perspective (Domanović, 2010). The parameter of financial perspective that is used for achieving the aims of enterprise, is also important because we can derive from it other three perspectives. The

indicators that contribute to the successful processing of market and customers (e.g. customers' satisfaction) are developed within customer perspective. When we take into account the creation of an appropriate strategy for enterprise management, it is vital to use an integrated approach to marketing and financial dimension.

Modern business conditions, interactive relationship between participants at a competitive market, as well as the mere struggle for survival at the market, require making numerous strategic decisions on a daily basis. Therefore, in the context of economic integrity, information from financial statements (in the span of few years) is the basis for analysis of the economic and financial behavior of an enterprise that also represents a necessary element for making business decisions (Ivkov, 2014). Providing the quality system of informing by the help of financial indicators involves also the existence of complete, precise, comparative and accessible information (Ivkov and Andjelković, 2013). The processing of such information is also the basis for marketing information, as well as for the creation of the enterprise future growth. The innovative marketing strategy that is best defined, could also fail unless it is followed by appropriate financial strategy. On the other hand, the financial strategy that is aimed at the realization of high-profit rate can't be completed (realized) unless it is followed by appropriate marketing strategy for the realisation of planned sales volume. Financial strategy of an enterprise is aimed at a successful combination of sales volume, costs, expenses, profit, asset, debts, and investments in order to reach the specific liquidity and profitability level. The given goals (objectives) are put in an appropriate financial program in order to be realized. Financial programme depends on marketing programme. This relationship is evident in all elements of the financial programme, especially in elements such as sales volume, costs, and investments. By combining analytically financial aims and programme we can obtain various models of profitability. Given models are used for evaluating financial implications of enterprise marketing strategies. Profitability models play a crucial role in the overall process of strategic management. These models are important for combining three key areas of enterprise management: 1) profit management; 2) business assets management; 3) capital management (sources of capital and debt ratio). There is a high level of the interrelationship among these areas. Furthermore, these three areas are often reduced to two strategic ones. The first area is associated with assets and capital management- financial strategy, whereas the second one is associated with profit management- marketing strategy (Lovreta, 1998). Customer profitability management (CPM) brings an effective cost and price management so as to create programmes for profit increase. A continuous monitoring of changes in profitability of different segments means that enterprise adjusts to changes and becomes an active creator of new trends in today's market. CPM in combination with effective material and non-material assets makes it feasible for the enterprise to identify the chances for value creation in order to increase customer profitability. However, in the long run, enterprises that don't upgrade and differentiate its products become incapable of keeping profitable customer segments (Wang, Hong, 2006). That way, an act of measuring customer profitability adds an additional and new dimension to marketing

which leads to an establishment of the relationship between marketing and finances in terms of increasing enterprise value. There have been significant changes in marketing concept due to the fact that implementation of financial calculations in marketing has been used to assess customer profitability and brand value (equity). The concept of CLV implies the necessity of integration for marketing and financial activities. Moreover, CLV represents the link that connects these two traditional business functions. With the expansion of CLV concept, it is feasible to determine the impact of marketing strategies on enterprise value more precisely (Gupta and Lehmann, 2006b; Askary, 2013; Kumar, 2006b; Hughes, 2006). It is evident that an integral approach to financial and non-financial determinants is necessary during the creation of an appropriate enterprise management strategy which will lead to its growth and development.

Implications of customer satisfaction on financial performances

A group of professors from Harvard, Heskett, et al., (2003) has developed a concept “*The value profit chain*”, which implies that the value can be assessed from the customer’s point of view as well as from employees, investors, and partners of one enterprise. Moreover, this concept offers patterns for calculating the value for above-mentioned stakeholders. Satisfaction and customer loyalty represent the primary growth factors of the profitability of the enterprise that imply the value for investors and partners. In marketing, satisfaction is associated with the feeling that occurs in the evaluation stage after purchasing and consuming products and using services. Customers feel satisfied if a product or service meets or exceeds their expectations. That is why “creating a value and customer satisfaction are at the heart of modern marketing thought and practice. Customer satisfaction is the key to retaining existing and attracting new customers (Maricic, 2011). Satisfaction is generally analyzed as a function of the performance of the purchased product and previous expectations. “Satisfaction is a customer’s response to achievements. This represents the price that shows attributes of a product or service, or just a product or service which provide a pleasant level of consumption, including those levels of insufficient or excessive fulfillment”. This approach to the definition has led to the formation of a new model whose significance is reflected in the fact that it represents one of the first attempts to test the correlation relationship between satisfaction and affection. In this context, the model is the basis for future researchers (Oliver, et al., 1997). The concept of customer satisfaction is the subject of special attention in marketing because it is reasonably believed that satisfaction affects the intentions and future behavior of the customer. Szwarc, (2005), has yielded significant results in customer satisfaction studies. The created customer satisfaction should not be viewed as the goal of overall marketing activity but as a very important step towards the creation of loyal customers. Satisfaction and loyalty of the customers are two key links in the profit-making chain. Auh and Dzonson (2005) emphasize two factors that significantly affect the degree of positive correlation between satisfaction and loyalty. These two factors represent the relative significance of the quality and price of the product itself and they are associated with purchasing and the difficulty in detecting differences in the attributes of brand rivalries of a given product category. A positive

correlation between satisfaction and loyalty becomes stronger if quality plays a key role in the purchasing process and if consumers are able to easily detect differences in the quality of the attributes of competitive products. If an enterprise creates a sufficient number of satisfied and loyal customers, it will meet the basic prerequisite for achieving long-term profitability. A high level of customer satisfaction in the current period contributes to increasing profits in the enterprise. On the other hand, since the primary goal (objective) of an enterprise lies in a long-term, and not a short-term profitability, it is necessary to create satisfied loyal customers. An increase in the level of customer satisfaction, as a rule, increases the level of their loyalty. Therefore, customer satisfaction represents an extraordinary market benchmark and a barometer of future revenue and profit. Customer satisfaction is a business-oriented indicator of the future. Other benchmarks, such as sales and market share, are backward-looking benchmarks in business performance measurement. They show what was in the past, without taking into the account the future. Thus, customer satisfaction has become the leading performance indicator for future. The company can have good financial indicators and poor satisfaction, due to the fact that customers are not capable of changing the source of supply in a short period of time. Customers who are unsatisfied, usually do not regret the company's abandonment. In order to maintain market share, new customers have to be attracted (Milisavljević, 2006).

According to Sheth, et al., (1999), the customer-orientated approach provides enterprises with specific benefits that result in increased profitability and revenue growth. In this regard, six advantages are listed, of which three affect the increase in profitability, and other three the increase in the revenue of the enterprise. Specific benefits that affect the increase in profits are 1) cost-effectiveness (reduction) through repeated purchases; 2) preferential prices for regular customers, 3) The loyalty of customers during the periods of crisis for an enterprise. The specific benefits that affect the growth of revenue are: 1) the positive effect of oral propaganda, 2) the increase in the number of trial purchases, and 3) the innovation of new products. By maximizing customer satisfaction, an enterprise maximizes profitability and its market share. An enterprise can always increase the level of customer satisfaction by lowering prices or improving the quality of services. However, this can frequently result in a decline in profits, and this is certainly the least-desirable business option. Therefore, the purpose of enterprise orientation to achieve a higher level of customer satisfaction is to offer them greater value in products and services at an adequate price, which is also profitable for an enterprise. It is known that quality products and services correspond to higher prices for the offer. Customers will also accept higher prices with increased value in products and services, which will also affect the increase in corporate profits. Creating value for customers and the degree of their satisfaction are key elements in developing and managing relationship marketing with customers. Such an approach has led to an explicit measurement of the impact of the company's bid on creating value for customers. Payne and Holt, (2001), made a significant contribution to measurements in order to understand customers' value and degree of their satisfaction. In a study undertaken by Ladhary et al., (2008), the quality

of interaction surfaced as important triggers of satisfaction. The research results confirm that there is a high level of influence of product or service quality on the increase in customer satisfaction (Brady and Robertson, 2001; Yang et al., 2009). Likewise, the research confirms that the price has a significant impact on customer satisfaction and loyalty (Bei and Chiao, 2001). Measuring customer satisfaction is a very significant business activity of a market-oriented enterprise. The results obtained provide useful guidelines for improving existing relationships with customers. The information provided in this way serves as an important step for sunflower oil manufacturers in order to determine the contribution that their activities aimed at increasing customer satisfaction have so as to improve the value creation process for the customer as well as to increase the value itself. All studies and other relevant papers presented here are used in this study in order to investigate a complex system of evaluating key determinants and business indicators for the purpose of evaluating the possibility of further growth and development of the oil industry, and thus the overall economy.

Methodology

Measurement of customer satisfaction as a key element of relationship marketing is based on a process that was used by renowned authors in this field, Churchill, and Iacobucci, (2002). In this context, the following stages of the process of measuring customer satisfaction were applied in this paper: 1) defining the problem; 2) designing the research; 3) determining methods and techniques for collecting data; 4) sampling and collecting data; 5) analysis and interpretation of data. The usage of Balanced Scorecard model is significant for the oil industry from the perspective of customers. In accordance with the premise of research in this paper, field surveys were carried out, according to the set goals and performance criteria (*Table 1.*) for the purpose of identifying statistically significant determinants of customer satisfaction and loyalty.

Table 1. Objectives, performance benchmarks, initiatives

Objectives	Performance benchmarks	Initiatives
Create a strong relationship with customers	Customer satisfaction	Develop a customer feedback database

Source: own review

The intention is to prove that the value for the customer is created within the two-way interactive process of the sunflower oil producer and the purchaser. This perspective of value creation is based on the idea of mutual knowledge exchange, which automatically leads to the creation of higher values for both sides. Customer satisfaction surveys are conducted according to price and brand in the retail sector in the territory of the City of Belgrade and Novi Sad. These surveys are based on the determination of the size and structure of the sample. The sample was created on a case-by-case basis in locations in central city zones. The reason for this lies in the fact that there is a significant concentration of respondents in the mentioned zones and an organized trade supply service. However, there are also respondents in areas where there is no significant concentrated and organized supply of sunflower oil. The research was based on a

sample size of n = 125 subjects. Also, the sample includes the defined age structure and schooling (education) of respondents. When it comes to the gender structure, the sample includes 69 women (55. 2%) and 56 males (44. 8%). The main goal of the research was to determine the relationship between purchasers, citizens of Belgrade and Novi Sad, according to the key elements of satisfaction related, the price of the products of the oil industry, and the brand of sunflower oil producer and their reputation. In this context, the research was carried out to identify statistically significant determinants of customer satisfaction and loyalty. Survey of satisfaction and loyalty of purchasers was carried out according to the attached questionnaire (*Table 2.*).

Table 2. Questionnaire on customer satisfaction with the price and brand of sunflower oil producers

No.	Statements (Claims)	1-absolutely disagree				7-absolutely agree		
1	The prices of sunflower oil products are more favorable than what you expected	1	2	3	4	5	6	7
2	Prices of sunflower oil are correct compared to other types of oil of foreign competition	1	2	3	4	5	6	7
3	Prices of sunflower oil products are in accordance with the quality they offer	1	2	3	4	5	6	7
4	The oil producer chain relates to reputable and professional enterprises of the oil industry in Serbia	1	2	3	4	5	6	7
5	On the whole, the image of a sunflower oil producer is favorable	1	2	3	4	5	6	7
6	The products of sunflower oil producers are directed towards the needs and wishes of the customers	1	2	3	4	5	6	7
7	Looking back at the overall range of sunflower oil producers, you are very satisfied	1	2	3	4	5	6	7
8	The overall offer of sunflower oil producers greatly exceeds your expectations	1	2	3	4	5	6	7
9	In the future, you intend to continue using the range of products of the Serbian oil industry	1	2	3	4	5	6	7

Source: own review

The questionnaire that was used to collect data from the respondents covered a total of 9 claims that were evaluated on Likert’s seven-point scale, 1 absolutely disagree; 7 absolutely agree (Andjelković, 2014). Claims are grouped around 4 variables. These variables are Prices, Corporate Reputation (Sunflower Oil Manufacturer Brand), Satisfaction and Loyalty. Each variable was measured according to a certain number of statements-claims (two to three statements). The variables represent the unadorned midpoint of the assessments given by the respondents to the findings by which the variables were measured. In this context, prices were measured through the statements 1, 2 and 3. The sunflower oil producer’s brand was measured through the statements 4, 5 and 6. Satisfaction of customers was measured through the statements of 7 and 8. Customer loyalty was measured through the statement 9. The selection of the

statements by which the attributes of the sunflower oil brand producers were measured was adopted and adapted from Jeng, (2011); The selection of the statements by which prices and satisfaction were measured were made by studies conducted by Johnson et. al., (2001); Iglesias and Guillen, (2004); Cronin, et al., (2000); Fornell et al., (1996). In order to measure loyalty, a statement was taken and adapted from Gaur et al. (2001). Data analysis was conducted in the Statistical Package for Social Sciences version 12. To test the reliability and internal consistency of the statements, on the basis of the aforementioned software program, Cronbach's alpha coefficient for each individual variable was used. To examine the statistical significance of the effects of independent variables on the dependent variable (customer satisfaction), a multiple regression analysis was used.

Results and discussion

Descriptive sample information suggests that the percentage of women is bigger (55.2%) compared to men (44.8%). The relative relationship of the mentioned segmentation criteria is harmonized with the final markings or the purpose of the final product. In line with the segmentation of the sample, in the first part of the results of descriptive statistical analysis, we determined the estimates of the statements and attitudes of women and men about the attributes on the basis of which they were segregated as well as measured variables of the model related to the product price, brand, satisfaction and customer loyalty. The results of descriptive statistical analysis based on the data obtained from the survey are illustrated in the tables (*Tables 3 and 4.*)

Table 3. The results of descriptive statistical analysis (the grades of statements)

Statements	Grade
Prices of sunflower oil products are more favorable than you expected	3.11
Prices of sunflower oil are correct compared to other types of oil of foreign competition	3.71
Prices of sunflower oil products are in accordance with the quality they offer	4.01
The oil producer chain relates to reputable and professional enterprises of the oil industry in Serbia	4.58
On the whole, the image of a sunflower oil producer is favorable	4.49
The products of sunflower oil producers are directed towards the needs and wishes of the customers	4.45
Looking back at the overall range of sunflower oil producers, you are very satisfied	4.26
The overall offer of sunflower oil producers greatly exceeds your expectations	4.13
In the future, you intend to continue using the range of products of the Serbian oil industry	4.45

Source: own calculation based on survey database

Based on the results of the statistical analysis, in Table 3, estimates for 9 statements were given. Based on the use of the seven-point Likert scale, the higher estimates of the statements presented in the above table show more favorable attitudes of the respondents. On the basis of the above-mentioned statement, the highest respondents' estimate is that the chain of oil producers refers to renowned and professional enterprises of the oil industry in Serbia (4.58), and then it follows that the overall view is that the image

of the oil industry is favorable (4. 49). Likewise, the significant value of the grade also relates to the statement that the products of sunflower oil products are directed towards the needs and wishes of customers (4. 45).

Table 4. The results of descriptive statistical analysis (the grades of model variables)

Variables	Grade
Price	3.61
Sunflower oil producers' brand	4.51
Satisfaction	4.19
Loyalty	4.45

Source: own calculation based on survey database

In Table 4, based on the analysis results, estimates for model variables are given, since each variable is measured with two, or three statements. The results show that respondents have the most favorable attitude according to the conclusions concerning the brand of the oil industry (4. 51), and the most unfavorable attitudes about the statements through which the prices were measured (3. 61). Results show that respondents exhibit a higher level of loyalty compared to the level of their satisfaction. To test the reliability and internal consistency of the statements, the aforementioned software program is used for calculating Cronbach's alpha coefficient for each individual variable. Calculated values of Cronbach's alpha are given in the table (*Table 5.*).

Table 5. The value of Cronbach's alpha coefficient

Variables	Cronbach's alpha
Price	0.725
Sunflower oil producers' brand	0.801
Satisfaction	0.716
Loyalty	0.762

Source: own calculation based on survey database

Coefficient Cronbach's alpha shows the reliability and internal consistency of the statements through which the model variables are measured. Its value moves in the 0-1 interval and it is considered that the statements are internally consistent if the value of this coefficient is greater than 0. 7. Taking into account all variables, we have reliable results, i.e. the values of the Cronbach's alpha coefficient for all variables are more than 0. 7. The results from Table 5 show that the highest degree of reliability can be found in the variable of the brand of the products of the oil industry (Cronbach's alpha = 0. 801) as well as in loyalty variable (Cronbach's alpha = 0. 762). The results of a multiple regression analysis on the basis of the causal relationship between the dependent and independent variables are shown in the following table (*Table 6.*). In the observed case of empirical analysis, the influence of two independent variables (price and brand of sunflower oil producer) on the satisfaction as a dependent variable is shown.

Table 6. The results of multiple regression analysis (dependent variable: satisfaction)

Variables	β	VIF
Prices	0.239*	2.013
Oil producers' brand	0.427**	3.121

Source: own calculation based on survey database. Results important at level $p < 0.01$ (**): $p < 0.05$ (*): $R^2 = 0.605$

From the shown results of a multiple regression analysis, it is evident that both observed independent variables (producer price and brand) have a statistically significant effect on satisfaction, with the strongest impact being the brand name of the sunflower oil producer, since it has the highest value of coefficient β . Since the Variance Inflation Factor (VIF) is less than 5, it can be concluded that multicollinearity is not a problem in the given research (Andjelković, 2001). The results of a multiple regression analysis in which the dependent loyalty variable represents the function of the two observed independent variables are shown in the following table (Table 7.). In other words, the table below illustrates the impact of two independent variables (price, the brand of the products of the oil industry) on customer loyalty.

Table 7. The results of multiple regression analysis (dependent variable: loyalty)

Variables	β	VIF
Prices	0.120	2.013
Oil producers' brand	0.420**	3.121

Source: own calculation based on survey database. Results important at level $p < 0.01$ (**): $R^2 = 0.712$

Based on the results of the analysis shown in the table, it follows that the regression model describes 71.2% variability of loyalty. In the observed case, the results confirm that only the brand of sunflower oil producer has a statistically significant and very strong impact on customer loyalty. In this context, the product brand of a given manufacturer is a key driver in creating long-term customer loyalty. The quality of services and prices are important factors in securing current customer satisfaction, but in the long run, customers are primarily focused on those supply chains of sunflower oil products that have a strong brand, or corporate reputation. Due to the fact that the values of VIF are less than 5, it can be concluded that multipolarity does not pose a problem in the given research.

Conclusions and implications

According to the results of the multiple regression analysis, it can be concluded that both observed variables (the price and the brand of the producer) have a statistically significant effect on satisfaction, with the strongest impact being the brand or reputation of the producer of sunflower oil. Another conclusion that arises from the result of the analysis, also, indicates the significant and very strong influence of the brand on customer loyalty. Based on the overall results of the analysis, i.e. the stated statements, the conclusion is that the brand of the product (the reputation of the producer of

sunflower oil), is the key driver of creating long-term value for customers. Prices are important factors in securing current customer satisfaction, but in the long run, customers are primarily focused on those supply chains with sunflower oil products that have a strong brand. These conclusions confirm H1 outlined at the beginning of the work: “The prices are an important factor in providing immediate customer satisfaction and loyalty, but in the long run, the brand of products or the reputation of the sunflower oil producer is the key driver of creating superior value for customers as well as long-term profit.” The information obtained in this way enables the sunflower oil producer to determine the contribution that his activities aimed at increasing the satisfaction of customers have on increasing the value of the enterprise itself. In this way, H2 is also confirmed that “the input for creating the output of sunflower oil products comes from customers, i.e. from the interaction with the customers.” For these companies, it is characteristic that the value-creation process is not set on the basis of the traditional formula where it begins with the input and the output is terminated (Komnenić and Lukić, 2010). In this way, changes in key customer relationship management strategies can be undertaken, such as allocation of resources and service levels, price formation, brand product, which are all in the function of increasing overall, and in particular, the financial performance of sunflower oil producer in Serbia.

From the point of view of the value of this study, it is particularly important that the results of the research confirm that in order to achieve sustainable competitive advantages, the emphasis has been put on the importance of non-financial measures of business success. In concrete researches, customer satisfaction is important and it is measured through the price and brand variables. Therefore, the modern market conditions of business imply the need to prepare financial statements for different interest groups by providing additional information in relation to those that can be read from the existing basic financial statements. “The importance of various intangible assets initiates the need to enable the presentation of those items of assets that contribute to the value of the enterprise which, according to the existing IFRS (International Financial Reporting Standards), do not meet the requirements for disclosing in the balance sheet (Šaponja and Gravorac, 2014)”.

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UTICAJ MARKETING ODNOSA SA KUPCIMA NA FINANSIJSKE PERFORMANSE PROIZVODJAČA SUNCOKRETOVOG ULJA U SRBIJI

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Sažetak

Cilj ove studije je da se empirijskim istraživanjima utvrdi prema konceptu marketing odnosa, kako ključni atributi cene i brenda kao determinante satisfakcije i lojalnosti kupaca utiču na stvaranje vrednosti za kupaca i dugoročnog profita u sektoru proizvođača suncokretovog ulja u Srbiji.

Za potrebe ove studije kreiran je upitnik kao sredstvo za prikupljanje primarnih podataka. Upitnik je strukturiran prema konstacijama koje su opredeljivale ključne attribute satisfakcije kupaca, i distribuiran na 125 ispitanaka. Korišćena je deskriptivna statistika i višestruki regresioni model analize kako bi se odredili ključni faktori atributa satisfakcije kupaca koji utiču na percipiranu vrednost kupaca. Na ovaj način posmatra se uticaj satisfakcije i njenih atributa kao nefinansijskih merila na finansijska merila performansi preduzeća.

Na osnovu dobijenih rezultata, ova studija je utvrdila da faktori ključnih atributra koji se odnose na cenu i brend imaju statistički značajan uticaj na satisfakciju, pri čemu najjači uticaj ima brend proizvođača. Rezultati istraživanja lojalnosti kupaca, kao druge ključne odrednice marketing odnosa, potvrđuju da jedino brend ima značajan i veoma jak uticaj na lojalnost kupaca. Cena predstavlja važan faktor u obezbeđivanju trenutne satisfakcije kupaca, ali dugoročno gledano, kupci su prvenstveno fokusirani ka onim proizvođačima ulja koji imaju snažan brend, odnosno korporativnu reputaciju.

Studija otvara mogućnost diskusije u postojećoj literaturi tako što otkriva kako ključni atributi satisfakcije i lojalnosti kupaca utiču na stvaranje superiornih vrednosti za kupaca i dugoročne vrednosti samog preduzeća. U ovoj studiji je potvrđeno da se proces stvaranja vrednosti za preduzeće ne postavlja na osnovu tradicionalne formule gde on počinje inputom i završava se autputem. Input za stvaranje autputa preduzeća, dolazi iz interakcije sa kupcima. U tom kontekstu se posmatra ekonomski efekat

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između doslednog proizvodjenja superiorne vrednosti za kupca i dugoročnog profita. Takođe, vrednost ove studije proizilazi iz rezultata istraživanja, da savremeni tržišni uslovi poslovanja nameću potrebu oblikovanja finansijskih izveštaja prema različitim interesnim grupama obezbeđujući dodatne nefinansijske mere uspešnosti i informacije u odnosu na one koje se mogu pročitati iz postojećih osnovnih finansijskih izveštaja.

Ključne reči: *suncokretovo ulje, cena, brend, marketing odnosa, satisfakcija, finansijske performanse.*

GASTRONOMIC MANIFESTATIONS AS A FACTOR OF IMPROVEMENT OF SERBIA'S TOURISM OFFER

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Summary

Under the influence of globalization and mass settlement of cities and urban areas, nostalgia for traditional and rural is increasingly felt. All this supports the development of manifestation and gastronomic tourism and the promotion of autochthonous products and traditions. Serbia is a country where a large number of national minorities lives, each of which has an impact on the gastronomy of the some area. The combination of all the cuisines and the diversity of tradition made Serbian dishes unique. There are a large number of events in the tourism offer of Serbia, which themes are gastronomic products. Manifestations, as a kind of promotion of a particular area, are becoming more and more popular. The paper analyses gastronomic manifestations as an important segment of Serbia's tourism offer. The methods applied in the paper are the method of correlation and comparative analysis. The results of the research indicate a positive interdependence between the number of manifestations and tourist traffic during the year, while the existence of an interdependence between the number of manifestations and tourist traffic in the regions was not recorded.

Key words: *manifestations, gastronomy, tourism*

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Introduction

There are numerous manifestations that have food for the basic topic. Food festivals as a form of food tourism can play an important role in presenting new tastes to tourists, as well as learning about different customs. Tradition in preparing food is passed

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down from generation to generation, thus becoming the cultural good of the people. Thanks to gastronomic tourism, tradition is preserved and it is trying to bring domestic food to many tourists from neighbouring cities, as well as foreign tourists. In the era of globalisation, localisation and the use of gastronomy and food can be a source of regional and national identity (Hjalager, Richards, 2002). Every region in Serbia has a specific dish or an agricultural product that makes it recognizable. However, a festival that simply contains a food component can not be classified as a food festival. The food festival is a festival with food that emphasizes regional or local food specialties or a festival on the theme of food, which has food-related activities and programs or food topics. Food festival is a place where communities are engaged in public celebration and promotion of local food (Everett, Aitchison, 2007). With the changes regarding the preferences of local and international tourists, the traditional concept of holiday is also changing (Sanin, Aydin, 2017, p. 181). Food festivals are one of the ways of completing the experience of more and more demanding tourists.

The term gastronomy is in most cases linked to the consumption of food in restaurants. However, the trends of gastronomic tourists today include visiting and tasting food and drinks at primary and secondary producers, the presence of food and drink manifestations and the consumption of authentic dishes and drinks. Gastronomic tourists becomes a viable alternative for new destinations that cannot benefit from “sun, sea, and sand,” or natural or cultural resources (Kivela, Crotts, 2005, p. 41). Food at manifestations is a very powerful means of communication with tourists, because visitors to these events can socialize and engage in cultural activities, such as visits to art galleries, historic sites or parks, to find hidden gastronomic treasures known only to local people, try unusual dishes and food and get acquainted with a particular culture or tradition (Bjeljac, 2010, p. 128). Therefore, gastronomic tourism and gastronomic events are compatible with other forms of tourism and tourist values. Through gastronomy, other forms of tourism are connected.

The subject of the paper is the analysis of gastronomic manifestations in the tourism offer of Serbia and the perception of the possibilities for their popularization. The aim of this paper is to prove, based on the analysis of available information and data, as well as the results of the research on gastronomic manifestations and their connection with tourist traffic, that gastronomic tourism in Serbia should be developed both due to the volume of resources available in Serbia and the possibility of a positive impact on the growth of tourist traffic. In order to achieve the stated goal of the research, the authors of the paper proceed from the basic assumption of the existence of a positive interdependence between the number of manifestations and the realized tourist traffic.

Theoretical concept of gastronomic tourism

Gastronomy includes all that relates to cooking, cooking skills, and in this regard, in a wider sense, includes gourmand, gourmet, and in the broadest sense, the connection between culture and food, art nutrition, culinary art. Gastronomy therefore refers to rules or norms in respect of eating and drinking (Santich, 2004, p. 18). The relationship

between tourism and gastronomy is a long-standing and close one (Correia et al., 2008, p. 164). Gastronomy can add value to the tourist experience and is associated with quality tourism for travellers in search of new products and experiences that yield a high level of satisfaction (Kivela, Crotts, 2009, p. 163). In considering gastronomy as a motive for tourist movements, it is necessary to define several concepts: food tourism, culinary tourism and gastronomic tourism (Vukić, 2015, p. 120). Some authors define food tourism as a visit to primary and secondary food producers, food festivals, restaurants and all those locations that are the motive for food tasting. The term culinary tourism is in line with the concept that tourists can experience another culture through food, i.e. culinary tourism is research participation in the consumption, preparation and presentation of food, local cuisine and menus. It is considered that gastronomic tourism is every journey that is at least partly motivated by the interest in food and drink or consumption of food and drink. Gastronomic tourism can also be viewed as a subset of cultural tourism (the cuisine is part of the culture) (Kalenjuk et al., 2011).

Gastronomic tourism is also defined as the activity of researching and discovering culture and history through food, which influences the creation of unforgettable experiences (Kalenjuk et al., 2015). Regions in which technological waves and globalization have not significantly affected changes in the way food and beverage production, but also the culture of their consumption have become favourable for the development of a selective form of tourism known globally under the names of food and beverage tourism, culinary tourism, gastronomic tourism, gourmet tourism (Hall, Mitchell, 2002). Gastronomic tours, arranged to introduce a region's dishes and food culture which plays an important role in the selection of and the experience tourists can have in a region, can feature a region (Sormaz, 2016, p. 728). Gastronomic tourism, in which focus is the local cuisine of the destination as the primary attraction, is one of the relatively small niches in modern tourism. This type of tourism offers a holistic experience that includes various factors, such as atmosphere, price and quality, which are also the determinants of consumer satisfaction (Correia et al., 2008). The culinary tourism experience has been noted as having multiple valuable effects on the territory and its products, such as increased awareness, loyalty, emotional connection, increased involvement and brand differentiation (Mason, Paggiaro, 2012, p. 1330). Gastronomic tourism is a niche of tourism that has grown rapidly, so it represents a new opportunity in a market that can enhance the attractiveness of the destination without introducing some new major products.

Gastronomic tourism is a possible competitive advantage and can be an essential element in branding the country or region. A clearly defined gastronomic identity and heritage can be exploited in the key processes of differentiation and rejuvenation, helping to convey a unique sense of place (Fox, 2007). Tourist spending can stimulate local gastronomy and be an instrument for improving agriculture and food production.

Gastronomic manifestations as a tourism product

Gastronomic manifestations or food events, sometimes called special or hallmark events, are fairs, festivals, cultural and industrial events that take place regularly or from time to time. Food-related festivals are an easy way to animate members of the local community, as well as visitors of all ages because of the great role which food plays in everyday life, and which is not only a factor of survival, growth and development, and performing daily activities, but also contributes to better quality of life (Kostić, Petrović, 2015). The food and drink manifestations include all manifestations that are associated with, of course, food and drink, or making and selling some traditional gastronomic recipes of a particular area or presenting local drinks like wine and brandy.

Numerous food manifestations have appeared around the world, with growing interest in gastronomic tourism, becoming a very interesting form of recreation and tourist attractions. The destination can be further promoted, such as the destination for wine tourism by the development of wine manifestations (Wargenau, Che, 2008). Local food provides a gateway into a destination's intangible heritage (Björk, Kauppinen-Räsänen, 2014, p. 298). Food festivals are a great opportunity for the destination for many reasons. For food and wine producers, these festivals provide a cheap and sometimes profitable way to promote brands to new consumers and provide opportunity to interact with consumers as well as their feedback. For tourism destinations, gastronomic and wine manifestations are a chance to gain awareness about regional brands, promote the region to which a certain type of gastro-product is related, but also a reason for re-visits to a particular region (Vukić, 2015, p. 128).

Gastronomic manifestations as a subtype of cultural events are of particular importance, enriching the tourism offer, which can extend the tourist season, protect and enhance cultural values of destinations. Gastronomic manifestations attract a large number of visitors, both domestic and foreign tourists (Čatić, 2016, p. 47). The accompanying manifestations are expositions (arts, old mechanization, new agricultural machines and tools), sports competitions, entertainment programs, folklore evenings, agricultural conferences, etc.). Manifestations can be included in the package of arrangements of some tour operators or travel agencies, whether it is a manifestation within the borders of the state for which the package arrangement was created or organizing a trip to another country to attend a particular event (Vrančić, 2016, p. 31).

Manifestations can contribute to the completion of the tourism product of rural tourism. The importance of rural tourism is reflected in the very important interaction of agricultural production, traditional agricultural food products, presentation of tradition, traditional gastronomy and tourist services (Cvijanović, Ružić, 2017, p. 33). The process of identifying events and creating an integrated rural tourism product should be implemented by the local community together with local tourism organizations, with the strategic and financial support of government and local institutions, taking into account that the state should create a desirable environment for the promotion of a particular concept of development (Radović et al., 2012). Traditional food is the reason

for the loyalty of tourists and affects positively the development of a rural destination (Vujko et al., 2017, p. 477). At the same time, gastronomic experiences can add value to tourism by providing a link between local culture, landscape and food, and creating an atmosphere that is so important for an unforgettable vacation experience (Hjalager, Richards, 2002).

Manifestations strengthen the image and recognizability of the place as a gastronomic destination. The aim of this event, apart from publicity and achieving economic results, is primarily the introduction of a society with products of the local population, autochthonous gastronomy and tradition (Štimac, 2016, p. 41). Numerous marketing instruments can be used to promote events in Serbia. The creation of logos and slogans of the manifestation, the production of informative material and their distribution, advertising, sponsorship and support of events, presentations at specialized tourism fairs, the Internet as a form of communication with potential visitors of the event are just some of them.

Potentially attractive for tourist visits are also events dedicated to the culinary heritage of the Serbian population, that is, gastronomy. In one part of the scientific expert public, the media, and other public opinion, this type of manifestation is often called "ijade". By this approach and the name, these manifestations are often disdained and underestimated and their significance is reduced (Bjeljac, 2010, p. 96). There are a vast number of gastronomic festivities that are considered to be an important part of the tourist offer of destinations or even regions in Serbia (Bjeljac et al., 2016, p. 16). Every region in Serbia has some gastronomic product that is a trademark and by which local tourist organizations try to attract guests. In November 2011, the Tourism Organization of Serbia presented a brochure "Soul Food" written in English at the Tourism Fair in Berlin, featuring gastronomic products by region. This is yet another step forward in presenting the rich offer of national dishes and drinks that Serbia has abundantly. With this kind of marketing, it can be expect a greater interest of foreign tourists who will decide to spend part of their vacation in the rural areas of Serbia and enjoy traditional dishes and drinks (Stojanović, 2013, p. 39).

Quantitative analysis of gastronomic manifestations in the tourism offer of Serbia

Based on the publication "Events 2017", issued by the National Tourism Organisation of Serbia, which includes tourist events, fairs, cultural, sports, business and other events, organized with various reasons and with various contents and which enrich the tourist offer of Serbia, quantitative analysis of gastronomic manifestations in the tourism offer of Serbia is conducted.

According to the events calendar, a total of 817 events was scheduled during 2016 in Serbia. In 2017, this number is higher and amounts to 829 manifestations (National Tourism Organization of Serbia, 2017). Based on the analysis of the calendar, it can be highlighted the fact that in Serbia there are currently 241 gastronomic manifestations, where food is the main motive of manifestations or appears as additional content.

When organizers of manifestations are observed, they can be divided into 7 groups (*Table 1.*).

Table 1. Organizers of gastronomic manifestations in Serbia

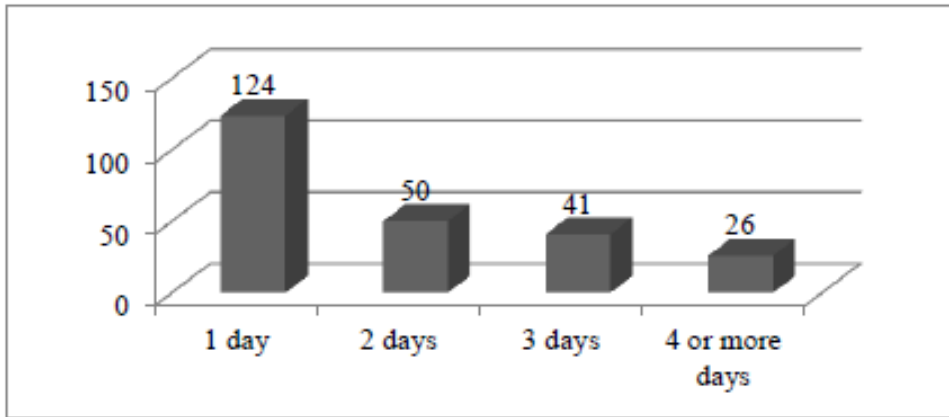
Organizers	Manifestations	
	Number	Share
Citizens' associations	17	7%
Tourism organizations, municipalities, offices for tourism	93	39%
More organizers (tourism associations, various clubs and societies, tourist organizations and companies)	12	5%
Associations, organizations (associations of beekeepers, livestock farmers, winemakers, bakers)	30	12%
Cultural centres	21	9%
Local communities	20	8%
Fairs and festivals (Belgrade fair, Šumadija fair, wineries, cultural network, Novi Sad fair, cheese festival)	15	6%
Others (tourist agencies, tourist companies, tourist-sports centres, chambers, schools...)	33	14%

Source: National Tourism Organisation of Serbia, 2017

The largest number of gastronomic manifestations in the tourist offer of Serbia is organized by tourism organizations (39% of the total number of manifestations, or 93), followed by other organizers, with 14% and 33 manifestations. Various associations and organizations, with 12% and 30 events are at the third place. Following are cultural centres with 9% or 21 manifestations, local communities with 20 manifestations which make up 8%, citizens' associations with 17 events - 7%, fairs and festivals make up 6%, or 15 manifestations and the least number of events (5% or 12 manifestations) is organized by groups that make up more organizers.

When the duration of manifestations is analysed (*Graph 1.*), the most are those that last one day. There are 124 one-day gastronomic manifestations in Serbia, which is 51% of the total number of manifestations. They are followed by two-day ones (50 manifestations, or 21%). The following are three-day manifestations (41 manifestations, or 17%). The least number of manifestations, only 26 manifestations or 11%, lasts for four days or more (mostly fairs and grape harvesting).

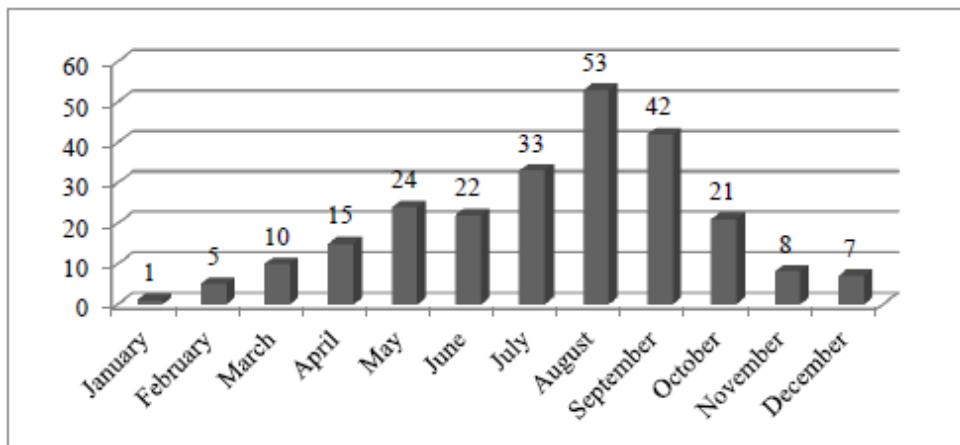
Graph 1. Duration of gastronomic manifestations in Serbia



Source: Authors' presentation based on National Tourism Organisation of Serbia, 2017

Gastronomic manifestations are held throughout the year, but mostly during the summer and autumn months (*Graph 2*).

Graph 2. Number of gastronomic manifestations in Serbia by months



Source: Authors' presentation based on National Tourism Organisation of Serbia, 2017

In order to perceive the potential link between the number of gastronomic manifestations and the number of tourists, a comparative overview of the number of gastronomic manifestations and the total number of tourists in the Republic of Serbia by months is given in *Table 2* (Statistical Office of the Republic of Serbia, 2017).

Table 2. Comparative overview of the number of gastronomic manifestations and the total number of tourists in the Republic of Serbia by months

Months	Number of manifestations	Tourist arrivals (in 000)
January	1	150.5
February	5	166.7
March	10	178.7
April	15	222.9
May	24	292.4
June	22	252.7
July	33	287.5
August	53	323.6
September	42	253.9
October	21	245
November	8	177.5
December	7	202.2

Source: National Tourism Organisation of Serbia, 2017; Statistical Office of the Republic of Serbia, 2017

Table 3 shows the calculated value of the correlation coefficient between the number of gastronomic manifestations and the number of tourists per months. Given the available size of the sample, Spearman's correlation coefficient of rank was chosen as an adequate indicator. This indicator belongs to a group of non-parametric indicators, whose application does not require the fulfilment of certain assumptions (first of all, the distribution normality) which requires the calculation of parametric indicators (Janković-Milić, 2016, 79).

Table 3. Correlation coefficient between the number of gastronomic manifestations and the total number of tourists per months

			Tourist arrivals
Spearman's rho	Number of manifestations	Correlation Coefficient	0.951(**)
		Sig. (2-tailed)	0.000
		N	12

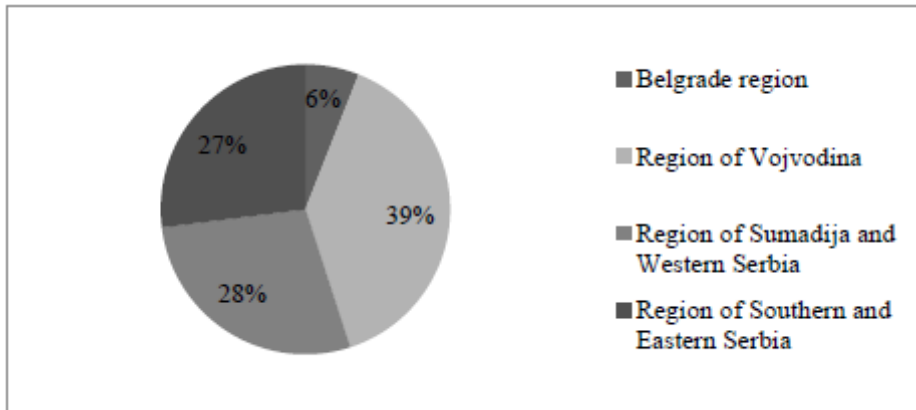
Note: ** Correlation is significant at the 0.01 level (2-tailed).

Source: Authors' calculation (SPSS Statistics 19)

Based on the calculated value of Spearman's correlation coefficient, it can be concluded that there is a high positive interdependence between the number of gastronomic manifestations in Serbia and the total number of tourists per months. The most visited months of the year are also the months in which the largest number of gastronomic manifestations is held.

According to the geographical schedule, observed by the statistical regions of the Republic of Serbia, gastronomic manifestations can be grouped into manifestations in Šumadija and Western Serbia, Southern and Eastern Serbia, Vojvodina and Belgrade. In the territory of Vojvodina, 39% of gastronomic events are organized from the total number, or 95 manifestations. In Šumadija and Western Serbia, 68 manifestations (28%) are organized, in Southern and Eastern Serbia, 64 manifestations (27%), while only 14 events are organized in Belgrade, or 6% (*Graph 3*).

Graph 3. Geographical schedule of gastronomic manifestations



Source: Authors' presentation based on National Tourism Organisation of Serbia, 2017

In order to perceive the potential link between the number of gastronomic manifestations and tourist visits of the region in Serbia, *Table 4* gives a comparative overview of the percentage share of the number of gastronomic manifestations and the total number of tourists in the Republic of Serbia by region (Statistical Office of the Republic of Serbia, 2017a).

Table 4. Comparative overview of the percentage share of the number of gastronomic manifestations and the total number of tourists in the Republic of Serbia by region

	Number of manifestations (%)	Tourist arrivals (%)
Belgrade region	6	33.2
Region of Vojvodina	39	16.2
Region of Šumadija and Western Serbia	28	36.2
Region of Southern and Eastern Serbia	27	14.4

Source: National Tourism Organisation of Serbia, 2017; Statistical Office of the Republic of Serbia, 2017a

Based on the review of the data presented in *Table 4*, it can be concluded that there is no interdependence between the number of gastronomic manifestations and the number of tourists by regions in Serbia. This is confirmed by calculating the Spearman's correlation coefficient in *Table 5*.

Table 5. Correlation coefficient between the percentage share of the number of gastronomic manifestations and the total number of tourists by regions

			Tourist arrivals
Spearman's rho	Number of manifestations	Correlation Coefficient	0.000
		Sig. (2-tailed)	1.000
		N	4

Source: Authors' calculation (SPSS Statistics 19)

The value of Spearman's correlation coefficient in Table 5 points to the absence of any interdependence between the number of gastronomic manifestations and the number of tourists by region in Serbia. Those regions that absorb the highest number of tourist arrivals are not the same regions in which the largest number of gastronomic manifestations are held.

Conclusion

Attractive and diverse natural environment, authentic gastronomy and cultural heritage, cities as tourist motives are great development opportunities of Serbia in designing tourist offer. In this, the role of manifestations is very important, which are often the only driver of social life in smaller communities. The number of events in Serbia is growing every year, but it is assumed that in the coming period, the number of manifestations useful for the development of tourism will be even greater. In the calendar of events, 829 events were presented in the tourist offer of Serbia for 2017. These are the more visited and manifestations of tradition. In practice, this number is higher because there are a large number of local events that do not have marketing support. Serbia has a favourable geographical position, which favours the development of manifestation tourism, both at the regional and international level. Also, a large number of foreign companies operate in Serbia, which have the opportunity to present their products and services at various gatherings, fairs and festivals. Events in Serbia are also recognized in the relevant strategic documents as tourism products of special importance for the tourism development, in the second place there are manifestations/events (cultural, sports, etc.), immediately after the tourism of cities. All this speaks in favour of the fact that Serbia has great potentials for the development of manifestation tourism.

Food can serve as a means of branding one country. Gastronomic manifestations, which are common in rural areas, are the true protectors of tradition and perfectly reflect the typical food and lifestyle of certain nations. Therefore, these manifestations are priceless in preserving traditional food, agriculture, old crafts, wealth of folklore, national costumes and folk festivities. Gastronomic events are a unique opportunity when visitors can enjoy the local specialities prepared in the traditional manner, as well as in traditional dance and music. Some manifestations attract more visitors than there are residents in the place of the event. A smaller number is of an international character,

which is also of greater importance because local food and drinks are presented to tourists who for the first time meet with Serbian tradition.

The basic question is whether Serbia is using its gastronomic wealth and the fact that such a small area offers so many different foods sufficiently. The results of the research in this paper pointed to the fact that the largest number of gastronomic manifestations in Serbia is organized in those months when the country attendance is the highest, that is, there is a positive interdependence between the number of gastronomic manifestations and the number of tourists per months. However, the second part of the analysis showed that those regions where most of the gastronomic events are organized are not the regions with the largest tourist traffic. According to this fact, the starting assumption of the research can not be considered confirmed. Realized tourist traffic in Serbia is not directly related to the number of gastronomic manifestations. The biggest problem in the popularization of gastronomic manifestations as a tourism offer is the lack of adequate policies and strategies for their development, insufficient promotion, insufficient investment and lack of interest of potential participants. For the development of manifestation tourism, it is also necessary to improve the tourist infrastructure and suprastructure. Also, support of travel agencies and tour operators is necessary, in the form of offer of tourist arrangements that organize visits to gastronomic events. With an adequate policy and strategy, gastronomic events can be the drivers of a successful development of manifestation tourism in Serbia.

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GASTRONOMSKE MANIFESTACIJE KAO FAKTOR UNAPREĐENJA TURISTIČKE PONUDE SRBIJE

Tanja Stanišić⁴, Marija Kostić⁵, Milena Mišeljić⁶

Sažetak

Pod uticajem globalizacije i masovnog nastanjivanja gradova i urbanih sredina, sve više se oseća nostalgija za tradicionalnim i ruralnim. Sve ovo ide u prilog razvoju manifestacionog i gastronomskog turizma i promociji autohtonih proizvoda i tradicije. Srbija je zemlja u kojoj živi veliki broj nacionalnih manjina, gde svaka od njih ima uticaja na gastronomiju podneblja. Kombinacija svih kuhinja i raznolikost tradicije učinili su srpska jela jedinstvenim. U turističkoj ponudi Srbije postoji veliki broj manifestacija čija su tema gastronomski proizvodi. Manifestacije, kao vid promocije određenog podneblja, postaju sve popularnije i brojnije. U radu su analizirane gastronomske manifestacije kao važan segment turističke ponude Srbije. Metode primenjene u radu su metod korelacione i komparativne analize. Rezultati istraživanja ukazuju na pozitivnu međuzavisnot između broja manifestacija i turističkog prometa u toku godine, dok nije uočeno postojanje međuzavisnosti između broja manifestacija i turističkog prometa po regionima.

Ključne reči: manifestacije, gastronomija, turizam

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HEDGING BY USING WEATHER DERIVATIVES IN WINTER SKI TOURISM

Bojan S. Đorđević¹

Summary

Tourism, as one of the main driving forces of economic development, is exposed to many risks. Besides frequent fluctuations in foreign currency exchange, prices of fuel and transportation, the tourism industry has become more sensitive to weather conditions lately. One of the new instruments which can be efficiently used for weather risk hedging is weather derivatives (forwards, futures, options and swaps on chosen weather variables - temperature, rain, snow, wind etc.).

In this paper, we will present the possibility of weather derivatives application in winter tourism - snowfall forwards - in order to hedge the business of ski lift operator company. Our research is based on snowfall data of Kopaonik mountain ski resort and revenues of ski lift operator company. We will show that weather derivatives might be an effective tool for hedging weather risk and reducing the volatility of companies' revenues in the winter ski tourism business in Serbia.

Keywords: *weather derivatives, weather risk, snowfall, hedging, winter ski tourism*

JEL: *C15, G1, Z33*

Introduction

The effects of climate changes and weather conditions on company's business results are increasing, and affecting a growing number of economic sectors. According to MunichRe Group (2000), over 80% of business activities on a global level are depending on the weather. Most affected sectors are energetics, agriculture, construction, transportation, and tourism (Bank, Wiesner, 2011; Zapranis, Alexandridis, 2013). The companies concerned are the ones that are highly sensitive to weather conditions and seasonality of their operations (Müller, Grandi, 2000a; 2000b). Tourism, as an economic sector, is very sensitive to all kinds of changes, of both economic and non-economic character (Becken, Hay, 2007; Agrawala, 2008). It is exactly the second type of change, the non-economic one, which is gaining importance lately (for example,

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safety risk, and climate change and weather risk). As emphasized by Simpson et al. (2008), besides increased exposure and sensitivity to various kinds of risks, modern tourism companies features higher fixed costs and lower profitability. Such structure makes them “slow” in accepting changes, vulnerable under the influence of different sets of risks and affecting the level of tourism service quality (Scott, McBoyle, 2007). Šperanda (2008) suggested that companies operating in tourism sector should eagerly acquire new knowledge and useful tools for risk management, such as, and currently available in our market, currency futures - forwards and swops, which can efficiently manage currency and interest risk.

Weather risk is a product of increasing climate changes, which effects we all feel. Extremely high or low temperatures, droughts and lack of rain, overflow of falls and floods, storms and hurricanes, definitely affect the business of the tourism sector companies. Business protection can be partly found at insurance companies, which cover only specific types of risk when paid compensation for damage in many cases compensates the partial loss. That is why, in order to protect or hedge the loss and reduction of product/service production caused by unfavourable weather conditions, weather derivatives are constructed, as a new tool for risk management (Russ, 2004). As Cao et al. (2004) and Brockett et al. (2005) pointed out, it is about weather risk which presents uncertainty in money flows and revenues as a consequence of *non-catastrophic weather conditions* (fluctuations in temperature, the quantity of precipitation - rain and snow, the speed of wind etc.). Edrich (2003) and Ali (2000) made a clear distinction between weather risk and other sources of risk. What is vital here, is that weather risk affects the quantity of demand and sales of certain products/services and not the price of those goods and services. It is all about so-called *volumetric* risk. The weather condition risk is highly geographically localized and it is not possible to control it. Considering the exposure to weather risk and possibility for hedging, Leggio (2007) concluded that companies usually decide to use weather derivatives in order to lessen the volatility of revenues and money flows, to cover and compensate expenses (companies - hedgers), but also to stimulate and enhance sales (making profits and earnings - speculators) (Đorđević, Đorđević, 2014). It is definite that the main motive for trading these derivatives is hedging, but Zapranis and Alexandridis (2013) also emphasized the inevitable motive for profit and existence of speculators, as an important segment of weather derivatives market.

Table 1. Connection between weather and financial risk

SECTOR	WEATHER VARIABLE	RISK
Power / Energy industry	Temperature	Lower sales during warmer winters and colder summers
Agriculture / Food Industry	Temperature / Rain / Snow	Low-yield and loss in periods of extremely low/high temperatures or rainfalls
Beverage producers	Temperature	Lower sales during colder summers

SECTOR	WEATHER VARIABLE	RISK
Construction	Temperature / Snow	Delays in work during bad weather conditions
Transport and Logistics	Temperature / Rain / Snow	Delays/transport cancellation
Tourism / Ski industry	Temperature / Snow	Reduced revenues during seasons with temperatures and falls below average
Municipality Government	Snow	Higher costs of snow removal from city streets when the falls are above average
Road Salt Companies	Snow	Lower incomes during seasons with weak falls

Source: Brocket et. al. 2005; Zapranis, Alexandridis, 2013.

Weather derivatives can be defined as future contracts (forwards, futures, options, swaps etc.) that are based on weather index on chosen weather variable (temperature, rain, snow, wind etc.) (Jewson, Brix, 2005; Hull, 2009; Lazibat et al., 2010). Weather index gains its value by quantification of recorded weather condition deviation from chosen reference point (weather station), where deviation calculation is based on real weather conditions observation for a certain period and where each level of divergence (for example 1°C, 1 mm of rain or 1 cm of snow) obtains its tick size (tick) (Jewson, Brix, 2005). Depending on type and position taken (buying or selling), the contract becomes valuable when the value of index falls or rises above strike level. This way, weather conditions turn into tradable goods (VanLennep et al., 2004; Veselinović et al., 2014). Like other financial instruments, weather derivatives are traded in the organized market - stock exchanges (standard contracts), but also out of the market (over the counter - OTC), in arrangement with traders - banks, insurance houses, hedge funds etc. (Marković, 2013; Đorđević, Đorđević, 2014). If the trade is in an organized market, then we are talking about futures, while forwards and swaps are usually traded in OTC. Weather options are present at both markets, and they usually contain chosen weather index in their bases. The biggest and most important weather derivative market today is American CME, while in Europe it used to be London market LIFFE, known today as ICE Europe.

Forward represents a simple contract which, at given time, arranges purchase and sale of certain assets at some future time point, where commitments are realized in the future, i.e. on a previously set date. One side (forward buyer) hedges from an eventual rise of assets price, while the other side (forward seller) protects from the fall of assets price (Hull, 2009; 2011). Forwards are not standardized contracts, which mean that they are traded on OTC markets, with the mutual agreement of both sides on all elements of the contract (contract price, maturity date). Basic motive for forwards trading is protection (hedging) from markets' risk and final delivery of assets on the set date. These contracts are not liquid, meaning that they cannot be re-sold, thus they are not speculative (Đorđević, Đorđević, 2013; 2014). Compared to other derivatives, forwards have both advantages

and disadvantages. They are very flexible because they are adjusted to both sides and have small transaction cost. Disadvantage refers to the absence of clearing house in the trade, so the risk of contract realization is growing. Also, if there is no margin (which is the case with futures), this type of contract exposes traders to credit risk (Golden et al., 2007). In case of weather derivative, forward would contain weather index in its base on certain weather variable (temperature, rain, snow, wind, frost etc.). On weather derivative market forwards usually appear in the form of swap contracts (Marković et al., 2012). Contractors would be obliged to set the elements for construction of weather forward precisely: weather index with variable, index unit value - tick, reference meteorology station - weather station, strike level, upper and lower limit - L_{lower} and L_{upper} , maximum pay off - *maxPayOff*, validity period, due date and margin, in order to lessen credit risk (for example 5-10% of contract value).

Today, weather derivatives represent a device in weather risk management, and their usage in the world is increasing, mostly in options trading. Since weather derivatives present general uncertainty in our region, apart from few works on the subject of their application in agriculture, this paper aims to show the possibility of hedging by applying chosen weather derivatives (snowfall forward) in winter ski tourism, on an example of ski lift operator in Kopaonik.

The paper is structured as follows: in section 2, we define the problem and the aims of our research. In section 3 we give an overview of most significant research results on the subject of weather risk management and derivatives application in winter ski tourism, ski resorts and ski lift operator business. In section 4 we present research methodology, data collection and results. In this section, we represent analyses of hedge effectiveness when forwards are applied to snowfall index (weather snowfall forward) in ski lift operator business in Kopaonik mountain. Eventually, section 5 gives conclusions and recommendations for future research.

Defining research problem and aims

Ski season in Kopaonik ski resort lasts from December until the end of April (winter ski season). In that period ski resort, that is ski lift operator, makes a major and most significant share of its incomes from ski tickets sales and ski lift operations. During a winter season, when the profits are the highest, the quantity of snowfalls and height of natural snow on ski tracks is of great importance, excluding artificial snow systems, which efficient work depends on the temperature (it takes from at least $-2,5^{\circ}\text{C}$ up to -5°C for snowmaking system to work efficiently). Due to climate changes, which in our case can be summed up to extreme weather (un)conditions (insufficient or overflowing snowfalls), the exposure of ski resorts and their income to weather risk is growing. In order to ensure their business and protect (hedge) from potential losses, ski operator can use weather derivative with weather index on snowfalls in their base. World markets (for example CME) offer monthly and seasonal weather derivatives (forwards, futures, options, and swaps), which appear in both organized (standardized contracts) and OTC markets. In weather-sensitive and seasonal industries, such as tourism, monthly and seasonal *optional* contracts on

various weather variables (temperature, falls - rain, snow, frost etc.) are widely used. In winter tourism, dominant weather variable is snowfall quantity in ski season, although we shouldn't neglect temperature and wind, on whose index base ski resorts can also trade.

In this paper, we presumed that the quantity of snowfall highly affects incomes from ski tickets during the winter ski season at Kopaonik mountain. Ski lift operator (in our case JP Skijališta Srbije) wants to ensure (hedge) its business and ski ticket sales profits from weather risk of insufficient snowfall during the season (*financial hedging*), without taking into consideration existing artificial snowmaking system, so that *operational hedging* is not considered. Let us assume that weather derivatives on a quantity of snowfall are available at OTC market. Ski lift operator chooses weather forward, or *seasonal snowfall index* forward, to be more precise. Snowfall quantity data is gained from Kopaonik weather station, which is settled in Sunčana dolina (Sunny Valley) so that *geographical basis risk* is avoided, while the inclusion of *basis risk* will depend on a correlation of weather index with snowfall and ski ticket sales revenue. Basis risk will be included as the most important element of snowfall forward hedging effectiveness, as a coefficient of simple linear regression of income value and snowfall weather index (Castelino, 1992; Rohrer, 2004).

When evaluating weather forward, we will use the simplest and at the same time efficient method for price setting - method of *historical simulation*, which is based on historical data of Kopaonik snowfall for the past 10 years. As Hnilica (2007) ascertained, a method of historical simulation represents a simple model for weather derivative evaluation and a base for further statistical analyses, with the assistance of appropriate software (Crystal Ball, for example).

Therefore, we have two goals: firstly, we want to show that there is a statistically significant connection between snowfall and ski lift operators' income, and secondly, we'd like to analyze forward implementation effect in hedging weather risk and reduction of weather risk in ski lift operators' business at Kopaonik.

Literature review

The largest number of weather derivatives implementation research is found in the agriculture sector, while in tourism that is not a case. Researching winter ski tourism, most researchers focused on basic questions of climate changes and snowfall influence on tourism companies business and tourists' behaviour. Thus, researching the connection between lack of snow, skier's activities and ski ticket sales in winter resorts in Switzerland, Austria and Slovakia, certain authors came to conclusions about statistically significant influence of snowfall and weather conditions on ski ticket sales and activity of skiers on the tracks (Shin et al., 2009; Toeglehoher et al., 2011). In his research on activities of domestic and foreign visitors of winter resorts, Falk (2013) discovered significantly higher sensitivity of domestic visitors to weather condition changes in relation to foreign tourists, which led to different behaviour and activities on ski tracks. Toeglehoher et al. (2012) presented a new model for measuring weather risk and business sensitivity to weather conditions – Weather-VaR. Their research was

based on 20-year snowfall data and ski centre Kitzbuehel (Austria) operations, which led to conclusions about significant possibilities of VaR methodology application in weather risk management.

The most important (and available) research results of weather derivative application in winter tourism are gained from examples of ski resorts in Austrian and Italian Alps. Bank and Wiesner (2011) looked into the possibility of efficient weather derivative application in Austrian winter centres. Interviewing 61 ski lift operators, they got results of significant possibilities of derivative application, in order to reduce the lack of natural snow risk and protect themselves from business loss. Piovani et al. (2012) and Sileo (2012) analyzed weather derivative application and hedging efficiency implementing weather put option in ski operator business in winter centre Andalo in Italian Alps. Referring to methodologies suggested by Beyazit and Koç (2010; 2012), based on data from a ski center in Turkey, they constructed parameters, defined the most suitable model to determine the price of selling option, and established significant possibilities to apply options in order to reduce risk from ski resorts revenue decline, due to the lack of natural snow. Given results were affirmed by Franzoni and Pelizzari (2016). Tang and Jang (2012; 2016) in their works constructed and presented snowfall forward as an efficient instrument for ski resort business hedging, calculating hedge effectiveness. Named authors emphasized the importance of *geographical basis risk* as the most significant derived element of derivative which highly affects the effectiveness of forward hedging, but only when the construction of multiple property resorts is in question (in order to construct one unique derivative, so-called *basis derivative*, Skijališta Srbije would need snowfall data and business data for Kopaonik, Zlatibor, and Stara Planina ski resorts). As Castellino (1992) and Rohrer (2004) pointed out, basis risk is the most significant data in the construction of a weather hedge. Analyzing geographic, calendar and production basis risk, they concluded that given basis risks are much more important than correlation coefficient, but only in case of a spatial distance of hedged locations and meteorological stations (Considine, 2000; Golden et al., 2007, Yang et al., 2009).

Based on formerly presented studies, it is evident that all researchers emphasize the significant influence of weather variables (snowfall) on business results of world's ski resorts, as well as positive results of derivative's hedging. Since these kinds of studies haven't been conducted in our region so far, it is our task to ascertain to what extent ski centre's business depends on snowfall quantity, to present weather derivative as a new risk management tool and to measure the effectiveness and efficiency of chosen derivative hedging.

Research methodology and results

To investigate the possibility of efficient weather risk derivative hedging, we must go through several steps: 1. Weather index determination (snowfall index - *SFI*), 2. Investigation of ski resort revenue dependence on tickets sales based on snowfall quantity (regression and correlation analyses, autocorrelation test and test of heteroscedasticity), 3. Construction of chosen weather derivative (weather snowfall forward), and 4. Evaluation of snowfall forward hedging effectiveness.

Weather index determination

In our research we will use cumulative snowfall index – *CumSFI*, corresponding to the sum of overall monthly falls during winter skiing season at Kopaonik (1st December – 30th April). We generate *CumSFI* as follows:

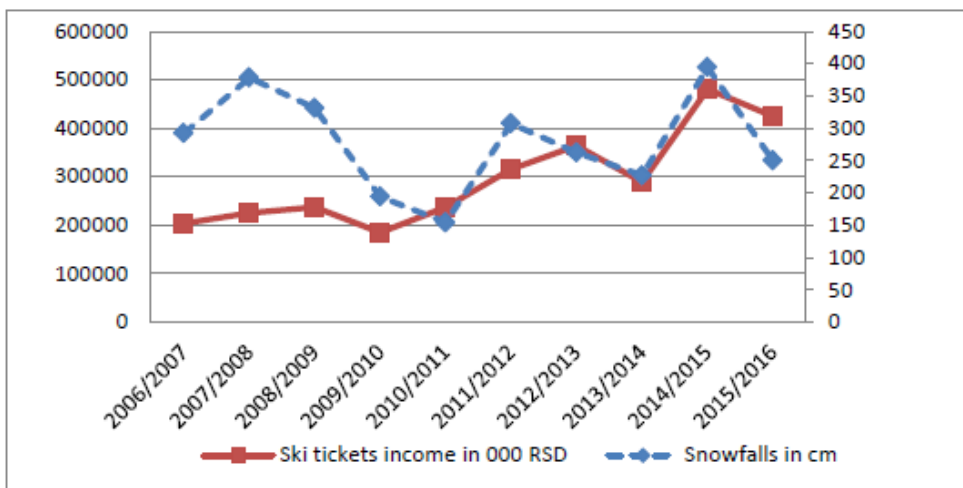
$$CumSFI = \sum_{t=1}^x y_t$$

Where we have

- x – length of cumulative period (1st December - 30th April)
- y_t – quantity of snowfalls on day t

In order to calculate weather index, we need data about snowfalls measured at Kopaonik. Historical daily data are gained from RHMZ Serbia measuring station Kopaonik at Sunny Valley, for the 1997-2015 periods. Since companies prefer season contracts when trading weather derivatives, we would need data about the quantity of snowfall for certain winter seasons. The contracts that cover the period from 1st November till 30th April are most traded on the markets. In this work, we will use the overall snowfall quantity in winter seasons (2006/2007 - 2015/16), which in our case represent season cumulative indices *CumSFI* for Kopaonik ski resort. Named period of 10 winter seasons has been chosen because this period had available data about income generated from ski tickets sales in given ski resort, which is Kopaonik ski operator. Cumulative index *CumSFI* presents overall snowfalls data in five months period (December - April). Snowfalls, as well as ski resort monthly income from ski tickets in November, are excluded because ski resort opens from 1st December. Snowfalls and incomes from ski tickets are shown in Figure 1.

Figure 1. Snowfalls by ski seasons and ski tickets incomes of ski operating company



Source: Author

Regression model and standard assumption model review

Analyses of those two separate variables (snowfall quantity as an independent variable – x , and the amount of ski lift operator's revenue generated from ski tickets, as a dependent variable – y) connection are based on simple linear regression model and equation:

$$y = a + \beta x + \varepsilon$$

Where is:

a – constant of model

β – evaluation of regression coefficient with independent variable x (quantity of snowfalls)

ε – residual of model

Model is based on results of data analyses published in reports on ski tickets sale in winter centre Kopaonik, as well as on report of referent meteorological station in Sunny Valley on snowfalls for season 2006/07 up to 2015/16. Data are given on monthly level for December, January, February, March and April.

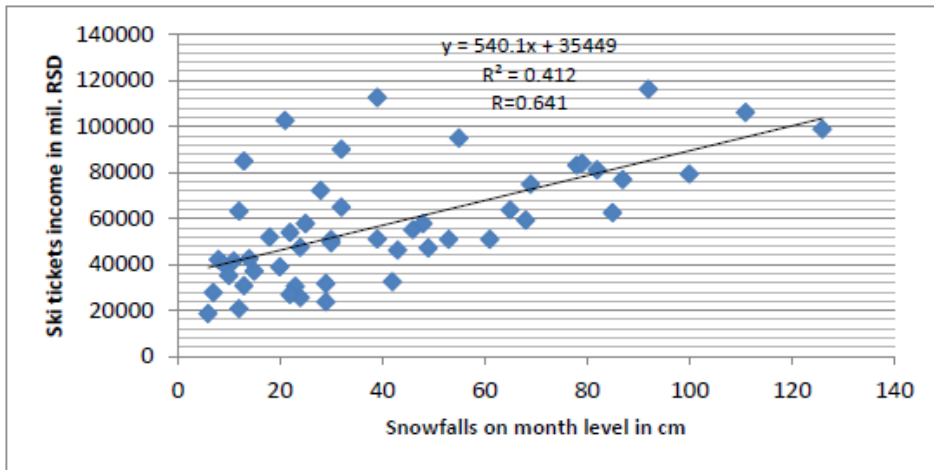
Coefficient β is the most important parameter for us because it shows the change of dependable y (ski resort income from ski tickets sales) when the independent x (quantity of snowfall) changes per 1 unit, that is 1 cm. The value of this coefficient will be of importance when constructing weather derivative, i.e. determination of its tick size.

Evaluation of set regression model will be reliable only if standard assumption model is fulfilled. Otherwise, the evaluation of regression coefficient would be biased. That is why it is necessary to examine several assumption models. The first assumption that needs to be fulfilled is testing residual homoscedasticity and heteroscedasticity. We will use *Breusch – Pagan / Cook – Weisberg test*. It is assumed that residual variance is constant (H_0). The result $Prob > \chi^2 = 0.423$ is telling us that model has no expressed heteroscedasticity, that is, there is no significant difference of random error variances.

The second assumption is related to residual autocorrelation. We use *Durbin – Watson test (DW)*. At significance level $\alpha = 0.05$ and observation number $n = 50$, with one regression variable, we have limit table values $d_l = 1.503$ and $d_u = 1.585$. Based on carried out *DW* test we gained autocorrelation coefficient $d = 1.009 < d_l = 1.503$. We reject H_0 and conclude there exist a positive residual autocorrelation. In order to remove autocorrelation, we have implemented *Cohrane – Orcutt* model. The result is the transformed value of *DW* test ($d = 1.625 > d_u = 1.585$), thus we accept H_0 and conclude that autocorrelation in the model has been removed.

Gained coefficient evaluation forms final regression model of the influence of snowfalls on ski lift operator's ticket sale sincome. The results gained by regression and correlation analyses are shown in Figure 2. and in Table 2.

Figure 2. Snowfall and ticket income regression and correlation coefficient



Source: Author

Table 2. Monthly results of statistical analyses for winter seasons 2006-2016.

	<i>December</i>	<i>January</i>	<i>February</i>	<i>March</i>	<i>April</i>	<i>Season</i>
Snowfall	203*	383	614	636	310	214.6
Mean	20.3	38.3	61.4	63.6	31	42.92
St.dev.	9.821179	24.21226	34.59672	29.71045	20.72572	97.01569
Variance	96.45556	586.2333	1196.933	882.7111	429.5556	9412.044
Income						
Mean	50861.8	60766.5	71198.9	74000.1	31872.2	288699.5
St.dev.	17419.12	24246.92	26519.35	22587.72	12520.33	92157.44
Variance	3.03E+08	5.88E+08	7.03E+08	5.1E+08	1.57E+08	8.49E+09
ρ	0.075873	0.813872	0.701831	0.58885	0.884855	0.6418

Source: Author

Note: *CumSFI in cm

Evaluating regression and correlation analyses results, we can conclude the following: determination coefficient $R^2 = 0.4119$ (adjust R square = 0.3997) is leading us to a conclusion that 41.19% of the overall variability of ticket income is explained by snowfall quantity. The remaining 58.81% is not explained by regression and is influenced by unidentified factors. Correlation coefficient $R = 0.6418$ indicates directly expressed linear stochastic relation between snowfall and ticket income. Finally, we can present linear regression equation of snowfall and ticket income connection $y = f(x)$:

$$y = 540.145x + 35448.56 + 19726.88$$

The most significant data in Table 2. are standard deviation and variance of snowfall and incomes during given months, which present a measure of risk, i.e. ski resort weather risk income volatility. We can see that highest values of standard deviation are achieved for January, February, and March when ski resort generates most of its income. This

is the most important information for ski resorts when it comes to decision making about contracting certain monthly derivative in order to hedge, regardless of its type (forwards, futures or options).

Construction of weather snowfall forward

Let us assume that ski lift operator wants to hedge from the lack of snowfall. For this purpose, weather forward on snowfall index is arranged, with strike level $SL = 214.6$ cm of snow. Ski lift operator holds a short position in this contract. The payoff is expected in case that $CumSFI < SL$, i.e. $(SL - CumSFI) \times T$.

The other contractor, let's say an insurance house, for example, holds a long position and any snowfall quantity bigger than SL (214.6 cm) is in order since the house will be expecting a payoff in the value of $(CumSFI - SL) \times T$.

Weather forward value is gained through the following formula (short position):

Where is

- SL – strike level
- $Cum SFI$ – cumulative snowfall index
- T – tick value (weather index unit value in money)
- e^{-rt} – discount factor
- r – interest rate (interest rate on capital markets in Serbia – 4%)
- t – maturity period (5 months)

The weather index unit value T is gained based on regression equation coefficient and snowfall average in given time. Mathematical calculation shows $T = 11.000$ € / cm of snowfalls. Since the trading takes place on OTC market, we assume that both buyer and seller of weather forward agreed on the T money value.

Basic elements in the construction of weather forward are weather index ($CumSFI$), the weather index unit value in money (tick – T), strike level (SL), maturity period – t , interest rate – r , and reference climate point or measuring station. Since forwards are traded on bilateral, OTC market, it is up to contracting parties (buyer and seller) to agree upon all named elements. In this case, there is a possibility of arranging a monthly, several months or seasonal forward on snowfall. Depending on the maturity period (monthly or season), we get strike level SL , which presents snowfall average for a certain period (*Mean*). The elements of weather forward are shown in Table 3.

Table 3. Basic elements of seasonal and monthly snowfall forward of Kopanik ski resort

Weather Snowfall Forward		
Type of contract	<i>OTC Seasonal Forward</i>	<i>OTC Monthly Forward</i>
Weather index	<i>Seasonal CumSFI</i>	<i>Monthly CumSFI (February)</i>
Meteorological station	<i>Kopaonik Sunny Valley</i>	<i>Kopaonik Sunny Valley</i>
Time	<i>5 months</i>	<i>1 month</i>

Tick value	11.000 €/cm	11.000 €/cm
Strike level	214.6 cm	61.4 cm
PayOff limit*	214.6 cm	61.4 cm
Interest rate	4%	4%
MaxPayOff	2.32 mil.€	672.700 €

Note: * In our case, payoff limit is at strike level. In bilateral OTC contracts, it is possible to arrange both upper and lower payoff limit, which is mostly the case with weather swaps. In such case, lower and upper limit would be set $SL \pm \sigma$ (st.dev.)

Hedging effectiveness evaluation

Hedging effectiveness - HE, is evaluated based on several elements: 1. Revenue value without hedging - $VR_{UNHEGDED}$, 2. Value of hedged revenue - $VR_{HEDEGED}$, 3. Hedge ratio - h , 4. Strike level - SL , and 5. Value of payoff - *PayOff*. Those elements are gained based on following equations:

$$VR_{HEGDED} = VR_{UNHEGDED} + PayOff$$

$$PayOff = h \times (SL - CumSFI)$$

Hedge ratio - h or optimum indicator of hedger minimum variance, i.e. ski resort, is gained by following formula (Hull, 2011; Rao, Thakur, 2008, Gupta, Kaur, 2015):

$$h = \rho$$

Where is

ρ – correlation coefficient of income change ΔR and snowfall change ΔS ($\rho=0,30$)

$\sigma_{\Delta R}$ – standard deviation of snowfall quantity change ($\sigma_{\Delta S} = 35,37$)

Hedging effectiveness is gained on the base of formula (Ederington, 1979; Tang, Jang, 2012, Gupta, Kaur, 2015):

$$HE = 1 -$$

Results of weather forward hedging effectiveness for the past 10 winter seasons at Kopaonik are shown in **Table 4**.

Table 4. Hedging effectiveness using weather snowfall forward

Ski season	CumSFI	Unhedged Revenue (million €)	PayOff	Hedged Revenue (million €)
2006/07	180	1.776	0.066	1.842
2007/08	222	2.105	-0.014	2.090
2008/09	251	2.156	-0.069	2.086
2009/10	145	1.462	0.133	1.595
2010/11	77	1.749	0.264	2.013
2011/12	332	2.942	-0.225	2.717
2012/13	304	2.808	-0.171	2.673

Ski season	CumSFI	Unhedged Revenue (million €)	PayOff	Hedged Revenue (million €)
2013/14	88	1.986	0.243	2.229
2014/15	356	3.895	-0.271	3.624
2015/16	191	3.175	0.045	3.220
Mean - μ	214.6	2.4054	4.16E-18	2.4089
St.dev. - σ	97.01569	0.767866	0.18595	0.639261
Variance - σ^2	9412.044	0.589618	0.034577	0.408655
Hedge Ratio - h				0.00192
HE				0.308 (30.8%)

Source: Author

Analyzing basic financial business results we'll be given a more comprehensive view of economic-financial effects of trading forward in ski resort operations, including variable costs - V_c , cover margin or ski ticket income - M_{ps} . The effects on ski resort operations are considered in cases VR_{HEDGED} and VR_{UNHEDGED} . Relations are as follows:

$$Mps = VR - Vc$$

$$Mps^{\text{UNHEDGED}} = VR_{\text{UNHEDGED}} - Vc$$

$$Mps^{\text{HEDGED}} = VR_{\text{HEDGED}} - Vc$$

Obtained results are shown in **Table 5**.

Table 5. Hedge effectiveness and risk reduction with variable costs

Ski season	CumSFI	VR_{UNHEDGED} (million €)	VR_{HEDGED} (million €)	V_c	Mps^{UNHEDGED}	Mps^{HEDGED}
2006/07	180	1.776	1.842	0.736	1.04	1.106
2007/08	222	2.105	2.090	0.627	1.478	1.463
2008/09	251	2.156	2.086	0.420	1.736	1.666
2009/10	145	1.462	1.595	0.720	0.742	0.875
2010/11	77	1.749	2.013	0.853	0.896	1.16
2011/12	332	2.942	2.717	0.665	2.227	2.052
2012/13	304	2.808	2.673	0.633	2.175	2.04
2013/14	88	1.986	2.229	0.734	1.252	1.495
2014/15	356	3.895	3.624	1.120	2.775	2.504
2015/16	191	3.175	3.220	1.768	1.407	1.452
Mean - μ	214.6	2.4054	2.4089	0.8276	1.5728	1.5813
St.dev. - σ	97.01569	0.767866	0.639261	0.375634	0.652695	0.497878
Variance - σ^2	9412.044	0.589618	0.408655	0.141101	0.42601	0.247882
Hedge Ratio - h	0.00192					
HE	0.308 (30.8%)				0.420 (42%)	

Source: Author

Table 5. shows that with use of forward, there is evidently significant reduction of hedger's (ski lift operator) exposure to weather risk. For *CumSFI* ranging from 77 cm

up to 356 cm snowfall, standard deviation (σ) and variance (σ^2) of net ski ticket income are reduced by 23.77 %. If we observe results based on net ski ticket income – Mps , the results of hedging are even better – we can note hedge effectiveness rise by 39%. We can say that obtained results are in accordance with recent results of derivative hedge effectiveness research in European ski centres (risk reduction and ski ticket income volatility decrease by 28%) (Leggio, 2007; Tang, Jang 2012; Sileo, 2012).

If we look at the variable costs values – V_c , we can see higher values next to $CumSFI$ lower values. The explanation lies in greater use of snowmaking system, which the ski lift operator is using if there is the lack of natural snow. According to Kopaonik ski resort, an optimum level of snow on the ski track is 30 cm for daily use, with a maximum temperature of $-2,5^{\circ}\text{C}$ needed for efficient system operation. For example, during 2007/08 season, Kopaonik ski resort made 300.000 m^3 of artificial snow (average of 33cm of snow on the tracks) with costs of 20,00 RSD/ m^3 (6,6 million RSD). If we have in mind that $CumSFI = 222\text{cm}$ in that season (more than the historical average of 214.6 cm), we can conclude that ski resort was forced to use snowmaking systems during certain periods, which affected the growth of V_c .

Conclusion

We have presented seasonal weather forward as a new and efficient tool for weather risk financial hedging. Our research was focused on analyses of a possible implementation of snowfall forward in ski lift operator business at Kopaonik mountain ski resort, in order to reduce the lack of snowfall risk and ski ticket income volatility decrease. Using basic techniques of risk management we can achieve more than expected ski ticket income hedging effectiveness by over 40%. Considering the fact that companies have a different understanding of risk and aversion to risk, this paper presents in what way and with what kind of hedging strategies (short and long hedge) tourism companies can control such risk. In our example, we used the dominant variable for winter ski tourism – snowfall, but we must also emphasize the possibility of using a temperature-based index derivative, which can be of importance for ski centre operative hedging, i.e. for snowmaking system.

This research is based on weather snowfall forward as basic and most simple future contract. Besides its advantages, we must point out some operational flaws of forward, which are reflecting in higher level of credit risk, insufficient liquidity (not transferable) and difficulties to find the other partner in OTC trading. Therefore, tourism companies have liquid contracts, such as futures and options, available, both standardized (exchange-traded derivatives) and in OTC market. The stock exchange is offering contracts which are monthly and seasonal. In this paper, besides seasonal, we have shown monthly digression of snowfall index and incomes, which make a basic data for the potential choice of weather derivative and construction of the same.

Given results are the foundation for further exploration of possibilities and effectiveness of weather derivatives application in winter ski tourism in Serbia. Since there haven't

been any researches of this kind, author's intention was to explore the options of implementation and weather option effects in Kopaonik ski resort in a future period, as well as in other ski resorts – Zlatibor and Stara Planina. This will enable an overview of geographic diversification – *geographical basis risk* and construction of weather basis derivative, based on chosen contract – forward, future or option. It is up to companies in winter tourism sector to keep track of new discoveries, inspect all possibilities and be prepared for timely reaction in terms of greater exposure to different kinds of risk. They already have different strategies of financial and operative hedging at their disposal.

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HEDŽING PRIMENOM VREMENSKIH DERIVATA U ZIMSKOM SKI TURIZMU

Bojan S. Đorđević²

Sažetak

Turizam kao jedna od glavnih pokretačkih snaga ekonomskog razvoja, izložen je mnogim rizicima. Pored čestih fluktuacija deviznih kurseva, cena goriva i transporta, turistička industrija postaje sve osetljivija na vremenske prilike. Jedan od novih instrumenata koji se mogu efikasno upotrebiti za hedžing vremenskog rizika jesu vremenski derivati (forvardi, fjučersi, opcije i svopovi na izabrane vremenske varijable - temperatura, kiša, sneg, vetar itd.).

U ovom radu predstavljamo mogućnost primene vremenskih derivata u zimskom ski turizmu - forvarda na snežne padavine - da bi se hedžovalo poslovanje ski lift operatera. Naše istraživanje bazira se na istorijskim podacima o snežnim padavinama na planini Kopaonik i prihodima ski lift operatera. Pokazaćemo da vremenski derivati mogu biti efektan alat za hedžing vremenskog rizika i smanjenje volatilnosti prihoda kompanija u zimskom ski turizmu u Srbiji.

Ključne reči: *vremenski derivati, vremenaki rizik, snežne padavine, hedžing, zimski ski turizam*

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THE IMPACT OF RELEVANT FACTORS ON WHEAT SUPPLY AND DEMAND IN THE REPUBLIC OF SERBIA

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Summary

The aim of the study is to conduct the wheat balances analysis, to research the supply and demand in the domestic market, and to examine the partial impact of the relevant factors on the supply and demand. The the research results of wheat production and trade flows can contribute to the increase of supply and to the structural changes in production, the strengthening of competitiveness, the increase of trade exchange, improvement in production and processing, new investments, higher employment rate, and so on. The methods used in the research are the wheat balances analysis, the functional and correlation analysis (the functional correlation analysis), the variance analysis, T-test, as well as other general methods. The results of the wheat production and consumption balances analysis indicate the existence of surplus and potential for export of an average of 805.29 thousand tons with a trend of increase after 2013. The impact of production, initial stocks, imports, and purchase prices on wheat supply is high ($R = 0.99$). The impact of consumption, sales prices, income, exports, and final stocks on wheat demand is high ($R = 0.95$). By analyzing the correlation coefficient of wheat production and supply, a coefficient of 0.96 was obtained, while for the wheat consumption and demand the obtained coefficient was 0.82, which indicates high correlation dependence. In the period 2000-2016, the export of wheat was increased 8.7 times along with the increase in price per kg and the total export value.

Key words: *supply, demand, export, wheat, wheat balances analysis, correlation dependence.*

JEL: *C21, L11, Q13.*

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Introduction

The agricultural policy of the Republic of Serbia gives special importance to wheat, primarily for the purpose of the nutrition of the population or food self-sufficiency, increasing the use of wheat as industrial raw material, and as an export potential.

Wheat production is primarily oriented towards meeting the needs of the domestic market. The quantities of wheat above the food self-sufficiency levels are characterised by high oscillations, so despite satisfactory quality, the manufacturers cannot count on stable export flows and revenues. To succeed in the market, especially the international market, the producers must introduce standards, innovate the production technology, and traders must be willing to adopt the marketing orientation (Puskaric et al., 2009).

Production and trade dynamics are impacted by agricultural policy measures, as well as marketing, which is becoming an increasingly powerful factor in the market. Agricultural policy measures were aimed at stabilizing the market, so production and sale prices, protective prices, and purchase prices were established to eliminate imports and stimulate domestic production and purchase. The Government establishes protective prices for wheat based on production costs, expected yield levels, as well as the domestic supply and demand ratio. To stabilize wheat production and trade flows, it is necessary for the Government to determine the minimum price in advance, i.e. before sowing, because in that case the producers would know the level of profit they can count with (Markovic et al., 2013). The study Mutavdžić et al. (2017) determined significant seasonal price fluctuations and concluded that the characteristics of price fluctuations indicate economically optimal time for selling and purchasing wheat (the optimal time for realization of wheat is the period from February to May).

The average per capita consumption of wheat in the Republic of Serbia is about 150 kg, which is at the level of average global consumption. In the upcoming period, if the income of the population would not grow significantly, wheat consumption could be expected to grow in order to meet the necessary daily energy needs, because it is a relatively cheap source of energy (Markovic et al., 2013).

Producers or marketers have the task of exploring the needs and demands of consumers and by satisfying them, to ensure generation of profit. Consumers, on the other hand, satisfy their needs according to their preferences. When shopping, consumers choose between different products or different features of the same product, so is important to define which factors determine the demand. Based on defined demand, producers develop a product which would dominate the market and meet demand to the maximum extent. In doing so, they define the product quality, price, distribution, packaging, etc.

Market characteristics represent the most important factor regarding the profit level. "Various factors which have impact on the market position of business entities can be related to both the supply segment and the demand segment, and sometimes to both market processes". Samuelson gives great importance to the differentiation of products and to the influence of the seller or buyer on the process of price formation,

showing in this way the importance of the number of participants in the market process” (Djordjevic, 2006, pp. 175, 176).

Unlike the markets of agricultural and food products in developed countries, which are well organized, in the Republic of Serbia, the market is disorganized, the competition undeveloped, and the economic relations between agricultural production and processing are disordered. The market in the Republic of Serbia has the characteristics of a perfectly competitive market regarding supply, and the characteristics of the oligopoly regarding demand. The purchase of agricultural products is disorganized, and vertical integration of producers and processors is absent. For all of these reasons, it is important to use the potentials and tools of the environment analysis, which is an important factor of business success, the purpose of which is to identify current and timely anticipate possible future situations in the environment (Cavlin, 2015).

The role of the government in modern market conditions is gaining importance, i.e., the government should encourage the establishing of modern purchasing and distribution centres in order to unify the supply of agricultural and food products. Economic integration and organization would increase production and processing, as well as the procurement of modern technology, investments, employment and product quality. In a word, the government should create a favourable environment for business organization, cluster organization, or other forms of business integration.

Supply and demand factors are different and show their impact in a different way. Dinu (2016) concluded that an efficient agri-food supply chain calls for the involvement of all participants: suppliers of raw materials and packaging, transporters, warehouses, clients. According to the findings of Haile et al. (2017) weather extremes— in terms of shocks in both temperature and precipitation — during crop growing months have detrimental impacts on the production and supply of the wheat. To cope with daunting challenge Tadesse (2017) have identified as the primary goals for sustainability i the deployment of novel cultivars which include genetic resistances yield stability and increased yield potential, training and deployment of novel agronomical practices.

Although wheat production is an agricultural activity, in the analysis it is important to determine its effects on the society. Thus, at the macro level, the production of wheat, and at the micro level, the income it provides to producers, are determined.

Based on the available statistical data, the trends of production, i.e. supply and consumption of wheat in the Republic of Serbia in the period from 2000 to 2016, have been analyzed in this study. Supply and demand factors are different and show their impact in a different way. Supply and demand are confronted, conditioned by each other and harmonized. Wheat trade flows are impacted by prices and revenues, while non-priced factors are gaining in importance.

The consumption of wheat and various wheat products has specific characteristics (Smith, 2017). The traditional demand models start from the view point that consumers maximize their interest by choosing between several different products. Such models

do not offer an answer to the question of why a consumer chooses a brand of product or products of specific producers (Trivic and Sagi, 2008). The characteristic of wheat demand is low flexibility, which means that with the change in prices and income the wheat demand shows relatively small changes. In analysing demand, the factors of demand, the aggregate demand, demand structure, demand trends, demand actors, non-economic and other demand factors need to be studied.

This study specially deals with the available production potentials, wheat balances, factors that produce impact on the production, as well as the factors that have an impact on wheat supply and demand.

The goal and importance of the study

The goal of this study is to carry out the wheat balances analysis, to study the supply and demand in the domestic market, and to examine the partial impact of the relevant factors on the supply and demand.

The significance of the research is in the practical application of the obtained results. The assessment of the relation between the factors that determine the supply and demand will serve to assess the future movement of supply and demand, i.e. for the planning of sales both on domestic and foreign target markets. Similarly, the research results can be used by macroeconomic policymakers to regulate market flows, to prevent major disturbances, to ensure sufficiency, and to dynamize wheat exports as a strategic product.

Methods of research and data sources

The study has analyzed the production and consumption of wheat in the Republic of Serbia in the period 2000-2016 by method of wheat balances analysis. The wheat balances analysis was performed on the basis of the dynamic series analysis by three-year periods, the functional, and the correlation analysis. The impact of domestic consumption, imports and purchase prices on wheat supply have been considered. At the same time, factors such as domestic consumption, exports, sales prices and GDP per capita have been studied, and their individual and partial impact on demand has been measured.

By multiple linear correlation analysis the impact of relevant factors on wheat supply and demand has been examined. The multiple linear equation reads (Kis, 2005):

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + \dots + b_nx_n, R, S_y, r_1, r_2, \dots, r_n,$$

By the analysis of variance (ANOVA) the probability of correlation has been determined. By the T-test the significance of each coefficient in predicting a certain phenomenon has been analyzed and the value of the partial correlation has been determined.

Available data of The Statistical Office of the Republic of Serbia, the Statistical Yearbook of Serbia, Agricultural statistics, Statistics of national accounts, as well as scientific and professional literature have been used in this study.

RESEARCH RESULTS AND DISCUSSION

Production and consumption of wheat in the Republic of Serbia

At the European level, Serbia represents a significant producer of cereals and also the biggest regional producer, regarding the sown areas under wheat is on the twelfth place in Europe (Arsić et al., 2015). According to the findings of Munćan (2016) in the structure of field crop production in Vojvodina, the most common are two groups of crops: the grains/cereals, with dominant wheat and maize (Savić et al., 2016). In the period 2000-2016, in the Republic of Serbia, an average area of 579.64 thousand ha was used for wheat production. The average yield was 3.71 t/ha, and production was 2,163.41 thousand tons. In the observed period, the decrease in areas under wheat was recorded, but due to the increase in yield per ha, a minimal increase in production was achieved (Table 1).

Table 1. Production, areas under wheat and wheat yields

Year	Area (000 ha)	Yield (t/ha)	Production (000 t)
Ø 2000-2002	678,80	3,23	2.231,00
Ø 2003-2005	603,72	3,33	2.043,33
Ø 2006-2008	528,82	3,70	1.944,33
Ø 2009-2011	513,55	3,70	1.937,00
Ø 2012-2014	564,93	4,07	2.332,67
2015	589,22	4,10	2.428,00
2016	595,12	4,80	2.885,00
Ø 2000-2016	579,26	3,68	2.148,47

Source: The Statistical Office of the Republic of Serbia, FAOSTAT

In the observed period, there is a fluctuation of sown areas, yields and total production. Inadequate measures of agricultural policy, as well as inadequate application of agrotechnical measures have proved as a limiting factor in increasing production volumes, which shows a negative effect on both the available quantities of wheat for the needs of the domestic market and on the exports.

Total available quantities of wheat in the observed period in the amount of 2,632.15 thousand tons/year, consist predominantly of the production - 2,346.71 thousand tons or 89.16% and transitional stocks - 275.04 thousand tons or 10.45% (Table 2).

Total wheat consumption in the domestic market in the observed period amounts to an average of 1,826.85 thousand tons/year, of which 1,561.08 thousand tons or 85.45% represents domestic consumption, and 265.77 thousand tons or 14.55% are transitional stocks. The balance between total available quantities and total consumption with transitional stocks represents the available quantities for export in the amount of an average of 805.29 thousand tons (Table 2).

The dynamic analysis, which has been used here, makes it possible, based on the data regarding production and consumption, as well as quality and prices, to anticipate the possibility of wheat exports in order to further stimulate production. In this way, the producers would be able to define the wheat sowing schedule and the volume of production in accordance with demand in the international market. The government would therefore have an interest to increase the competitiveness of producers in terms of quality, quantity and price by introducing incentive economic measures.

Table 2. Balance of wheat production and consumption in the Republic of Serbia (in 000 tons)

Category	2000.	Ø01-03	Ø04-06	Ø07-09	Ø10-12	Ø13-15	2016	Ø00-16
Initial stocks	300,0	331,3	334,3	404,7	307,33	111,67	218	275,04
Domestic production	1.924,0	2.044,7	2.213,3	2.009,0	1.888,33	2.501,67	2.885	2.346,71
Total available quantities	2.224,0	2.376,0	2.547,7	2.413,7	2.209,00	2.632,67	3.123	2.632,15
Total domestic consumption	1.921,0	1.912,3	1.913,3	1.622,3	1.429,67	1.298,00	1.376	1.561,08
Final stocks	200,0	297,7	438,0	418,7	110,67	205,33	195	265,77
Total consumption	2.121,0	2.210,0	2.351,3	2.041,0	1.540,33	1.503,33	1.571	1.826,85
Surplus	103,0	166,0	196,3	372,7	668,67	1.129,33	1.552	805,29

Source: The Statistical Office of the Republic of Serbia, FAOSTAT (calculated by the author)

The wheat balances analysis shows that the total available quantities of wheat in 2016 are higher than in 2000 by 40.4%. Total consumption in 2016 decreased in relation to 2000, but also in relation to the average consumption in the analyzed period.

Total available quantities of wheat, with certain oscillations, are constant observing three-year periods, which is also the case with the movement of available consumption. The balance surplus of wheat, of the average 805.29 thousand tons, shows an increasing trend in the analyzed period, especially after 2013.

The conducted wheat production and consumption balances analysis shows the existence of available quantities for export. However, from an economic point of view, it would be more profitable to process the wheat into a range of final products (Djuric et al., 2017) and export it in this form to the international market. By wheat processing, the value of the basic raw material, the degree of utilization of processing capacities, and the employment are increased, a rich range of products is created and produced in accordance with demand and consequently, and a greater value is achieved, which has a positive impact on the production and processing economy.

Factors that have impact on wheat supply and demand

In our conditions, the production and supply of wheat is relatively unstable due to the high degree of dependence on natural, economic, material and technical and agro-economic factors. The wheat demand shows, as a rule, low flexibility, because wheat products are relatively cheap and have good substitutes (Pejanovic, 2007, p. 213). Due to the low flexibility of consumption, wheat demand is a relatively stable market category.

Delivery of wheat to the market is performed through an organized transport network, i.e., by indirect transport, while an insignificant part is placed on the market directly. Wheat is one of the most actively traded agricultural commodities on stock exchange. Trade in rural markets amounts to only 0.3% of the annual production (Djorovic and Tomin, 2010; Markovic et al., 2013).

As for the wheat trade, it has recently been going on through the agricultural product trade exchange also in the form of “unripe wheat” trade, i.e., the sales contracts are concluded already in March and April and wheat is delivered immediately after the harvest (Markovic et al., 2013).

The wheat supply is adversely affected by (Vlahovic, 2003):

- Adverse conditions of operation in the agro-industrial complex;
- Low purchase (protected) price, which often barely covers production costs;
- Insufficient incentive measures to dynamize production, and consequently the wheat supply;
- Unregulated relations between producers, mill and bakery and other industries using wheat flour as the basic raw material.

The factors having impact on the wheat supply and demand have been analyzed. The analysis has measured the impact of production, initial stocks, imports and purchase prices on wheat supply, as well as the impact of consumption, sales prices, final stocks, income and exports on wheat demand.

By regression/correlation analysis, multiple (R) and partial (r) impact of domestic production X_1 , initial stocks X_2 , imports X_3 and purchase prices X_4 on wheat supply Y have been analysed. By regression/correlation analysis, multiple (R) and partial (r) impact of domestic consumption X_1 , sales prices X_2 , income X_3 , exports X_4 and final stocks X_5 on wheat demand U have been analysed.

Table 3. The impact of factors on wheat supply and demand

		Production	Initial stocks	Imports	Purchase prices	
Supply function	R	r1	r2	r3	r4	
$Y = 835,85 + 0,77H_1 + 0,53H_2 - 2,07H_3 + 0,014H_4$	0,993	0,955	0,339	0,150	-0,247	
Demand function		Domestic consumption	Sales prices	Income	Exports	Final stocks
$U = - 216,89 + 1,095H_1 + 0,01H_2 + 1,223H_3 + 0,097H_4 - 0,34H_5$	0,946	0,821	0,0117	0,00139	0,239	- 0,134

Source: The Statistical Office of the Republic of Serbia (calculated by the author)

The coefficient of determination regarding wheat shows that 92% of the total wheat supply change is explained by the impact of the analyzed factors. The analysis of variance (ANOVA) has determined the probability of the existence of correlation. The empirical level of F distribution (70.105) is greater than the critical value of F (significance F) distribution, which indicates that the high value of F is not random and that the regression equation is relevant for predicting wheat supply. By the T-test, the significance of each coefficient in predicting wheat supply has been analyzed. The absolute values of t production statistics and the initial stocks are higher in relation to the critical value t (4 degrees of freedom and $\alpha = 0.05$; 2.7764) and are important for predicting the total supply. Concerning the wheat supply, there is a positive and negative agreement in variations. The impact of domestic production has a positive impact on supply. On condition that there is no change in other factors, the increase in domestic production per measuring unit will lead to an increase in the supply by 0.77 thousand tons. Concerning initial stocks, there is a positive relation between the analyzed factors. Increase in the initial stocks will result in the increase of the wheat supply by 0.53 thousand tons. Wheat import is insignificant and any change in imports has a negative impact on the supply. The change in purchase prices has a negative impact on the wheat supply.

By the correlation analysis of domestic production and total wheat supply, a coefficient of 0.96 has been obtained, which shows high correlation dependence. The coefficient of partial correlation between the initial stocks and imports shows a medium and minimal correlation with wheat supply. The analysis of purchase prices shows negative correlation dependence between the examined factors.

The coefficient of determination shows that 89.47% of the change in the total wheat demand is explained by the impact of domestic consumption, sales price, income, exports and final stocks. The change in domestic consumption by measuring unit corresponds to an increase in the total demand by 1.095 thousand tons. Analysis of the variance (ANOVA) determined the probability of the existence of correlation. The empirical level of F distribution (5.099) is lower than the critical value of the F (significance F)

distribution, which shows that the regression equation is not relevant for predicting the total wheat demand. By the T-test, the significance of each coefficient in predicting the total wheat demand has been analyzed. The absolute values of t statistics of domestic consumption are greater than the critical value t (3 degrees of freedom and $\alpha = 0.05$; 3.182) and are important for predicting the total demand. Concerning the wheat demand, there is a positive and negative correlation of factors. The change in domestic consumption by measuring unit corresponds to an increase in the total demand by 1.095 thousand tons. The change in exports by measuring unit corresponds to an increase of about 0.097 thousand tons of total wheat demand. Change in final stocks has a negative impact on wheat demand.

By the correlation analysis of wheat consumption and demand, a coefficient of 0.821 has been obtained, which indicates high correlation dependence. The coefficient of sales prices, income, final stocks and demand indicates that there is minimal and negative correlation dependence between the observed factors. Correlation coefficient between exports and total wheat demand indicates minimal correlation dependence.

Impact of factors on wheat exports

Changes in the international wheat market have been extremely dynamic showing trends of production increase, achieving self-sufficiency in most countries and growing supply in the international market (Pejanovic et al., 2006).

Domestic market limitations cannot provide economies of scale, so export is one of the most important instruments for strengthening the competitive position of the domestic company in the international market (Djuric et al., 2017).

Some countries, i.e., economic groups, are closed, using different types of barriers when importing wheat. Such barriers are reflected in imposing standard customs restrictions, while various quantitative restrictions are much more used, which represents a new form of measures in agricultural protectionism, quality standards, sanitary regulations, etc. (Markovic et al., 2013).

In the period 2000-2016, the export of wheat increased 8.7 times with the increase in price per kg and in total export value.

Table 4. Export of wheat from the Republic of Serbia

Years	Quantity (t)	\$/kg	Value (\$)
2000	103.047,80	0,12	12.345,29
Ø01-03	230.838, 64	0,12	19.314,92
Ø04-06	121.772, 97	0,14	16.445,45
Ø07-09	215.095,27	0,23	46.385,48
Ø10-12	355.806,17	0,27	93.984,20

Years	Quantity (t)	\$/kg	Value (\$)
Ø13-15	650.637,83	0,22	148.440,97
2016	892.362,00	0,16	143.432,80

Source: The Statistical Office of the Republic of Serbia and UN Comtrade (calculated by the author)

The price is a significant factor regarding wheat demand on both domestic and foreign markets. On the one hand, the price is a demand factor, and on the other hand the price is impacted by a number of factors: production costs, productivity, consumption preferences, competition, and economic policy. In the previous period, there was an increase in wheat prices in the world, due to increased demand, reduced stocks in recent years, problems in production caused by climate change and reduction of available cultivable land in the world. The levels of domestic wheat prices depend on the movement of prices in the international market, i.e. relationship between supply and demand. The wheat export price analysis shows a significant fluctuation by three-year periods.

Table 5 shows the export of the first 15 wheat products according to the value of exports. The export is dominated by common wheat, sweet biscuits and flour, actually by the products of the lowest level of processing, which is not favourable. As earlier research by Raičević et al. (2012) shows wheat flour and other grain mill products have a high value of export and there was a significant increase of export and obtained exporting price.

Table 5. Export of wheat products in 2016

Item No.	Products	Average export volumes (t)	Average export value (000 USD)	Price USD/kg
1.	Common wheat, other	298.311,52	61.840,09	0,21
2.	Sweet biscuits, wafer biscuits and sheets	19.777,12	54.619,38	2,76
3.	Wheat flour	128.455,03	40.328,34	0,31
4.	Other bakery products	9.496,08	22.457,89	2,36
5.	Products obtained by swelling and roasting of cereals	3.074,56	9.964,65	3,24
6.	Hard wheat, other	44.289,05	9.798,53	0,22
7.	Grits and corn flour	28.793,78	9.167,66	0,32
8.	Common wheat, for sowing	15.275,70	3.871,42	0,25
9.	Pasta, uncooked, unstuffed, other	3.608,38	2.752,42	0,76
10.	Malt, fried or not (including starch flour)	5.347,59	2.330,29	0,44
11.	Wheat flour	6.390,20	1.791,28	0,28
12.	Mixtures and dough for bakery products from 048.4	1.491,27	1.711,04	1,15

13.	Cereal sprouts, whole, rolled, flakes, milled	2.946,64	1.046,12	0,36
14.	Corn flour	2.647,42	979,23	0,37
15.	Pasta, uncooked, unstuffed, with eggs	949,05	753,47	0,79

Source: The Statistical Office of the Republic of Serbia and UN Comtrade (calculated by the author)

Export of wheat from the Republic of Serbia, in the period 2000-2016, has the structural characteristics of exports of undeveloped countries. The export structure of the Republic of Serbia is significantly different from the average export structure of the economically developed countries. The inadequacy of the export structure is also reflected in a low similarity with the average import structure on export markets. Structural non-similarity between exports and imports, limits the possibility of the increase of exports and decrease of the foreign trade deficit.

Over the last few years, exports have relied on previously developed capacities, limited in volume and with backward technology. The prices of agricultural products of domestic exports are lower in relation to the effective prices of products of higher processing levels. Thus, exports of predominantly primary products/raw materials result in lower effects. The increase in exports was achieved in sectors that include products of a lower degree of finalization.

Although the export of agricultural and food products has a significant share in the export structure of the Republic of Serbia, its competitiveness is at a low level, and the increase in competitiveness and the degree of processing of agricultural and food products is considered key factors for dynamizing production and trade flows (Djuric et al., 2017).

In addition to stable and sustainable growth of production and product quality, the strategy for increasing the export of agricultural and food products also includes both adjusting the export structure to the requirements of import demand and improving competitiveness, primarily by using comparative advantages.

Conclusion

Unlike the market of agricultural and food products in developed countries, which operates successfully, in the Republic of Serbia, it is unorganized, the competition is underdeveloped, and the economic relations between agricultural production and processing are disordered. The market in the Republic of Serbia has the characteristics of a perfectly competitive market regarding supply, and the characteristics of the oligopoly regarding demand. The purchase of agricultural products is disorganized, i.e. there is no cooperation between the producers and processors.

The research concerning the wheat supply and demand should contribute to both the increase of supply and structural changes in production, as well as to the development of quality range of products in processing, along with permanent meeting of the demand.

The slight increase in wheat production in the analyzed period is the result of an increase in the average yield. Due to inadequate measures of agricultural policy, undefined starting conditions for sowing and inadequate agricultural organization, there is a trend of decrease and fluctuation in wheat growing areas. The relatively lower yields in wheat production show that there are reserves for increasing productivity, and therefore also competitiveness in order to meet the domestic market, and dynamize exports. The wheat balances and the wheat balances analysis, showing a surplus of wheat, indicate that we can be a net exporter of this strategically important product.

The impact of production, initial stocks, imports and purchase prices on wheat supply is high ($R = 0.99$). The impact of consumption, sales price, income, exports and final stocks on wheat demand is also high ($R = 0.95$). The analysis of correlation coefficient of the domestic production and the total wheat supply has resulted in the coefficient of 0.96, and the analysis of correlation coefficient of the wheat consumption and demand, in the coefficient of 0.82, which shows high correlation dependence.

In order to dynamize exports and generate higher profits, the wheat production should be focused on wheat processing into a diversified quality range of products in accordance with demand. By agricultural property aggregation, by increasing the number of commercial farms, by implementation of legal, economic and agrotechnical measures, it is possible to overcome the extensive wheat production and strengthen the competitiveness in the foreign markets. Additionally, it is necessary for producers to adjust the production structure and products, in terms of quality, quantity and prices, to the requirements of consumers or foreign customers in order to increase exports and generate higher profits.

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UTICAJ RELEVANTNIH FAKTORA NA PONUDU I TRAZNJU PŠENICE U REPUBLICI SRBIJI

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Sažetak

Cilj rada je da se izvrši bilansna analiza pšenice, istraži ponuda i tražnja na domaćem tržištu, te ispita parcijalni uticaj relevantnih faktora na ponudu i tražnju.

Rezultati istraživanja proizvodno-prometnih tokova pšenice mogu doprineti povećanju ponude i strukturnim promenama u proizvodnji, jačanju konkurencije, rastu razmene, unapređenju proizvodnje i prerade, novim investicijama, rastu zaposlenost i dr.

Od metoda u istraživanju se koristi bilansna analiza, funkcionalna i korelaciona analiza, analiza varijanse, T-test, kao i drugi opšti metodi.

Rezultati bilansne analize proizvodnje i potrošnje pšenice ukazuju na postojanje suficita i potencijala za izvoz u iznosu od prosečno 805,29 hiljada t sa trendom povećanja nakon 2013. godine.

Uticaj proizvodnje, početnih zaliha, uvoza i otkupnih cena na ponudu pšenice je visok ($R=0,99$). Uticaj potrošnje, prodajnih cena, dohotka, izvoza i krajnjih zaliha na tražnju pšenice je visok ($R=0,95$). Analizom koeficijenta korelacije proizvodnje i ponude pšenice dobijen je koeficijent 0,96, a potrošnje i tražnje pšenice dobijen je koeficijent 0,82, što ukazuje na visoku korelacionu zavisnost. U periodu 2000-2016. godine izvoz pšenice povećan je 8,7 puta uz povećanje cene po kg i ukupne vrednosti izvoza.

Ključne reči: ponuda, tražnja, izvoz, pšenica, bilansna analiza, korelaciona zavisnost.

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SOME MANAGEMENT CHALLENGES FOR FOOD COMPANIES IN THE REPUBLIC OF SERBIA AND BOSNIA AND HERZEGOVINA

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Summary

This paper aims to explore controlling, one of the key management functions, and autonomy at work, a determinant of employee control. Another purpose of this research is to examine the differences in autonomy or, more precisely, to find out to what degree autonomy among non-managers may affect creativity, innovation and business performance of an organization. The research was performed in food companies in the Republic of Serbia and Bosnia and Herzegovina. The data collected via a questionnaire were analysed by the SPSS statistical software. Five-level Likert scale was used to rate the responses. The main findings show that employees in food companies in Serbia perceive a higher level of autonomy than their counterparts in Bosnia and Herzegovina, and that the level of autonomy varies among different departments, the highest being in marketing and sales.

Key words: management, controlling, autonomy at work, food industry, employees, Serbia, Bosnia and Herzegovina.

JEL: Q15, Q18, E20.

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Introduction

Management is a United States term to describe an act of managing, that is, coordinating the elements and factors of production so as to serve the purposes of an organisation (Pejanović, 2012). There are five management functions: planning, organising, staffing, coordinating and controlling. Controlling is a managerial function designed to keep track of what has been done, and compare the performance with the existing standards. When problems occur, it's either the standards or the work to be done that needs to be changed. The five components of management are closely interrelated and open to change.

A fairly new concept in the development of global economy - knowledge economy - has triggered a series of changes, affecting not only the way modern organisations are doing business, but also their organisational design and management structure, and even more so the way they interact with their consumers, competitors and partners in a shifting competitive business landscape. The complexities of modern companies, transforming their production and technology, as well as social responsibility, have also affected the design of a controlling system in the management process. The imperative of a permanent growth in economic efficiency, gauged by using a return on assets (ROA) ratio or another financial indicator, has been imposed on a company's managers.

Drucker argued back in 2005 that controlling was one of the key factors to shape management in a knowledge economy. This important management function is gaining prominence in the increasingly competitive markets, driven by a constant demand for growing efficiency in the use of resources, considerable cost cuts, cheaper yet improved services and products, rapid and permanent innovation to upgrade products and processes, the quick obsolescence of technologies and other explicit, organisational knowledge.

Control, or controlling, is a manager's effort to gauge, evaluate and compare actual achievements against those planned, in order to take corrective actions to address off-plan results (Krstić, 2012). The corrective actions are taken to tackle a negative variance, when a business or individual performance is off target. Controlling is a necessity, but under the modern concept of control, managers should not use it as a restraining tool, but rather a creative instrument to encourage and guide employees in reaching desired individual and work-related performance levels. Control is a steering mechanism for individuals to help them work towards their own life goals in the context of organisational objectives.

In the era of knowledge economy, managers should create a work environment, in which employees can unlock their potential in the most productive way, relying on their prior knowledge, professional competence and practical skills (Jovanović et al., 2010; Pejanović, 2001). In a decision-making process - particularly in the implementation stage and in fulfilling job requirements - one of the key mechanisms of employee control is to enable employees to practice autonomy in decision making and in meeting their job requirements. Autonomy implies freedom of thought and action, and a free decision making, encouraging creativity and innovativeness.

Theoretical Background

In the operation of a company, it's possible and indeed necessary to control nearly all assignments, jobs, activities, processes, and most notably so, the resulting business performance. It's a necessity, because however competent and experienced managers might be, they can't predict with high probability the course a business operation might take in a near or distant future if exposed to a wide array of uncertainties and risks. Besides, the information needed to reach a decision is rarely known upfront, while there's a whole spectre of internal and external factors shaping the operation and growth of a company, which the management is equally unaware of.

There are three levels of control across an organisation, covering a) the company as a system, b) processes and activities, and c) operators (Pejanović, 2011; Milisavljević, 2012; Krstić, 2012, Đuričin et al., 2016). The organisational structure of control at the company level consists of the primary business functions that resources and competences are distributed against. On the other hand, departments can be composed of different smaller organisational units (plants, sections, services), and it's necessary to control their respective results and the performance of their operators as well. Likewise, a company can be viewed as a set of inter-functional business processes, whose competitiveness hinges of how successfully they are executed (Đoković et al., 2017). It is therefore necessary to monitor and control the processes and activities, as there's clearly a strong link between more effective business processes and company performance. The process control is expected to satisfy consumer needs by ensuring a quality process output, along with the efficient and effective execution of the process.

Company outputs involve different business processes, performed and streamlined by individuals (operators in the broadest sense of the term), fulfilling their job requirements. Accordingly, performance control implies so-called individual performance, too, as a separate level of performance. The performance of an individual includes his/her work results, achievements, productivity, contribution, competence, knowledge, commitment, loyalty, etc. (Su et al. 2015; Krstić and Sekulić, 2013; Fletcher and Williams 1996). It's precisely the control of operators that's the central theme of the paper, as the research goal is to establish a relationship between controlling the company and the processes on the one hand, and the operator on the other.

A manager's control includes a set of activities that are key not only to successful business performance management in his/her organisation, but also to managing the performance of subordinates, lower-level managers and non-managers.

Autonomy on the job constitutes a very important feature at work (Breugh, 1999; Aube et al., 2007), and it typically refers to a relationship between the management and employees. It's defined as the establishment of integrity, freedom and independence of employees in performing business activities and making decisions within the job description (Vanderfeesten and Reijers, 2006; Van Mierlo et al. 2006).

In a number of studies, a link has been established between autonomy at work, individual performance and company results (Breugh, 1985; Denton and Kleiman, 2001; Judge et al., 2001). In order to reach autonomy at work, employees should know their purpose in the company, and the way their results shape the overall business performance. Autonomy in the workplace is also another motivational factor for employees (Herzberg, 1968; Saragih, 2011). In framing autonomy at work, responsibility for planning and employee control deserves a special emphasis. The employee needs to be able to fully complete a job (a project, a task, etc.), as integrity in doing it is a motivation boost per se.

Autonomy largely increases job satisfaction. More complex jobs, which imply an increased level of responsibility, call for broader autonomy, too (Cooper and Locke, 2000). Aside from pre-set rules and procedures referring to a job, creativity, as a permitted decision-making space, plays an important role as well.

A global research by the *Economist Intelligence Unit* (Laserfriche and Economist Intelligence Unite, 2014) quoted more than two-thirds (68 per cent) of 227 corporate, education and government leaders as saying that a pressing need to increase efficiency, cut costs and manage risks had tightened centralised control in certain business units, departments and offices over the previous five years. At the same time, 57 percent of the respondents said that their organizations had delegated broad decision-making authority to business units, local or regional offices and other groups. A large number of the leaders (42 per cent) said that their organisations allowed for autonomy and performed controls at the same time. The same source suggests that in order to strike a balance between the two it's necessary to use information technologies to facilitate centralised control and autonomy alike, and to choose standardisation over centralisation.

Autonomy at work is a phenomenon that has drawn interest from theorists and practitioners involved in work efficiency management. Autonomy spans a broad spectre of advantages, from freedom in terms of the actual performance of a job, through flexible hours and workplace arrangements, to more developed forms of autonomy referred to in theory and practice as job crafting.

The results of a research by the University of Birmingham, involving 20,000 British employees, revealed that employees with broader autonomy at work reported positive effects on their wellbeing and a higher degree of job satisfaction. Having explored different forms of autonomy, the author, Daniel Wheatley, maintained in the 2017 study that there's a difference between "job control" and "schedule control". "Job control" referred to the job tasks and pace of work, and „schedule control“ to the actual hours. Another peculiar finding is that the two types of control have different gender- and age-related impacts. The positive effects on personal wellbeing notwithstanding, managers are still reluctant to offer a higher degree of autonomy to employees, preferring to solidify their primacy in control and ensure maximum effort from employees, the new piece of research has shown.

In a bid to identify a better relationship between an employee and his/her job, job crafting has been defined as a set of physical and cognitive changes individuals make in relation to their task or relational boundaries of their work. The method allows individuals to adjust a job to themselves, their competences, proclivities, skills and motivation to do it properly. There are three ways to apply job crafting (Wrzesniewski and Dutton, 2001): *task crafting*, proactively changing the number, scope or type of tasks; *relational crafting*, allowing employees to change the quality and extent of interactions with others at work, and *cognitive crafting*, changing the way employees think about their work, or how they perceive their job tasks.

It's only together with the contextual factors of a working environment, such as support to autonomy at work, that the individual factors, job crafting included, can lead to employee wellbeing. Support to autonomy depends on a specific management style, requiring a manager open to new experiences, who's also able to understand and support different views by employees, and encourage an initiative on their part. The autonomy support is therefore necessary for the development of the individual factors, and only together can they create a motivating working environment.

The specific structure of business operations in the food industry makes employee control in the industry very particular as well. The tailored conditions surrounding food production have created clear-cut divisions within, based on the nature, time and location of different operations, very strict controls and clear boundaries between employees and managers. With this in mind, it's a challenge to find out how the organisational trend of blurring the strict boundaries and divisions affects controlling in food industry (Pejanović, 2013). Can the trend open new room for tighter control by employees, through autonomy and self-determination in doing a job, or rather soften the control they have over their job (Holt and Hvid, 2014). The research the abovementioned authors had carried out in two food companies revealed that in spite of scepticism about the change, employees were pleased to have an opportunity to plan their work and learn something new, which might be a primary driving force of change opening the industry's door to autonomy at work.

Research Methodology and Hypothesis

The subject of the study is the role of autonomy at work in employee control in food companies in Serbia and Bosnia and Herzegovina.

The purpose of the research is to analyse the level of autonomy on the job in the food companies, in order to find out to what degree autonomy at work can encourage innovation, initiatives, interpersonal relationships and individual performance.

The sample includes 192 employees in the Serbian and Bosnian companies. Their food production/processing portfolios include:

- Milling products;
- Fruit and vegetable juices;
- Milk processing and cheese production;

- Meat processing and canning;
- Coffee and tea processing.

The research has covered 31 companies in Serbia, and another 30 in Bosnia and Herzegovina. These are active companies, with a positive financial result. The emphasis is on medium-sized and large companies that have reported income of at least EUR10 million over the past three years, with no fewer than 80 employees.

Table 1. Basic Information about the Research Subjects in Serbia and Bosnia and Herzegovina

QUESTION	CATEGORIES	Respondents	
		SERBIA	BOSNIA AND HERZEGOVINA
Gender	Male	54	55
	Female	40	43
Age groups	below 29	12	18
	30-44	47	32
	45-65	28	35
	over 65	7	13
Educational qualification	Secondary education	26	41
	College/university degree	51	46
	Specialists	9	5
	Master degree	8	6
	PhD	0	0
Organisational structure	Marketing and Sales	16	16
	Production	21	19
	Quality Department	9	12
	Procurement	18	19
	Finance	11	12
	Human Resources	14	17
	Legal Department	5	3

Source: The authors' own calculation

Most of the employees, as many as half of them, belong to the 30-44 age group (Table 1). The age structure in Bosnia and Herzegovina is somewhat different though, as it's dominated by the 45-65 age group. As for educational qualifications, most of the interviewed employees have a college/university degree, and most work in the *procurement* and *HR* departments.

Research Instrument

The questionnaire incorporated 20 questions. Part 1 included four general questions, related to gender, age, educational qualifications and organisational structure. Part 2 consisted of 16 questions, referring to autonomy at work as a determinant of employee control. The authors used a Likert scale, offering a choice of five responses: 1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree, 5-strongly agree.

SPSS Statistics software, Version 19.0, has been used to process the sample and calculate descriptive statistics, i.e. the mean, median, and standard deviations. Aside from the descriptive statistics, the following methods of statistical analysis have been used: Preliminary statistical procedures (*Explore*); Correlation analysis (Spearman's Rho coefficient); Independent sample T-tests for comparing means; Scale reliability analysis (Alpha Cronbach's coefficients).

Based on the research goal, the following hypotheses were tested:

H1. The realisation of innovation requires a higher degree of autonomy at work in decision making and task performance.

H2. There are differences in a degree of autonomy at work between decision making and task performance.

H3. There are differences in launching initiatives for change, depending on motivation and creativity.

H4. Better interpersonal relations exist in companies offering a higher degree of autonomy at work in decision making and task performance.

H5. A lower degree of autonomy in decision making and task performance has a negative effect on employees' work results in each part of the organization.

Research Results and Discussion

The hypotheses have been tested with categorial variables, and the results presented in tables.

In the modern business world, innovation is a driver of competitive advantage. A company's management should follow the key trends in the industry neighbourhood, encouraging innovation at home. From this perspective, opportunities have been explored as to whether innovation and innovative processes are truly accepted, and if managers are aware of them (Table 2). The correlation coefficient referring to the questions indicative of the two phenomena is relatively low against the total sample size (0.34), but slightly higher in the group of Serbian respondents (0.52). In these two cases, the correlation has a statistical importance, too, as it's a statistical regularity, not a product of coincidence. Yet the coefficient is very low in Bosnia and Herzegovina (0.16), and it's not statistically significant, as $p=0.11$, i.e. over 0.05, meaning that the hypothesis is accepted that the two phenomena in the Bosnian sample are statistically independent, and there's no correlation between them.

Table 2. Correlation between the Arguments of Innovation in the Workplace and Autonomy at Work

Method	Variables	Statistical Indicators	Total Sample	Serbia	Bosnia and Herzegovina
Spearman's rho	Autonomy at work in relation to a decision to introduce innovation in the workplace	Correlation Coefficient	0.34	0.52	0.16
		Sig. (2-tailed)	0.00	0.00	0.11
		N	192	94	98

Source: Prepared by the authors based on data analysis in SPSS 19.0

When it comes to decision making, introducing innovation depends somewhat on a level of autonomy at work. To be more accurate, individual decisions alone cannot guarantee more permanent innovation, or expand it throughout the company. It is safe to say that the introduction of strategic innovation depends exclusively on the management, and that autonomy at work might be a determinant of control after the management has committed to operational innovation.

Autonomy at work is considered a tool for employee control. Depending on the job description and the sector, it's important to establish the intensity of control and decide to what degree to apply it, eventually gauging the impact it might have on employees' creativity and motivation.

As for the food industry in Serbia and Bosnia and Herzegovina, companies are not competitive enough (Jeremić et al., 2016; Bešić et al., 2015). The argument largely refers to their technological competitiveness, or rather the lack thereof, hinging on permanent innovation. Coupled with a low level of knowledge, it's impossible to expect a company to thrive technologically, which in turn leads to low employee productivity (Njegovan, Pejanović, 2015; Pejanović, Njegovan, 2013; Maksimović, Pejanović, Njegovan 2013; Bešić et al. 2014).

The differences in the level of autonomy in decision making and task performance have been explored in two ways (Table 3). It's important to note that integrity in decision making with a higher level of responsibility is implicit, and that the performance of a task suggests respect to the task-inherent rules and procedures. The authors have first compared the arithmetic mean inducing the level of autonomy in decision making (1-no autonomy, 5-full autonomy) and frequency, i.e. the existing level of control in different intervals.

The Kruskal-Wallis test, comparing the arithmetic mean between two or more independent samples, detected in the total sample statistically significant differences in the level of autonomy at work, depending on the existing levels of control - the more frequent the existing level of control, the lower the level of autonomy. For example, with daily controls, the average value of autonomy on this scale is mere 1.59. Conversely, biannual controls increase the autonomy average to 2.54, growing to 3.14 with no control whatsoever. The statistically significant results have been reported in the Serbian sample as well (the p-value is less than 0.05), but in Bosnia and

Herzegovina the significance level was larger than 0.05 (0.25). Besides, the arithmetic averages in the companies employing daily, weekly or monthly controls unveiled no particular regularities in the Bosnian sample, as opposed to the total sample and the Serbian sub-sample.

Table 3. The Control of Results, Autonomy in Decision Making and Task Performance

Item	The Arithmetic Mean		
	Autonomy at Work in Decision Making and Task Performance		
Intensity of Control	Total Sample	Serbia	Bosnia and Herzegovina
Daily	1.59	/ ¹	2.14
Weekly	2.09	1.90	2.28
Monthly	1.87	1.72	2.07
Quarterly	1.87	1.92	1.84
Biannual	2.54	2.36	3.50
Not implemented	3.14	4.16	2.73
Statistical significance (Sig. P<0.05) Kruskal-Wallis Test	p=0.00	p=0.00	p=0.25
Mean Value	2.03	1.83	2.22

Source: Prepared by the authors based on data analysis in SPSS 19.0

The other way of argument testing is to use three questions about the impact of the existing level of control to create a separate total control scale first.

The reliability of the scale has been tested using Crombach's Alpha coefficient. It's fairly high (0.84), which indicates that the three individual questions follow the same direction, participating in the summary scale to a relevant degree. A correlation coefficient has been used to compare this scale with the one indicating the level of autonomy in decision making (Table 4). The scale has been used for the other hypotheses as well, testing the level of control under the name "control-total."

Table 4. Correlation between the Arguments of Autonomy at Work and Employee Control

Methods	Variables	Statistical Indicators	Total Sample	Serbia	Bosnia and Herzegovina
Spearman's rho	Autonomy at work in relation to decision making and controlling	Correlation Coefficient	0.49	0.71	0.30
		Sig. (2-tailed)	0.00	0.00	0.01
		N	192	94	98

Source: Prepared by the authors based on data analysis in SPSS 19.0

The authors are confident that there's a statistically significant, positive relationship between the secondary scale, indicating the existing level of control, and the scale indicating autonomy in decision making. The correlation is particularly high in the Serbian sub-sample, slightly lower in Bosnia and Herzegovina, reaching 0.49 in the total sample. Statistical significance has been confirmed at all three levels, meaning that with the growing perception that the existing level of control encourages creativity, motivation and innovation, the feeling of autonomy in decision making grows as well.

Establishing viable controlling in companies does affect the motivation and creativity of employees (Guinot et al., 2014; Goris, 2007). In modern organizations, it's a challenge to establish exactly the type of control that would be an incentive for employees in terms of the quality of task performance (Chen and Chang, 2013). For the purposes of the research, a fairly firm and statistically significant correlation has been established between motivation, creativity and initiatives (Table 5). In other words, those who think that the existing levels of control have a positive impact on motivation and creativity, also tend to believe that the existing levels of control were conducive to launching initiatives as well.

Table 5. Correlation between the Arguments of the Impact of Control on Motivation, Creativity and Innovation in Task Performance

Method	Variables	Statistical Indicators	Total Sample	Serbia	Bosnia and Herzegovina
Spearman's rho	The impact of control on motivation and initiatives for innovation in task performance	Correlation Coefficient	0.59	0.73	0.45
		Sig. (2-tailed)	0.00	0.00	0.00
		N	192	94	98
Spearman's rho	The impact of control on creativity and initiatives for innovation in task performance.	Correlation Coefficient	0.61	0.75	0.46
		Sig. (2-tailed)	0.00	0.00	0.00
		N	192	94	98

Source: Prepared by the authors based on data analysis in SPSS 19.0

Again, the correlation is the highest in the Serbian respondent group, over 0.70, it's comparably lower in the total sample, and the lowest in the Bosnian sample. Significance is under 0.05 in all three samples, indicating no correlation whatsoever.

Interpersonal relationships are important for creating favourable working conditions, resulting in the maximum performance from employees. To a degree, job satisfaction depends on interpersonal relations, too. Having explored the correlation between autonomy at work and the role interpersonal relationships have in employee satisfaction, the authors have found it to be very low though, barely reaching the borderline level of statistical significance. It means that good interpersonal relations are not the result of a higher level of autonomy at work, when it comes to decision making (Table 6). In the total sample, correlation was 0.19, in Serbia 0.28, and mere 0.15 in Bosnia and Herzegovina.

Table 6. Correlation between the Arguments of Autonomy at Work in Decision Making and Employee Satisfaction with Interpersonal Relations

Methods	Variables	Statistical Indicators	Total Sample	Serbia	Bosnia and Herzegovina
Spearman's rho	Decision making and employee satisfaction with interpersonal relations	Correlation Coefficient	0.19	0.28	0.15
		Sig. (2-tailed)	0.06	0.06	0.14
		N	192	94	98

Source: Prepared by the authors based on data analysis in SPSS 19.0

As every food company included in the research consists of organisational parts (departments), a relationship has been studied between employees' autonomy at work and their performance, and it turns out to be different in different departments (Table 7).

Table 7. Correlation between the Argument of Autonomy at Work and Employee Performance in Different Departments

Department	Correlation Coefficient	Statistical Significance (Sig. $p < 0.05$)
Marketing and Sales	-0.41	0.01
Production	0.27	0.08
Quality Department	0.19	0.40
Procurement	-0.18	0.29
Finance	-0.11	0.61
Human Resource Management	-0.35	0.05

Source: Prepared by the authors based on data analysis in SPSS 19.0

A low level of autonomy at work has a negative effect on employee performance, particularly in the Marketing and Sales, as a moderate and statistically significant negative correlation (-0.41) has been recorded. The higher the level of autonomy at work, the lower the tolerance of employees to performance measurement methods is. No such correlation has been recorded in other departments.

Business operations in the Marketing and Sales do involve pronounced creativity and innovativeness in employees. Accordingly, the results show that there's a direct link between a higher degree of autonomy at work and improved performance, expected to produce more effective promotional strategies and a boost to the sales at the end of the day. Yet for the sales in a food company to grow, the competitiveness of the final product needs to be handled first.

Conclusions

Given the specific characteristics of the food industry, autonomy at work is becoming increasingly important in managerial decision making. Balancing between autonomy and control shapes a new environment that allows employees to perform their work tasks timely and creatively.

As the companies included in the research share similar business climate, working conditions and product diversification, the occurrences in the two states are very much alike. The results have shown that employees in Serbia's companies enjoy a higher degree of autonomy in performing their tasks and improving business performance.

Based on the research results and differences between employees in Serbia and Bosnia and Herzegovina, a strong conclusion has been drawn that the level of education and the length of service largely determinate the capacity of the employee to respond to the requirements of a food company. More precisely, longer-term employees, who in the Serbian companies typically have a university degree as well, enjoy a higher rank in the company and a higher degree of autonomy at work.

Likewise, a level of autonomy at work has different effects on the level of employee motivation, which the research results have confirmed, too. Lower motivation levels in Bosnia and Herzegovina's companies raise a number of questions over the key motivation drivers. There are certainly many reasons behind the result, but the one the study has revealed is the correlation between lower levels of education and job dissatisfaction.

Different departments in a food company display varying degrees of autonomy at work. The results have confirmed, without any significant variables between the Serbian and Bosnian employees, that the highest level of autonomy at work has been recorded in the marketing and sales departments. It is safe to say that a decision to award them a higher level of autonomy can encourage creativity – one of the intrinsic qualities of the two departments - and that it's fairly easy to justify by the short and long-term goals of their organisational sections. Frequent changes in marketing may provide a mental stronghold in the minds of the managers, allowing them to offer these departments more autonomy at work, particularly in creating activities and tasks for employees.

What also makes this paper specific is the choice of the research sample, and a drive to explore autonomy at work as a phenomenon. The research themes in earlier papers largely revolved around top managers in different fields, whereas this one has focused on employees instead. Autonomy at work is analysed outside management structures, and it's actually the reflection of the autonomy the management has provided for that's being examined here.

The research work for this paper has also raised questions related to employee perception of autonomy, and the valorisation of efficient decisions by the management of a food company. The objective is to view autonomy at work as a balance between flexibility and control, against the backdrop of key management processes. Autonomy in the workplace can't be the result of an ad hoc campaign, bound to produce short-lived and often very negative effects in a company.

Controlling as a tool to ensure a free flow of knowledge and successful implementation of knowledge management programs should strike a balance between autonomy at work and employee control. This, in a way, upholds the basic postulates of knowledge management – a high degree of autonomy in the workplace and in pre-set models of behaviour, allowing the creativity and innovativeness of employees to come to the fore, with control to provide economic justification and purpose for their activities in a company.

The results of the research, involving employees in the food industry of Serbia and Bosnia and Herzegovina, have produced a general conclusion that a degree of autonomy exists in human resource management, but that a systematised framework in managerial decision making doesn't. The level of autonomy at work is higher in Serbia than in Bosnia and Herzegovina. The results don't apply to the general employed population though, largely because the food industry is very specific, and the questionnaire used in the research echoes its specific features.

The research presented in the paper outlines one of the many ways to explore different methods and management frameworks pertaining to employee management in the food industry. The complexity of a delicate balance between flexibility and control in companies draws more attention than before. Taking into account the limitations inherent to the research, including the economic and social situation in the Western Balkans, the authors feel that every effort should be made to launch a new set of studies looking into autonomy at work, in order to make it possible for business decisions to be more conducive to the success of food companies and other organisations.

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NEKI IZAZOVI MENADŽMENTA U PREHRAMBENIM KOMPANIJAMA U REPUBLICI SRBIJI I BOSNI I HERCEGOVINI

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Sažetak

U najširem smislu, menadžment je poslovna filozofija. Međutim, u užem smislu, termin ima vrlo specifično značenje, što je predmet ovog istraživanja. Autori su odabrali aktuelno pitanje u kontroli, jednoj od pet funkcija upravljanja. Autonomija je na poslu, determinanta kontrole zaposlenih, koja je u velikoj meri istraživana u prehrambenim kompanijama u Republici Srbiji i Bosni i Hercegovini.

Kontrola zaposlenih, njihov učinak i rezultati predstavljaju veliki izazov menadžmenta u procesu poboljšanja efikasnosti upravljanja ljudskim resursima kompanije, poslovnog učinka i konkurentnosti. Ključno pitanje je kako dizajnirati sistem kontrole u kompanijama koje su uključene u istraživanje, ali nije lako ni definisati odgovarajuću ulogu za posebnu vrstu kontrole - kontrolu zaposlenih, njihov učinak i rezultate - s obzirom na kulturu znanja, inovacije i kreativnost, koji su sve značajniji u poboljšanju ekonomske efikasnosti i konkurentnosti. Druga svrha istraživanja je i da otkriju razlike u autonomiji kao determinantu kontrole zaposlenih u ovim kompanijama ili, preciznije, da saznaju u kojoj meri autonomija među menadžerima može uticati na kreativnost, inovativnost i poslovne performanse.

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HOUSEHOLDS' DEMAND FOR GROUNDWATER CONSERVATION: THE CASE OF IRRIGATION PRACTICES IN KOMBOLCHA DISTRICT, EASTERN ETHIOPIA

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Summary

Ground water degradation is the problem, and its management is curial for sustaining the benefit from the resource. To maintain the resource we have to have full information about the value of the resource conservation. Therefore, in this study a contingent valuation survey was conducted in Kombolcha district to elicit households' willingness to pay for groundwater conservation. A sample of 394 households was randomly selected, and interviewed. However, after checked for sample selection bias 4 protest bidders were excluded from the data set. Tobit model was applied to determine the factors affecting willingness to pay. The descriptive analysis shows that about 82% of the respondents reported that the groundwater has being degraded due to population pressure, deforestation, soil degradation, agricultural expansion and climatic change. The mean willingness to pay was computed at 60.63 ETB with the total willingness to pay of 1,689,576.21 per annum. The study determined that monthly income, educational level, total farm land holding, total family size, perception and tropical livestock unit were variables that have significant effect on households' willingness to pay. Thus, socio-economic variables should also be considered while designing water related projects at household level.

Keywords: *Contingent Valuation Method, Groundwater conservation, Tobit model, Willingness to Pay*

JEL: *Q25, Q50, Q51, Q59*

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Introduction

Groundwater is water located below the earth's surface in the saturated zone unlike the surface water (Siebert *et al.*, 2010). It is a valuable renewable natural resource, and its availability depends on economic activities (Emerton and Bos, 2004). Globally, groundwater is an important resource for irrigation practices and hence livelihoods and food security of billions of people (Morris *et al.*, 2003). Groundwater aquifers have the potential to be used for anthropogenic carbon dioxide sequestration (Malanson, 1993; FAO, 2003), and indirectly regulate soil erosion (Malanson, 1993). Intensive groundwater uses for irrigation has given rise to satisfy social and economic benefits. However, the poor management and intensive groundwater use has all too often been the causes of groundwater degradation. Groundwater degradation directly and indirectly affected economic activities. The increased pressure on groundwater results in wells drying up and conflict between users (Morris *et al.*, 2003). Moreover, only rich farmers can afford to a reliable source of water; and the poorer sectors of society are likely to be the hardest hit as they are the most vulnerable to ecosystem changes. Generally, declining groundwater levels have an impact particularly in the developing world, and forcing women and children to walk long distances to take water resource (FAO, 2003).

Groundwater management is crucial for poverty alleviation, environmental conservation as well as sustaining the benefit from the resource. There has been a growing concern by policy makers, interest groups and the public for the management of groundwater. In order to manage groundwater, among others, more reliable information on the economic value of groundwater conservation is crucial. This study therefore, tried to estimate the economic values of groundwater conservation using contingent valuation method (CVM). A respondent was introduced to a hypothesized market scenario and a willingness to pay (WTP) value. The study provides valuable information on the value of groundwater conservation of Kombolcha district to decision makers and agricultural water users that are affected by the degradation of the resource. It is believed that the study plays a key role in formulation of a successful groundwater policy.

Measuring Welfare Change

The values of environmental resources (like groundwater resource) are measured using its effects on human welfare (Mitchell and Carson, 1989). A weaker, but perhaps ethically more neutral, criteria for welfare measure is Pareto improvement. In Pareto improvement a policy change makes one or more persons better off without making at least one other person worse off (Haab and McConnell, 2002).

Change in environmental goods (from statuesque to improvement) can affect individual's welfare through changes in prices they pay for private inputs and goods, and the quantities of non-marketed environmental goods. This welfare changes can be measured using ordinary consumer's surplus, which holds income constant but not the level of utility. According to Hicks (1943) the welfare changes can also be measured using compensating surplus, compensating variation, equivalent variation

and equivalent surplus. Compensating variation and compensating surplus measure the gains or loss from environmental goods and services, and hold utility constant at the initial level. However, equivalent variation and equivalent surplus measure welfare change and hold utility constant at some specified alternative level. Generally, these four welfare measures involve either payment or compensation to maintain utility at the specified level (Randall and Stall (1980), cited in Mitchell and Carson 1989). If the proposed change is welfare increasing through changes in the quantity of environmental goods, which is the focus of this study, the appropriate welfare measure is the compensating surplus. This measure can be interpreted as the consumer's WTP in order to gain the quantity increase and still maintain their initial utility level (Mitchell and Carson 1989).

In Hicksian demand curve, the demand function for the public good requires accurate market data. But, it is very difficult to obtain accurate market data therefore, contingent valuation method, which requires the creation of hypothetical market scenario that is similar to actual market situation for groundwater conservation was used. From this method we can generate the WTP data without having to estimate the actual demand curve. This concept can be further emphasized from the relationship between the expenditure function and Hicksian compensated surplus measure. According to Haab and McConnell (2002), the expenditure function that provides the theoretical structure for welfare estimation is specified as:

$$y=e(p,q,u)=\min_x \{p \cdot x/u(x,u) \geq u\} \quad (1)$$

Where: y is the minimum amount of income needed to maintain utility level given the price and public good vectors; q is the vector of environmental goods; p is a vector of prices; u is level of utility when $u = V(p, q, y)$; x is the vector of private goods and y is income. Let p_0, q_0, u_0, y_0 represent some initial level of those respective arguments and p_1, q_1, u_1, y_1 represent some succeeding levels. The derivative of the expenditure function with respect to price gives the Hicksian or utility-constant demand. We can represent the compensation surplus by:

$$WTP = CS = [e(p_0, q_0, u_0)] - [e(p_0, q_1, u_0)] \quad (2)$$

q_1 is preferred to q_0 for proposed new project brings welfare gain. In this case, the compensated surplus (CS) measure tells us the consumers' WTP for welfare gain. WTP is the amount of income an individual would give up to make him indifferent between the original state: income at y and the public good at q_0 and the revised state: income reduced to $y - WTP$ and the public good increased to q_1 . Contingent valuation is capable of obtaining the appropriate Hicksian measure for a proposed change in the public good (Mitchell and Carson 1989). It can be viewed as a way of estimating the change in the expenditure function (Haab and McConnell 2002). This study determines the value of groundwater conservation using the concept of WTP.

Methodology

Description of the study area

The study was conducted in Kombolcha district located about 514 kms south east of Addis Ababa. The district is having an area of 446.61 km², and found in the northern part of East Hararghe zone. The district falls under *Woina dega* (74%) and *Kola* (26%) agro-climatic zones. The annual rainfall and temperature of the district ranges from 600 mm to 900 mm and 18^oc to 23^oc, respectively. Based on the 2007 population and housing census of Ethiopia, the district has a total population of about 140,769 (FDREPPC, 2008). The livelihood of the population typically depends on crop-livestock mixed farming system. The district's farming economy is characterized by small and fragmented land holdings with an average of 0.25 hectare. The district is one of the major producers of vegetables including potato, onion, cabbage, beet root, tomato, and lettuce using irrigation water.

Sampling techniques and data collection methods

A two-stage sampling technique was used to select sample respondents. In the first stage, 3 rural kebeles were purposively selected out of the 19 kebeles based on identified as they are more attached to the water resource. These sample kebeles include Bilisumma, Kerensa and Walta Lamaan. In the second stage, proportionally with population percentage of these 3 kebeles, a total of 394 households were selected using simple random sampling techniques. Both secondary and primary data were used for this study. The primary data were collected using face to face interviews with the heads or working members of the households. A CVM method in the form of open ended elicitation format was used to elicit households' WTP for groundwater conservation.

Data analysis

The survey data was analyzed using descriptive statistics and econometric models. Tobit econometric model was used to analyze the determinants of WTP for groundwater conservation. This model has an advantage over other discrete choice models (Linear probability model, logistic, and probit) in that, it reveals both the probability and the maximum WTP of the respondents. In discrete choice models like probit and logit model the dependent variable (y_i^*) is not observed, what we observe is the dummy variable. However, in Tobit model the dependent variable, or the WTP, is partially observed and the dependent variable (y_i^*) assumes zero values for a substantial part of the sample. That is, y_i^* is observed if $y_i^* > 0$ and is not observed if $y_i^* \leq 0$. If y_i^* and x_i were observed for everyone in the population, we could use standard regression methods (ordinary least squares (OLS)) (Maddala, 1992). However, in this study since we deal with maximum WTP for groundwater conservation which is partly observed, we employed Tobit model. The censored regression (Tobit) models generally apply when the variable to be explained is partly continuous. According to Maddala (1997) the equation for Tobit model is constructed as:

$$y_i^* = \beta x_i + \varepsilon_i \tag{3}$$

$$y_i = \begin{cases} y_i^* = \beta x_i + \varepsilon_i & \text{if } y_i^* > 0 \\ 0 & \text{if } y_i^* \leq 0 \end{cases}$$

where: y_i^* is latent or unobserved willingness to pay for groundwater conservation; y_i is a household's actual maximum willingness to pay; x_i is vector of explanatory variables; β is a parameter vector common to all households; α is the intercept; and assuming the random error ε_i is independent and normally distributed across respondents, $\varepsilon_i \sim \text{NID}(0, \sigma^2)$. Some of the households interviewed did not have any WTP, whereas, some of them had WTP for groundwater conservation. For those not undertaking WTP is zero in Tobit model the WTP is a random variable and has probability distribution, and it is possible to determine each observations probability.

$$p(y_i = 0) = p(\varepsilon_i < \beta x_i) = 1 - F(\beta x_i) \tag{4}$$

$$p(y_i > 0) = 1 - p(y_i = 0) = F(\beta x_i)$$

Where p is probability distribution and $F(\beta x_i)$ is cumulative density function

The model parameters can be estimated by maximizing the Tobit likelihood function of the following form.

$$L = \prod_{y_i^* > 0} \frac{1}{\sigma} f \left(\frac{y_i - \beta x_i}{\sigma} \right) \prod_{y_i^* \leq 0} \frac{1}{\sigma} F \left(\frac{-\beta x_i}{\sigma} \right) \tag{5}$$

f and F are the density probability function and cumulative distribution function of y_i^* respectively. $\prod_{y_i^* > 0}$ means that the product over those i for which $y_i^* > 0$, and $\prod_{y_i^* \leq 0}$ means the product over those i for $y_i^* \leq 0$.

The Tobit coefficients do not directly give the marginal effects of the associated explanatory variable on the dependent variable. But their signs show the direction of change in probability of WTP as the respective explanatory variables changes. Therefore, it is not reasonable to interpret in the same way as the one interprets coefficients in an uncensored linear model (Johnston and Dinardo, 1997). Hence, we should estimate the marginal effect of the Tobit model. According to, Long (1997) and McDonald and Maffitt (1980) to identify the effects of explanatory variables on the probability of WTP, conditional and unconditional WTP the following techniques could be used.

The marginal effect of an explanatory variable on the expected value of the dependent variable was estimated by:

$$\frac{\partial E(y_i)}{\partial x_i} = F(z)\beta \tag{6}$$

The change in the probability of willingness to pay for groundwater conservation as explanatory variable X_i changes was estimated by:

$$\frac{\partial F(z)}{\partial X_i} = f(z) \frac{\beta}{\delta} \tag{7}$$

Similarly, the change in the probability of willingness to pay with respect to a change in explanatory variable among willing respondents was estimated by:

$$\frac{\partial E(y_i/y_i^* > 0)}{\partial X_i} = \beta \left[1 - Z \frac{f(z)}{F(z)} - \left(\frac{f(z)}{F(z)} \right)^2 \right] \tag{8}$$

Where, $z = \frac{x\beta}{\delta}$, $F(z)$ is the cumulative normal distribution of Z , $f(z)$ is the value of the derivative of the normal curve at a given point (that is, unit normal density), Z is the Z -score for the area under the normal curve, β is the vector of Tobit maximum likelihood estimates and δ is the standard error of the error term.

Result and Discussion

Characteristics of sampled households

A total of 394 sampled households were interviewed. However, 4 respondents were protested zero bidders and after checked for sample selection bias they were excluded from the data set. Of the total 390 respondents, 52% were males while 48% were female respondents. The age of these sampled respondents' ranges from 16 to 78 years with an average of 37.57 years old. The survey results also showed that 70% of the respondents were married and the rest 30% were single. A total number of 2552 persons were recorded with a minimum of 2 persons and a maximum of 12 persons per households. On average, about 7 persons per household were recorded which was above the national average of 4.7 persons (FDREPCC, 2008). This is because the households could have more than one wife. The result on the status of the respondents showed that 69% of the respondents were head of the households, and the rest 31% were working member of the households. Educational attainment is another parameter considered in our empirical models. The educational status of the sampled respondents ranges from zero (illiterate) to 10+3 years of schooling with an average of about 6 years of schooling. The total farm land holding of the sampled households was also estimated at 136.23 ha with average cultivated farm size per household of 0.35 ha (see Table 1). This indicated that the average farm size of the study area is lower than the national average of 0.8 ha (CSA, 1995).

Table 1. Socio-economic characteristics of the sample households

Variables	Mean	Std. Dev.	Min	Max
Maximum willingness to pay	60.63	42.80	0	200
Household income	1641.33	1342.40	258.33	5850

Age	37.57	15.60	16	78
Sex	0.521	0.50	0	1
Marital status	0.7	0.46	0	1
Educational level	5.89	3.54	0	13
Status of the respondents	0.69	0.46	0	1
Total family size	6.544	2.68	2	12
Tropical livestock unit(TLU)	1.86	0.70	1.56	3.87
Total farmland holding	0.349	0.27	0.2	1.83
Perception	0.815	0.39	0	1

Source: own survey, 2017

Major sources of income of the households' are from on farm activities primarily from production of crops and livestock production. The total monthly income of these households was computed at 495,117.56 ETB. On the other hand, the monthly income of the households obtained from off farm activities were also computed at ETB 145,000. The fact that off-farm incomes contribute smallest to the total family income, it explains that most of the surveyed household can rely mainly on agricultural activities with relatively narrow landholding size for their livelihood. Data related to livestock owned by the respondents was also collected in terms of TLU³. On average the survey result show that 1.86 TLU with a minimum of 1.56 and maximum of 3.87 was recorded per households (Table 1).

Causes and effects of groundwater degradation

The groundwater has been degraded to satisfy the demands of the ever increasing population for agricultural production. About 82% of the respondents were known the goods to be valued properly. They have an experience of using the resource for irrigation practices. The respondents reported that the availability of groundwater is decreasing from time to time. This shows that the depth of the water table is increase. The reasons attributed to the problem were population pressure, deforestation, soil degradation, agricultural expansion and climatic change. The result indicated that population pressure was the main causes of groundwater degradation. Therefore, the government should create awareness on family planning of the local people. On the other hand, about 18% of the respondents did not perceive the problems of groundwater degradation (Table 2).

Table 2. Causes of groundwater degradation

Causes	Number of households	Percent
Population pressure	82	21.03
Deforestation	60	15.38
Soil degradations	78	20
Agricultural expansion	65	16.67

3 Conversion factors used in estimation of tropical livestock unit (TLU) were Donkey = 0.7; Cow, Bulls and Ox=1; Calf = 0.25; Sheep and Goats= 0.13; Chicken=0.013 and Camel = 1.25

Causes	Number of households	Percent
Climate change	35	8.97
None	70	17.95
Total	390	100

Source: Survey result, 2017

They pay nothing for the water resource except the withdrawal and digging cost. This is because the wells used for irrigation practices is owned as private property. They bought motor pump on average estimated at birr 9000. The fuel used to pump the water was 1.5 liter per hour. The survey result shows that the price of the fuel at the time of the survey was 25 birr per liter. The price of the fuel is above the price set by the Ethiopian government, and its shows that there was a black market.

Seven effects of groundwater degradation perceived by the respondents were also identified and described: (1) health problem (2) delay in household chores (3) food shortage (4) low income, and (5) enhanced climate change. In particular, 19.23% of the respondents indicated that health problem was the effects of groundwater degradation. About 20.51% of the respondents' reported that they earned low income (Table 3).

Table 3. Effects of groundwater degradation

Effects	Number of households	Percent
Health problem	75	19.23
Delay in household chores	60	15.38
Food shortage	78	20.00
Low income	80	20.51
Enhanced climate change	27	6.92
None	70	17.95
Total	390	100

Source: Survey result, 2017

Protection measures were also elicited from the aware respondents for possible improvement of the degraded groundwater. A majority of the respondents suggested that strong government regulation, soil and water conservation, tree planting and training groundwater users are among the protection measures (Table 4).

Table 4. Perception on protection measures of groundwater degradation

Protection measures	Number of households	Percent
Strong government regulation	58	14.87
Soil and water conservation	87	22.31
Tree planting	95	24.36
Training groundwater users	80	20.51
None	70	17.95
Total	390	100

Source: Survey result, 2017

Households WTP for groundwater conservation

The result shows that 75.38% of the sampled households were willing to pay for groundwater conservation. Using open ended elicitation format the mean WTP were estimated at 60.63 ETB per year per household for ten years. The willing respondents were also asked to point out their reasons for maximum WTP in ETB. The respondents provided different reasons for their maximum WTP. About 48.97% of the respondents reported that they could not afford more than what they stated because of inadequate income. While, 13.33% and 13.08% reported that the amount they decided to pay was satisfactory, and other should pay respectively. However, about 24.62% of the sample respondents' were not willing to pay for groundwater conservation.

Factors affecting households' WTP

Estimate of the parameters of the variables expected to affect willingness to pay for groundwater conservation are shown in Table 5. The dependent variable is partly a continuous variable that individuals respond as maximum willingness and ability to pay for the improvement service recalling the benefits expected out of it. A total of 10 explanatory variables were considered in the econometric analysis, out of which 6 explanatory variables were statistically significant. The other 4 explanatory variables are insignificant effect on the amount of WTP for groundwater conservation.

Table 5. The Tobit model estimation results of households' WTP

Dependent variable: Maximum Willingness to Pay; 390 observations			
Explanatory Variables	Coef.	Std.Err.	t-value
Households income	0.008***	0.002	3.87
Age	-0.235	0.204	-1.15
Sex	-0.53	5.65	-0.09
Marital status	2.927	8.04	0.36
Education	2.213***	0.801	2.76
Respondents status	0.308	8.07	0.04
Total family size	2.412**	1.08	2.23
Tropical livestock unit	11.56***	3.97	2.91
Total farm land holding	20.43**	9.74	2.1
Perception	6.61**	6.98	0.95
_Cons	-5.17	16.45	-0.31
Log likelihood = -1676.30			
LR chi2(10) = 40.87			
Prob > chi2 = 0.000			
Obs. summary: 96 left censored observations at maxwtp<=0;			
294 uncensored observations			
0 right-censored observations			

** significant at 5%; *** significant at 1% significance levels (survey result, 2017)

However, the interpretation of the censored regression model is not straightforward. That is, the marginal effects cannot be adequately explained from the estimated coefficients

of the Tobit model. Therefore, for interpretation of the Tobit model this paper report three sets of marginal effects: (1) the effect on the probability of a positive WTP, (2) the effect on conditional WTP, and (3) the effect on unconditional WTP for groundwater conservation. To be more specific, households' monthly incomes have positive and significant association with the households WTP for groundwater conservation. That is, when the income of the household increase by one birr, it would increase the probability of willingness of a household to pay by about 0.004%. Besides, when income of the household increase by one birr their willingness to pay would increase, on average, by about 0.007 ETB for all observation and 0.005 ETB for willing respondents', *ceteris paribus*. This shows that groundwater resource is a normal economic good whose demand changes in the direction of income change. Respondents with higher education levels were more likely to state positive WTP, and on average, they actually stated higher conditional and unconditional WTP than respondents with lower educational levels. This result suggests that investing in education of people might help to improve the degraded environmental resource like groundwater. The marginal effect of the result shows that the respondent being educated, the probability of willingness to pay increases by 0.2%. Also, as the years of education increases by one year, the amount of cash the household is willing to pay for groundwater conservation increase by 1.88 birr for the whole sample of study, and 1.41 birr for the willing respondents, *ceteris paribus*. The variables perception has positive and significant effect on the amount of WTP. A unit changes in perception from 0(unperceived) to 1 (perceived) the probability being willing to pay increases by 2.86%. That is, the marginal effect result shows that a unit changes from 0 to 1 the willingness to pay increased by 5.67 birr and 4.3 birr for the whole and willing respondents respectively, *ceteris paribus* (Table 6).

Table 6. Marginal effects of the explanatory variable on the amount of willingness to pay

Explanatory Variables	Change in probabilities as explanatory variable changes	Change among individuals who are willing to pay	Change among the whole
Households income	0.00004	0.005	0.0069
Age	-0.00106	-0.15	-0.1994
Sex	-0.00239	-0.339	-0.4499
Marital status	0.01338	1.86	2.478
Education	0.00199	1.41	1.879
Respondents status	0.00139	0.197	0.2611
Total family size	0.0109	1.54	2.048
Tropical livestock unit	0.0522	7.39	9.814
Total farm land holding	0.0923	13.06	17.34
Perception	0.0286	4.3	5.671

Source: own survey, 2017

Aggregate WTP for groundwater conservation

An important issue related to the measurement of welfare using WTP is aggregation of benefit (Alemu, 2000). According to Mitchell and Carson (1989) there are four important

issues to be considered regarding sample design and estimating a valid aggregation of benefits: population choice bias, sampling frame bias, none response bias and sample selection bias. Random sampling method was used in this study using a list of households. Face to face interview methods was used and protest zero responses were excluded from the analysis and expected protest zeros was accounted in the estimation of the total aggregate benefit of groundwater conservation in this paper. Hence, none of the above biases was expected in this study. Mean WTP was used as a measure of aggregate value of groundwater conservation in this study. The mean is perhaps better than the median since the good dealt with is not a pure public good (Alemu, 2000), as there are purely private benefits from groundwater conservation measures. As it is indicated in Table 7 below, the aggregate WTP was calculated by multiplying the mean WTP by the total number of households in the population. Following this, the aggregate WTP for groundwater conservation was computed at 1,689,576.21 birr per year for ten years.

Table 7. Aggregate Benefits of groundwater conservation

Total households (Y)	Expected households to have a protest zeros (X) ⁴	Expected households with valid responses (Z) ⁵	Mean WTP ⁶	Aggregate Benefit (in Birr) ⁷
28154	287	27867	60.63	1,689,576.21

Source: Own survey, 2017

Conclusion and Recommendations

The purpose of this study was to assess the economic value of groundwater conservation using CVM. The descriptive analysis shows that 82% of the respondents reported that the availability of groundwater is decreasing from time to time, and the reasons attributed to the problem were population pressure, deforestation, soil degradation and agricultural expansion and climatic change. In order to improve the availability of groundwater policy makers should encourage and provide technical advice to households who are planting and maintaining tree resource, and practicing soil and water conservation. The results of the study on willingness to pay showed that the households were willing to pay for groundwater conservation. The annual mean WTP value of households was computed at 60.63 birr per year. Small respondents were recorded as protest zero, and imply that contingent valuation method is appropriate method to value groundwater

4 4(1.02%) of 394 sampled households were protest zeros. We excluded those protest zeros from further analysis after we have tested for sample selection bias. So X is the expected number of households which are expected to protest for the proposed project. It is calculated by the percentage of sampled protest zeros (1.02%) by the total population 28154 (Y).

5 Y-X is the total households in the study area which are expected to have a valid response

6 Is the mean willingness to pay calculated from the open ended elicitation methods

7 Is mean multiplied by the number of total households which are expected to have valid response (Z*Mean WTP) measured in ETB

conservation. Thus, in estimating the value of environmental resource at household level, it is important to use contingent valuation method. The empirical findings on the determinants of WTP indicated that monthly income, educational level, total farm land holding, total family size, tropical livestock are key factors influencing the willingness to pay. Besides, the study estimated that there is a statistically significant and quantitatively non-negligible effect of perception on the households' WTP. Generally, the study leads us to conclude that understanding of socio-economic characteristics that significantly influenced households WTP is a necessary and first step to achieve groundwater conservation. Therefore, when designing groundwater project any policy maker should consider significant socio-economic factors for successful groundwater project at household level.

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IMPACT OF ECONOMIC POLICY ON THE MANAGEMENT OF COMPETITIVENESS OF THE AGRICULTURE SECTOR IN SERBIA

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Summary

There is a tendency of increase and change in the structure of demand for the products from agricultural sector in the modern global environment. Such situation demands market orientation of agricultural producers, from business entities to individual agricultural holdings, in order to offer the appropriate response to the changes in the environment conditions and new market demands. The entrance and survival in the developed world market demand raising the competitiveness of agricultural sector which cannot be based on the low input prices alone (land, workforce), but the application of modern knowledge and innovation, that is, the synergistic effect of all the competition factors. For their part, the state and local governments should create an encouraging social and economic environment for agriculture and rural development, especially in undeveloped regions and areas of the Republic of Serbia. The undeniable agricultural potentials can significantly contribute to foreign trade balance improvement, public debt reduction, unemployment decrease and increase of the living standard of the population.

Key words: *competitiveness, agriculture, economic policy, Serbia*

JEL: *Q11, Q13*

Introduction

The Republic of Serbia is very suitable for agricultural production: large and high-quality areas of arable land, favourable climate conditions for all agricultural crops,

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rich flora and fauna, rich tradition and developed scientific institutions are all priceless treasure of Serbian agriculture. However, the results of numerous research show that the competitiveness of Serbian agriculture is based on the cheapest production factors when compared to other countries (land, workforce, other inputs). Serbia is in EU accession process so approaching the European model of doing business is imposed as the imperative, as well as the need for enterprises and agricultural holdings in agribusiness to build and preserve their competitive advantages. That will be a very difficult and long road, taking into account a number of traditional weaknesses in agricultural policies during the complete transitional period.

The absence of clear state strategy for agricultural sector development is obvious in the agricultural policy after the year 2000. The institutional and legislative reforms have been initiated but not finished yet. The insufficient budget resources caused the inability to solve the problems in the field of stimulating rural development and financing of agriculture. The budget for agriculture is significantly lower than the needs, with 4% average participation for the period from 2010 to 2016. Plant production had 66,6% share and cattle production had 33,4% share in the total value of agricultural production in 2016, while the ratio of plant and cattle production is reversed in the developed EU countries, which points to a high share of production with low added value, that is, low level of processing. Although the sector of agriculture shows a surplus in foreign trade, there is a great potential for export structure improvement and increase in the value of agricultural commodity production, both by the agricultural enterprisers as well as agricultural holdings.

The aim of this paper is to point out the necessity and possibility for agriculture sector competitiveness increase, both for enterprises as well as individual agricultural holdings. Regardless of the numerous traditional weaknesses, the participants in the agricultural chain should use the global increase in the demand for agricultural products in the future. The prerequisite for this is market orientation of the agricultural sector based on the sustainable management of natural resources and environment protection.

Competitiveness factors in the sustainable development of agriculture

The issues of competitiveness improvement in the national economy are given considerable attention as one of the key strategic tasks of every country. The competitiveness level of the national economy and its business entities tell us about the ability of the country for goods and service production in the competitive conditions, the realization of which increases the level of the living standards for the population and the opportunity for long-term sustainable growth and development. Competitiveness analysis offers the answers to the questions why the economy of a certain country is more or less successful than the surrounding countries, as well as on a wider scale. There are a number of indicators of the competitiveness level of the national economy, such as world market share, export or level of national income per capita. The task of the state is reflected in the creation of the favourable macroeconomic business conditions that lead to the growth of the competitiveness of individual enterprises, branches and the entire national economy.

According to Porter (2008), the key competitiveness factor is productivity, but it is also influenced by the macroeconomic environment, economic policy of the state, workforce costs, natural resource availability, differences in the types of management and the relationships between the management and workers. Kuznecov (2005) thinks that competitiveness is determined by the quality of the economic institutions and their contribution to the formation of the favourable business conditions on one hand, and the ability of the companies and branches to use these conditions for sustainable competitive advantage creation and development on the other hand. Due to all the above mentioned, the formation of high-quality and efficient institutions that rely on human capital and foreign technology attraction is one of the successful ways of solving the problem of sustaining the macroeconomic dynamics.

The differences in the economies of individual countries in their cultures, population, infrastructure, the way they manage the national values, even in history, influence the level of company competitiveness as well as the entire economy in different levels. Despite the increasing influence of the globalisation process, national competitiveness is determined by a set of factors which depend on the specific, local conditions (Porter, 2008). But large share of these factors are influenced by the state with its policies, measures and institutions.

The term competitiveness is defined in the Global Competitiveness Report as a set of factors, policies and institutions which determine the productivity level in a country (World Economic Forum, 2006). OECD defines international competitiveness as a measure of advantage or disadvantage of a country from the aspect of the placement of its products in the international market. Garelli (2009) defines competitiveness of a country as a field of economic theory which analyses the facts and policies that shape the capability of a country to create and maintain the environment which creates values for the companies and prosperity for its population.

Porter (1990) defines competitiveness as the national economy capability to use natural resources, physical and human capital. He integrates these factors into a homogenous unit because it is impossible to become and remain competitive in the long-term period at the national or global level unless there is a clearly defined strategy of natural resource usage, as well as macroeconomic policy which has to follow, and it should be aligned with the goals given in the strategy. Rosic and Veselinovic (2008) think that the competitiveness of a national economy is not an isolated phenomenon but an interdisciplinary phenomenon that arises from both internal and external environment.

According to the New Global Competitiveness Index (NGCI), not all the countries are identical in their starting positions in the international competition, and therefore they also have different starting points in achieving competitiveness. According to this parameter, the competitiveness level of a country is determined by the action of three factors (Savic, 2010), and they are: succession, macroeconomic and microeconomic competitiveness. There is a relatively solid natural resource potential in Serbia which can be a good foundation for the economic development in the future. However, so far

the economic policy has not paid enough attention to natural resources, and therefore its macroeconomic results are among the weakest ones in Europe.

Nowadays, the agricultural producers in Serbia face different business conditions that are reflected in much more competition in the local market on one hand, and open possibilities for exit into large international markets such as EU or Russia on the other hand. The exit into foreign markets is possible if the products are competitive compared to foreign producers. This competitiveness should not be based on low input price alone, but on modern knowledge and innovation application, that is, synergistic effect of all the competitiveness factors as well.

Although many strategic documents point out a great importance of agriculture and rural areas, the state and local governments have not yet created sufficiently encouraging social and economic environment for rural and agriculture development, especially in certain regions and areas of the Republic of Serbia. There are still many weaknesses present, from unfavourable age structure, out-dated machinery, unregulated market of agricultural products and insecure placement, insufficient irrigation, underdeveloped rural infrastructure, price disparity, etc. The development of SMEs sector and entrepreneurship in agriculture could largely reduce the above mentioned weaknesses and turn them into development opportunities for our country. This can be said especially if we bear in mind the tendency of increasing demand for (organic) agriculture products, rural tourism development, European integrations as well as the announcement of the larger support of the state for the development of this sector.

The development of modern agriculture demands knowledge and innovations in a number of areas (Asenso-Okyere, Davis, 2009), from technology, development of modern institutions, appropriate and timely agricultural policy to organisation (public and private groups and companies which have to innovate in order to become more efficient and more effective in the services they offer). Intensive inclusion of Serbia in international integration processes imposes an additional need for companies and other subjects of agricultural economy to create and carry out knowledge transfer in order to build, preserve and strengthen the competitive advantage. Knowledge as a source of innovation and successful adaptation to the changes in demand by increasingly demanding customers represents the key determinant for successful dealing with competition, preservation of the existing as well as the conquest of new markets (Vasiljevic, Savic, 2014).

The competitiveness of Serbian agriculture is mainly based on cheaper production factors when compared to other countries (land, workforce...), and that it results in the provision of competitive prices for food and agricultural products. However, the permanent sources of competitive advantage must be found in other areas, primarily in knowledge application and innovations. The success of the company depends on the level of the available knowledge, the way the knowledge is applied and the speed it acquires new knowledge. The traditional factors of production in agriculture (land, workforce, capital) are of secondary importance. The goal of knowledge management

is to transfer the information and intellectual knowledge into sustainable value. The efficient system for knowledge management in agriculture provides the outputs in terms of technology, software, trained professionals, information and other elements necessary for a continuous development of agriculture. All the participants are both the source and users of knowledge and information simultaneously, so that the knowledge from other areas has growing importance in successful business of the people from the sector of agriculture (Engel, 1990).

According to Stefanovic and Brocic (2012), there are tendencies nowadays, at the global level, encouraging more coherent development and increase of food production, as well as fast, rational and organised distribution of agricultural and food products all over the world. The economic theory explains that the larger share of agricultural and food products export in the total export of the country points, as a rule, to its lower economic level. However, the export of agricultural products is a very important item in foreign trade balance in some of the developed countries of the world (Holland, Denmark, France etc.). Byerlee et al (2009) point out that every country should recognise multiple functions of agriculture and its influence on the total economic development.

The importance of agriculture in the EU can be understood on the basis of several information that illustrates the role of this sector in the economy of that community. Thus, for example, agriculture and food industry provide over 15 million work places in the EU, that is, 8,3% of all employed citizens of the Union. This percentage varies considerably among different countries: in the „old“ EU members (15 industrially developed countries of the western Europe) the average value is 4%, whereas in the „new“ EU members (Romania, Bulgaria, Slovakia, Hungary) more than 12% of the total workforce works in agriculture and food industry (Vapa-Tankosic, Stojisavljevic, 2014).

Gulan (2016) expects that agriculture brings economic development, that it increases gross domestic product and that it is the backbone of the overall economic stability. Agriculture is a real economic field which directly brings almost 15, and indirectly even up to 40 per cent of domestic product, while it takes part in the export of the country with cca 23 per cent. This is the reason to encourage the development of agriculture in order to maximally valorise natural, human and processing capacities which are used only with a third of possibilities. The effective usage of agricultural potential is possible if small agricultural producers are connected to the markets in such a way to achieve a larger profit and other benefits (Zakic et al, 2014).

The role of the state in agriculture development is reflected in the definition of the frame for political and institutional changes which contribute to more efficient development of agricultural sector and the increase of the living standard of the population from the rural areas. Agriculture needs a stable and efficient long-term policy which will give successful answers to both internal and external challenges, such as (Strategy, 2014):

- The need to reduce the lagging process in technological development compared to the competitive countries and enable more efficient facing of the agricultural sector with the climate change effects;

- The necessity to increase food chain efficiency, and agricultural and food sector competitiveness;
- The provision of stable income and business environment for farmers and other entrepreneurs;
- The achievement of economic, environmental and social goals of sustainable development, where multifunctional agriculture and rural tourism have a special place;
- The willingness to meet the demands which come out of the EU and World Trade Organisation accession process.

The development of agriculture should be based on the concept of sustainable development with environment protection and sustainable management of natural resources. There are indisputable opportunities for a large increase in production volume and competitiveness increase in Serbia not only in the local-regional but also in a wider environment.

The potentials of agriculture and the results achieved in the period of transition

The level of development achieved by agriculture in Serbia is the result of the situation which followed the period after the war and agricultural policy conducted during the period of transition. The development of agriculture was mainly based on the social sector, through agricultural cooperatives and large agro-industrial companies. Agriculture was neglected during the entire post-war period in comparison to industry and other areas of economy, especially through price disparities at the expense of agriculture which remain even today. A slower growth of agriculture is also the result of inconsistencies in formulating and implementing the concept of development and neglect of the private sector in economic policy. Regardless of such a situation, the significance of agriculture in the foreign trade balance of Serbia and in the total employment should be emphasised, considering the problems of the country's indebtedness as well as a high unemployment rate (Anicic et al, 2016).

Disregarding a great influence of agricultural sector, there is still not social and economic environment sufficient enough for the development of rural areas and agriculture, especially in certain regions and areas in the Republic of Serbia (Ristic, 2013). The level of development of agricultural sector has not even close to be achieved, nor the possibilities for integral long-term development of agriculture and rural areas and their contribution to the development of the local economy and society. Primary agricultural production is not functionally connected to the other sectors of the economy such as processing industry, trade, tourism, water management, forestry, education, health care, etc. Developed agriculture in rural areas raises competitiveness of the entire local economy and it is a holder of employment for the population of those areas.

On one hand, Serbia possesses great comparative advantages for the development of agriculture, such as the fertile land, tradition, other natural resources, favourable climate conditions, etc; but there are numerous weaknesses preventing the above

mentioned advantages from the efficient usage on the other hand. They are, among others, out-dated machinery, unfavourable age structure, uncertain placement of the final products, price disparities at the expense of the agricultural products, insufficient area under irrigation, etc.

The share of the agri-food products in the foreign trade exchange is cca 23% when it comes to exports (Table 1), although imports are rather high in this sector during the observed period, and they range from around 8% in the total import to the entire 11,9% in 2015. As for exports, there are great possibilities for export structure improvement in terms of higher share of final processing products with higher added value in comparison to the primary products. It is a characteristic of import to often use the products of auspicious quality and lower price although we have surplus in production in the local market (meat, milk, certain products in oliviculture, etc).

Table 1. Foreign trade commodity exchange of agri-food products for the period between 2010 and 2016, (millions of euros)

DESCRIPTION	2010	2011	2012	2013	2014	2015	2016
export in agriculture	1.688	1.937	2.106	2.104	2.315	2.819	2.898
the share of agriculture in the total export (%)	22,8	22,9	24,9	19,1	20,8	23,4	21,6
import of agri-food products	903	1.010	1.163	1.227	1.310	1.950	1.275
the share in the total import (%)	7,3	7,1	8,2	7,9	8,5	11,9	7,3
trade balance of agri-food products	785	927	943	877	1.005	869	1.624
coverage of import by export (%)	186,9	191,8	181,1	171,5	176,6	144,5	227

The source: Statistical Office of the Republic of Serbia, 2017; Chamber of Commerce and Industry of Serbia, 2017.

Business entities in the sector of agriculture as well as agricultural households have to accept the principles of market and entrepreneurial behaviour. Regardless of the existing (and future) support of the state for development and competitiveness of this sector, it will mainly depend on the entrepreneurial initiative of the business entities in the area of agriculture. New technology development, conquering new markets and work productivity increase have to be priorities over the expectations of various stimulations and encouragements by the state authorities. There is a special problem concerning these issues for family households from the area of agriculture because they have the weakest position in comparison to all the participants in production and product realisation – such as warehouses, cold storages, domestic trade chains, exporters.

Family households need support and education in terms of association (cooperatives, clusters, etc.) and the protection of the geographical origin of their products. Modern market is looking for a stable offer and continuous supply which cannot be achieved

without associations. Also, state owned agricultural land should be sold to a great extent or offered for a long-term lease to the local farmers, to be paid for through agriculture products delivery. This would be the way of achieving multiple positive effects: the land would be used in a more efficient way, the young would remain in rural areas, the pressure of cheap workforce in large cities would be reduced, etc.

The characteristics of the agricultural policy since 2000 until now are the absence of a clear state strategy in the development of the agricultural sector. Institutional and legislative reforms have been started but they have not been completed. Insufficient budget resources caused the inability to solve problems in the area of encouraging rural development and financing of agriculture. Since 2005, the Republic of Serbia has been in the process of negotiations to join the World Trade Organisation (WTO), according to which it is obliged to cancel direct incentives for agricultural production. The agricultural budget is much lower than necessary, with the average share of 4% for the period from 2010 to 2016 (Table 2).

Table 2. The agricultural budget and its share in the budget of the Republic of Serbia from 2010 to 2016, (000 of dinars)

Year	National budget	Agricultural budget	
		Total	The share in the national budget
2010	825.884.900	25.621.810	3,8
2011	824.575.900	33.676.000	4,1
2012	1.018.633.400	40.876.000	4,0
2013	1.040.014.300	44.699.500	4,3
2014	1.110.121.000	45.427.200	4,1
2015	1.082.988.200	45.308.200	4,2
2016	1.085.308.426	40.600.000	3,7
The average share			4,0

The source: *The Law on Budget of the Republic of Serbia from 2010 to 2016*

Plant production had 66,6% share and animal husbandry production 33,4% share in the total value of the agricultural production in 2016. In comparison to 2015, net index of production physical volume increased for 8,3%. Plant production was higher for 18,9% compared to the previous year, and the highest increase was in crop production 24,7%. The increase in production value was 18,8% for wheat, 35,2% for corn, 22,9% for sugar beet and 42,1% for sunflower. The value of animal husbandry production is 1,7% lower compared to the previous year, and within the animal husbandry production cattle breeding is 0,7% lower, sheep farming is 10,9% lower, but 4,5% higher in pig farming (Statistical Office of the Republic of Serbia 2017). High growth rate in 2016 is partly the result of the decline in agricultural production in 2015 in comparison to 2014 and 2013 (Table 3).

Table 3. The movement of agricultural production, goods and services from 2011 to 2016, producer prices, Millions of dinars

Description	2010	2011	2012	2013	2014	2015	2016
Total Production of goods and services	466.811	519.959	502.684	544.441	569.387	525.466	574.441
Plant Production	328.980	359.103	324.451	358.223	376.110	342.762	404.269
Animal husbandry production	126.771	150.022	167.146	173.245	178.528	169.038	155.429
Services in agriculture	11.058	10.834	11.087	12.972	14.748	13.665	14.742

The source: Statistical Office of the Republic of Serbia, 2017

Challenges and development perspectives of the agricultural sector

The biggest economic problems in the way of economic growth and development in the economy of Serbia are high unemployment rate, high foreign trade deficit and insufficient investment growth. The sector of agriculture can largely change the unfavourable picture of the economy in Serbia by its resources and other potentials. It refers to both small and medium-sized enterprises in the area, as well as the family farms. Small family households with their number and economic potentials are an indispensable part of the Serbian economy, although often on the edge of profitability, and as such, they demand a special treatment within the agricultural policy.

The importance of family households is also reflected in the fact that the United Nations declared 2014 as the International Year of Family Farming. In the countries that are new EU members, family farms are recovering after a long period of forced collectivisation, and that is also the case with the family households in Serbia. The advantage of family farming is that it can adjust better to the changes in technology, economy, social and political conditions. In order to reduce price connected risks, the farmers avoid large and risky investments into a single activity. Those using credit resources do it carefully, sustaining the debt at the reasonable level in comparison to the estate and the value of the property they own.

A set of laws is in force or in preparation in the Republic of Serbia, aimed at establishing the instruments for financing and business risk management in the sector of agriculture. Some of the most important ones are the Law on Incentives in Agriculture, the Law on Financing and Securing Finances for Agricultural Production, the Law on Public Warehouses for Agricultural Products and the Draft on Commodity Exchange Law. The Law on Subsidies in Agriculture and Rural Development aims at enabling the predictability for the work of agricultural producers, protecting producers, improving competitiveness, enabling better budget resource planning and harmonisation with the EU regulations.

Passing the law on commodity exchanges will provide the opportunity for safer daily trading and the establishment of forward market of agricultural products. That will increase the loan volume by the commercial banks for the sector of agriculture because the banks will be able to secure the value of goods as collateral for the loan according to the principle of hedging strategy and in this way, grant a higher loan amount. Agricultural production in the Republic of Serbia is significantly lower in almost all areas in terms of yield compared to the EU countries, so that it is necessary to direct the subsidies in the Republic of Serbia as much as possible to agricultural products yield and quality increase, similar to the policy of subsidies in the EU countries.

The problems that repeat for many years are mutual relationships among agricultural producers, warehouses, cold storages, exporters and tradespeople. For example, there is always a problem with raspberries and it is the share of producers and cold storage owners in raspberry export prices which vary in different periods, depending on the world prices and the yield in other areas (Poland, Chile and other countries). The producers often get the delayed data about the world prices from the associations in charge of following them. Also, there are new varieties and innovations in production which threaten the traditional ones. Hypermarkets, on their behalf, favour the varieties easier for manipulation, and the frozen raspberry market is often oversaturated because it is becoming the stock goods for processing so the low price dominates over quality.

Apple producers should take advantage of the existing situation about the increase in demand for our apples in Russia (largely due to the Russian counter-sanctions to its permanent suppliers from the EU). High profits should be used for modernisation and efficiency increase in production and cost reduction because this situation will not last for a long time due to Russia's orientation to its own production and reduction of dependence on imports.

Fattener producers are exposed to the influence of cyclic prices even more than the producers in plant production. There is also the openness of the domestic market for imports, reduction of customs duties, price equalisation with highly competitive producers from the EU, etc. A specific problem in cattle breeding is low purchase price of milk and reduction in the number of dairy cows and fatteners, so that regardless of the approved export quotas for beef meat of 8700 tons, Serbia only exports 2000 tons due to low production level. There are certainly great opportunities here to realise significant foreign exchange inflow with more efficient production because there is a demand much higher than our current production capabilities. This fact is also the proof of the necessity for the consistent agricultural policy because short-term wrong steps cause long-term losses for agricultural producers.

Desirable activities for the improvement of small family household status are vertical association (connecting producers to the market) as well as horizontal connection (interconnection of producers). Investments are necessary for equipment, machinery and facilities modernisation, as well as domestic product processing and branding with the aim of creating a product with higher added value. The establishment of market distributive centres, logistic support, the strengthening of knowledge transfer and new

technology system are all necessary measures for raising competitiveness and life standard of the population in rural areas. Also, organic production is a great chance for small family households in view of the awareness about the significance of healthy food, as well as a global increase in demand for food products.

The important shift in the development of agriculture offers the financing possibility through IPARD – the Instrument for Pre-Accession Assistance for Rural Development. This instrument will help the implementation of the Common EU Agricultural Policy in Serbia. The measures of the IPARD programme for 2014-2020 policy envisage two stages, and they are: the investments in physical property of agricultural households, the investments in agricultural product processing and marketing, the investments in diversification of activities and business development within the household, as well as technical support in the first stage. Local action strategy preparation and implementation – LEADER approach – is planned for the second stage, agricultural and environmental measures and organic agriculture.

The characteristics of food industry are low level of capacity usage, and thus low efficiency. Larger capacity usage is present in meat, sugar and milk industry, while tea, mineral water, beer and non-alcoholic beverage industries use 75-85% of the existing capacities (Strategy, 2014). The characteristics of food sector is an expressed dual structure that is made up of a large number of big, modern business entities, and much more of several small and medium-sized enterprises. Small and medium-sized enterprises possess insufficient resources for investments in the latest technology, which has a negative effect on production efficiency and product quality.

Agricultural cooperatives are practically devastated during the period of transition. They were excluded from the privatisation process, but the unsolved property relations, especially the impact of the grey economy led to their collapse. This is the type of environment where cooperatives had no access to the capital market and they did not even use the incentives from the Ministry. There was a lack of cooperation as well, except in the narrow, local areas. The other associations of producers, although significant in numbers, are underdeveloped, with a low professionally level and lack of managerial staff. Consequently, these associations have a weak bargaining power due to dependence on the processing industry.

Lending is an indispensable condition for the development of small and medium-sized enterprises in agribusiness. Farmers and SMEs in agriculture have the weakest access among all sectors to financial resources in Serbia, offering a poor volume of credit products with excessive interest rates and return periods that are not adapted to agricultural production. The existing mechanisms in agricultural finances are inadequate, and changes should be made in the approach itself. It could be provided through the institutional support, share capital of banks, credit associations and leasing companies. Under the circumstances, the development of small and medium-sized enterprises in agribusiness should take place through family agriculture households (Bogavac-Cvetkovic et al, 2010, p 164).

According to the Business Registers Agency data (2017), the achieved rates of return on the assets engaged in agriculture sector are up to 2,6%, and they are far lower than the interest rates that excess 10% for certain types of commercial loans. In this way, the competitiveness of the economy in the international market is reduced in the long run. The situation would be significantly changed with the formation of a national development bank, which would be professionally and politically-driven, finance long-term projects important for the overall development of the economy, and it would be particularly relevant for the agriculture sector. All of the above mentioned facts indicate that the new agricultural policy must be based on modern management according to the model and experiences of the developed European countries that we strive for in our strategic orientation.

Conclusion

It is an undeniable fact that the sector of agriculture and rural areas in the Republic of Serbia possesses significant resources, both in terms of their volume and diversity. This offers great opportunities for production growth, production and service diversification, and the creation of new, innovative products. On the other hand, serious efforts are necessary for structural reforms in the sector of agriculture and rural areas, with the aim of strengthening their efficiency and competitiveness. Agricultural policy should provide a response to the influence of globalisation that exposed this sector to the fundamental changes, some of the most important being: the increase in industrial production, production differentiation, changes in food demand structure and volume, food supply chains consolidation, etc. All of these things cause a large increase in production risk, especially for small farmers and family households.

Serbia has a strategic interest in further development of the agricultural sector, from the physical growth of production volume, the adjustment to the changed market demands to the provision of competitiveness growth among all the participants in the chain of production, processing and turnover of agricultural products. The increase in the competitiveness of this sector should provide sustainable management of natural resources, poverty reduction and life quality improvement in rural areas. This is the way to reduce (prevent) negative migrations from rural areas to urban centres, especially among the younger population.

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UTICAJ EKONOMSKE POLITIKE NA MENADŽMENT KONKURENTNOSTI POLJOPRIVREDNOG SEKTORA SRBIJE

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Sažetak

U savremenom globalnom okruženju prisutan je trend povećanja i promene strukture tražnje za proizvodima poljoprivrednog sektora. Takva situacija zahteva tržišnu orijentaciju proizvođača agrarnih proizvoda, od privrednih subjekata do pojedinačnih poljoprivrednih gazdinstava, da bi se dao adekvatan odgovor na promenjene uslove okruženja i nove tržišne zahteve. Ulazak i opstanak na razvijenom svetskom tržištu zahteva podizanje konkurentnosti proizvođača agrarnog sektora, koja se ne sme zasnivati samo na niskoj ceni inputa (zemljište, radna snaga), već na primeni savremenih znanja i inovacija, odnosno na sinergetskom efektu svih faktora konkurentnosti. Sa svoje strane, država i lokalne samouprave treba da kreiraju podsticajan društveno-ekonomski ambijent za razvoj sela i poljoprivrede, naročito u nerazvijenim regionima i oblastima Republike Srbije. Nesporni poljoprivredni potencijali mogu značajno da doprinesu poboljšanju spoljno-trgovinskog bilansa, smanjenju javnog duga, smanjenju nezaposlenosti i povećanju životnog standarda stanovništva.

Ključne reči: konkurentnost, poljoprivreda, ekonomska politika, Srbija

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REGIONAL CHARACTERISTICS OF MARKET PRODUCTION OF FRUIT AND GRAPES IN SERBIA¹

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Summary

In the paper analyzes the trends in the development of market production of fruit (on the example of the apple and the plum) and grapes in Serbia from 1976 to 2015. The grouping of the Serbian districts according to the degree of the market production of fruit and grapes in 2015 was performed by a cluster analysis, on the basis of the six features of production, five features of the capacities, and five features of development.

According to the data for 2015, the degree of the marketability of apples in Serbia was 47.7%, plums 15.9%, and grapes 18.3%. The Serbia-North Region shows a surplus in the production of apples, and a deficit in the production of plums (-181.7%) and grapes (-99.1%). The Serbia-South Region has a surplus in the production of the analyzed kinds of fruit (the apple accounting for 43.0%, and the plum 50.9%) and grapes (45.2%).

Keywords: market production of fruit, economic development, I-distance, cluster analysis

JEL: Q-13, O-11

Introduction

Serbia is a traditionally significant producer of all kinds of continental fruit and grapes. Given the commercial, technological and nutritive characteristics of fruit production,

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its development strongly influences the development of not only primary agricultural production and agroindustry, but also the overall economy and especially the rural areas and the country as a whole (Đorović et al., 2008). Fruit growing unites, on the one hand, requirements for the production of ecologically healthy food, whereas on the other, those for the protection of the living environment. In that manner, it becomes an important factor of the improvement of the production of healthy food and the management of the quality of the population's nutrition.

In nutrition, fruits are an important source of vitamins, minerals, and the other ingredients necessary for an organism, which determine the quality of the nutrition of the population of a country. Therefore, the consumption of fruit significantly ranks in the structure of balanced diet. Fruit is a "source of health", an organism's resistance (immunity), physical and mental strengths. The advantage of consuming it reflects in the fact that it is frequently used fresh, directly and without thermal processing, during which precious substances that fruit is rich in are lost (Tomić, 2008).

The great significance of fruit growing reflects in the following: the irreplaceability of fruits in a population's nutrition⁵; raw materials in the development of the food industry and other accompanying activities; the export of fresh or unprocessed fruit to a foreign market; a more balanced utilization of the labor force during the year; a high profit as per unit of area; the utilization of natural resources; combating the erosion of soil; changes in microclimates, the development of bee growing and wood pulp⁶ (Božić, 2005).

An increase in the national income and demand for food products leads to an increase in the consumption of fruits and grapes in their fresh and processed state on the domestic market⁷. Several factors have influenced the growth of demand for fruit, as the basic driver of the development of fruit growing and growth in the marketability of this branch, as well as an increase in the volume of fruit production. Specially significant are the growth of income per capita, changes in the socioeconomic structure of the population in favor of non-agricultural and mixed, the development of the culture of nutrition and habits in fruit consumption, etc. Especially significant is an increase in the consumption of fruit due to the process of the diversification of processing and the emergence of new fruit products⁸.

5 The World Health Organization suggests that, in the structure of the population's nutrition daily energy needs, fruits should account for about 3%. (Božić, 2005).

6 Technical wood, suitable as a raw material for processing (walnut, pear, plum, cherry) and firewood.

7 The consumption of fruit and table grapes oscillates from one year to another, depending on yields, is relatively small and of an unfavorable structure. According to the available statistical data, the consumption of fresh fruit and grapes per capita ranges between 50 and 65 kg. (Đorović et al., 2010).

8 Fruit juices, jams, various pulps, fruit wines, pasteurized and dried fruits, concentrates, candied fruits, brandies of different standards and qualities, products in combination with pastries, yoghurts, ice-creams, chocolate-fruit, confectionaries, etc.

In fruit production, the two tendencies are becoming apparent in the movement and usage of product capacities. On the one hand, the number of fertile trees is increasing, whereas on the other, there is a fluctuation of the areas under orchards. As a result of the policy of stimulating the development of fruit growing in the social sector, until the mid-1980s, there was a tendency for the areas under orchards to increase. The deterioration in the economic conditions was weakening the motive for expanding the production capacities in the social sector. On the other hand, due to the pronounced processes of degrading fruit production, especially with the farming households that had been left without active labor force, fruit plantations were being cleared (Simić et al., 1994). The instability of the movement of the volume of fruit and wine-growing production was influenced by both economic and natural factors.

Even though there has been an ever-increasing influence of growing demand, the diversification of processing and an increase in the processing capacities, traditional factors, such as annual and occasional variations in the climatic conditions, the slow changing of the extensive methods of growing, the insufficient economic motivation of farming households to invest their capital and raise contemporary plantations, etc. still have a significant influence. Even apart from the foregoing, Serbia still has favorable ecological conditions, not only for the traditional production of the apple and the plum, but also for the production and processing of other kinds of fruit and grapes.

The development of the market production of fruit and grapes is influenced by the crop changes that have been made on the world economic scene, the recessive tendencies and the contradictions of the development of agriculture under the influence of business, systemic, economic and ecological determinants, especially during the transition period. For that reason, there is a need for determining the factors of the development of the market production of fruit and grapes in the transition period and the changed external and internal market environment.

In the paper, we start from the hypothesis that, in Serbia, there is a pronounced regionalization of the production of fruit and grapes, especially in we bear in mind the degree of the dependence of these productions on natural conditions. Therefore, we can speak about a pronounced regionality of the production of each of the analyzed kinds of fruit and grapes. The presence of these productions, especially an increase in the degree of marketability, has a positive influence of overall agriculture, i.e. the economic development of the Serbian districts.

The goal of the paper is to analyze the development of the market production of fruit and grapes as per Serbian districts, on the basis of the three groups of features: production, capacities and development. Based on these features, the I-distance (Ivanović's Distance) was applied to rank the Serbian districts.

The results of researching the features of production, capacities and development represent a good ground for the implementation of the production regionalization and conducting a joint agrarian policy as per the districts that belong to the same cluster.

Methods of Work and Data Sources

By analyzing the production of fruit and grapes as per Serbian districts, it was determined that there is a connection between the volume of production, the available capacities and the development level.

While carrying out the analysis of the production of fruit and grapes, the territorial organization of Serbia was taken into consideration. Serbia's territory is shown according to the Regulation on the Nomenclature of Statistical Territorial Units⁹. (Devetaković, 2008) With respect to its territorial organization, Serbia applies the EU standards in the domain of statistical organizing (NUTS and LAW Levels). The NUTS-1 Level of Serbia encompasses 2 regions (Serbia-North and Serbia-South). The NUTS-2 Level encompasses 5 regions (Vojvodina Region, Belgrade Region, Region of Šumadija and West Serbia, Region of Southern and Eastern Serbia and Region of Kosovo and Metohija). The NUTS-3 Level encompasses 25 districts, and the NUTS-4 Level encompasses Serbian municipalities.

The ranking of the districts by applying the I-distance Method was performed on the basis of the three groups of features: a) production (6, from x_1 to x_6): x_1 -apple production as per districts, x_2 -plum production as per districts, x_3 -grape production as per districts, x_4 -the apple marketability degree as per districts, x_5 -the plum marketability degree as per districts, x_6 -the grapes marketability degree as per districts, b) capacities (5, from x_7 to x_{11}): x_7 -the number of the apple fertile trees as per districts, x_8 -the number of the plum fertile trees as per districts, x_9 -the number of the fertile vine stocks as per districts, x_{10} -the share percentage of the areas under orchards, x_{11} -the share percentage of the areas under vineyards, and c) the development level (5, from x_{12} to x_{16}): x_{12} -NI/per capita, x_{13} -the percentage of the non-agricultural population, x_{14} -the percentage of an increase/decrease in the number of the population in 2015 in comparison with 2002, x_{15} -the share of agriculture in the NI of the economy, and x_{16} -the share of industry in the NI of economy.

On the basis of the data as per municipalities, a fact was established that there is a significant difference between the mean value and the median calculated for the data at the district level because the analyzed features as per municipalities do not represent a normal distribution of the data at the district level. Because of that, the ranking of the districts according to the analyzed features was performed on the basis of the medial value as per municipalities. (Stevanović et al., 2016, Lakić et al., 2003)

For each of the mentioned groups of features (production, capacities, development), the I-distance (Ivanović, 1973, 1977, Ivanović et al., 1973, Docampo, 2011, Jeremić, 2012, Hauner et al., 2010, Nita, 2011) was applied to perform the ranking of the districts from 1 to 25 (Rank 1-the best, Rank 25-the worst).

$$D_k = \sum_{i=1}^n \frac{|X_{ik} - X_1^-|}{s_1} \prod_{j=1}^{i-1} (1 - r_{ij}) \quad (1)$$

⁹ Official Gazette of the RS, N^o. 109/09 and 46/10.

By applying the cluster analysis, the homogenous groups of districts in Serbia were defined from the point of view of the volume of the production of fruit and grapes. The similarities between the districts, according to the analyzed features, were defined by the Euclidian measure of distance, whereas the complete linkage method was used to group the Serbian districts. The obtained results of the hierarchical classification are displayed by a dendrogram.

For the analysis of the production and capacities features (x_1-x_{11}), the data stated in the publication entitled *Municipalities in the Republic of Serbia in 2015*, published by the Statistical Office of the Republic of Serbia, were used. Since 2006, the data about the development level feature ($x_{12}-x_{16}$) as per districts have not been published, so for those features the publication entitled *Municipalities in the Republic of Serbia in 2005* were used.

Results and Discussion

In economic development, agriculture provided accumulation and labor force for the development of non-agricultural activities, the production of raw materials for the processing industries, the users of the output of industrial products, whereas the export of agricultural products used to serve to reduce the deficit in the country's foreign-trade balance. Economic development, too, had a positive impact on the development of agriculture, which is reflected in the changing of its structure, i.e. through the growth of the share of highly-accumulative productions (fruit growing, vine growing, cattle breeding, etc.) in the economic structure. For that reason, agriculture is said to be playing a multifunctional role in economic development.

Because of the comparative microclimatic conditions, Serbia has for long been recognized as a vine-growing country. There are areas differentiated as traditional wine-hills, which are known as the regions where quality wine is produced today. (Vlahović et al., 2006)

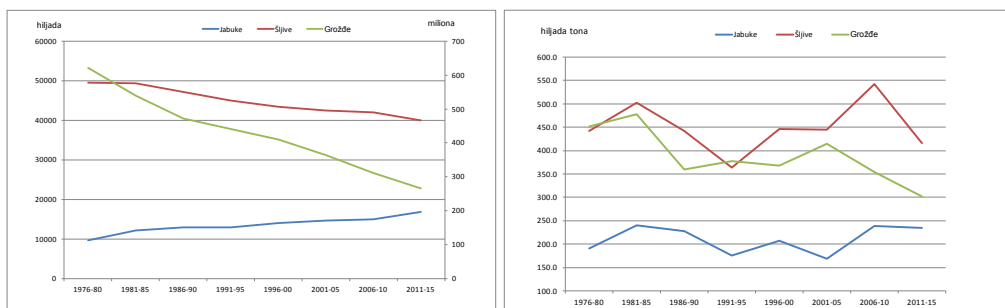
In the period from 1976 to 2015 (Graph 1), the number of the fertile apple trees increased by 1.8 times, from 9.6 to 16.8 trees (i.e. the 1.9% growth rate). The volume of the apple production increased by 23.2%, from 190.7 to 234.5 thousand tons (the 0.6% growth rate), whereas the yield of apples as per tree decreased by 29.7%, from 19.8 to 13.9 kg (the -1.3% growth rate). The decrease in the yield as per tree was a consequence of shifting to growing apples in a contemporary manner. The number of the fertile apple trees ranged from the minimal 8.7 to the maximal 18.4 million, the production ranged from 95.6 to 307.0 thousand tons, and the yield as per tree from 6.0 to 26.0 kg. The average annual fluctuation (standard deviation) in the number of the apple trees was 2.1 million, 42.7 thousand tons in production, and 3.9 kg in the yield as per tree.

The number of the fertile plum trees decreased by 24.8%, from 49.6 to 40.1 million trees (the -0.7% growth rate). The volume of the plum production was reduced by 17.9%, from 442.1 to 416.6 thousand tons (the -0.5% growth rate), whereas the yield of plums as per tree increased by 16.3%, from 8.9 to 10.4 kg (the 0.4% growth rate). The

average annual fluctuation (standard deviation) in the number of the plum trees was 3.4 million, 120.6 thousand tons in production, and 2.9 kg in the yield as per tree. In the analyzed period, the number of the plum fertile trees ranged from the minimal 37.1 to the maximal 50.4 million, production ranged from 197.5 to 662.6 thousand tons, and the yield as per tree from 4.0 to 15.9 kg.

The number of the fertile vine stocks decreased by 65.2%, from 622.0 to 265.2 million vine stocks (the -2.7% growth rate). The volume of the grape production was reduced by 44.2%, from 451.7 to 301.9 thousand tons (-1.4% growth rate), whereas the yield of grapes as per vine stock increased by 71.4%, from 0.7 to 1.1 kg (the 1.4% growth rate). The average annual fluctuation (standard deviation) in the number of the fertile grape stocks was 112.6 million, 89.6 thousand tons in production, and 0.2 kg in the yield as per stock. In the analyzed period, the number of the fertile grape stocks ranged from the minimal 225.5 to the maximal 648.0 million, the production ranged from 182.9 to 630.4 thousand tons, and the yield as per stock from 0.4 to 1.5 kg.

Graph 1. Fertile trees/stocks and the production of apples, plums and grapes in Serbia in the period from 1976 to 2015



Source: Processed by the Author on the basis of the data from the Statistical Office of the Republic of Serbia, Belgrade.

There are big differences in the presence of fruit growing and vine growing as per Serbian regions, not only with respect to the areas, but also with respect to the number of fertile trees/stocks and the kinds of fruit and grapes. According to the data for 2015, the areas under orchards in Serbia accounted for 156.7 thousand ha, i.e. 4.56%, whereas those under vineyards accounted for 22.5 thousand ha, i.e. 0.64%, of the total agricultural areas.

One-half of the total apple production is achieved in the three districts (North Bačka 13.5%, South Banat 11.0% and South Bačka 10.1%) of Vojvodina Region, and one district (Danube-Basin 14.0%) of the Region of Southern and Eastern Serbia. Apart from these, the apple production districts are Srem District, accounting for 8.8%; Belgrade District, accounting for 6.0%, and Zlatibor District, accounting for 5.7%. One-third of the total plum production is generated from the three districts (Mačva District 11.3%, Kolubara District 11.1% and Šumadija District 10.5%) of the Region of Šumadija and Western Serbia. As the more significant districts producing plums,

the following ones should be mentioned: Toplica District 8.5%, Morava-Basin District 6.1%, Nišava District 5.6% and Moravica District 5.4%. Also, one-third of the total grape production is generated from the two districts (Jablanica District 10.8% and Bor District 10.1%) of the Region of Southern and Eastern Serbia, and one district (Rasina District 10.7%) of the Region of Šumadija and Western Serbia. The grape production districts worthy of mentioning are also Nišava District 9.1%, Morava-Basin District 7.7%, Srem District 6.7% and Zaječar District 6.3%.

Table 1. The production of fruit and grapes and the marketability degree as per Serbia's regions and districts in 2015

Actually	Production in t			Marketability degree in %		
	Apple	Plum	Grapes	Apple	Plum	Grapes
Republic of Serbia	332255	738278	320329	47.7	15.9	18.3
I Serbia – North	180778	110941	82847	51.6	-181.7	-59.1
I-1 Belgrade region	19783	34197	16041	-108.0	-329.8	-286.4
I-2 Vojvodina region	160995	76744	66806	71.2	-115.7	-4.5
1.2.1 West Bačka district	6552	7860	4157	32.8	-100.0	-59.5
1.2.2 South Banat district	36495	9509	13543	80.8	-162.8	22.2
1.2.3 South Bačka district	33416	8025	11477	54.8	-572.4	-98.3
1.2.4 North Banat district	2486	6603	6874	-39.6	-87.7	24.0
1.2.5 North Bačka district	44919	12271	4269	90.0	-30.1	-57.7
1.2.6 Central Banat district	7766	8021	5179	43.0	-97.2	-28.8
1.2.7 Srem district	29361	24455	21307	74.6	-9.1	47.2
II Serbia – South	151477	627337	237482	43.0	50.9	45.2
II-1 Region of Šumadija and Western Serbia	64618	424029	77610	25.2	59.3	6.2
2.1.1 Zlatibor district	19010	35878	0	64.4	32.6	0.0
2.1.2 Kolubara district	3237	81984	452	-27.4	82.0	-1273.9
2.1.3 Mačva district	7230	83205	2324	2.4	69.7	-357.3
2.1.4 Morava district	10132	39597	434	50.3	54.6	-1648.3
2.1.5 Pomoravlje district	6615	44914	24656	23.5	59.8	69.1
2.1.6 Rasina district	5623	34999	34272	-1.2	41.9	75.0
2.1.7 Raška district	6368	25872	154	-18.3	-4.0	-7265.8
2.1.8 Šumadija district	6403	77580	15318	-10.1	67.5	30.7
II-2 Region of Southern and Eastern Serbia	86859	203308	159872	56.2	33.2	64.2
2.2.1 Bor district	2197	3897	32370	-32.0	-165.8	86.5
2.2.2 Braničevo district	6359	18472	14201	32.6	17.2	54.6
2.2.3 Zaječar district	3242	12499	20043	14.5	20.8	79.2
2.2.4 Jablanica district	5795	24373	34545	12.3	25.5	77.8
2.2.5 Nišava district	7583	41589	29290	-18.9	22.6	53.6
2.2.6 Pirot district	2784	14388	9090	22.5	46.4	64.2
2.2.7 Podunavlje district	46545	10411	11035	89.8	-62.2	35.5
2.2.8 Pčinja district	4778	14657	2601	-3.2	-20.1	-185.4
2.2.9 Toplica district	7576	63022	6697	71.7	87.9	51.8

Source: Processed by the Author on the basis of the data from the Statistical Office of the Republic of Serbia, Belgrade.

The marketability of apple production in Serbia is around 55%. 40% of annual production is encompassed by total purchase. About 15% of the annual production of apples is circulated through the peasant marketplace. The analysis of the structure of the consumption of plums shows that about 70% of the total produced quantities are

turned to brandy¹⁰, about 12% are dried, about 10% are consumed in the fresh state, and around 8% are processed¹¹. (Đorović et al., 2010) In the grape production structure, table grapes are estimated to account for around 20%, and wine ones around 80%. The marketability of the production has had a significant fall, namely from as much as 15.5% to merely 2%. About 1.8% of annual production is encompassed by total purchase, whereas approximately 0.9% is circulated through the peasant marketplace. (Đorović et al., 2008)

According to the data for the year 2015, the marketability degree¹² of the apple was 47.7%, 15.9% was that of the plum, and that of grapes accounted for 18.3%. The Region of Serbia-North shows a 51.6% surplus in the production of apples, and a deficit of -181.7% in the production of plums and -59.1% in the production of grapes. The Region of Serbia-South recorded a surplus in both of the analyzed kinds of fruit (the apple 43.0%, the plum 50.9%) and grapes 45.2%. Beside Belgrade District, which recorded a deficit, all of the analyzed kinds of fruits and grapes (the apple -108.0%, the plum -329.8% and the grapes -286.4%), adding to it yet 8 districts (North Banat District -39.6%, Kolubara District -27.4%, Raška District -18.3%, Šumadija District -10.1%, Nišava District -18.9%, Bor District -32.6%, Pčinja District -3.2% and Rasina District -1.2%), demonstrated a deficit in the production of apples, ranging from -3.2% to -39.6%. A deficit in the production of plums was recorded in all the 7 districts of Vojvodina Region, ranging from -9.1% in Srem District, to -572.4% in South Bačka District. In yet other four districts of the Region of Serbia-South there was a deficit in the production of plums, ranging from -4.0% in Raška District to -165.8% in Bor District. Only the 3 (South Banat District 22.2%, North Banat District 24.0% and Srem District 47.2%) of the 8 districts of the Region of Serbia-North recorded a surplus in grape production. The deficit in the production of this region ranged from -4.5% in West Bačka District to -286.4% in Belgrade District. Due to unfavorable soil and climate conditions, in the 4 (Zlatibor, Kolubara, Moravica and Raška Districts) of the 8 districts of the Region of Šumadija and Western Serbia, the production of grapes was not, or was but only symbolically, present. With the exception of the Pčinja District, in which the grape production deficit was -185.4%, the other 8 districts of the Region of Southern and Eastern Serbia recorded a surplus in the production of grapes of 35.5% in the Danube-Basin District, up to 79.2% in Zaječar District.

Differently from the apple and the plum, the production of grapes has a more pronounced regional expansion. Due to favorable microclimatic, orographic and soil conditions, the following are Serbia's famous wine hills: Negotinska Krajina, Fruška Gora Mountain, Župa Valley, and Vršac Hill.

10 In the analysis of the marketability of the production of plums, we started from the fact that the plum turned into brandy is realized on the market in a significant quantity, whereas only small amounts of brandy are retained for household needs.

11 By industrial or domestic processing, marmalade, jam, compote, juice, etc. are produced.

12 $((\text{production surplus})/\text{total production}) * 100$

Cluster Analysis of Fruit and Grape Production in Serbia

By calculating the I-distance for the capacities, production and development level features, the ranking of the districts of fruit and grape production in Serbia was performed.

Table 2. The ranks of the districts of the production of fruit and grapes in Serbia according to the I-distance

Districts	Capacities Features		Production features		Development Level Features	
	I-distance	Rank	I-distance	Rank	I-distance	Rank
Rasina district	30.98	1	48.32	2	8.78	16
Podunavlje district	27.49	2	64.54	1	7.80	17
Toplica district	16.25	3	44.35	3	3.96	22
Morava district	16.21	4	41.88	4	11.40	11
Šumadija district	8.09	5	41.53	5	10.54	13
Nišava district	6.10	6	38.33	8	4.98	20
Mačva district	4.88	7	39.63	7	3.48	23
Pomoravlje district	4.66	8	40.49	6	9.63	15
Kolubara district	4.61	9	29.11	21	5.71	19
Zlatibor district	3.92	10	26.91	22	10.01	14
Zaječar district	3.37	11	36.56	9	3.20	24
Jablanica district	3.15	12	32.50	18	10.62	12
Jablanica district	2.99	13	36.14	11	3.07	25
Raška district	2.90	14	32.54	17	15.35	6
Pirot district	2.09	15	33.92	15	18.57	5
Srem district	1.52	16	36.53	10	11.97	9
Braničevo district	1.16	17	35.35	12	4.83	21
Pčinja district	0.76	18	31.85	20	7.75	18
Central Banat district	0.38	19	34.04	14	12.88	7
West Bačka district	0.37	20	34.30	13	22.50	2
Belgrade district	0.22	21	0.00	25	60.14	1
South Banat district	0.12	22	32.01	19	12.19	8
North Bačka district	0.07	23	23.15	23	11.61	10
South Bačka district	0.05	24	32.68	16	19.16	4
North Banat district	0.02	25	20.72	24	20.53	3

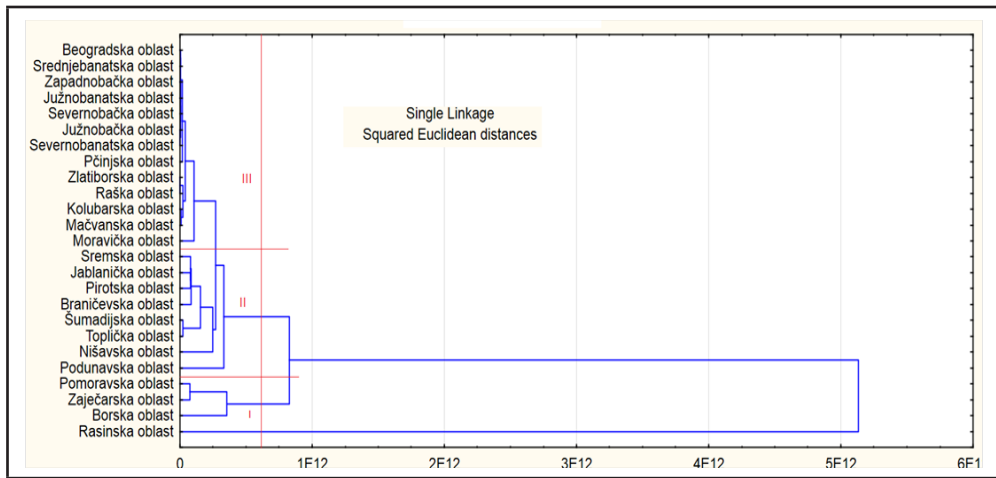
Source: Calculation done by the Author on the basis of the data from the Statistical Office of the Republic of Serbia, Belgrade.

The production of apples and plums is present in all of the 25 districts and that of grapes in 21. There are significant differences in the ranks of the districts of the production of apples, plums and grapes, according to the capacities, production and the development level features (Table 2). The ranks of the first 8 districts according to the capacities and production features have the identical orders, but according to the development features, they belong to the different ranks, from 11 to 24. The said is indicative of the fact that, according to the development features, the districts of the production of apples,

plums and grapes belong to less developed areas, i.e. they are not directly correlated with the development level features. The previously mentioned is also confirmed by the 4 most developed districts, according to the development level features (Belgrade, West Bačka, North Bačka and South Bačka Districts). According to the capacities features, these districts belong to the ranks 20, 21, 24 and 25, whereas according to the production features, they belong to the ranks 13, 16, 24 and 25.

In the dendrogram (Graph 2), the 3 clusters of the districts of the production of apples, plums and grapes in Serbia are identified. The most numerous is the third cluster, encompassing 13 districts, and is followed by the second, encompassing 8 districts, and the first, only encompassing 4 districts.

Graph 2. The dendrogram of the production of apples, plums and grapes as per districts in Serbia



The first cluster includes 4 districts, two from each of the Region of Šumadija and Western Serbia (Morava River Basin and Rasina Districts) and the Region of Southern and Eastern Serbia (Bor and Zaječar Districts). The districts of this cluster are the regions known for grape production. According to the features of the grape production capacities, the districts of this cluster belong to the ranks 1-4, according to the grape production features to the ranks 1-5, and according to the amount of the NI/per capita to the ranks 11 (Morava Basin District) to 23 (Bor District). The marketability of the grape production of this cluster is high and belongs to the ranks 1-6. According to the plum production features, the districts of this cluster belong to the ranks from 5 (Morava Basin District) to 22 (Bor District). The situation is similar when the apple production features are concerned, where the same mentioned districts belong to the ranks from 8 (Morava River Basin District) to 21 (Bor District).

The second cluster includes 8 districts, the 6 districts (Braničevo, Jablanica, Nišava, Pirot, Danube-Basin and Toplica Districts) of the Region of Southern and Eastern Serbia, 1 district (Šumadija District) of the Region of Šumadija and Western Serbia,

and 1 district (Srem District) of Vojvodina Region. According to the apple production features, the districts of this cluster belong to the ranks 1 (Danube-Basin District) to 20 (Pilot District). The ranks of the apple production capacities are worse than the ranks of the production features, which is indicative of the fact that there is intensive apple production taking place in these districts. The exceptions are the Danube-Basin District (Rank 1) and Toplica District (Rank 4), which have the same rank of the apple production and capacities features. According to the plum production features, the districts of this cluster belong to the ranks 4 (Šumadija District) to 19 (Pilot District), whereas according to the capacities features, they belong to the ranks 2 (Toplica District) to 16 (Srem District). With the exception of Šumadija District (Rank 9) and Srem District (Rank 10), according to the development level features, the fields of the second cluster mainly belong to the less developed districts (Ranks 16-24).

The third cluster is the most numerous. The thirteen districts belong to this cluster, of which 7 of the 8 districts in total of the Region of Serbia-South, 5 of the 8 districts of the Region of Šumadija and Western Serbia, and only 1 district of the Region of Southern and Eastern Serbia.

According to the apple production and capacities features, the districts of the third cluster belong to the ranks 2, 3 (Moravica District) to 25 (North Banat District). According to the plum production features, the districts belong to the ranks 1 (Mačva District) to 25 (Belgrade District), and also with respect to the capacities, they belong to the ranks 1 (Moravica District) to 25 (South Bačka District).

According to the development level features, they range from the most developed (West Bačka District – Rank 1, and Belgrade District – Rank 2) to the poorest districts (Pčinja District – Rank 25).

Conclusion

Studying the regional distribution of agricultural production is aimed at perceiving and maximally taking the comparative advantages and possibilities of a faster growth of the agriculture of some area in the biggest capacity in the market conditions of business doing. Simultaneously, the development of market production leads to the creation of the preconditions for a further development of both agriculture and the overall economy.

Due to specific orographic and climatic conditions, the production of grapes shows the biggest regional dependence, whereas the mentioned specificities are less pronounced in the production of apples and plums.

Of the 7 districts as the significant grape producers that account for 61.4% of the total production, the four belong to the first cluster. In the districts that belong to the first cluster, 34.8% of the total grape production in Serbia is realized. The stated data are indicative of the pronounced regionalization of grape production, which has also been confirmed by the dendrogram.

In 6 (North Bačka, South Banat, South Bačka, Belgrade, Zlatibor, and Moravica Districts) of the 13 districts in total that belong to the third cluster, 48.3% of the total apple production is realized. Of that, 33.6% originates from the three districts of Vojvodina Region. The data are indicative of the fact that the districts that belong to the third cluster are significant apple producers.

Differently from grapes and apples, the production of plums is more regionally diversified. Not a single cluster of the three clusters is a region dominant in plum production. Yet, one-half (52.4%) of the total plum production is concentrated in the three (27.8%) districts of the third cluster (Kolubara, Mačva and Moravica Districts) and the three (24.6%) districts of the second cluster (Šumadija, Toplica and Nišava Districts).

The simple correlation coefficients¹³ of the apple, plum and grape production and the NI/per capita indicate a low negative degree of the dependence of these productions and the development levels. So, there is no interdependence between the production of apples, plums and grapes and the level of economic development.

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REGIONALNA OBELEŽJA TRŽIŠNE PROIZVODNJE VOĆA I GROŽĐA U SRBIJI

Simo Stevanović¹⁴, Snežana Stevanović¹⁵, Svjetlana Janković-Šoja¹⁶

Sažetak

U radu je analizirana regionalna obeležja tržišne proizvodnje voća (na primeru jabuke i šljive) i grožđa po oblastima Srbije u periodu 1976-2015. godine. Grupisanje oblasti u Srbiji prema stepenu tržišne proizvodnje voća i grožđa u 2015. godini izvršeno je klaster analizom na osnovu 6 obeležja proizvodnje, 5 obeležja kapaciteta i 5 obeležja razvijenosti.

Prema podacima za 2015. godinu, stepen tržišnosti jabuka u Srbiji iznosio je 47.7%, šljiva 15.9% i grožđa 18.3%. Region Srbija-Sever suficitaran je u proizvodnji jabuka, a deficitaran u proizvodnji šljiva (-181.7%) i grožđa (-99.1%). Region Srbija-Jug suficitaran je u proizvodnji analiziranih vrsta voća (jabuka 43.0% i šljiva 50.9%) i grožđa (45.2%).

Ključne reči: *tržišna proizvodnja voća, privredna razvijenost, I-odstojanje, klaster analiza.*

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ECONOMIC AND LEGAL ASPECTS OF SUNFLOWER INSURANCE USING THE MODEL OF REGIONAL INDEX¹

Todor Marković², Janko Veselinović³, Željko Kokot⁴

Summary

The application of index insurance in agriculture is becoming more and more popular in the last few years, especially in developed countries. Index insurance of crops and fruits is based on data related to a particular administrative unit or region. The regional index represents the average yield or average revenue in a region that is the basis for calculating the premium and insurance compensation. In the case of sunflower production, one of the most frequent crops in the region of Kula municipality, the authors show the methodology of applying the analysed insurance. The main advantage of this insurance model can be the facts that there is no need to estimate the damage, as well as a drastic reduction in morale-hazard. This insurance model can be a significant alternative to classical insurance and its implementation should result in an increase in the number of insured and insured areas. Firstly, it is necessary to remove the potential legal dilemmas about the implementation of this insurance model in Serbia and to define more precisely some legal institutions in this area.

Key words: *insurance, regional index, sunflower, damage assessment, moral hazard.*

JEL: Q14, G22

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Introduction

In the recent years, we have witnessed accelerated climate change around the world. Modern agriculture world is facing many challenges and opportunities for development. It concerns the industrialization of agriculture and processes in the field of biotechnology, changing climatic conditions, opportunities, creating the era of information economy and globalization (Belei, 2017).

Unpredictable climatic events and natural disasters have always influenced to a large extent on the lives of all people on our planet, as well as on various economic activities. Based on the research, it is estimated that even 70% of the world economy is conditioned by weather fluctuations (Jain, Foster, 2000). Climate change projections indicate a major problem that will arise in the future (Fuhrer et al., 2006; Calanca, 2007). Based on this, it is necessary to use various measures to reduce the risk of various weather disasters, as well as the application of various risk management instruments (Bielza et al., 2007) and this issue, which at the same time represents the subject of research of the work itself, is more and more relevant in modern agro-economic literature. As a separate issue, due to the uncontested climate changes, there is a redefinition of the role of the state and local governments in terms of legal regulation and the direct or indirect legal and economic guidance of flows in insurance regarding weather-related fluctuations.

Undoubtedly, the best possible way to manage risk in agricultural production is to insure crops and fruits. In the past, yield insurance systems were mainly considered, and this type of operation function effectively where obligatory insurance is stipulated or there are subsidies from the state (Pretenthaler et al., 2006). Since some of the traditional insurance models have shown several shortcomings, there has always been a need to develop new insurance models that hinder in the meantime. Depending on the criteria, crop and fruit insurance systems can be divided to different ways, and one of the most comprehensive divisions distinguishes insurance against yield loss, success indicators insurance, whole-farm insurance, and index (parametric) insurance (Marković, 2013). Of all the listed systems, index insurance represents a group of the latest insurance models, and its wider application can certainly be expected in the near future. This group includes insurance based on the regional index and weather derivatives. Insurance based on the regional index represents an alternative to traditional multi risk crop insurance, and as a parameter, this type of insurance takes the average achieved yield or the average realized market revenue in a certain region (Marković et al., 2016). The latter type of insurance is based on the product of the average yield and the price for a particular region, and the characteristic of this type of insurance is that the average revenue per area unit in a certain administrative region (district, municipality, etc.) is used as the basis for covering the risk (Dismukes et al., 2013). In this way, protection against loss of revenue due to fall in yield, reduction in purchase prices or a combination of both of these factors is ensured, but this model will be further discussed in another study.

In this paper, special attention is paid to insurance based on the regional yield. In this model, insurance premiums are realized if the average regional yield is below the long-awaited average yield (Skees et al., 1997), whereby it is necessary to check (prove) whether the total insurance payment is conditional on changes in yield. This type of insurance was created in the middle of the last century as an alternative to insuring individual yields, with the aim of reducing moral hazard and negative selection (Halcrow, 1949), but much more attention was devoted to it in the 1990s when it returned to the focus of scientific interests (Miranda, 1991). The condition for the implementation of this concept is the formation of geographic regions, which are homogeneous in terms of climate. This assumes that all agricultural producers in the region pay the same insurance premium, and in the occurrence of the insured case, they will be compensated also in the equal amounts (Ebneht, 2003). The significant advantage of this model in comparison to the classical ones is reflected in the reduction of moral hazard, since individual insurers have no influence on the amount of the regional index achieved, nor on the level of indemnity (Chambers, Quiggin, 2002). Also, insurance based on the level of the regional index is less susceptible to asymmetric information, and it is not necessary to determine the expected yields and/or revenues for each individual farm (Deng et al., 2008). In addition, the aforementioned insurance model provides farmers with a better overall all risk protection in relation to some of the individual insurance (Schlieper, 1997). Among the other advantages of insurance based on the regional index, the elimination of negative selection, reduction of transaction costs, lower franchise and higher coverage level should be highlighted (Wolf, 1998; Ebneht 2003; Hirschauer, Mußhoff, 2008). It is also assumed that the amount of insurance premium per unit of capacity is lower than the amount of the premium in classical and indirect index insurance, which will be verified (proved) below. With this insurance system, several models can be used to determine the insurance premium amount. According to the model used by the World Bank, in a study dedicated to crop insurance in Senegal, the premium is calculated as the sum of the expected loss, the risk margin and administrative costs. Also, the premium can be calculated as the sum of the actuarial fair premium adjusted to the risk, and certain administrative and operational costs (Smith, Watts, 2009).

In Serbia, most insurance companies still apply mainly classical insurance systems for reduced yields, which are based on damage assessment, whereby farmers are insured from basic risks (hail, fire and lightning) and some other additional risks (storms, floods, spring frost). There are no modern insurance systems, although some empirical data indicate a real need for these models. Insurance based on the regional index is certainly one of those whose implementation in Serbia would be desirable. For these reasons, the aim of the research in this paper is to develop the theoretical basis and to present a practical example of insurance based on the regional index, whose characteristics are not well known to the domestic agro-economic public.

In addition to the economic aspect, in order to fully understand this area, it is necessary to analyze the legal aspects of sunflower insurance using the regional index. Due to

the lack of positive legislation in this area, but also because of the poor autonomous sources of rights, such as general business terms and conditions or contracts in this area, it is important to provide answers to some of the questions. The aim of this paper is to provide relevant answers concerning the legal framework and elements of the contract between the insured and the insurer, in this specific legal transaction. The subject of the legal analysis is two relationships, namely: the relationship between local self-government and the insured and relationship between the insured and the insurer. We have paid more attention to another relationship because it is purely legal in nature, while the relationship between local self-government and insured belongs mainly to the sphere of economic policy, which should certainly have its own legal frameworks. The aim of the paper was to come to a concrete example through a theoretical analysis, which can serve both legal theory and practice.

Material and methods

For the purpose of the research, data from the Statistical Office of the Republic of Serbia were used on average areas, achieved yields and realized sunflower production on the territory of Kula municipality. Data were analysed for a period of five years (2010-2014). On the example of the mentioned municipality, the model of insurance application based on the regional index is presented. When using this model, as a regional index, the average yield was used in the analysed period, and the insured area refers to the average area under sunflower in the observed region. The contracted value of certain crops per unit of yield was taken from the Product Exchange in Novi Sad. Assuming the achievement of a lower and higher yield than the average, a simulation of the application of the analysed insurance system is carried out, whereby the following parameters are calculated:

Guaranteed (insured) yield (E_v) represents product of expected average municipality yield (E_{dg}) and contract level of insured coverage expressed in % (D_v):

$$E_v = E_{dg} \cdot D_v \quad (1)$$

Insurance sum per hectare (S_{ve}) is calculated as a product of guaranteed (insured) yield (E_v) and contract value per yield unit (P_p):

$$S_{ve} = E_v \cdot P_p \quad (2)$$

Total insurance sum (ΣS_v) was obtained as a product of insurance sum per area unit (S_{ve}) and total insured area (F_v):

$$\Sigma S_v = S_{ve} \cdot F_v \quad (3)$$

Further, possible loss amount that can be compensated by using analysed model as well as indemnity amount, are obtained by simulation. Realized loss (V_r), expressed absolutely, represents coefficient of difference of insured (guarantee) (E_v) and realized yield (E_r), and insured yield (E_v), and if multiplied with 100 the percentage amount will be obtained:

$$V_r = \frac{E_v - E_r}{E_v} \cdot 100 \quad (4)$$

Insurance indemnity (ΣA_v) is obtained as a product of realized loss expressed in % (V_r) and total insurance sum (ΣS_v):

$$\Sigma A_v = V_r \cdot \Sigma S_v \quad (5)$$

On the other hand, insurance indemnity per area unit (A_{ve}) can be obtained as a product of realized loss expressed in % (V_r) and insurance sum per hectare (S_{ve}), but also as a product of difference of guaranteed (insured) yield (E_v) and realized yield (E_r), and product price (P_p), according to the following formulas:

$$A_{ve} = V_r \cdot S_{ve} \quad (6)$$

$$A_{ve} = (E_v - E_r) \cdot P_p \quad (7)$$

Insurance premium per area unit (K_{ve}) is calculated as a product of premium rate (K_f) and insurance sum per area unit (S_{ve}), provided that the premium rate is 4,6% (Carter et al., 2007):

$$K_{ve} = K_f \cdot S_{ve} \quad (8)$$

At the end, total insurance premium (ΣK_v) is obtained as a product of insurance premium per hectare (K_{ve}) and total insured area (F_v):

$$\Sigma K_v = K_{ve} \cdot F_v \quad (9)$$

Based on the previous mentioned calculations, obtained is amount of insurance cost, as well as total loss value in sunflower production, that can be compensated by applying analysed insurance model. Along with these economic considerations, the analysis of positive legal regulations and practices of insurance organizations in this area was done.

Results and discussion

On the territory of the studied Kula municipality one of the most frequent crops is sunflower, which is grown on the surface of 2,000 ha. Sunflower production is characterized by relatively large oscillations per year in terms of planted areas and total production (*Table 1*).

The cause of these parameters certainly is the occurrence of different production risks that sunflower producers face. Consequences of this are lower production, lower total revenues at the level of all agricultural producers within the observed municipality, and consequently the realization of weaker financial results per capacity unit. Since the risks in the agricultural sector are specific, management also requires specific models.

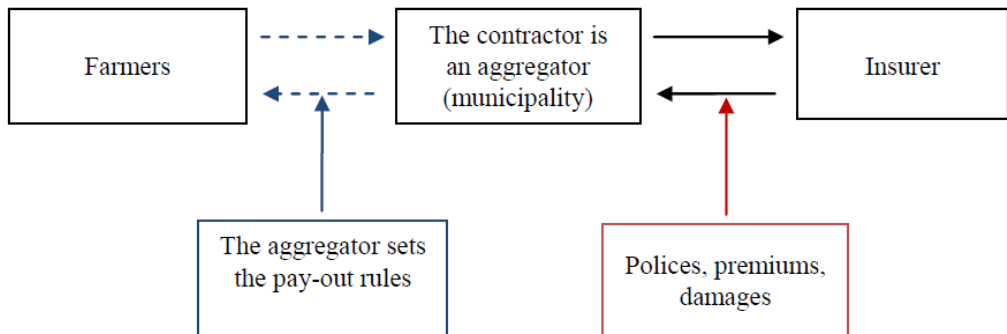
Table 1. Sunflower production in Kula municipality (2010-2014)

Parameter	Average (without extreme)	Variation coefficient (%)	Variation interval		Change rate (%)
			Minimum	Maximum	
Area (ha)	1.993	13,5	1.613	2.391	-9,37
Yield (kg/ha)	2.876	16,3	2.112	3.402	3,30
Production (t)	5.711	16,5	4.095	6.768	-6,37

Source: Authors based on Statistical Office of the Republic of Serbia

This paper analyses the model of insurance that includes insurance of yield loss in certain crops in the region. On a concrete case of sunflower production, an example of index insurance at the municipal level is given, within which protection from production losses is provided through a program of insurance and reinsurance against the consequences of all natural and climatic risks (drought, hail, flood, storm, cold, excessive precipitation etc.), which can lead to a significant reduction in yields and based on that market value of production. There are several key differences between micro-aspect insurances, that is, at the level of individual farmers and insurances, which are concluded on the so-called mezzo-level, that is, from the aspect of local self-government (municipality).

Schema 1. Program for insurance of revenue loss in Serbia on mezzo-level



Source: www.europa-re.com

Differences are reflected in the fact that at the mezzo-level, local self-government, or more precisely, the municipality, appears in the function of the insurance contractor and the insured, whereby it is responsible for paying the entire insurance premium. The municipality should decide which agricultural producers want to insure, which crops will be the subject of insurance, and then to decide on the breadth of the protection program it wants to buy, i.e. the total area it wishes to insure, the level of insurance yield coverage, as well as the sum of insurance per area unit. If a yield achieved at the municipal level is below the agreed yield, the right to indemnity is obtained. It is calculated on the basis of the percentage of contract yield reduction. The yield insurance at the municipal level allows the conclusion of the guaranteed (insured) yield and yield coverage of at least 60%, and at most 90% of the expected municipal yield. Below is

the example of the functioning of this new insurance mechanism, i.e. an example of calculating insurance premiums in the case of a sunflower yield insurance contract, with a 15% reduction in the average municipal yield (*Table 2*).

In the five-year period at the level of the analysed municipality, without extreme values, the average yield of 2,876 kg/ha is realized in sunflower production. The sunflower was cultivated on an area of 1,993 ha. Based on average data on areas and yields, using the formula in the method of paper, the values of guaranteed yield (1), insurance sum per area unit (2), and at the end of the total amount of insurance (3) were obtained. For 2016, certain yields are assumed that are lower and higher than the average yield. The lower yield option, using the formula (4) specified in the method of paper, assumes the realized losses of 24.34%. On this basis, the insurance indemnity based on the formula (5) is made, with the payment amounting to RSD 40.3 million with the insured sunflower production, while in the option with higher yield, there is no compensation. Also, using the formulas (6) and (7), the amount of insurance indemnity per hectare is reached (20.230 RSD). Based on the formula (8) the amount of insurance premium per unit of capacity is 3,824 RSD. This is approximately the same, or even lower, compared to premiums in classical insurance (Marković, 2013), or below the level of premiums for indirect index insurance (Marković et al., 2013). Regardless of the realized yield, according to the formula (9), the insured persons have an obligation towards the insurer in the amount of 7,621,192 RSD, what is the total insurance premium at the level of the observed municipality.

Table 2. Calculation of insurance indemnity using model based on regional index

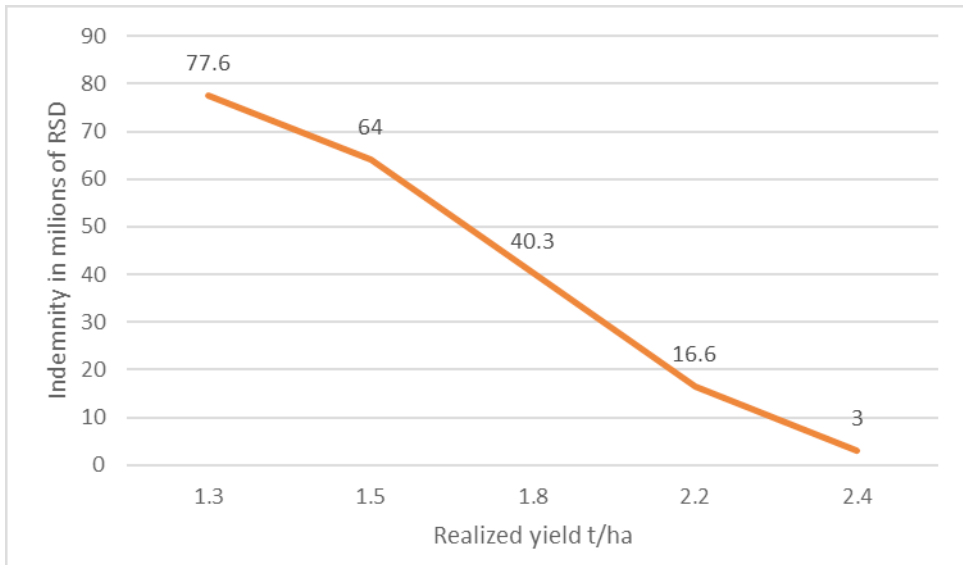
	Sunflower	
	Average yield at the municipality level (E_{dg}) (kg/ha)	2.876
Contract level of insurance coverage (D_v) (%)	85	85
Guaranteed (insured) yield (E_v) (kg/ha)	2.445	2.445
Contract price (P_p) (RSD/kg)	34	34
Insurance sum per ha (S_{ve}) (RSD/ha)	83.130	83.130
Insured area (F_v) (ha)	1.993	1.993
Total insurance sum (ΣS_v) (RSD)	165.678.090	165.678.090
Realized yield in 2016 (E_r) (kg)	1.850	3.700
Realized loss	0,24335	0
Realized loss (V_r) (%)	24,34	0
Insurance indemnity (ΣA_v) (RSD)	40.317.763	0
Insurance indemnity (A_{ve}) (RSD/ha)	20.230	0
Insurance premium amount (K_{ve}) (RSD/ha)	3.824	3.824
Insurance premium amount (ΣK_v) (RSD)	7.621.192	7.621.192

Source: Authors' calculation

Total insurance indemnity is directly caused by changes in yield. With increasing of yields, it decreases and at a certain point it is equal to zero, i.e. there will not be insurance indemnity if the average realized yield at the level of the analysed region (municipality) reaches the amount of the guaranteed yield. In cases with 85% coverage level, the guaranteed yield of sunflower would be 2,445 kg/ha. Graph 1 shows the movement of potential insurance indemnities, depending on the movement of the realized yield.

Similar observations apply to other coverage levels. The basic differences are reflected in the amount of the guaranteed yield, the amount of the total insurance sum and the amount of insurance indemnity. The lower the coverage level, the mentioned parameters have less value. Regardless of the defined level, this model insures all yields lower than the insured (guaranteed) yield, based on the concluded contract between the insured and the insurer.

Graph 1. Movement of insurance indemnities at the level of the analysed municipality



Source: Authors

Analysing the sources of positive law, it was determined that in our country this area is not regulated by law. On the other hand, it has been established that there are no autonomous sources of law in this area either. It was found that insurance companies do not offer this form of crop insurance. It has been determined that this form of insurance belongs to the group of non-compulsory insurances and that the state does not provide support for this type of insurance within its incentive measures.

In legal terms, there are two relationships here. The first relationship is between the municipality, the insured and the insurance organization. The second relationship is between the municipality and sunflower producer. By the means of regulation, states are trying to replace or supplement those market mechanisms that do not fulfil their role satisfactorily (Lakićević et al., 2013).

The first relationship is double-sided, while the relationship of the municipality and agricultural producers could be classified into the category of insurance in favour of third parties in which this third party has no obligation towards the insured. Agricultural producers would be beneficiaries of indemnity if the insured event occurs, or if the regional yield is less than 2,445 kg/ha. And the other relationship would become obligatory if the agricultural producers would undertake a contractual obligation to compensate the municipality for part or whole premium. However, in our law, this insurance category was not in use, and not all legal repercussions of this work are known. In particular, the position of local self-government regarding the possibility of concluding insurance in favour of third parties could be analysed. Although it could be classified as a subsidy, there are some differences in comparison to the classical forms of subsidies. The special legal issue is how to treat income from farmers based on their participation in the payment of the premium in the terms of law and finance.

There are several reasons for not implementing the insurance contract by applying a regional index. The first reason is economic by its nature because most of our local self-governments do not have enough economic resources to secure crops in their territory in this way (Veselinović et al., 2014). Another reason is the lack of interest of insurance organizations for this type of insurance and this contract, as well as insufficient education of agricultural producers in Serbia regarding the characteristics of this contract. The third reason is inadequate legal education and the lack of comparative practice in this area. In order to examine the possible elements of the insurance contract using a regional index, the following example is given (Table 3):

Table 3. An example of a sunflower insurance contract using a regional index

Insurance contract based on a regional index	
Contracting Parties	
Kula Municipality Kula, Street and Number, Serbia (Insured)	Name of Insurer Novi Sad, Street and Number, Serbia (Insurer)
Article 1. Subject of the contract	
The subject of this Contract is the payment of the monetary compensation of the Insurer to the Insured, which refers to the regional yield on the sunflower line, which will be planted in 2016 in the Kula municipality, on a total area of 1,993 hectares on the parcels that are attached to this contract. The basis for payment is the difference between the guaranteed (insured) yield per hectare and the realized sunflower yield per hectare in 2016, and according to the sunflower price on the Product Exchange in Novi Sad on August 20 th , 2016.	
Article 2. Guaranteed (insured) yield	
Guaranteed (insured) yield is 2,445 kg per hectare.	

<p style="text-align: center;">Article 3.</p> <p style="text-align: center;">Insurance sum per hectare and total insurance sum (RSD)</p> <p>Contract sunflower price per kilogram is 34.00 RSD. Total insurance sum is 165,678,090.00 RSD.</p>
<p style="text-align: center;">Article 4.</p> <p style="text-align: center;">Realized yield</p> <p>The realized yield shall be determined considering the realized yield of sunflower per hectare and the total yield of sunflower on the total area, expressed in kilograms, on parcels referred to in Article 1 of this Contract. The commencement harvest date, taking into account the created conditions of grain maturity and weather conditions, is determined by the Insured, with the notification of the Insurer.</p> <p>Sunflower yield is determined based on the measurement of yield at 10 referenced places, with the size of 1 ha, and an average yield on these plots is multiplied by the total number of hectares (1,993) and thus results in an overall value of the yield.</p> <p>Measurement will be done when harvesting sunflower seed, according to pre-agreed activities, and measurement will be carried out by a control organization authorized by both contracting parties. Both contracting parties have the right to supervise the work of the control organization.</p>
<p style="text-align: center;">Article 5.</p> <p style="text-align: center;">Insurance premium</p> <p>Insured pays to the Insurer premium in the amount of 3,824 RSD per hectare. Total insurance premium amount is 7,621,192.00 RSD.</p> <p>The premium is paid within the set deadlines as follows: (timely define the payment terms for the premium)</p>
<p style="text-align: center;">Article 6.</p> <p style="text-align: center;">Compensation for the lower yield than the guaranteed (insured)</p> <p>The Insurer is obliged to pay the Insured a reduction in the yield according to the application of the regional index for the reduction of the guaranteed (insured) yield referred to in Article 2 of this Contract. The Insurer is obliged to pay out the value corresponding to the difference between the guaranteed (insured) and the realized yield from the insurance. The Insurer for the realized loss pays the monetary amount to the Insured.</p>
<p style="text-align: center;">Article 7.</p> <p style="text-align: center;">Participation of the Insured in the risk coverage</p> <p>Insured participate with 10% in risk coverage.</p>

<p>Article 8.</p> <p>Control of the application of agro-technical and other measures</p> <p>The Insured is obliged to ensure that sunflower producers on the insured areas carry out agro-technical measures at least at the realized level in the previous referenced period, and the presentation of these measures is attached to this Contract making an integral part of it. An authorized person of an insurance organization will exercise control over the application of agro-technical measures that may affect the yield of sunflower on the parcels referred to in Article 1 of this Contract.</p>	
<p>Article 9.</p> <p>Dispute resolution</p> <p>An ad hoc arbitration shall be formed by the contracting parties in order to settle disputes relating to this Contract by each contracting party appointing one arbitrator, and the appointed arbitrators shall appoint a third arbitrator, and also the chairman of ad hoc arbitration. An ad hoc arbitration decision has the force of an executive court ruling. Ad hoc arbitration will apply the rules of the Foreign Trade Arbitration of the Serbian Chamber of Commerce.</p>	
<p>Article 10.</p> <p>Number of contract copies</p> <p>The Contract is made in 4 (four) copies, 2 (two) for each contracting party.</p>	
<p>Article 11.</p> <p>Place and date of the contract conclusion</p> <p>The Contract is entered in Novi Sad on December 17th, 2015.</p>	
<p>Insured</p> <p>Signature</p>	<p>Insurer</p> <p>Signature</p>

Source: Authors

The insurance contract of crops and fruits by applying the regional index by its legal nature is sui generis (Carić et al., 2011). It also contains elements of the insurance contract of yield, insurance against weather conditions, but also from the price fluctuations on the market. For farmers, which would thus be insured, this would mean safety in terms of climate fluctuations, but also partly in terms of fluctuations in the agricultural product market, because it could be counted with a defined yield. In agricultural production, this can also mean the insurance of unforeseen plant diseases. Compared to the classic insurance contract, this means that this contract involves several risks in one (Veselinović, 2011). In this way, one premium includes insurance against several uncertain events, which is not a feature of classic insurance contracts.

Conclusion

Agricultural production, as one of the most important sectors of the economy, is faced with numerous production risks, whose specificity is conditioned upon their quality management. This is reflected in the direct dependence of the achieved results and

weather conditions. In order to manage these specific risks, the best solution is offered by various insurance systems. One of the newer models is also insurance based on the achieved regional yield, whose use can greatly reduce significant damage that often affects certain regions. On the example of the analysed municipality, observing the sunflower, one of the most common crops, potential losses can be compensated in production in the form of a maximum payment of 40.3 million RSD, at the level of 85% coverage of the average yield. On the other hand, the insurance premium cost (3,824 RSD / ha) can be lower than in the conventional crop insurance system, as well as in indirect index insurance, which is certainly positive from the aspect of the limited financial power of the farmers.

With a clear strategy at the state level, and by establishing a legal framework and financial incentives, the analysed insurance model in Serbia could be successfully implemented, and thus insure many agricultural producers who perform their activities in climatically unstable regions. A comprehensive analysis of the legal aspects of this contract, with a comparative analysis, would contribute to its easier implementation in economic practice.

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EKONOMSKI I PRAVNI ASPEKTI OSIGURANJA SUNCOKRETA KORIŠĆENJEM MODELA REGIONALNOG INDEKSA

*Todor Marković*⁵, *Janko Veselinović*⁶, *Željko Kokot*⁷

Sažetak

Primena indeksnog osiguranja u poljoprivredi postaje sve zastupljenija u poslednjih nekoliko godina, posebno u razvijenim zemljama. Indeksno osiguranje useva i plodova bazirano je na podacima vezanim za određenu administrativnu jedinicu ili region. Regionalni indeks predstavlja prosečan prinos ili prosečnu vrednost proizvodnje u nekom regionu koji predstavlja osnovu za izračunavanje premije i naknade iz osiguranja. Na primeru proizvodnje suncokreta, kao jednog od najzastupljenijih useva u regionu opštine Kula, autori prikazuju metodologiju primene analiziranog sistema osiguranja. Kao osnovne prednosti ovog modela osiguranja mogu se navesti činjenice da ne postoji potreba za procenom štete, kao i drastično smanjenje moral-hazarda. Navedeni model osiguranja može predstavljati značajnu alternativu klasičnom osiguranju i njegova primena bi trebala da rezultira povećanjem broja osiguranika i osiguranih površina. Prethodno je potrebno otkloniti potencijalne pravne nedoumice oko primene ovog modela osiguranja u Srbiji i preciznije definisati neke pravne institute u ovoj oblasti.

Ključne reči: *osiguranje, regionalni indeks, suncokret, procena štete, moral-hazard*

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CHARACTERISTICS OF A DOUBLY-FED ASYNCHRONOUS GENERATOR APPLIED IN WIND TURBINES¹

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Summary

A mathematical model of a doubly-fed asynchronous generator is defined in the paper, using spatial vector theory, in relation to the reference axis associated with the stator. Expressions for characteristic quantities are derived, and operational characteristics for the torque, active and reactive power, power factor, and efficiency are plotted, from which generator operation is analysed at different rotational speeds. Based on this, possibilities and advantages of using doubly-fed asynchronous generators in wind turbines, for obtaining electrical energy from wind energy, are deduced.

Key words: *renewable sources, wind turbines, sustainable development.*

JEL: *Q1, Q19*

Introduction

For decades, electrical power was being obtained from conventional sources: coal, oil, gas, nuclear fuel. However, this production is accompanied by some undesirable effects, among which environmental pollution is the most severe, and even alarming. On the other hand, timescale for the recovery of fossil fuel is too long, and the reserves of it are being gradually exhausted.

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It is for these reasons that exploitation of alternative or renewable sources for electric energy production began at the end of the last century. Among these, wind stands out as the most important, since it has immense capacity and is cost-free, ecologically clean, and unrestricted in time.

In certain developed countries, already more than one quarter of electric power comes from wind power stations, and this share tends to grow rapidly (Pettersson, 2005).

Renewable energy potential in Serbia, excluding large hydro power plants, is estimated to 25 % of the primary power consumption (Radojević et al., 2009). Next to the biomass, there is a number of different renewable energy sources, such as wind energy, small hydro power plant, geothermal energy and the solar energy. Even though the biomass energy source currently has the largest potential, it is not sustainable as wind and solar energy, which cannot be exhausted (Milanović, Cvijanović, 2009).

The energy-consumer requirements in Serbia are highest during the winter. The maximum availability of the wind energy typically occurs during the winter, while the solar energy peaks occur in the summer (Gburčik, Mastilović, Vučinić, 2013).

The amount of solar energy received over the vegetation period is also important for calculating the potential for biomass production. According to Project Report (Gburčik et al., 2013), daily amounts of solar energy during the vegetation period ranges from 4.9 kWh/m² on the west, to 5.7 kWh/m² on the southeast of Serbia.

Considering the geographical position of Serbia and the climatic conditions, the most suitable model for supplying agricultural property from renewable sources for their sustainable development is a hybrid model, which consists of wind generators and solar panels.

A region with fertile agricultural land and with locations potentially suitable for the construction of wind generators in Serbia is located north of the Danube River, i.e. wider region of the territory where wind kosava blows. This area covers about 2000 km² and is suitable for the construction of wind generators (Mikičić et al., 2006).

The objective of this article is to present a brief assessment of the variable-speed wind turbine with doubly-fed induction generator (DFIG) because of its advantages, such as small power converter rating and the ability to control the output power.

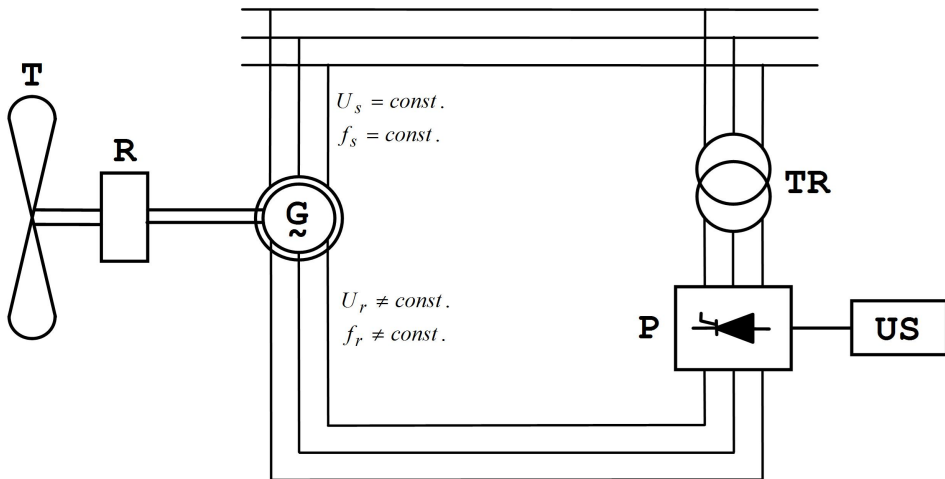
Choice of an appropriate electric generator is crucial in the process of converting wind energy into electric power, due to the stochastic nature of the wind. The essence of this conversion lies in making the wind turbine efficiency as large as possible. This means that at every wind speed maximum electric power of desired quality should be obtained (Vukić et al., 2006).

The use of standard generators comes with a lot of problems. The most acceptable solution is found in using a doubly-fed asynchronous generator, (Figure 1.), especially for high power, because it allows the rotating speed of the wind turbine to change efficiently within a wide range. The speed can change to become either lower or higher than the synchronous speed (Adjoudj et al., 2011).

The stator is connected directly to the grid, while the rotor circuit contains the voltage and frequency energy converter, which also enables the electric current to flow in both directions (Krause, 2013).

Mathematical model of a doubly-fed asynchronous generator is defined by using spatial vector theory (Justo et al., 2014; Mohammadi et al., 2014). Usually asynchronous machines are modelled using the well-known “T-form” equivalent circuit with self and mutual inductances. Expressions for all characteristic quantities are derived from general voltage and flux equations. Operational characteristics are plotted as functions of both the load and the slip angle. Conclusions about the applicability of doubly-fed asynchronous generators in wind power stations and the advantages they offer are drawn from the analysis of specific quantities (Quang, Ditttrich, 2015; Leonhard, 2001).

Figure 1. Schematic representation of a doubly-fed asynchronous generator.



Mathematical model for a doubly fed asynchronous generator

Since the operation of the doubly-fed asynchronous generator is considered in synchronous regime (controlled frequency is set independently), it is most convenient to use a mathematical model obtained from spatial vector theory (Elhassan et al., 2014; Padrón et al., 2010; Boardman et al., 2003), defined relative to the reference axis associated with the stator, the speed of which equals the synchronous speed ω_s .

Speed regulation is possible both above and under the synchronous speed, as well as in both directions (Milkić et al., 2014). Angular velocity is defined by:

$$n = \frac{60}{\Pi} (f_1 \mp f_2) \tag{1}$$

The mathematical model can be represented by the following set of complex equations (Milkić et al., 2014; Soens et al., 2003):

$$\mathbf{U}_s = -\mathbf{I}_s R_s - d\boldsymbol{\Psi}_s / dt - j\omega_s \boldsymbol{\Psi}_s \quad (2)$$

$$\mathbf{U}_r = -\mathbf{I}_r R_r - d\boldsymbol{\Psi}_r / dt - j(\omega_s - \omega) \boldsymbol{\Psi}_r \quad (3)$$

$$\boldsymbol{\Psi}_s = \mathbf{I}_s L_s + \mathbf{I}_r L_m \quad (4)$$

$$\boldsymbol{\Psi}_r = \mathbf{I}_s L_m + \mathbf{I}_r L_r \quad (5)$$

Using the differentiating operator p voltage and flux equations, observed in the said reference frame and expressed in relative units, are:

$$\mathbf{u}_s = -\mathbf{i}_s r'_s - (p + j) \boldsymbol{\Psi}_s \quad (6)$$

$$\mathbf{u}_r = -\mathbf{i}_r r'_r - (p + js) \boldsymbol{\Psi}_r \quad (7)$$

$$\boldsymbol{\Psi}_s = \mathbf{i}_s x_s + \mathbf{i}_r x_m \quad (8)$$

$$\boldsymbol{\Psi}_r = \mathbf{i}_s x_m + \mathbf{i}_r x_r \quad (9)$$

where x_s and x_r are total inductive reactances per phase of the stator and the rotor, respectively while the slip is defined as:

$$s = f_r / f_s = (\omega_s - \omega) / \omega_s \quad (10)$$

Stationary operation is considered, so plugging $p = 0$ into (6) and (7) yields:

$$\mathbf{u}_s = -\mathbf{i}_s r'_s - j \boldsymbol{\Psi}_s \quad (11)$$

$$\mathbf{u}_r = -\mathbf{i}_r r'_r - js \boldsymbol{\Psi}_r \quad (12)$$

$$\boldsymbol{\Psi}_s = \mathbf{i}_s x_s + \mathbf{i}_r x_m \quad (13)$$

$$\boldsymbol{\Psi}_r = \mathbf{i}_s x_m + \mathbf{i}_r x_r \quad (14)$$

The stator voltage vector \mathbf{u}_s is taken to define the positive direction of the real axis, while the rotor voltage vector \mathbf{u}_r leads by an angle \mathcal{G} . Hence:

$$\mathbf{u}_s = u_s \cdot e^{j0^\circ}, \quad \mathbf{u}_r = u_r \cdot e^{j\mathcal{G}} \quad (15)$$

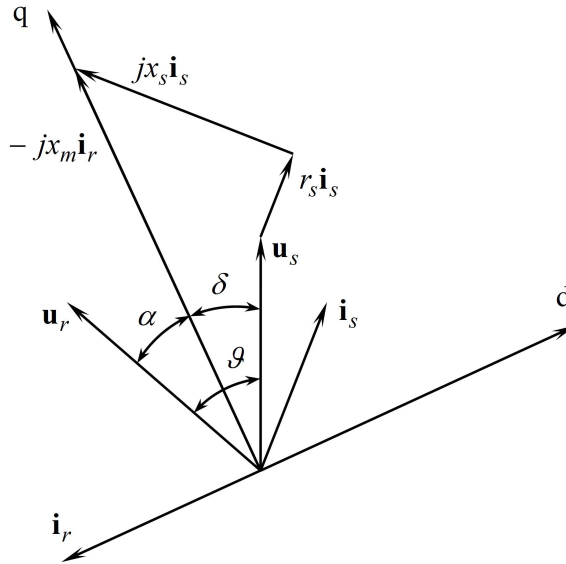
where \mathcal{G} is the phase angle between stator and rotor voltage vectors. Vector diagram for the doubly-fed asynchronous generator (Muller et al., 2002) in the synchronous operating mode shows that the phase angle between stator and rotor voltage vectors \mathcal{G} and the angle between the stator axis and the stator voltage vector δ (called the load angle, in line with synchronous machine terminology) are related as (Figure 2.):

$$\delta = \vartheta - \alpha \tag{16}$$

where the angle α is given by:

$$\alpha = \arctg \frac{sr_s x_r - r_r x_s}{r_s r_r + sx_s x_r - sx_m^2} \tag{17}$$

Figure 2. Phasor diagram for a doubly fed asynchronous generator



Operational characteristics

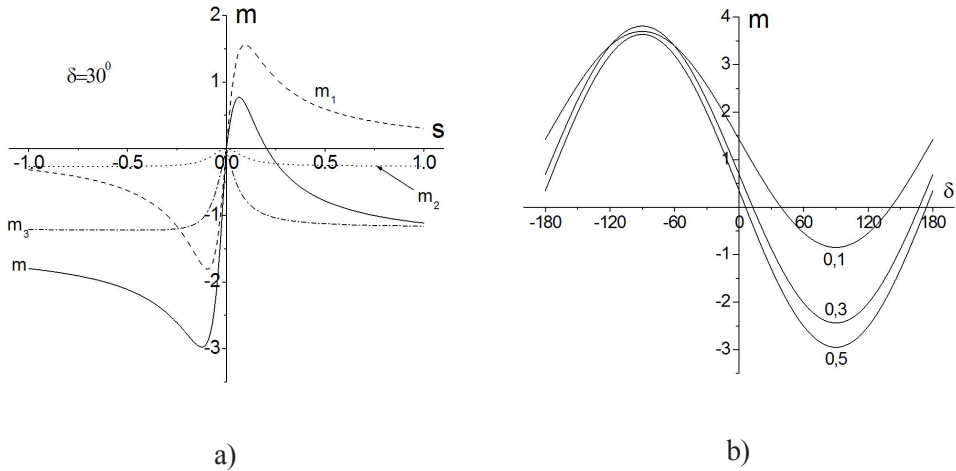
Solving the voltage and flux equations (11), (12), (13) and (14), taking into account assumptions (15), (16) and (17), yields expressions for characteristic quantities of a doubly-fed asynchronous generator in the synchronous operating regime. Operational characteristics are plotted for an asynchronous generator with 200 kVA nominal power, for which the parameters from the equivalent scheme, expressed in relative units, are: $r_s=0.022 p.u.$, $r_r=0.026 p.u.$, $x_{sy}=0.14 p.u.$, $x_{ry}=0.14 p.u.$ and $x_m=3.4 p.u.$. Voltage and frequency of the stator remain constant, while rotor quantities change, with a constant ratio of rotor voltage and frequency $u_r/f_r=const$. Since $s=f_r/f_s$, in relative units $u_r=s$.

Electromagnetic torque

General expression for the electromagnetic torque of a doubly-fed asynchronous generator is:

$$m_{em} = \frac{u_s^2}{k_1^2 + k_2^2} (sr_r x_m^2 - u^2 r_s x_m^2) + \frac{u_s^2}{k_1^2 + k_2^2} ux_m \left[-(r_s r_r + sx_s x_r - sx_m^2) \sin \vartheta + (sr_s x_r - r_r x_s) \cos \vartheta \right] \quad (18)$$

Figure 3. a) Dependence $m = f(s)$; b) Dependence $m = f(\delta)$.



Expressed as a function of the load angle the electromagnetic torque is:

$$m_{em} = \frac{u_s^2}{k_1^2 + k_2^2} (sr_r x_m^2 - u^2 r_s x_m^2 + ux_m \sqrt{a^2 + b^2} \cdot \sin \delta) = m_1 + m_2 + m_3 \quad (19)$$

where: $k_1 = r_s r_r - s(x_s x_r - x_m^2)$, $k_2 = sr_s x_r + r_r x_s$, and $u = u_r / u_s$.

The torque consists of three components. The first two (m_1) and (m_2) are asynchronous, while the third (m_3) is a synchronous component that corresponds to the angular torque of the synchronous generator to whose rotor voltage u_r is applied. Fig. 3.a) shows the three components of the torque, as well as the resultant torque, versus the slip angle, for a load angle of $\delta=30^\circ$. Owing to the presence of the synchronous component, the resultant torque is at its maximum for $\delta=\pi/2$ regardless of the slip, as shown in Fig. 3.b).

Stator and rotor powers

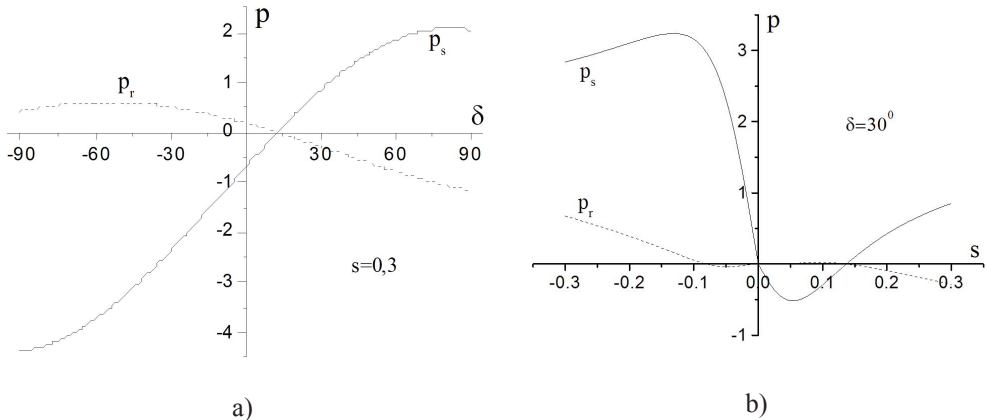
Final expressions for stator and rotor active power are, respectively:

$$p_s = \frac{u_s^2}{k_1^2 + k_2^2} [(r_r k_1 + s x_r k_2) - u x_m (k_2 \cos \vartheta + k_1 \sin \vartheta)] \tag{20}$$

$$p_r = \frac{u_s^2}{k_1^2 + k_2^2} [u s x_m (k_1 \sin \vartheta - k_2 \cos \vartheta) + u^2 (r_s k_1 + x_s k_2)] \tag{21}$$

Dependences of active power (equations (20) and (21)) on the load and the slip angle are presented in Figs. 4. a)...b) for both stator and rotor, while reactive power curves (based on expressions (22) and (23)) are shown in Figs. 5. a)... b).

Figure 4. a) Dependence $p = f(\delta)$; b) Dependence $p = f(s)$.

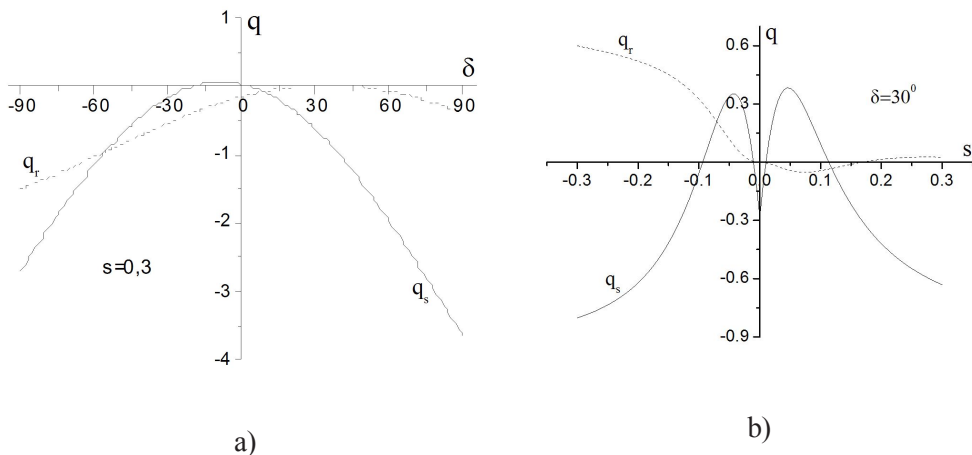


The equations for stator and rotor reactive power are:

$$q_s = -\frac{u_s^2}{k_1^2 + k_2^2} [(s x_r k_1 - r_r k_2) - u x_m (k_1 \cos \vartheta - k_2 \sin \vartheta)] \tag{22}$$

$$q_r = -\frac{u_s^2}{k_1^2 + k_2^2} [u^2 (x_s k_1 - r_s k_2) - u s x_m (k_1 \cos \vartheta + k_2 \sin \vartheta)] \tag{23}$$

Figure 5. a) Dependence $q = f(\delta)$; b) Dependence $q = f(s)$.



Analysis of characteristics shown in the figures provides insight into a specific power flow in the doubly-fed asynchronous generator. When the generator works with speeds that are lower than the synchronous speed (positive slip), active power is transmitted to the load at stator side, while rotor consumes active power from the grid. However, in the supersynchronous regime ($s < 0$), both the stator and the rotor supply the grid with active power. This is a great advantage, because double feeding can lead to an operation mode with a power higher than nominal, since total active power equals the sum of active powers from both the stator and the rotor.

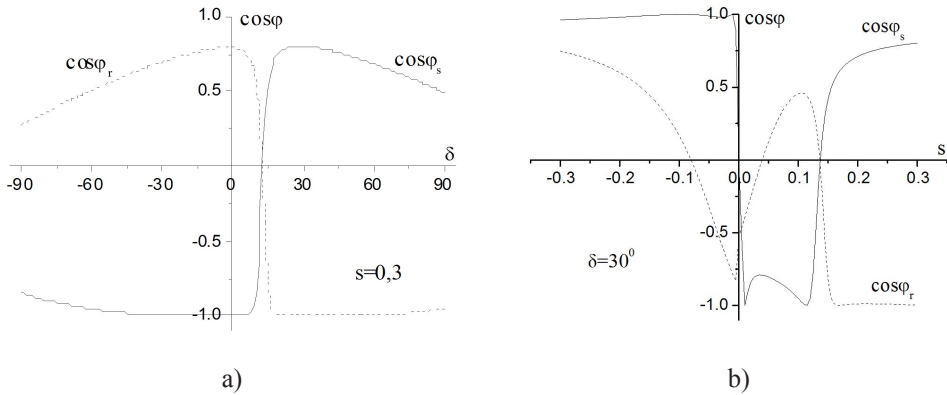
Stator and rotor power factors

In order to meet specific needs of electric power systems, a doubly-fed asynchronous generator, intended for producing active power, in some cases also has to produce reactive power, i.e. it has to work with a desired stator power factor. Figs. 6. a)...b) show the dependences of the power factor on the load angle and slip, respectively. It can be inferred from these graphs that by setting an appropriate rotor voltage change, constant power factor operation can be achieved.

$$\cos \varphi_s = \frac{(r_r k_1 + s x_r k_2) - u x_m (k_2 \cos \vartheta + k_1 \sin \vartheta)}{\sqrt{(k_1^2 + k_2^2) [(r_r^2 + s^2 x_r^2) + u^2 x_m^2 - 2 u x_m (s x_r \cos \vartheta + r_r \sin \vartheta)]}} \quad (24)$$

$$\cos \varphi_r = \frac{u (r_s k_1 + x_s k_2) - s x_m (k_2 \cos \vartheta - k_1 \sin \vartheta)}{\sqrt{(k_1^2 + k_2^2) [s^2 x_m^2 + u^2 (r_s^2 + x_s^2) - 2 u s x_m (x_s \cos \vartheta - r_s \sin \vartheta)]}} \quad (25)$$

Figure 6. a) Dependence $\cos\varphi = f(\delta)$; b) Dependence $\cos\varphi = f(s)$.



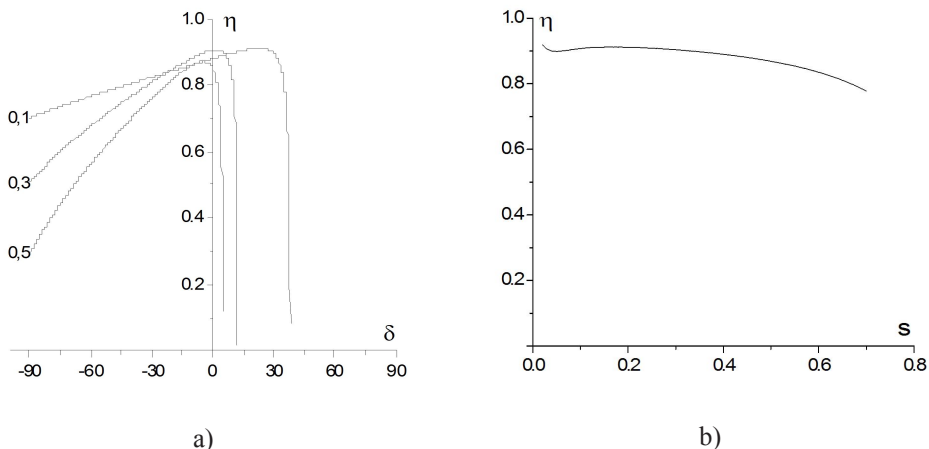
Efficiency

The main indicator of how economic the operation of a doubly-fed asynchronous generator is, comes from analyzing the characteristics of its efficiency, Figs. 7. a)... b), obtained from expression:

$$\eta = 1 - \frac{r_s i_s^2 + p_{Fe_s} + r_r i_r^2 + sp_{Hk_r} + s^2 p_{Fk_r} + p_{f_{v_n}} (1-s)^{\frac{3}{2}}}{m_{em}(1-s) + p_{f_{v_n}} (1-s)^{\frac{3}{2}}} \quad (26)$$

Comparison with characteristics that correspond to standard operation reveals a slight decrease of efficiency, caused by the presence of higher harmonics in stator and rotor currents, which results in the appearance of additional losses and additional torques. An appropriate change of the applied rotor voltage can insure operation with minimal losses.

Figure 7. a) Dependence $\eta = f(\delta)$; b) Dependence $\eta = f(s)$.



Conclusion

Considering the operational characteristics presented in the paper, it can be concluded that the doubly-fed asynchronous generator can be efficiently used in wind power stations, for converting wind kinetic energy into electrical energy. The synchronous working regime, when rotor frequency is set independently, allows stable generator operation in a wide range of speeds, typically within $\pm 30\%$ of the synchronous speed.

Efficient energy conversion can be achieved in this way, which means that conversion proceeds with maximum exploitation of the wind turbine (for every wind speed there is a specific speed of the wind turbine, and its efficiency is at a maximum).

For obtaining the desired change in the voltage fed to the rotor, semiconductor based energy converters (thyristors, IGBTs, etc.) are included into the rotor circuit. Since the flow of energy in the rotor changes direction in different regimes, energy converters need to enable energy to flow from the grid to the rotor, but also vice versa. At speeds higher than the generator synchronous speed, transformed energy is conveyed to the grid from both the stator and the rotor. The doubly-fed asynchronous generator can, therefore, work at an energy higher than the nominal.

Because the power transmitted through the rotor is proportional to the slip, the power of the energy converter is proportional to the regulated speed, typically within 30% of the nominal wind generator power. This is the main advantage of a doubly-fed asynchronous generator over other wind generators, in which the power of the energy converter corresponds to the full (nominal) power.

Another advantage of a doubly-fed asynchronous generator is the possibility of controlling its reactive power. Modern wind generators can work with the power factor of $\cos\varphi = \pm 0.9$, whereby active and reactive powers it generates can be controlled independently. Naturally, the generated reactive power causes an increase of the energy converter's nominal power.

Appendix

p – differentiating operator	s – slip
Π – number of pole pairs	n – rotor speed
r_r, r_s – stator, rotor resistance per phase	ω – rotor angular velocity
x_{sr}, x_{rs} – stator, rotor leakage reactance	ω_s – synchronous angular velocity
x_m – magnetizing reactance	m_{em} – electromagnetic torque
x_s, x_r – stator, rotor reactance per phase	p_s, p_r – stator, rotor active power
L_s, L_r – stator, rotor inductance	q_s, q_r – stator, rotor reactive power
L_m – magnetizing inductance	p_{fvn} – mechanical losses at rated speed
i_s, i_r – stator, rotor current	p_{Fes} – stator core losses
u_s, u_r – stator, rotor voltage	p_{Hkr} – hysteresis losses in rotor core (at locked rotor)
f_r, f_s – stator, rotor frequency	p_{Fkr} – eddy current losses in rotor core (at locked rotor)
Ψ_s, Ψ_r – stator, rotor magnetic flux	η – motor efficiency
δ – load angle	$\cos\varphi_s, \cos\varphi_r$ – stator, rotor power factor
g – the angle between stator and rotor voltage vectors (phasors)	

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KARAKTERISTIKE DVOSTRANO NAPAJANOG ASINHRONOG GENERATORA PRIMENJENOG U VETROELEKTRANAMA ⁶

Žarko Milkić ⁷, Aleksandar Čukarić⁸, Saša Štatkić⁹, Goran Maksimović¹⁰

Sažetak

U radu je definisan matematički model asinhronog generator sa dvostranim napajanjem primenom teorije prostornih vektora, u odnosu na referentnu osu vezanu za stator. Izvedeni su izrazi za karakteristične veličine, nacrtane su pogonske karakteristike za moment, aktivne i reaktivne snage, faktor snage i stepen iskorišćenja, na osnovu kojih je izvršena analiza rada u uslovima sa različitim brzinom obrtanja. Na osnovu toga ukazano je na mogućnosti i prednosti primene asinhronog generatora sa dvostranim napajanjem u vetroelektranama, za dobijanje električne energije iz energije vetra.

Ključne reči: obnovljivi izvori, vetrogeneratori, održivi razvoj.

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- 6 Rad je deo istraživanja u okviru projekta broj. TR 33016 – Istraživanje, razvoj i primena programa i procedura energetske efikasnosti u elektromotornim pogonima, 2011-2018, finansiran od strane Ministarstva za Obrazovanje, nauku i tehnološki razvoj Republike Srbije. Period projekta: 2011-2018.
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FARMER INNOVATIVENESS AND ITS IMPACT ON INTERNET AND SOCIAL MEDIA ADOPTION¹

Maja Ćirić², Marko Carić³, Boris Kuzman⁴, Ana Zekavica⁵

Summary

In recent years, huge efforts have been made to implement ICT innovations in the agricultural sector in order to increase its competitiveness. The question that can be posed is what depends on the successful implementation of ICT innovations among farmers. Numerous scientific papers were published with the purpose of identifying factors that affect acceptance of particular innovation by users. The aim of this paper was to determine whether the farmer innovativeness influences the acceptance and the degree of using the Internet and social media by farmer. Additionally, statistically significant correlation between the demographic factors of the farmers and their innovativeness was investigated. The research was conducted using survey method. Descriptive statistics, Correlation analysis using Pearson's correlation coefficients and Chi-square test were used as statistical methods. Obtained results confirmed the initial hypotheses and based on that recommendations for the creation of a marketing strategy for introducing new ICT solutions in the field of agriculture are made.

Key words: *farmer innovativeness, Internet, social media, marketing research, demographic characteristics, precise agriculture*

JEL: *M31, Q13*

Introduction

The use of the Internet and social media in agriculture becomes inevitable for improving the competitiveness of this sector. There are numerous benefits that can be achieved

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by using the Internet and social media: better information flow, better promotion and easier access to customers, possibility of creating virtual markets, interconnecting small farmers and applying precise agriculture. However, Internet and social media are a discontinuous innovation, which implies a new way of using an unknown product until then. Therefore, their acceptance depends on the resistance that consumers have towards innovations. As innovations fit more into the existing system of beliefs and habits of consumers, it will be more quickly accepted.

The process of innovation acceptance is influenced by many factors: product characteristics, i.e. innovation characteristics, compatibility - the degree to which innovation fits into the existing system of values and individual experiences, complexity - the degree of which it is relatively difficult to understand or use, the divisibility - the degree to which innovation can be tried on a limited basis, communicativeness - the degree to which the results of its use can be observed, the reference group and individuals, the socio economic system and the mass media of mass communication (Kotler, P., 1988, pp.356-357).

Rogers E. M. (1962, p.162) states that people differ from each other reflecting their willingness to accept innovation. Based on the time of acceptance of innovation, consumers are divided into innovators, early adopters, early majority, late majority and laggards.

Identifying these consumer groups is important in order to create an appropriate marketing strategy for the successful introducing of innovation on the market. However, it is difficult to identify some key trait for these groups of consumers because they differ for different products (Novaković, Rajačić, B. 2005).

Therefore, the aim of this paper was, first of all, to determine whether the farmer innovativeness will affect acceptance and intensity of using the Internet and social media. In addition, it is important to determine whether farmers who are grouped by tendency to use innovative products and technologies differ from each other in demographic characteristics.

Answers to these questions will facilitate to identifying the demographic profile of farmers that belongs to the group of innovators and early adopters and enable all the companies that try to implement various ICT innovations in agriculture to focus on them.

Consumer innovativeness and its measurement

Many studies on innovation focus on organizational innovations, new product characteristics, and consumers' response toward such innovations. According to Pauwels et al. (2004), innovation is actually treated as a key driver for the success of business organizations. Although there are constant and new innovations in the design of products (technological innovations), marketing and supply chain (non-technological innovation), service delivery (process innovation), and so on, Srinivasan et al. (2009) described most of the new products as failures at the introductory stage of their life cycle. The main reason behind this huge failure of new product innovations is the

inability of marketers to understand consumer needs and wants. In other words, their inability to conceptualize consumer innovativeness might be a strong reason (Kaushik, A.K., Rahman, Z., 2014). Bearing in mind we considering farmers as consumers of the Internet and the social media, it is necessary to analyze their innovativeness as consumers, i.e. their consumer innovation.

Kaushik, A.K. and Rahman, Z., (2014, p. 244) found three basic dimensions of consumer innovativeness (CI), i.e., innate innovativeness (II), domain-specific innovativeness (DSI), and innovative behavior (IB). The first perspective of consumer innovativeness is a generalist perspective, which identifies consumer innovativeness based on their innate innovativeness. This perspective treats consumer innovativeness as a personality trait or characteristic of any individuals that differentiates them from others in their society (Hilgard, Atkinson, and Atkinson 1975). Innovativeness was traditionally assumed to remain constant over a person's lifetime because it was treated as an individual personality trait. However, this general approach was not entirely adequate because consumer innovativeness may be more related to the consumer interest in a certain product category than with its own characteristics (Citrin et al., 2000).

Bearing in mind that certain research showed that consumer innovation does not have to be constant throughout the life of consumers and under the influence of social factors, another key perspective of consumer innovativeness appeared, called the particularist perspective.

This perspective of consumer innovativeness treated innovativeness in a specific domain of a consumer's interest and renamed innovativeness as domain-specific innovativeness. The third and final perspective of consumer innovativeness is the integrator perspective, which proposes an intermediary level of the first two perspectives, i.e., the generalist and particularist perspectives of the consumer innovativeness. It supports both the perspectives and considers consumer innovativeness to be a constant and global in nature, but only to some extent and not exactly in all domains of consumers' interest. According to this perspective, individuals might show a uniform attitude toward adopting an innovation in a specific or few domains, but not for all the domains of their interest. It actually depends upon the situation and need of that particular change for the consumer at the same time (Kaushik, A.K. and Rahman, Z., 2014, p.247).

Researchers have developed a variety of measures for consumer innovativeness (Roehrich 2004). One of the most extensive research carried out on the consumers in the 15 major world economies took into the account ten items reflecting various constructs of innovativeness and on the basis of factor analysis identified three dimensions: openness, enthusiasm, and reluctance (Tellis, GJ, Yin , E., Bell, S., 2009, p.15).

The first two dimensions are primarily positively valenced, while the third one is negatively valenced. Their analysis shows that the positively valenced items suffer from social desirability bias, while the negatively valenced scale, reluctance, does not. Based on the results of this research, we created three questions in the questionnaire we used for measuring innovation of farmers in Vojvodina.

Researchers have long suspected that the innovative consumer can be described by various demographics. Identifying these demographics remains important to marketers because they help with targeting decisions. Given that researchers in different ways define consumer innovativeness, there is no single view of how demographic factors are related to consumer innovativeness.

Several studies showed the relationship between sex, age, education, income and mobility with consumer innovativeness, but some reported lack of relationship between consumer innovativeness and demographic factors (Tellis, GJ, Yin, E., Bell, S., 2009, p .6).

Bearing in mind the opposite results presented in scientific literature, it is important to determine whether there is a correlation between the most important demographic factors and the consumer innovativeness of farmers in Vojvodina.

The importance of Internet and social media for farmers

Agricultural development faces multiple challenges including 1) climate change, 2) sustainable natural resource management, 3) food security, 4) shortages of fresh water, 5) limited availability of agricultural land, and 6) changing consumer expectations. In this context, ICT can play an important role in improving efficiency and leading to smart farming in the future of agriculture (Guerrini, 2015). Today's modern farms are adopting new technologies and generating unprecedented amounts of data, including field-specific information, yield mapping, soil moisture and nutrition, weather, leaf-area index, insects, and farm management data. Data collected from farms are a fundamental block for data-driven farming decision, and it is critical to turn the data into value to support better farming decision making. ICT now plays increasingly important role in future farming (Xin, J. Zazueta, F., 2016, p. 276).

In the research conducted on the sample of agricultural producers in Serbia, Montenegro and Bosnia and Herzegovina (Novalić, F., Selimović, F. and Biševac, F., 2011.) concluded that Internet is a rich source of informative and educational content. E-trade is represented in agriculture; at certain moment, some jobs, such as stock exchange trading and informing, can only be made via the Internet. Some research establish that small number of farmers uses the Internet and the benefits it provides.

In the research (Ćirić, M., Kuzman, B., 2017), a significant increase of Internet use by agricultural producers was revealed. According to the obtained results of these authors, the Internet is used by 66.47% of respondents on the daily level. This result is considered satisfactory, because it is on the level that is characteristic for countries in Europe but lower in the USA. However, although the percentage of farmers who use Internet is significantly increased compared to the previous period, the purpose of using Internet and especially Social networks is primarily entertainment, not business. In conclusion, the authors cite recommendations that would change the purpose of using the Internet in favor of improving their work.

Social media has an amazing growth within few decades. It has become part of everyday life for most people in the developed and developing countries. At present social media is the world's largest communication network. It is the simplest and fastest way for sharing information such as file, photos, videos etc. Social media is not only a tool for reaching large audiences; it is also an opportunity to develop relationships (Jijina C.K, Raju G., 2016, p. 22). Social media can be defined as a type of website through which it is easy to connect the modern Internet technology (Web 2.0) with user interaction.

The biggest advantages of social media and the reason for the great popularity of certain services of this type are ease of use and real two-way communication. Consequently, the use of social media for achieving different goals is a great challenge in the whole world, also in Serbia. Currently, the most popular social media in Serbia, among different user groups are: Facebook, Twitter, Instagram, LinkedIn, YouTube (Ljubojević, Č. Ćirić, M., 2017).

Development and introduction of smart phones, broadband and 3G mobile networks have provided opportunities for farmers to connect with their peers in spite of the distance separating them. Farmers can use Internet tools such as web forums for discussion and debate, Internet searches, digital versions of farmer magazines (Farmers Weekly, 2016) to learn new knowledge, query problems, and access information on their phones, even in the middle of a field. Moreover, social media, such as Twitter, Facebook or a Google group, enables them to instantly communicate, over an electronic hedge, with online peers who may never meet face-to-face, but can advice, sympathize and relate. Finally, several studies suggest that farmers tend to prefer kinesthetic (“learn by doing”) or audio/visual learning to other learning styles. As a result, IT now can allow farmers to view or record videos, listen to recordings and watch live web-streaming of conferences, with the subsequent benefit of enabling them to develop their knowledge and learning without having to leave their farms (Burbi, S. Hartless Rose, K. 2016, p. 2).

The use of social media sites help to enable collaboration, information sharing and partnerships for innovation among literate farmers, stakeholders, extensionists and other actors. Enabling farmers and others to “gain a voice”, offering localized and customized information, helping to share and manage the information are the main advantage in using social media in agricultural extension services. Also social media creates meaningful relationships with customers and improves market intelligence and get ahead with competitors (Jijina C.K., Raju G., 2016, p.23).

Major agricultural companies are currently using various forms of social media such as YouTube, Twitter, and Facebook. Social media and agricultural companies have the potential to build strong connections between consumers, workers, and the general public with technical, relevant, and interesting information (Carter, J, 2013).

Technical and educational illiteracy, unavailability of high speed Internet connection and recording equipment, unauthentic information, data charges and accessing device are the main limitations in the use of social media (Jijina C.K1, Raju G., 2016, p.24).

Research method

The aim of the research was to determine the correlation between the farmer innovativeness and its adoption of the Internet and social media. In addition, the purpose was to determine whether there are differences in the demographic characteristics of farmers, which can be classified as an innovator, early adopter, early majority, late majority and laggards, according to the tendency to use innovative products and technologies.

The hypotheses from which we proceed are:

H1: There is a positive correlation between the farmer innovativeness and the degree of use the Internet and social media.

H2: There is a statistically significant difference in farmer innovativeness depending on its gender, age and education.

The research of farmers was carried out between February and June 2016. in the territory of the Autonomous Province of Vojvodina. The sample consisted of 125 randomly selected respondents. The survey method was applied, while the survey instrument was a questionnaire. The questionnaire is created for the purpose of this research and it is not standardized.

The data obtained in this study were processed using “Statistica” software. The following statistical methods were used: Descriptive statistics, Correlation analysis using Pearson’s correlation coefficients and Chi-square. The results of the survey are expressed numerically and shown in the table.

Results and Discussion

The results obtained in the study were summarized and shown in the Table 1.

Table 1. Farmer innovativeness

No.	Question	The answer	Count	Percent
1.	Assess the extent to which you are open to new ideas.	Completely	28	22.40%
		To greater extent	30	24.00%
		Average	24	19.20%
		To lesser extent	15	12.00%
		Not at all	28	22.40%
2.	Assess the degree to which you have the tendency to try new products and technologies.	Completely	26	20.80%
		To greater extent	26	20.80%
		Average	29	23.20%
		To lesser extent	16	12.80%
		Not at all	28	22.40%

3.	Assess the extent to which you have resistance to change in your habits and routines.	Completely	20	16.00%
		To greater extent	34	27.20%
		Average	22	17.60%
		To lesser extent	28	22.40%
		Not at all	21	16.80%
4.	Categorization of farmers based on the previous three questions.	Innovators	24	19.20%
		Early adopters	29	23.20%
		Early majority	26	20.80%
		Late majority	20	16.00%
		Laggards	26	20.80%

Source: Created by authors based on the survey

Based on the data presented in table no. 1 we can notice that the answers to questions that measure the farmer innovativeness by assessing its openness, enthusiasm for testing new products and resistance to changing habits are similar. This indicates that farmers who are open to new ideas have the most common tendency to try new products and lesser resistance to change personal habits and routines. However, although small, certain differences in answers are existed. The highest level of farmer innovativeness is given answering to the question of the farmer openness for new ideas, while the smallest degree of innovation comes answering to the question about resistance to changes in habits. This point out the fact that people will give better ratings when someone ask they about their openness for new ideas than when someone asks how willing they are to change their habits.

Based on the farmers’ score, three arithmetic means were calculated for the three questions, and farmers were classified into five categories according to the degree of innovation. It is evident that 19.20% of farmers are classified as innovators, while 23.20% are early adopters. These two groups of farmers are particularly important because they represent the bearers of development and innovation in agriculture. Early majority is made up of 20.80% of farmers. They are also important because they are also ready to adopt innovations when they see other farmers as users of innovations (innovators and early adopters). Late majority, 16% of them, are farmers who need a lot of time to adopt innovation, while 20.80% of farmers are loyal to tradition and established routines and thus it is difficult to persuade them to use innovative products, services and technologies. It is positive that this percentage, although significant, is not too high in this sample.

Table 2. Level of use of the Internet and social media

No.	Question	The answer	Count	Percent
1.	Do you use the Internet, how often?	Every day	67	53.60%
		Few days a week	10	8.00%
		Once a week	12	9.60%
		Once a month	7	5.60%
		I do not use the Internet	29	23.20%

2.	Do you use the Facebook, how often?	Every day	42	33.60%
		Few days a week	14	11.20%
		Once a week	4	3.20%
		Once a month	3	2.40%
		Never	62	49.60%
3.	Do you use Instagram, how often?	Every day	19	15.20%
		Few days a week	6	4.80%
		Once a week	3	2.40%
		Once a month	2	1.60%
		Never	95	76.00%
4.	Do you use Twitter, how often?	Every day	5	4.00%
		Few days a week	6	4.80%
		Once a week	1	0.80%
		Once a month	0	0.00%
		Never	113	90.40%
5.	Do you watch videos on YouTube, how often?	Every day	15	12.00%
		Few days a week	37	29.60%
		Once a week	17	13.60%
		Once a month	16	12.80%
		Never	40	32.00%

Source: Created by authors based on the survey

Based on the data presented in Table 2, we notice that 53.60% of the farmers use the Internet every day, and 8% of them use it several times a week. This is significantly lower than in the US and in line with the level of Internet usage in Europe. These farmers are the ones who can be responsible for the introduction of new ICT solutions in agriculture. However, the fact that 23.20% does not use the Internet shows that there is still a significant percentage of farmers who have not accepted the Internet and do not take advantage of the use of the Internet in their business, which may be related to their personal concept and resistance to changes and innovative products. When we consider the degree of use of Facebook, we notice that 33.60% of farmers use the Internet every day, while 11.20% of them use Facebook several times a week, which are also quite good indicators. 49.60% of farmers still do not use Facebook. Instagram is a network used by a relatively small number of farmers (15.20% every day, and 4.80% few times a week). Thus, the total percentage of farmers that use this network intensely is 20%, those who use it once a week or once a month is almost negligible, while 76% have never used this network. Considering that the Instagram is network that appeared later in relation to Facebook in Serbia and began to be more intensively used in the last two years, it is expected that it is still not accepted among the wide population and that the number of Instagram users is lower compared to Facebook users. Twitter is definitely a network that has no relevance for farmers in Serbia unlike the US, since 90.40% of respondents have never used this network. YouTube is a social medium that is watched by only 12% of farmers every day, but 29,6% of farmers watch it few times a week, which represents 41.60% of the respondents, making YouTube a medium with a significant degree of use. In addition, it is interesting to note that the smallest

percentage of farmers never used YouTube (32%). This data also confirms significant degree of using YouTube by farmers.

Table 3. Pearson’s correlation coefficients

	Using Internet	Using Facebook	Using Instagram	Using Twitter	Using YouTube
The degree of openness for new ideas	0.74*	0.54*	0.42*	0.27*	0.54*
The degree of inclination to try new technologies, products and services	0.70*	0.52*	0.41*	0.26*	0.52*
Degree of resistance to changes in habits	-0.66*	-0.63*	-0.49*	-0.41*	-0.54*

*Correlations are significant for $p < 0.001$

Source: Created by authors based on the survey

In order to determine whether there is a correlation between answers used to measure by farmers innovativeness and the degree of farmers’ use the Internet and social media, Correlation analysis using Pearson’s correlation coefficients is applied. Based on the results obtained in Table no. 3 it can be concluded that all three questions that used to measure the innovativeness of farmers are significantly related to the use of the Internet, Facebook, Instagram, Twitter and YouTube at $p < 0.001$. In the first two responses concerning the degree of openness for new ideas and the degree of tendency to try new technologies, products and services, the correlation coefficient is a positive. This means that, if farmers are more open to new ideas and are more willing to try new technologies, products and services, the level of using the Internet and social media will be higher. For the third response that relates to the degree of resistance to changes, the correlation coefficient is a negative. Thus, if farmers have a greater resistance to change, their use of the Internet and social media will be lesser. The highest values of correlation coefficients were established between all three indicators of farmers’ innovativeness and degree of Internet use, while the lower values of correlation coefficients were obtained between farmer innovativeness and the use of Twitter. The obtained values are analogous to the fact that the Internet is most intensively used by farmers and the Twitter at least.

Table 4. Farmer demographic characteristics and the degree of their innovativeness

Demographic factors		Men	Women	-30	31-50	51+	Primary school	Secondary school	BSc, MSci, Ph. D
Categories of innovation		Chi-Square=11.66 df=4, cv=9.49 p=0.05		Chi-Square=43.83, df=8 cv= 15.51, p=0.05			Chi-Square=31.72 df=8, cv= 15.51, p=0.05		

Demographic factors		Men	Women	-30	31-50	51+	Primary school	Secondary school	BSc, MSci, Ph. D
Innovators	No.	14	10	14	5	5	2	11	11
	%	58.33	41.67	58.34	20.83	20.83	8.34	45.83	45.83
Early adopters	No.	24	5	11	13	5	3	17	9
	%	82.76	17.24	37.93	44.83	17.24	10.35	58.62	31.03
Early majority	No.	24	2	2	11	13	5	21	0
	%	92.31	7.69	7.69	42.31	50	19.23	80.77	0
Late majority	No.	14	6	5	7	8	6	9	5
	%	70	30	25	35	40	30	45	25
Laggards	No.	23	3	2	2	22	13	8	5
	%	88.46	11.54	7.69	7.69	84.62	50	30.77	19.23

Source: Created by authors based on the survey

Based on the data presented in Table 4, it can be noticed that differences in the level of farmer innovativeness depending on gender. The difference between genders was established using Chi-square test for independent samples, where the dependent variable was answer to the question about the degree of farmer innovativeness, while the grouping variables were the gender of respondents. Since the Chi-square was greater (11.66) than the critical value of 9.49 for $df = 2$ and $p = 0.05$, we can conclude that there is a statistical significance of the dependent variable in relation to the gender. This means that gender as a demographic factor has a significant impact on the farmer innovativeness. Analyzing the descriptive statistics about participation of men and women in groups of farmers classified according to the innovativeness, we can notice that men dominate in all groups because their share in the overall sample of respondents is much higher than women share. Despite this fact, percentage of women is at most present in the group of innovators, while men are dominant in early majority group. Thus we can conclude that women among farmers are those that are more willing to adopt innovations, which is important to take into account in the process of creating marketing strategies related to the introducing ICT innovations in agriculture.

In order to determine whether there are statistically significant relation between farmers' age and its innovativeness, we used the Chi-square test and confirmed that farmers' innovativeness is related to its age, given that $\chi^2 = 43.83$ at $df = 8$, $cv = 15.51$ and $p = 0.05$. Based on the results of descriptive statistics, we can conclude that younger farmers, up to 30 years, are the most represented in the category of innovators; farmers between 30 and 50 years are the most represented in the early adopters and early majority category, while people over the age of 50 at most belongs to the laggards group.

The connection between the innovativeness of the farmers and their education was also checked by the Chi-square test, and since $\chi^2 = 31.72$ at $df = 8$, $cv = 15.51$ and $p = 0.05$, it can be concluded that there are statistically significant relation between the farmer innovativeness and its education. Based on descriptive statistics, we note that those with higher education were primarily in the category of innovators and early adopters, the farmers with secondary education are at most were in the early majority category, while those with primary education are predominantly were in the laggards category. This is important to keep in mind when creating marketing strategies because farmers those are more educated will more likely fall into the group of innovators.

The obtained results are in line with numerous studies that showed a positive correlation between the demographic characteristics of consumers and innovation.

Conclusion

We confirmed the hypothesis that there is a correlation between farmer innovativeness and its acceptance the Internet and social media. If the farmers are more open to new ideas and trying new products, services and technologies and have less resistance to changes in habits, their use of the Internet and social media is greater. Considering that in this sample 53.60% of the respondents stated that they use the Internet every day, this means that the Internet is used by farmers who belong to the group of innovators, early adopters and a part of the early majority. Therefore, the increase in Internet usage is expected in the future because it is expected that other farmers who belong to the group of early majority, who have not yet started using the Internet, will start using it. Likewise, members of the late majority group are expected to start using the Internet, while for the laggards group it is uncertain how much they will be interested in using the Internet and their percentage in this sample is 20.80%. Farmers are the most interested in Facebook and YouTube and their further intensive use is also expected. Instagram and Twitter are networks that are not yet widely accepted among farmers and are used by farmers who have the highest degree of innovativeness and the desire to try new things.

In addition, we have also analyzed how many demographic factors affect the farmer innovativeness. Based on the obtained results, we can accept the starting hypothesis that there is a statistically significant relation between farmers' innovativeness and their gender, age and education. The survey showed that female farmers, persons up to 30 years and those with higher education have the highest degree of innovativeness and they can be classified as innovators. Man between 30 and 50 years of secondary

education at most belong to the early adopters and early majority group. Late majority is mostly consisted of men over 50, but also those between 30 and 50 years old with secondary education. Men over 50 years old with primary school belong to the laggards group. Thus, the Internet and social media are currently mostly used by women and men of higher education and secondary education up to 50 years old and it is expected that their use will extend to men of secondary education who belong to the late majority.

According to the obtained results, a number of recommendations for marketing strategy creators can be drawn. When introducing new ICT solutions in agriculture, it is necessary to focus on farmers with the highest degree of innovativeness. The most innovative farmers are women, younger than 30 years old, with higher education, so they should be the basic target market. But having in mind that there is the low participation of women in agriculture, companies should also focus on men between 30 and 50 years old, with secondary education. These demographic characteristics are very important to know when company makes marketing mix: product, price, distribution and promotion. A personal sale is most effective when company introduces new ICT products, but it is also very important to intensively apply the methods of Internet marketing. It is necessary to put special emphasis on SEO websites and intensive promotion through Facebook and YouTube.

The limitation of this study is in a relatively small sample of farmers and it is recommended that in the next research an examined sample of farmers be increased in order to obtain even more precise data.

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INOVATIVNOST POLJOPRIVREDNIH PROIZVOĐAČA I NJEN UTICAJ NA PRIHVATANJE INTERNETA I DRUŠTVENIH MEDIJA

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Sažetak

Poslednjih godina ogromni napori se ulažu u pronalaženje načina da se implementiraju ICT inovacije u sektor poljoprivrede ne bi li se povećala njegovu konkurentnost. Pitanje koje se može postaviti jeste od čega zavisi uspeh implementacije ICT inovacija među poljoprivrednim proizvođačima. Brojni naučni radovi pisani su sa svrhom da identifikuju faktore koji utiču na to da li će određena inovacija biti prihvaćena od strane korisnika. Cilj ovog rada jeste da se utvrdi da li je inovativnost poljoprivrednih proizvođača faktor koji utiče na prihvatanje i stepen korišćenje interneta i društvenih medija od strane poljoprivrednih proizvođača. Osim toga nastoji se utvrditi da li postoji statistički značajna povezanost demografskih faktora poljoprivrednih proizvođača i njihove inovativnosti. Za potrebe istraživanja primenjena je metoda ankete. Od statističkih metoda korišćena je deskriptivna statistika, korelacije i Hi kvadrat test. Dobijeni rezultati potvrdili su početne hipoteze i na osnovu toga su date preporuke za kreiranje marketing strategije prilikom uvođenja novih ICT rešenja u oblasti poljoprivrede.

Ključne reči: *inovativnost poljoprivrednih proizvođača, internet, društveni mediji, istraživanje tržišta, demografske karakteristike, precizna poljoprivreda*

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FACTORS INFLUENCING STUDENTS' CHOICE OF FAST FOOD RESTAURANTS

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Summary

The global expansion of fast food consumption habits and the consequent change in the competitive environment led to greater market research and the targeting of consumer groups. On the other hand, the growth of the market and the increase in the number of fast food restaurants have encouraged consumers to pay more attention to the products they consume, that is, have influenced their interest in the diversity of factors that are decisive when choosing a restaurant.

This study investigates factors influencing students' choice of fast food restaurants. The study was conducted at University of Novi Sad. The results show that the most important influences on this choice are Food Quality, Nearness and Accessibility and Hygienic factors, primarily cleanliness of the restaurant, kitchen, and service personnel. Differences in fast food choice factors were found regarding the gender of respondents.

Key words: *fast food restaurants, consumer behavior, students*

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Introduction

Food consumption away from home is an increasing phenomenon among all sub-categories of the population across the world (Issahaku et al., 2014; Ares et al., 2009).

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Definitions of fast food in the scientific literature are different. Some authors define it as packed, quickly prepared and suitable meals, while others take a narrower definition of fast food and define it as the food purchased in one of the biggest fast food chains such as McDonald's (Kirsten, 2008). Fast food is characterized by low prices, large portions and energy value of food that is rich in calories and fats (Bowman, Vinyard, 2004; Guthrie et al. 2002; Brindal et al. 2008; Olise et al., 2015). On average, a traditional fast food meal accounted for 47.47% of an 8400 kJ daily guideline (Brindal et al., 2008).

Modernization and fast pace of life shorten the time needed to prepare food, which affects the trend of eating meals in restaurants. This is not a passing trend but a daily need of a modern human. For this reason, food preparation in hospitality facilities must meet certain quality standards. Although food quality is often a primary determinant factor for a restaurant, other very important factors are service staff, price, menu, ambience and convenience.

Studying consumer behavior explores how individuals make decisions to spend their available resources (money, time, effort) to consume specific products. It includes research on what, why, how, when, where and how often consumers buy products (Kesić, 2006). The American Marketing Association (AMA) defines consumer behavior as "a dynamic interaction between thinking, behavior and events in the environment, based on which human beings manage aspects of the exchange in their lives" (Peter, Olson, 2008). The basic assumption of successful marketing is understanding consumer behavior in order to create a supply (marketing mix), that is, an adequate way of meeting the needs and wishes of consumers (Živković, 2011). Market research and the definition of targeted segments of consumers are crucial to the development of the appropriate marketing strategy of the restaurant.

Literature review

A review of previous research reveals a number of studies that defined market segments in the food service sector. For instance, Koo, Tao and Yeung (1999) used dining occasion or purpose as the preexisting criteria for segmentation. Results of the study indicate that customers who dine out due to different reasons (as families, for business, or as tourists) have different criteria in choosing a restaurant. Consumers who were in the group "family guests" gave a greater importance to the price compared to "business guests". Depending on the type of cuisine, Western food is more acceptable to business guests compared to those who came to the restaurant with their family. Oyewole (1999) used the frequency of consumer visits as a criterion for examining the determining factors for the choice of restaurants by consumers. The research results have shown that the importance of the ten distinguished attributes of the restaurant quality is different for visitors depending on their frequency of visits (less frequent, frequent and more frequent). Less frequent visitors attach greater importance to health aspects of food and child-friendly dimensions; frequent visitors are more concerned with communications and hygiene, while for more frequent visitors the most important are availability and expeditiousness.

Many studies exploring the reasons why people consume fast food have pointed to convenience. The IGA survey reported that consumers generally consume fast food because of convenient locations and time constraints (FOODweek, 2008). Bryant and Dundes (2008) have examined student attitudes in the USA and Spain and have come to the conclusion that the most important factors in choosing fast food restaurants are the taste and smell of food. Convenience, cost, and menu choices are also distinguished as important factors for consuming food in fast-food restaurants (Driskell et al., 2006). In addition to the apparent advantages of fast foods related to quick and easy preparation, availability and relatively low cost, some researchers emphasize the hedonistic aspect of its consumption (Park, 2004). Clark and Wood (1998) comment that food quality and value appear to be the most significant restaurant attributes. Lewis (1981) also highlights the quality of food as the most important attribute for the selection of fast food restaurants. Prescott et al. (2002) and Steptoe et al. (1995) show that crucial factors include familiarity, price and taste. Similarly to the studies, the results of a survey conducted on a sample of 50.000 students at seven Australian universities showed that the greatest determinants of food-purchasing behavior were taste, followed by value for money, convenience, then cost (Tam et al., 2017). Some studies put emphasis on service staff in restaurants. Thus Becker et al. (1999) showed in their research that students from the USA have different expectations when it comes to restaurant services, as opposed to Hong Kong students. Students at the University of Hong Kong primarily appreciate respect, unobtrusive courtesy and personal hygiene of employees, while students from U.S.A. prefer eye contact, employee knowledge and personalized service.

Although the presented studies highlight the importance of individual factors for selecting restaurants by consumers, consumer behavior is a complex category that can not be fully defined by distinguishing individual attributes. In real world situations, the choice of restaurants is influenced by time pressures, specific environments, personal preferences, and social variables (Brindal, 2010).

Methodology and description of the research

The survey was conducted using random sample method through electronic means and social networks in the period from October to December 2016. The target group were students of all studying levels (basic, master and doctoral studies) at the University of Novi Sad. A sample of 279 respondents was obtained.

The self-administered questionnaire used in the study contained 33 attributes that were collected through a review of relevant literature (Aksoydan, 2007; Islam, Ulah, 2010; Koo et al., 1999). The first part of the questionnaire contained questions related to the characteristics of the respondents (gender, level of studies and Faculty), while the second part of the questionnaire focuses on the attributes of fast food restaurants. Questionnaire items were ranged on a 5-point Likert scale from 1 (not important) to 5 (very important).

All statistical analyzes were conducted using SPSS software (Statistical Package for Social Sciences, version 23.0). Data was analyzed using frequency distributions, percentages, means, T-test and factor analysis.

Results

Characteristics of respondents. The sample included 154 (55.2%) males and 125 (44.8%) females among the respondents. In regards to the level of studies, more than half of the respondents are at basic/primary level of studies, while the smallest share of students is at doctoral level. The research involved students from six faculties of the University of Novi Sad (Table 1.). Their share in the sample ranges from 13.6% (Faculty of Philosophy) to 21.1% (Faculty of Medicine).

Table 1. Characteristics of respondents (N = 279)

Variables	Sample size	Percentage
Level of study		
Higher education	158	56.6
Master's degree	101	36.2
Doctor's degree	20	7.2
Gender		
Male	154	55.2
Female	125	44.8
Faculty		
Faculty of Sciences	42	15.1
Faculty of Agriculture	51	18.3
Faculty of Tehnology	48	17.2
Faculty of Technical Sciences	41	14.7
Faculty of Philosophy	38	13.6
Faculty of Medicine	59	21.1

Factor analysis. Factor analysis (principal component analysis) was conducted to determine the basic dimensions of 33 attributes of fast food restaurants. In this study, all factors with eigenvalue greater than 1 and with factor loadings more than 0.3 were retained. The results of the factor analysis, which suggested a five - factor solution, included 33 hotel attributes and explained 77.69 % of the variance. The Kaiser – Meyer – Olkin (KMO) overall measure of sampling adequacy was 0.76 which was middling (Kaiser, 1974) and Bartlett's test of sphericity was significant ($p = 0.000$). The results of the factor analysis produced a clean factor structure with relatively higher loadings on the appropriate factors. The Cronbach's α values for each factor were greater than 0.7 (Nunnally, 1978). The results showed that the Cronbach's α coefficients of the five factors ranged from 0.78 to 0.97. Table 2 shows the results of the factor analysis.

Table 2. Results of factor analysis

Extraced factors	Items	Factor loading	Eigenvalue	Variance explained	Cronbach's α
F1 - Hygiene	Cleanliness of restaurant	0.855	9.934	28.57	0.96

Extraced factors	Items	Factor loading	Eigenvalue	Variance explained	Cronbach's α
	Cleanliness of service personnel	0.844			
	Nail cleanliness of service personnel	0.869			
	Service personnel's attention to hygiene	0.866			
	Convenience of service material	0.846			
	Cleanliness of china and cutlery	0.827			
	Cleanliness of food	0.862			
	Cleanliness of kitchen	0.860			
	Tidiness of kitchen	0.897			
	Cleanliness of kitchen equipment	0.746			
	Cleanliness of kitchen staff clothing	0.795			
	Kitchen staff's attention to hygiene	0.859			
	Cleanliness of toilet	0.865			
F2 - Service	Clear and readable menu	0.921	8.166	25.14	0.97
	Good communication of service personnel	0.915			
	Friendliness of service personnel	0.862			
	Clear speech of service personnel	0.913			
	Good behavior of service personnel	0.886			
	Service knowledge of service personnel	0.878			
	Kitchen open to visitors	0.917			

Extraced factors	Items	Factor loading	Eigenvalue	Variance explained	Cronbach's α
	Ease of making complaints to manager	0.933			
	Prompt handling of complaints	0.923			
	Speed of service	0.917			
F3 – Atmosphere	General appearance of restaurant	0.969	3.067	9.84	0.94
	Interior decoration of restaurant	0.936			
	Comfortable atmosphere	0.913			
F4 - Nearness and Accessibility	Nearness of University	0.823	2.636	8.33	0.85
	Accessibility	0.893			
	Parking space	0.644			
	Location of restaurant	0.730			
F5 – Food Quality	Odour and taste of food	0.328	1.834	5.80	0.78
	Appearance/presentation of food	0.950			
	Menu-item variety	0.888			

The first factor labeled “Hygiene” explained 28.57% of the total variance with a reliability coefficient of 0.96. This factor includes 14 items/questions related to hygienic safety in the process of food preparation. The second factor was “Service” explaining 25.14% of the total variance with a reliability coefficient of 0.97. The second factor includes 10 items related to the quality of the service process and the staff. The third factor was labeled “Atmosphere” and explained 9.84% of the variance with a reliability coefficient of 0.94. The “Atmosphere” factor contains three items that reflect the appearance and ambience of the restaurant. The fourth factor, labeled “Nearness and Accessibility”, accounted for 8.33% of the variance with a reliability coefficient of 0.85. It contains four items related to the nearness, location and accessibility of the restaurant. The fifth factor was “Food quality” explaining 5.80% of the total variance with a reliability coefficient of 0.78. The fifth factor contains three items related to the basic elements of food quality and supply of restaurant.

Descriptive statistics. The results of the descriptive statistics shown in Table 3 indicate that for the surveyed students the most important factors are “Food quality”, “Nearness and Accessibility” and “Hygiene”. A small difference between the arithmetic means of their ratings indicates that the three factors mentioned above are of great importance for respondents when choosing a fast food restaurant. Factors “Service” and “Atmosphere” have less significance for respondents when it comes to choosing fast food restaurants. These results are logical because consumers do not stay too long in this type of restaurant, they often order food “to go” and service staff, services, arrangement and atmosphere of the restaurant are not crucial to them.

Looking at items with the highest arithmetic mean, it can be concluded that these are two questions from the fifth factor related to quality of food and supply - *Appearance/presentation of food* (4.7849), *Menu-item variety* (4.7849), question from the fourth factor *Accessibility* (4.7061) and three questions from the hygiene factor - *Tidiness of kitchen* (4.6667), *Nail cleanliness of service personnel* (4.6416) and *Service personnel’s attention to hygiene* (4.6344). Questions with the lowest values of the arithmetic means of the ratings belong to the third factor - *Interior decoration of restaurant* (3.3226), *Comfortable atmosphere* (3.3405) and *General appearance of restaurant* (3.4301). Standard deviations did not exceed value 1 and ranged from 0.48965 (*Speed of service*) to 0.92264 (*Comfortable atmosphere*).

Table 3. Mean ratings of items and factors

Factors and Items	Mean	Std. Deviation
F1 – Hygiene	4.477	0.5031
Cleanliness of restaurant	4.272	0.541
Cleanliness of service personnel	4.290	0.548
Nail cleanliness of service personnel	4.642	0.624
Service personnel’s attention to hygiene	4.634	0.625
Convenience of service material	4.272	0.598
Cleanliness of china and cutlery	4.491	0.640
Cleanliness of food	4.531	0.586
Cleanliness of kitchen	4.531	0.5799
Tidiness of kitchen	4.667	0.5562
Cleanliness of kitchen equipment	4.387	0.5696
Cleanliness of kitchen staff clothing	4.373	0.5666
Kitchen staff’s attention to hygiene	4.570	0.5765
Cleanliness of toilet	4.538	0.6552
F2 - Service	3.781	0.5755
Clear and readable menu	3.642	0.4952
Good communication of service personnel	3.778	0.6631
Friendliness of service personnel	3.713	0.6866
Clear speech of service personnel	3.767	0.6566

Factors and Items	Mean	Std. Deviation
Good behavior of service personnel	3.792	0.6289
Service knowledge of service personnel	3.918	0.7421
Kitchen open to visitors	3.953	0.7306
Ease of making complaints to manager	3.928	0.7457
Prompt handling of complaints	3.660	0.5041
Speed of service	3.660	0.4897
F3 – Atmosphere	3.364	0.8125
General appearance of restaurant	3.430	0.8362
Interior decoration of restaurant	3.323	0.8113
Comfortable atmosphere	3.341	0.9226
F4 - Nearness and Accessibility	4.545	0.5087
Nearness of University	4.570	0.6244
Accessibility	4.706	0.5812
Parking space	4.491	0.6167
Location of restaurant	4.412	0.6221
F5 – Food quality	4.599	0.4257
Odour and taste of food	4.294	0.5225
Appearance/presentation of food	4.785	0.4839
Menu-item variety	4.717	0.5181

T-test of independent samples. T-test of independent samples was applied with an aim to compare attitudes of two groups of respondents – male and female. Results shown in Table 4 indicate that there is a statically significant difference regarding the gender of the respondents when the first factor “Hygiene“ ($p < 0.01$) is concerned. Female respondents give higher marks to hygiene attributes of fast food restaurants than males.

Table 4. Results of T-test analysis

Factor	Means		t-value
	Male (n=154)	Female (n=125)	
F1- Hygiene	4.3726	4.6049	-3.934*

* $p < 0.001$

Conclusion

This study aimed to develop an instrument exploring the factors that influence students' choice of fast food restaurants. The study was conducted using a questionnaire that was proven to be reliable and valid. The results reveal important and less important factors in the choice of a fast food restaurants among students from University of Novi Sad. The most important choice factors were identified as quality of food, appearance/

presentation of food, menu-item variety, cleanliness of the restaurant, kitchen, service personnel and nearness and accessibility of the University as well, while the least important factors were atmosphere and service.

By far the most important criterion for food quality is to be safe for consumers' health, although users are not often sufficiently aware of it, but in the first place they put sensory and even nutritional properties of food. The hospitality activity is very complex and specific in terms of ensuring safe and healthy food, given the dynamics of the process of preparation and finalization of food products, contact with equipment and surfaces, as well as the participants themselves who manipulate food. Supplying consumers with food that does not contain microbiological, chemical or any other contaminants is the basic principle of the program of the production of safe food and the protection of the health of the population (Popov-Raljić, Blešić, 2016).

The research results have shown that there are statistically significant differences in the importance of individual attributes for students depending on their gender. Female students have given statistically significantly higher ratings to questions related to the hygiene and cleanliness of restaurants, kitchen, food, and service personnel. Although constraints related to the sample size and the sampling method in this study do not allow generalization of the results obtained, some other findings showed that women scored a higher mean in concern for safe food than men (Liu, Niyongira, 2017), that women paid more attention to food safety issues than men because they take more responsibility for buying and preparing food (Liu et al., 2014), and that female were having more knowledge and willingness to pay for safe food than men (Liu et al., 2013).

This study recommends that fast food producers or distributors in Novi Sad should focus more on the quality of food, nearness and accessibility of University and cleanliness of restaurant, kitchen and service personnel. By complying with these recommendations, fast food restaurants will become more competitive on the market and will be able to meet the needs and expectations of a large and significant market segment - student population.

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FAKTORI KOJI UTIČU NA IZBOR RESTORANA BRZE HRANE OD STRANE STUDENATA

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Sažetak

Globalno širenje navike konzumiranja brzih prehrambenih proizvoda i posledična promena konkurentskog okruženja dovela je do veće pažnje usmerene na istraživanje tržišta i izdvajanje ciljnih grupa potrošača. Sa druge strane, rast tržišta i povećanje broja brzih restorana su ohrabрили potrošače da posvete veću pažnju proizvodima koje konzumiraju, odnosno uticali na njihov interes za raznolikost faktora koji su odlučujući prilikom izbora restorana.

Ovaj rad istražuje faktore koji utiču na izbor restorana brze hrane od strane studenata. Istraživanje je sprovedeno na Univerzitetu u Novom Sadu, a rezultati pokazuju da je najvažniji uticaj na izbor ovakve hrane pre svega blizina, pristupačnost, kao i higijenski faktori-čistoća restorana, kuhinje i uslužnog osoblja. Utvrđeno je postojanje razlike kod faktora izbora brze hrane prema polu ispitanika.

Ključne reči: *fast food restorani, navike potrošača, studenti*

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ECONOMIC INSTRUMENTS FOR REDUCTION OF GREENHOUSE GAS EMISSION IN AGRICULTURE AND FORESTRY

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Summary

A significant reduction of greenhouse gas emissions in agriculture and forestry can be achieved with adequate economic instruments. There are also other measures on disposal, such as good agricultural practice and organic production that involve the use of agronomic and biotechnological knowledge and skills with the purpose to produce healthy and safe food, with the preserving the environment and production resources.

In the paper we analyze the previous experience in the application of economic instruments for the reduction of greenhouse effect in Agriculture and Forestry, in the broad and narrow sense, both in the domestic and international context. Special attention is given to the experiences in the implementation of the so-called flexibility mechanisms under the Kyoto Protocol. As a result of these experiences, in the period after 2012, new instruments have been created, mainly on a voluntary basis, which does not inspire confidence in their effectiveness.

It has been noted that the system of economic instruments for the promotion of agricultural production in Serbia is in contradiction with the objectives of the climate protection policy.

Changes are proposed in terms of abolishing direct benefits per hectare and the livestock units, as well as introduction of incentives for energy efficiency, renewable energy sources, and specifically for the organic production. Punitive measures must, once and for all, stop the harmful and dangerous practice of burning crop residues on fields.

Key words: *economic instruments, air, gasses, greenhouse, agriculture.*

JEL: *Q51, Q 52, Q 54*

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Introduction

According to the latest estimates (IPCC 2014), annual global GHG emission in agriculture, forestry, and other land uses (AFOLU), in the period from 2000-2010 amounted to about 10-12 GtCO₂-eq, or about 24 percent of the total emissions in all the sectors. Specifically, 5-5.8 GtCO₂-eq, i.e. about 10-12 percent, of all anthropogenic GHG emissions, originated from agriculture, whereas 4.3-5.5 GtCO₂-eq, i.e. 9-11 percent, originated from forestry and other land uses. In absolute terms, these emissions have not significantly changed compared to the emissions registered in the previous (the fourth) report of the IPCC (IPCC, 2007). However, due to the increase in emissions from other sectors, primarily energetics, the share of the observed AFOLU sectors has decreased slightly. In absolute terms, the changes are caused due to the reduction of emissions in developed countries, whereas the emissions have increased in developing countries. In developed countries, the pressure has mainly increased on agricultural land, while deforestation and land degradation have increased in developing countries.

It is believed that AFOLU sectors have a great potential for reducing GHG emissions through afforestation, better land use and better ways of animal husbandry. By the end of this century the AFOLU sectors are expected to become net GHG sinks (Edenhofer et al., 2014). There are high expectations regarding the possibility of GHG reduction in forestry through afforestation and better forest management. It is estimated that the annual reduction potential of forestry in 2030 will range from 0.2 to 13.8 GtCO₂-eq and from 0.5 to 10.6 GtCO₂-eq in agriculture, with the expected cost of the reduced carbon from 100 USD/t CO₂-eq (Smith et al., 2014). The possibility of reduction of GHG emissions relative to the demand for agricultural products depending on the change in dietary habits should be added to this significant amount. These possibilities range from 0.7 to 7.3 GtCO₂-eq per annum in the period around 2050. In addition, the reduction of losses in food and waste from the food industry could further reduce GHG emissions in the amount of 0.6 to 6 GtCO₂-eq per annum. Such great potential gives AFOLU sectors an important role in efforts to protect the climate from anthropogenic influences.

In order for such optimistic predictions to be realized, it is necessary to create and implement adequate measures and instruments of practical policies, with the central place belonging to economic instruments.

Methodology and Data Sources

In research, it is used historical method, graphical method, method of comparative analysis, and are used with other standard methods (analysis and synthesis, generalization and abstraction, induction and deduction, description, logic, etc.).

Data sources include scientific and professional papers, websites, reports the Institute dealing with emissions of greenhouse gases.

Economic instruments

The term instrument implies the set of arrangements, conducted by a public entity in order to achieve a certain objective. Objectives can be classified into:

- national and international,
- sectoral,
- ecological,
- socio-economical.

The essential characteristics of these instruments are (Perman, Ma, McGilvray, 1996):

- Efficiency (cost efficiency or economic efficiency);
- Reliability (the extent to which a specific objective can be achieved);
- The level of awareness that the public entity must possess in order to correctly apply the instrument, as well as the costs of obtaining information;
- Long-term consequences (whether the effect of an instrument becomes weaker, stronger, or remains unchanged with time);
- Applicability (which degree of control is necessary to make the instrument effective);
- Dynamic efficiency (whether the application of the instrument creates incentives to increase production quality and reduce harmful emissions);
- Flexibility (the ability to adapt to changed conditions);
- Equity and consequences that the application of the instrument has on income distribution.

Systematic, organized and targeted application of economic instruments is the key component of economic policy measures. In the domain of environmental protection policy, especially climate protection, instruments of quantitative control and market-based instruments are used.

Quantitative control instruments (regulatory), also known as “prescribe and control“, are the oldest and the simplest devices to combat harmful emissions. An example is the EU Nitrates Directive of 1991.

The essence of these instruments is comprised of the following: set objectives in terms of the permitted amount of emissions or the necessary amount of pollution prevention, objective fulfillment control, sanctioning those who do not respect the regulation.

Pecuniary sanctions classify these instruments in the economic group. Their success depends on the efficiency of control, on the one hand, and pecuniary sanctions on the other hand. However, it is necessary to first set pollution standards for each pollutant. It is necessary to establish emission standards for each of the companies, so that the set objective is achieved with minimum costs. This means that marginal reduction costs of combating emissions must be known for each subject, which requires information on the emitters' cost functions. A state agency or a similar institution that is implementing responsible for combating pollution would struggle to collect all the information. Even if it were in a position to do so, the costs of obtaining such information would be very high and would exceed the benefits of an effective program. This results in the

practice that quantitative measures to control and combat harmful emissions are usually arbitrarily allocated, which makes the aforementioned programs inferior to market-based instruments, including the system of taxes and subsidies. Also, as a rule, the low level of incentives on dynamic efficiency accompanies such measures.

Recently, in most countries that practice quantitative measures, setting of objectives in terms of the allowed amount of emissions has been avoided. Instead, maximum concentrations of pollutants in the environment are determined and the requirements for so-called “clean” or “non-carbon” technologies are used as the main instrument to achieve this objective. Regulations that require the application of gas desulfurization on thermal power plant chimneys, catalysts on exhaust systems of motor vehicles, or unleaded petrol are examples of these instruments. It is believed that these instruments are relatively easy to control, easy to use and to rapidly lead to significant reductions in emissions, which makes them a major asset in the fight against pollution in most the OECD member countries. However, they are not always suitable and sometimes can be very inflexible, expensive, and not encouraging to dynamic efficiency.

Market measures for emissions control (economic instruments) in the strict sense include:

1. fiscal measures,
2. the system of transferable permits.

The advantages of the measures in comparison to the quantitative ones arise from the efficiency of the market mechanism itself to respond quickly to all signals, encourage dynamic efficiency, and lead to a reduction of pollution where the costs are the lowest.

Taxes and subsidies as the basic fiscal instruments, act through the changes in relative prices. Regardless of what is being taxed, either the level of input use or the pollution level, the result amounts to the rise in the cost of a particular process or activity. Subsidies for emission reductions operate in a similar manner. The only difference is that certain activities or production processes are less expensive for the amount of the subsidies paid. From a short-term perspective, taxes and subsidies are symmetrical, while in the long-term there are differences due to the redistributive effects.

Pollution taxes are aimed to achieve pre-defined environmental objectives. These taxes eliminate the difference between social and private costs. In order to achieve an economically acceptable pollution level, tax on each unit of harmful emissions must be equal to the marginal damage at an optimal level of pollution. In this way, external effects are internalized and the polluter is put into the position to take care not only of his own damage costs (private costs) but also of the social damage (external effects on the society). An introduction of eco-taxes is intended to reduce economic activities that disturb the environment to a socially acceptable level.

In case of no social action, the amount of pollution will be much higher since it depends entirely on the will of the polluter, whether it is a company or an individual. However, if a tax on pollutant emissions is introduced, the polluter will reduce the

harmful activity. In the case of subsidies aimed to encourage cleaner production, the polluter will not reduce the level of activity, but the level of harmful emissions will be reduced. It can be concluded that, from an environmental standpoint, it makes no difference whether we will fight against pollution by taxing harmful activities or by encouraging clean technologies through the subsidies. However, from an economic standpoint, a difference is apparent. The tax will have an impact on the reduction of economic activity (aggregate supply), whereas subsidies will not. However, it cannot be concluded that the subsidies are a superior instrument of the economic policy. Subsidies require a larger budget, which is necessary to be filled in from other sources. Moreover, the experience of the EU countries speaks in favor of taxation, as a suitable instrument for achieving environmental objectives (European Economy, 1992). In this context, an interesting argument is that environmental taxes not only have an ecological function, but may also have a significant fiscal function (filling of the budget), and thus reducing the need for income tax, which eliminates distortions and encourages growth (Weizsacker, 1989).

The simplest case of pollution taxes is the taxation of GHG emissions which are uniformly distributed in the environment so that the amount of the damage is independent of the place and time of emission. In order for the introduced tax to be an economically efficient instrument, it is necessary that:

1. the tax rate is the same for all pollutants (cost efficiency);
2. the height of the effective tax rate should correspond to the amount of the marginal damage in a socially efficient level of pollution. This is only possible if the state has information about the marginal damage function or the marginal cost function of combating pollution. As this is usually not the case, the tax rate is determined arbitrarily in practice, so the economic efficiency of the instrument is lost. However, even if the environmental policy measures are set in this manner the desired effect will be achieved with minimum costs;
3. whenever it is possible, emissions of harmful substances should be taken as the object of taxation, in particular, GHG emissions, rather than the economic activity itself. In this way, dynamic efficiency and substitution effects are encouraged. For example, if two fuels have the same price per unit of heat they generate, but different environmental effects, introducing a tax on the less favorable fuel reduces its use and consumers are encouraged to substitute it in favor of the one which is more environmentally friendly. Coal and natural gas are an excellent example (Perman, Ma, McGilvray, 1996).

The theoretical model of the system of transferable permits was developed in the late sixties and early seventies (Crocker, 1966; Dales, 1968), considerably later than the Pigou's concept of the pollution tax (Pigou, 1920). Therefore it is considered a relatively new instrument.

In order for the system of transferable permits to function effectively, it is necessary to:

1. determine the amount of pollution that will be allowed. If the efficiency of the system is sought, it is necessary that the total amount of permits issued, measured in the units of pollution, corresponds to an efficient level of pollution. If the regulator (the state) is not able to determine that level or considers that the criterion of efficiency is not adequate for a specific type of pollution, a number of permits can be otherwise defined. For example, with very hazardous pollution, the criterion of economically efficient level would be counterproductive.
2. identify the right of a business to emit a certain kind of pollution only to the extent to which it possesses a permit. Any further emission in excess of the limit must be strictly prohibited.
3. select the criteria for the initial allocation of transferable permits.
4. guarantee the freedom of trading at a price that is freely determined.

The system of transferable permits regulates the quantity of emissions, rather than relative prices. In that sense this instrument is closer to quantitative ones. However, the essential difference lies in the transferability (trade ability) of these permits. If the permit market operates (with the per-determined amount of allowed emissions), the equilibrium permit prices will be created, which indicates that the effect of the instrument would be the same as if a tax at a certain rate was introduced.

If the marginal cost of pollution elimination is higher than the market price of the permit, it pays off more to a single polluter to obtain more rights to pollute, rather than eliminate emissions on its own. At the same time, if another polluter's marginal costs of elimination (purification) of contamination are below the market price, it pays off more to sell the right, (emission permit) to the first polluter and eliminates the pollution on its own. As long as there are differences in marginal costs of eliminating pollution, the trade in permits will take place. When the marginal costs become equal for all the polluters, the permit market will stop operating and the market price will correspond to the level of social shadow-price of the pollution unit, presuming that the regulator opted for the efficient level of emissions. It is, therefore, considered that the system of transferable permits exerts an equal cost-effectiveness as the system of optimal taxation or subsidization. However, the distributional effects of these instruments can be completely different. The reason for this should be sought in the inability to always accurately determine the cost function of combating pollution, as well as in the different criteria in the initial allocation of permits.

The initial allocation of permits may take place, either free of charge, according to the per-accepted criteria, or on the basis of competition among buyers at an auction. In the latter case, the result of the auction will be a transfer of income from polluter in favor of the regulator, in an amount equal to the price of permits multiplied by the allowed amount of emissions.

The system of transferable permits, however, is not suitable for combating emissions that are not uniformly distributed in the environment. Reselling emission permits by polluters

located inside the sparsely populated area and purchase thereof by polluters which operate in the city core, will cause a significant increase in damages. The situation is similar in cases when the permit is purchased by an emitter located in the dense industrial area from the emitter located in a distant rural area. It can be concluded that the system of transferable permits can be successfully applied only in the case of pollution that is perfectly blended into the environment, such as GHG emissions, which represents the most significant limitation of this otherwise efficient and increasingly popular instrument.

When it comes to mobile sources of pollution, especially means of transportation, measures to control exhaust system are considered effective. Regulations on the mandatory minimum of technical standards (maximum of emissions) related to the use of vehicles are relatively easy to control and apply in the production of new vehicles. As for older vehicles, in which new technical solutions have not been applied, with differentiated rates of tax on the use of motor vehicles or sales tax, customers are encouraged to purchase newer, more environmentally friendly models. However, there are certain doubts surrounding this issue. Although it is quite clear that such measures, e.g. the installation of catalytic converters for exhaust gasses on internal combustion engines, will contribute to the reduction of emissions per kilometer, the overall effect will be reduced only slightly due to the increased use of motor vehicles. At the same time, such measures do not affect the reduction of emissions in critical parts of the day and at critical locations, e.g. in city centers (Pestic, 2012).

The first attempts of a practical application of transferable permits were made during the 1980s in the United States, in order to suppress leaded petrol from the market and eliminate CFC compounds. The most ambitious attempt to control acid rain occurred in the United States, under the IV Amendment of the Clean Air Act of 1990, which introduced a system of transferable permits for emissions of sulfur dioxide, with the intention that, by the year 2000, emissions of this gas will be reduced by 50% compared to the level in 1980. The first phase of the SO₂ reduction, during which limitations on emissions were placed for 263 biggest polluters, including 110 of thermal power plants, lasted until 1995. The Environmental Protection Agency (EPA) distributed a certain number of permits to each polluter based on the average thermal input in the period from 1985-1987, with the additional possibility of obtaining bonus licenses. Since 1 January 1995, each of the polluters has been allowed to emit SO₂ only in quantities for which they hold the license. Non-compliance was punishable by \$2,000 per ton of emissions, with the obligation to compensate for reduction during the following year. Since the beginning of 2000, almost all power stations using fossil fuels across the United States have been included in this system.

The main advantage of transferable permits is manifested through cost effectiveness. Not only have the expected reductions in SO₂ been achieved, but they have also been exceeded. The reductions over those which were planned in 1995 and 1996 led to the creation of reserves, (“permit banks”) in the amount of more than 6 million tons of SO₂. One of the peculiarities of the US system of transferable permits lies in the possibility of the delayed use of permits and the possibility of forward operations with them. The

fact remains that the total cost of combating emissions was significantly lower than it would have been the case if the same amount of the reduction was achieved by classical quantitative “prescribe and control” measures. Annual savings are estimated at about \$1 billion (Stavins, 1998). According to the EPA data, during the program, the volume of transactions in the market was growing; e.g. in 1996, it amounted to more than 4 million tons. The cost of permits in the free market had been falling since the beginning of 1992, when it amounted to about \$300 per ton of SO₂ emitted, up to about \$70, at the end of March 1996, with subsequent slight increase, gravitating at around \$100, not exceeding \$150 (Scmalensee et al., 1998).

The success of this program has undoubtedly contributed to the popularity of market-based measures, especially the system of transferable permits. The application of economic instruments in the endeavors for the preservation and protection of the climate should be observed in this context.

Economic instruments in the climate protection policy

A wide range of economic instruments intended for climate protection policy includes:

1. carbon taxes,
2. transferable permits,
3. incentives for the renewable energy sources,
4. incentives for the energy efficiency improvements,
5. introduction of technical standards,
6. subsidies for research, development, deployment and transfer of new technologies.

1. Carbon taxes are introduced in order to prevent negative external effects arising from the combustion of fuels containing hydrocarbons, such as oil and its derivatives, coal, wood, natural gas, etc. The tax on fuels containing carbon increases the cost of energy generated from these fuels, which encourages consumers to reduce their use or switch to the use of energy from alternative sources such as solar, wind, water, etc. The tax rate depends directly on the carbon content per unit amount of fuel (per ton, liter, cubic meter). As the demand for energy becomes more price elastic, i.e. more responsive to changes in price, such an instrument is more effective. This instrument is especially prevalent in European countries that lead a strict policy of climate protection, for example, Sweden, the Netherlands, Finland, Norway, Italy, Great Britain, France, Slovenia, etc. From non-European countries, taxes on carbon were introduced by Canada, in the province of British Columbia. Base levels of these taxes vary from state to state but are most often defined by the quantity and type of fossil fuel. In some states, there are serious political discussions on the tax, its effectiveness, and acceptability. In support of the introduction of the tax on carbon, there is also the possibility of ‘recycling’ tax revenues, i.e. the use of tax revenue from the carbon tax instead of some other taxes. For example, instead of taxing income, property or investments, it is possible to achieve the necessary budget revenues by taxing “pollution”, i.e. GHG emissions. Not only is this

form of budgetary neutral internalization of negative externalities, but it also provides an incentive for companies and citizens to work more, save more and invest more. In order to avoid taxing, businesses and citizens have an additional incentive to use less energy, introduce new technologies and new energy sources. Although it may seem as rather acceptable, this economic instrument is not politically favored, since it affects the income redistribution and the reduced living standards, as well as the impairment of international competitiveness of energy intensive products (Metcalf, 2009).

2. Transferable permits determine the allowed emission levels, both at the national level and at the level of individual sectors, up to the level of individual enterprises, on the basis of which they are issued. These permits may be an object of transactions between states, but also between enterprises (cap and trade operations). The condition is that each unit of GHG emissions, regardless of who is the emitter, must be covered by permits. Entities which lack permits, and for which it does not pay off to reduce their own GHG emissions, can purchase additional permits from the subjects which find it more profitable to reduce emissions on their own and to sell the permits. The system of transferable permits encourages reduction at the lowest cost.

The disadvantage of this instrument lies in the political weight of the agreement regarding an acceptable level of overall GHG emissions. An even greater problem is the allocation of permits to regions and businesses, causing potential political disagreements. There are two ways of allocating permits. One is the free distribution, according to a generally accepted criterion, for example, according to the registered GHG emissions in the past, and the other is the allocation of permits through auctions, i.e. how much one is willing to pay for a permit. Both types of allocations have their advantages and disadvantages. The problem with free permit allocation (so called “grandfathering”) is reflected in the arbitrariness of criteria and possible bias in the administration of the allowed emissions quota. In particular, the question is raised how to allocate permits to the previously nonexistent entities. In allocating quotas through auctions, there is a problem of the additional cost of buying permits. The entities which buy them will always opt to shift burden to the end customers or users of their products, which means that monopolists will always be in a position to pay more and get more emission rights, which will further strengthen their market position and reduce the level of competition.

Problems in the transferable permit system may arise during its controlling, i.e. monitoring and measurement of emissions. There is a problem of whether to measure only emissions that are related to the market activity or to measure all GHG emissions, no matter in which sector they occur, or how to measure changes in land use and forests. Especially delicate is monitoring and sanctioning of violations in the international transferable permits system.

3. Incentives for renewable energy include a wide range of subsidies for producers and users of renewable energy sources. Instead of giving subsidies for fossil fuels, soft loans and tax incentives are given to investments in renewable resources, favorable tariffs to producers of energy from renewables, price subsidies for buyers of renewable

energy. This instrument is widely used in developed economies, although in different forms and scope.

4. Encouraging efficiency in the production and consumption of energy acts in a similar way to the previous instrument. There are price incentives, favorable loans, favorable tax treatment of investments and profits in initial phase, jointly with the white certificates⁴ use, or ESCO⁵ (energy service company) arrangements.

5. Technical standards of efficiency consist of an explicit demand towards large producers and users of energy or public companies to apply certain standards of minimum energy efficiency. Any deviation from the standards is considered an offense, which makes this instrument delicate for application because it assumes an objective monitoring which requires an impartial implementing agency. In some countries it is hard to be achieved and separated from the daily political events.

6. Funding for research and development of non-carbon technologies, affirmation of alternative energy sources, and transfer of technology to the underdeveloped world are considered by many authors as one of the most auspicious instruments in the struggle against anthropogenic disturbances of climate on the planet (Harris, 2009; Stern, 2006).

There are firm reasons to believe that with the advent of new technologies, primarily in the energy production and transmission, the true turning point in the policy of climate protection will be reached owing to the fact that the combating GHG emissions will become much cheaper and spontaneously will enter into practice (Pescic, 2012).

The Kyoto Protocol

Up to date, the biggest global attempt to apply economic instruments on the climate protection policy can be attributed to the Kyoto Protocol and the flexible mechanisms which it defines. At the third Conference of parties that had ratified the United Nations Framework Convention on Climate Change (UNFCCC), in Kyoto in 1997, the most important document in this area - the Kyoto Protocol was adopted. According to the guidelines of this document, all the countries which accepted the responsibility to limit GHG emissions within the first commitment period of the protocol from 2008 to 2012 were listed in the so-called Annex B of the Protocol. Annex A lists the gasses which will be controlled, while Annex B lists the amounts of compulsory reductions in GHG emissions per country. The overall global average of emission reduction amounts to - 5.2 percent relative to the GHG emission level in 1990, which is considered as the base line for the Kyoto Protocol.

The Russian Federation ratified the Protocol on 16 February 2005, which put the Protocol into effect since the preconditions of its implementation had been achieved: that a certain number of countries had adopted it and that it included over 55% percent

4 Further information on “white certificates“: http://www.ewc.polimi.it/documents/EWC_brochure.pdf

5 Further information on ESCO arrangements: <http://www.esco-europe.com/>

of all global GHG emissions in 1990⁶.

Apart from national programs of GHG reductions, which all the Parties are free to design and implement on their own accord, the Kyoto Protocol also provides a certain degree of flexibility in fulfilling the commitments of the countries listed in the Annex B.

The Protocol provides three so-called flexible mechanisms:

- The international Emission Trade mechanism (ET) was designed for countries of the Annex B group. The Kyoto Protocol allows two of any countries of the aforementioned group to exchange portions of their commitments which results in redistribution of allowed levels of emission. Since GHG perfectly mix in the atmosphere, it is completely irrelevant where the reductions occur, so the International Emission Trade creates globally neutral, but important economic effects. Different countries and regions have different carbon intensities, different energy efficiencies, and different fuel substitution flexibilities. This creates the fact that they also have different marginal costs of emission reduction. The ET mechanism can also include private companies, which can trade among themselves, where the objects of the trade are Assigned Amount Units (AAUs) and Removal Units (RMUs). Purchased AAUs and RMUs could be used for fulfilling commitments in the first commitment period (2008-2012) as well as later, i.e. they can be ‘saved for the future’. When it comes to trade in emissions, it must be taken into account that the Kyoto Protocol emphasizes domestic measures for reducing GHG and that the intention was that all parties should implement actual projects for the purpose of climate protection. As a consequence, there is a limit of the Emission Trade, and the limit of the ‘saving for the future’ (DeCanio, 2003).
- Joint implementation (JI) was designed to encourage technology transfers and to intensify activities which bind the atmospheric carbon, in the long run, the so-called ‘carbon sinks’. The UNFCCC Annex 1 Parties, and the Kyoto Protocol Annex B Parties, can transfer or exchange Emission Reduction Units (ERU), (so-called ‘carbon credits’) which were issued for joint projects in the field of GHG reductions or strengthening of carbon sinks. Instead of reducing their own emissions, any of the Annex 1 Parties (i.e. Annex B) can invest in the project of reducing GHG in any other country which has also signed the same Annex if it is more cost-effective. This important incentive is justified by the fact that GHG expand in the atmosphere in a perfect way, so from the climatological perspective it is not relevant where the emissions and reductions occur. The basic principles of good JI practice are additionality and a good estimate of initial emission levels. The additionality principle assumes that JI projects must produce higher GHG emissions than those which would occur spontaneously. The estimate of an initial level of emissions is necessary for coordinating parties in JI. The difference

6 The Federal Republic of Yugoslavia ratified the UN Framework Convention on Climate Change in 1997 and the Republic of Serbia as its legal successor ratified the Kyoto Protocol in 2007

between GHG which would be emitted without a designed project and the amount which would be emitted prior to closing the project present the “saved” emission according to which the ERU are issued. According to the article 2 of the Protocol, every Party is allowed a certain amount of gasses which could have been emitted during the period 2008-2012. When the host country transferred the ERUs to the benefit of the investor country, the carbon credits were deduced from its account and added to the investor’s account, which helped to avoid double counting. The Kyoto Protocol required from all of the Annex B Parties to implement national systems for measuring and reporting of emissions and to create national GHG registers. Other requirements were to enable reporting and achieving the predetermined level of emissions in the period 2008-2012 (Pestic, 2004).

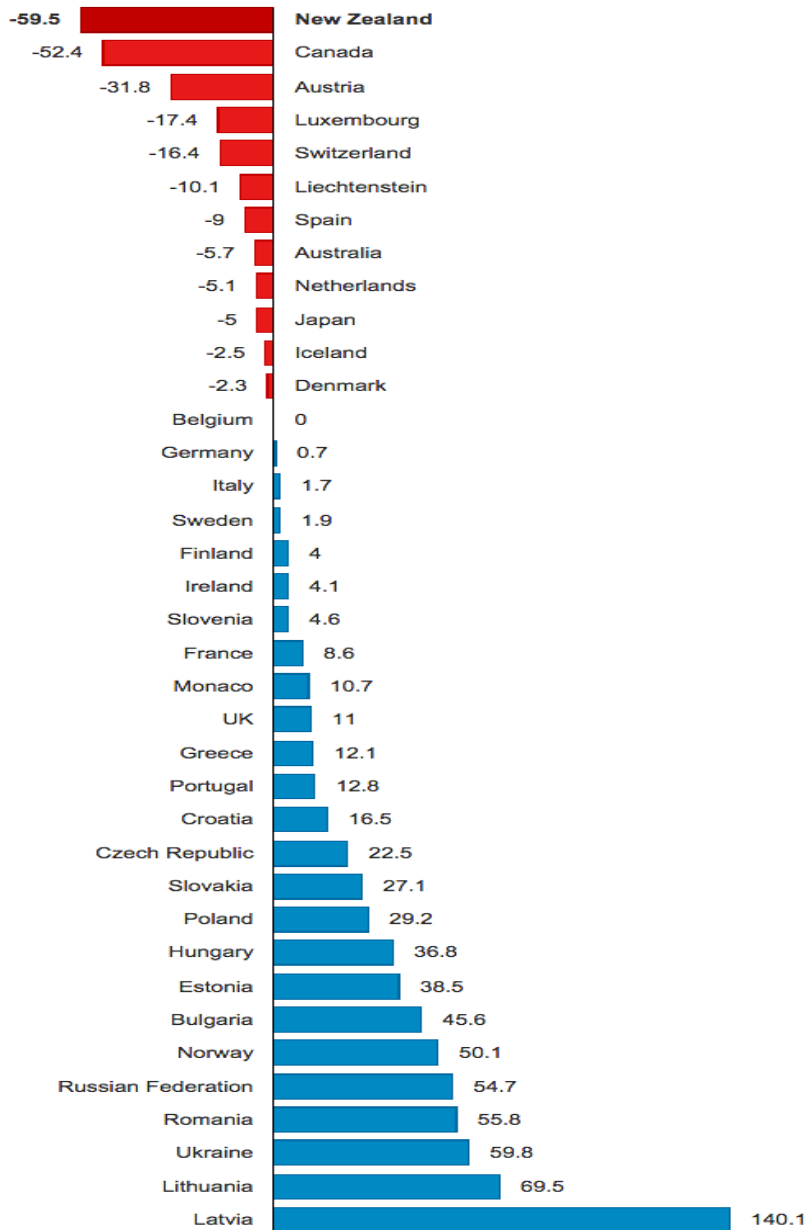
- The Clean Development Mechanism (CDM) was designed not only to provide Annex B countries with the possibility to reduce emissions in the countries that have not accepted the aforementioned status but also to help developing countries to achieve sustainable development using foreign investments. CDM projects, whose hosts are the countries which did not accept Annex B, provide the so-called Certified Emission Reductions (CERs), which the industrial countries, i.e. the investors, can use to meet the Protocol requirements. The CDM projects are based on three general criteria: voluntary basis, evidence of long-term benefits, and additionality (Rosales, Pronove, 2002). The CDM projects were expected to provide financing from private, rather than from state sources and to be executed through a partnership between the public and the private sector. Sectors suitable for CDM implementation include the energy sector, processing industry, waste management, forestry, and agriculture. In order for the Annex B countries to achieve the CER, it was necessary for the country where they were registered to have a binding emission quota, accurately calculated according to Protocol requirements and other acts, as well as the national system of GHG accounting. The CDM projects were supposed to be located in countries that have not accepted the commitment to reduce GHG, but have signed the Kyoto Protocol and have institutions for monitoring and control of the projects (Pestic, 2004).

After the first commitment period of the Kyoto Protocol (2008-2012), a conclusion can be drawn that the results are below the expectations. In the period from 2000 to 2010, the overall global emissions increased by about 10 GtCO₂-eq or at an average rate of 2.2 percent while in the entire period from 1970 to 2000 the average rate was 1.3 percent. The biggest increase was recorded in the energy sector (47%), followed by industry (30%) and traffic (11%) (IPCC, 2014). The biggest emission decreases occurred in countries in transition, mostly due to transitional recession and not due to successful implementation of climate protection measures (Fig. 1 and 2).

If the calculation includes savings which resulted from carbon sinks formed by land use, the degree of fulfilling the Kyoto Protocol commitments per country is given in figure 1, and if these savings were excluded, the degree is shown in figure 2.

Figure 1. The Kyoto Protocol fulfillment in the first period (including AFOLU emission savings)

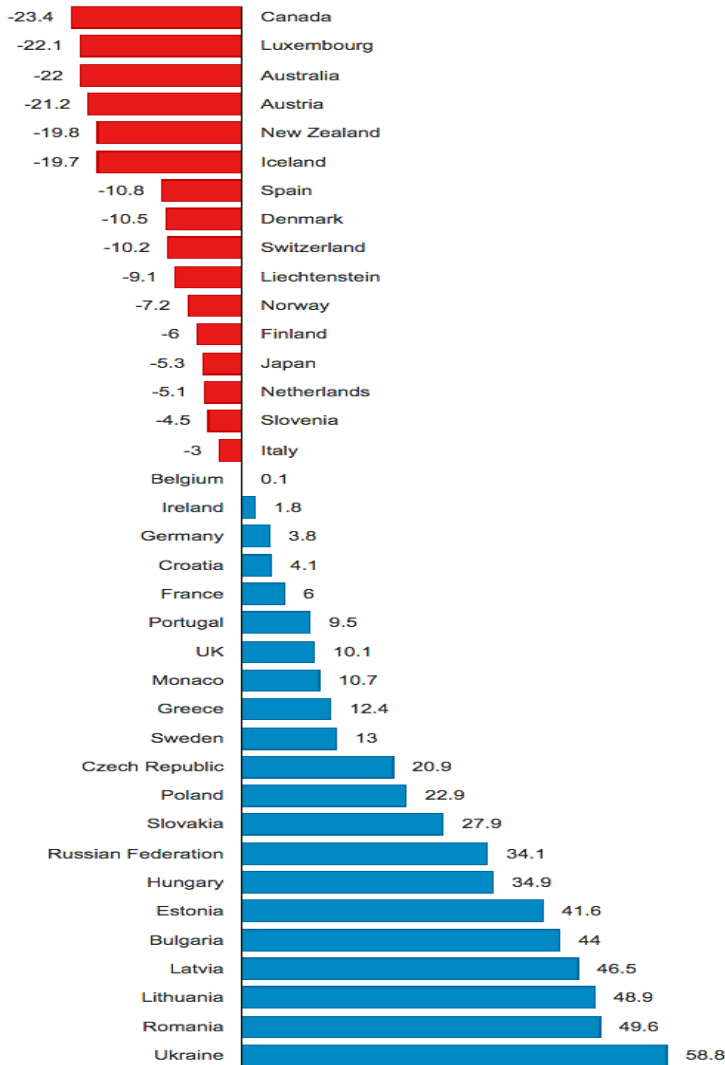
Kyoto successes (blue) and failures (red)



Source: The Guardian 2012

Figure 2. The Kyoto Protocol fulfillment in the first period (excluding AFOLU emission savings)

Kyoto successes (blue) and failures (red)



Source: The Guardian 2012

There are some opinions that the Kyoto Protocol has harmed more than it has benefited the GHG reduction (New Scientist, 2013). However, these opinions are isolated since there is a clear evidence that the developed countries which ratified the Protocol decreased the emissions by 22.6 percent in the first commitment period, which presents far more than the proposed commitments (UNFCCC Climate Action, 2015).

What surely remains as an undisputed contribution of the first commitment phase is the experience in implementation of economic instruments - particularly the CDM mechanism, which opens the door to the further implementation in the following period until 2020 (Schiermeier, 2012).

Instruments for GHG emission reduction in agriculture and forestry after 2012

Figure 1 shows a much higher degree of fulfillments in certain countries compared to figure 2, which clearly points to the importance and the potential of sectors related to land use.

Unfortunately, agriculture and forestry are not included in the European Emission Trade Scheme (ETS). Although it is the biggest carbon market in the world, the ETS is of no importance to the AFOLU sectors. CDM projects have not focused on these sectors to a wider extent either. Of about 7,000 registered active CDM projects in the world, as little as 2.5 percent is related to agriculture and only 0.6 percent to forestry. To make this absurdity worse, over 90 percent of proposed projects in the developing countries which participate in the NAMA Arrangement⁷ are related to AFOLU (Beckel, 2010). This means that in the next commitment period, by 2020, agriculture and forestry potentials will be used to a higher degree than now, most probably within the CDM arrangements. So far, in AFOLU sectors, projects related to methane reduction. (manure management, biogas, biomass use) and forestry were included in the CDM arrangement. It is expected that in the future the scope of these projects will expand. Experiences from countries such as Australia (Carbon Farming Initiative, The Western Arnhem Land Fire Abatement Project), New Zealand (nitrate fertilizer use reduction, promotion of breeding livestock with obligatory emission monitoring) and California (California emission market, opened in 2012) bring encouraging results.

In the USA, the increase use of voluntary systems of emission trade is becoming more important. By enabling trade in emission reductions on a voluntary basis (Voluntary Emission Reductions, VER), as well as in reduced emissions within CDM projects, the number of participants in the US carbon market has been increasing. Another consequence of the aforementioned activities is the increased depth of the market and the security of the market due to diversification. Large companies from the world of finance and banking, local self-governments, NGOs and other elements of civil society are increasingly in demand for certificates generated in this manner. The value of carbon credit transactions (proof of reduced emissions) from forestry projects in the USA amounted to 133 million USD in 2010, of which 95 percent originated from voluntary activities (Peters-Stanley et al., 2011).

7 Nationally Appropriate Mitigation Actions (NAMA) for suppression of GHG emissions presents a new concept designed for the developing countries in the period after 2012. The idea is that the countries themselves nominate projects in the areas which suit them the most, i.e. the areas which meet their own requirements for sustainable development. This concept was first introduced in the Bali Action Plan in 2007 and is completely integrated into the Cancun Agreement.

When it comes to the effects of financial instruments in the USA, the most prominent are the so-called weather derivatives, financial instruments in the form of bonds against natural disasters. These securities provide insurance companies with the possibility to neutralize risks of extreme weather conditions. The buyer of the bond sells the insurance against an accident stated in the bond. In other words, they are obliged to pay the seller the insured amount. In contrast, if the disaster does not occur, the seller pays high interest determined by the bond. These bonds became popular in the USA before 2008, so the overall nominal value of weather derivatives in 2006 amounted to 45 billion USD (Ferguson, 2008). After 2011, these stocks increased their presence on financial markets in Great Britain (Speedwell-weather, 2013), and even in India (Kulkarini, Asawa, 2012). The implications of weather derivatives on financial markets are becoming increasingly popular also as a subject of academic discussions (Weagley, 2014).

In developing countries, REDD+ mechanism draws attention. This voluntary instrument is used by the developed countries in order to decrease deforestation and emissions caused by forest degradation, as well as to increase carbon buildup in forests in the developing countries. The instrument was introduced in 2005 at the 11th Conference of UNFCCC Parties in Montreal. Later, on the 13th Conference, it was integrated into the so-called Bali Action Plan. Since then, this instrument has increasingly been put into practice, introducing two important innovations. The first innovation is reflected in a more intensive engagement with host countries, which are expected to take a more active role in the preparation of national strategies and action plans, raising the capacities for project implementation and technology transfers. The second innovation is reflected in an ex-post approach to finances. This approach is based on project results, or more precisely, on the real GHG reductions and carbon storages, instead of simply expressing the will to make the project successful. The details of ex-post financial flows in REDD+ projects are still subject to amendments and negotiations through various multilateral programs (Forest Carbon Partnership, Forest Investment Program) as well as through bilateral programs (Tanzania-Norway, Indonesia-Norway) (Smith et al., 2014).

There are high expectations regarding REDD+ projects. They are expected to bring to efficient and cost-effective ways of reducing GHG emissions in forestry (Golub et al., 2009). The costs of implementation, especially for monitoring REDD+ projects, will mostly depend on detailed regulations for the sustainable management and certification of forests in host countries. There are open questions in this domain, such as the “GHG drain” from investor countries to host countries, as well as the problem of biodiversity preservation in case of afforestation by highly efficient tree species which grow fast and have an intensive rate of binding carbon from the air.

Among the economic instruments, fiscal instruments are still prominent, e.g. the emission tax, input taxes (fuel, nitrate fertilizers etc.) as well as subsidies for energetic efficiency, carbon substitution, research and development of non-carbon technologies and taxes for certain other measures in AFOLU sectors. Nitrate taxes are especially applied in agriculture and they help to reduce the use of nitrate fertilizers.

Experience from Sweden is interesting for this domain. Sweden has one of the highest CO₂ taxes equal to 1000 SEK/t CO₂ (about 110 E/t). The tax on nitrate content in mineral fertilizers was introduced in 1984 at the level of 1.80 SEK/kg N primarily for the purpose of water protection. Although it showed good results, this instrument was abolished in 2010 to preserve the competitiveness of agricultural production due to planned increase in the CO₂ tax. A research (Mohlin, 2013) has shown that the N₂O emissions would have been bigger by 160t or 2 percent on average if the aforementioned tax had not been introduced; it has also predicted that the abolishment of this tax would completely neutralize the effects of CO₂ tax in agriculture. In the same research, it was concluded that the introduction of the tax on cattle products (milk and meat) throughout the EU at the level of 60 E/tCO₂-eq would result in the reduction of GHG emissions by 7 percent (Mohlin, 2013).

Credit allowances for the projects of sustainable development and good practice in agriculture and forestry are complementary to fiscal instruments. Favorable loans are recognized by international financial organizations (GEF - Special Climate Change Fund).

After 2012, there has been a noticeable increase in the voluntary actions regarding climate protection policy, which is no guarantee for efficiency and effectiveness. The 2015 Paris Agreement, declared as a “historic turning point”, in fact is far from reaching its aims. Although it may be considered as a big international political success, scientifically speaking it is insufficient and ineffective. Nationally determined contributions, the main Paris agreement instruments, are legally non-binding. They lack the specificity, normative character and compulsion necessary to become legally binding. Without mechanism to force a country to fulfill its declared intentions there will be no success in the international climate protection policy (Druzin, 2016). Also, there is a serious scientific doubt in the 2°C reduction targets. “Much greater emission reduction efforts will be required in order to hold the increase in the global average temperature to below 2°C by reducing emissions to 40 gigatonnes or to 1.5°C” (UNFCCC Secretariat, 2016). It may be concluded that, by now, the Paris Agreement targets are too weak, and its envisaged governance is uncertain. What will be the future course of its development remains to be seen.

Instruments for GHG emission reduction in Serbian agriculture and forestry

The overall GHG emissions from Serbian agriculture are estimated to be about 14.126 GgCO₂-eq (Znaor, Landau, 2015, pp. 177). However, there is information that the emissions from Serbian agriculture in 2012 totaled as little as 6.45 MtCO₂-eq or 11.5 percent of overall emissions (WRI, CAIT 2016), and that forests and land absorb up to 75.2 MtCO₂-eq which means that if AFOLU sectors are included, Serbia was in 2012 a GHG sink rather than an emitter at 19 MtCO₂-eq (WRI, CAIT 2016). Without questioning the reliability of the data, a conclusion can be drawn that even if more favorable values are accepted given by the World Resource Institute, there was a 3.51 percent increase of emissions by Serbian agriculture in the period between 2006 and 2012 (WRI, CAIT 2016), which also speaks in favor of the importance of Serbian AFOLU sectors for the entire region.

Unfortunately, the policy of GHG reductions from agriculture in Serbia is given a low priority. The system of economic support for agricultural production is opposed to the goals of climate protection policy. Direct incentives paid to the producers per hectare or per livestock unit are not conditioned by the methods of land cultivation or livestock breeding, which does not raise the producers' concern for GHG emissions.

Subsidies for diesel fuel for agriculture which are about 40 percent of the retail price of diesel, directly encourage agricultural producers to increase fuel consumption, which results in increased emissions, not only of GHG but other harmful substances as well. "Hidden subsidies" for mineral fertilizers present another concern since they encourage the irrational and harmful use of fertilizers. By writing off debts to fertilizer producers on one hand and selling fuel below its market price on the other, the country gives the mineral fertilizer producers the possibility to offer their products at prices which are lower than in the region. This often leads to excessive use of nitrogenous fertilizers, which is the main emitter of nitrogen oxide. Apart from the damage to human health and the wildlife due to high concentration of nitrogen in water and soil, the damage from GHG emissions is estimated to 260 million EUR per annum or to about 55 percent of the overall damage from GHG in Serbian agriculture which is estimated to about 475 million EUR (Znaor, Landau, 2015, pp. 177)⁸.

The habit of burning field residue, which is not banned or sanctioned in any way, has even more negative effects. Burning field residue not only emits additional CO₂ but it also wastes valuable bio-fuel material and causes a potential danger. A strict law must be introduced to sanction and prevent the practice of burning field residue once and for all.

Serbia needs radical changes in agricultural policy. The inefficient system of direct producer incentives per arable land area and per number of livestock must be abandoned. These incentives mostly suit large farms with conventional production. Bonuses must be given for products of certain quality and technology. Instead of encouraging the intention to produce something, it is necessary to create incentives for environmentally and climate friendly products. Encouraging energy inefficiency and diesel fuel overconsumption must be stopped. On a contrary, it is necessary to support agricultural producers to use more renewable energy by offering favorable loans and tax incentives. Instead of encouraging the use of mineral fertilizers, it is necessary to encourage organic agriculture, especially in the conversion phase.

Incentives to good agricultural and forestry practice must find their place in the agricultural policy measures. Special attention must be paid to deagrarianization and rural drain in peripheral agricultural regions where there are no preconditions for modern agriculture. These locations require a planned efficient afforestation in order to form a GHG sinks.

8 The damages to the climate as a result of GHG emissions in agriculture have been estimated by expressing all emissions in CO₂ equivalent, to which the emission damage price factor of 33.6 EUR/t CO₂-eq is applied. This damage factor is common in the analyses of the European Environmental Agency (EEA 2011) since it is considered to give a good reflection of the average market price of carbon as well as marginal costs of emission reduction.

Favourable credit policies and tax incentives should be used to encourage energy production from agricultural and forest biomass. This would be a significant step forward for a stable, decentralized, ecologically friendly energy sector which would serve as a basis for modern society and sustainable agriculture.

Conclusion

Agriculture, forestry, and other land uses (AFOLU sectors) are still considered very important in the framework of global efforts to preserve the climate. According to the latest IPCC report, global GHG emissions from agriculture, forestry and other of land uses in the period from 2000 to 2010 were about 10-12 GtCO₂-eq or about 24 percent of overall emissions. The annual potential of GHG decrease around the year 2030 is expected to be between 0.2 and 13.8 GtCO₂-eq in forestry and between 0.5 and 10.6 GtCO₂-eq in agriculture at the expected prices of reduced carbon of 100 USD/t CO₂-eq.

In order to utilize the potential, it is necessary to create suitable economic instruments. Of all economic instruments used so far, the central place belongs to the so-called flexible mechanisms of the Kyoto Protocol which together with national programs of GHG reduction form the basis for the effort to prevent anthropogenic climate changes. After the first commitment period, the results were lower than expected. The total global GHG emissions increased in the period from 2000 to 2010 by about 10 GtCO₂-eq or at an average annual rate of 2.2 percent, while in the entire period between 1970 and 2000, the average rate was 1.3 percent. It is believed that without the Kyoto Protocol and its flexible mechanisms, GHG emissions would have been bigger in the period from 2008 to 2012.

For the period after 2012, there has been a noticeable increase in the voluntary actions regarding climate protection policy, which is no guarantee for efficiency and effectiveness. The current global political climate is not favorable for a globally binding agreement. However, without obligation, there is no significant chance that the commitments will be fulfilled. Moreover, not only is it necessary to establish the legal obligation to implement measures against GHG emissions, but also a straightforward international system of sanctions must be established for those who do not comply. The success of the first commitment period of the Kyoto Protocol would have definitely been more substantial had the sanctions been provided for failure to fulfill the commitment. By now, there is no global political will to do so. Whether such initiatives will appear and when, will depend on the potential damage which may occur in the future due to climate change.

Considering the Serbia, no attention is paid to measures for GHG reductions emissions in agriculture. The system of economic instruments for encouraging agricultural production is opposed to the goals of climate protection policy.

Proposed changes in the agricultural policy include the abolishment of direct incentives per hectare and livestock units, introduction of bonuses for products of certain quality and technology, incentives for energetic efficiency, use of renewable energy sources and for organic production. The incentives for good agricultural and forestry practices must become a standard in agricultural policy.

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EKONOMSKI INSTRUMENTI SMANJENJA EMISIJE GASOVA SA EFEKTOM STAKLENE BAŠTE U POLJOPRIVREDI I ŠUMARSTVU

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Sažetak

Značajno smanjenje emisije gasova sa efektom staklene bašte iz poljoprivrede i šumarstva, može se ostvariti jedino uz adekvatne ekonomske instrumente.

U radu se analiziraju dosadašnja iskustva u primeni ekonomskih instrumenata u širem i užem smislu, kako u domaćim, tako i međunarodnim okvirima. Posebna pažnja se pridaje iskustvima u primeni tzv. fleksibilnih mehanizama iz Kjoto protokola. Kao rezultat tih iskustava, u periodu posle 2012. godine, stvoreni su novi instrumenti, pretežno na dobrovoljnoj bazi, što ne uliva poverenje u njihovu delotvornost.

Konstatuje se da sistem ekonomskih instrumenata za podsticanje poljoprivredne proizvodnje u Srbiji je u suprotnosti sa ciljevima politike zaštite klime.

Predlažu se promene, u smislu ukidanja direktnih davanja po hektaru i broju grla stoke, kao i podsticaji za energetska efikasnost, upotrebu obnovljivih izvora energije i posebno za organsku proizvodnju. Kaznenim merama se mora, jednom za svagda, prekinuti štetna i opasna praksa paljenja žetvenih ostataka na poljima.

Ključne reči: *ekonomski instrumenti, klima, gasovi, efekat staklene bašte, poljoprivreda.*

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ENVIRONMENT AND LEGAL PROTECTION OF ANIMALS IN THE REPUBLIC OF SERBIA

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Summary

The aim of this study was to investigate the application of scientific methods of animal protection in the legal legislation of the Republic of Serbia, through assaults on the environment. Apart from the introductory definition of the subject matter, normative developments of all legal norms protecting the animal rights have been described as well. From the results of the research which were obtained through the application of legal and dogmatic scientific methods, content analysis, quantitative and qualitative description and correlation, it can be concluded on the grounds of several findings as follows: contemporary legal theory and legislation of the Republic of Serbia do not deny the protection of animal rights; within the framework of codification of the Serbian substantive criminal law which was performed in 2005, the criminal and legal norms providing legal animal protection have not gain their importance yet, primarily since they are classified under the environmental offences and not under an independent chapter of the criminal law which will be justified. The findings indicate that the loss of crime in the offences against life, physical integrity and welfare of animals make more than a half in the total number of criminal charges against the suspect charged with committing offences against animals.

Key words: *ecological, animal protection, criminal code, sanction and offender.*

JEL: *K14, K140*

Introduction

The subject matter of the legal protection of animals is the animal welfare as a general value which can be explained from several different aspects. Namely, a change in human consciousness over the last century has contributed, at the first place, that animals have

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being treated as living beings not as goods. That is the main reason why the animal welfare is highlighted as a protective value, and thus, it is necessary to regulate it by law as well as to explore it scientifically.

The most important feature in defining and regulating the animal welfare (Mason, Latham, 2004) is based upon the scientific facts that animals as sentient beings are able to feel pain, fear, suffering, stress as well as that such conditions can cause panic, anxiety, insecurity, discomfort, whereas, on the other hand, they can exhibit joy, happiness, satisfaction, feelings of safety, etc.

There are different definitions of the term “animal welfare”, although they all refer to the key elements of welfare such as: quality of life, mental and physical satisfaction; conditions for adapting to the environment; respecting their nature (Rollin, 1993). Some authors quote that animal welfare refers primarily to the state in which animals accomplish complete mental and physical health as well as harmony with their environment (Carenzi, Verga, 2007).

The term animal welfare is usually used in the context of those animals whose survival is related to the man. Acknowledging this fact, the theorists base the definition of welfare upon the so-called Five Freedoms Concept (Webster, 2006), which covers: Freedom from Hunger and Thirst; Freedom from Pain, Injury or Disease; Freedom from Fear and Distress; Freedom from Discomfort- which means an appropriate environment including shelter and a comfortable resting area; Freedom to Express their Natural Behaviour and Company of the animal’s own or compatible kind.

Although, on one hand, the animal welfare is classified as one of the proclaimed values which are responsible for the overall well-being of animals, the question is whether it is certain to expect a complete fulfilment of all five freedoms which makes the framework for defining welfare in Serbia. On the other hand, there are researches which indicate that animal welfare is not always and entirely crucial for accomplishing certain physical and mental abilities, so, therefore, when evaluating the welfare criteria it is necessary to be cautious, particularly when the productive and reproductive readiness of animals is the issue (Broom, 1991).

Methodology and Data Sources

The sources of data (*Statistical Office of the Republic of Serbia*, Bulletin number 588, ISSN 0354-3641, 2014.) titled “Criminal charges” on the crimes against animals committed by the adult persons in the Republic of Serbia, were obtained on the basis of the research which was conducted using the Questionnaire CK-1” *The Questionnaire for an adult against whom the legal proceeding was completed*”. The data on the crimes of the accused and convicted adults were obtained on the grounds of the research which was conducted using Questionnaire CK-2 “The Questionnaire for the accused and convicted adult against whom the final criminal proceedings was completed”.

The instruments of the research have encompassed all the adult persons in the Republic of Serbia against whom there was a reasonable suspicion of having committed an offence

against animals and against whom the criminal charges were filed at the competent public prosecutor's office as well as those against whom statutory proceeding was conducted and completed. The term adult offender relates to the offender who was 18 years old at the time crime was committed.

The term type of decision (Questionnaire CK-1) implies the decision of the public prosecutor with which the legal proceedings were completed. The person reported relates to an adult person against whom criminal proceeding was conducted and lawsuit was filed due to the reasonable doubt that the person committed the offence. "The accused" is an adult person against whom indictment, proposition of the indictment or plaintiff was brought before the court. The convicted person refers to an adult person who was found guilty and against whom criminal sanctions were imposed. "Criminal offence" is the offence which has been prescribed by the law as the criminal act which is contrary to the law or committed against law. The expression "animal" in legal sense refers to any vertebrate able to feel pain, suffering, fear and stress (Law on Animal Welfare ("*Official Gazette of the Republic of Serbia*" No. 41/2009). When using the word "animal" in the scientific terms, it implies a large group of multicellular, eukaryotes and heterotrophic organisms classified in biology as the Animalia Kingdom (Nielsen, 2001). In this paper work the term "sanction" relates to a part of legal norm which is known as secondary disposition (Encyclopaedia of the social sciences, Macmillan Co., New York, *Volume XIII*, 1933, 531. 30).

Animal protection in constitutional and administrative law

The Constitution of the Republic of Serbia in its provisions does not explicitly stipulate the animal protection; however it is implied within the context of environmental protection, through an already proclaimed right of everyone to the healthy environment, or, in other words, through an obligation to protect and improve the environment (The Constitution of the Republic of Serbia ("*Official Gazette of Republic Serbia*", no. 98/2006). The protection of animals in administrative law (The Law on Environmental Protection ("*Official Gazette of Republic Serbia*", no. 135/2004, 36/2009, 36/2009 - Dr. Law 72/2009 - Dr. Law and 43/2011 - Decision of the Constitutional Court) is generally regulated by the Law on Environmental Protection (The Animal Welfare Act ("*Official Gazette of Republic Serbia*", no. 41/2009) within the water protection, protection of flora and fauna as well as within the preventive measures of the environmental protection (planning, construction and strategic assessment of the influences on the environment). The concrete administrative and legal protection of animals (Directive 86/609/EEC - J. Eur. Commun. Legal Spec., 1986, Reconciliation of Legal and Administrative Regulations of the Member Countries for the Protection of Animals used for Studies ... Directive 86/609/EEC - J. Eur. Commun. Legal Spec., 1986) is regulated by the Animal Welfare Act (Regulation on conditions for animal welfare in terms of space for animals, premises and equipment in the facilities where they are kept and bred animals placed on the market for production purposes, the method of keeping, breeding and transport of certain animal species and categories, as well as the keeping of records

of animals („*Official Gazette of Republic Serbia*“, no. 6/2010 and 57/2014) within the framework of the standardized rights, obligations and responsibilities of legal and natural persons as well as entrepreneurs. The legislator classifies all animals to which the welfare refers into seven categories: the animals which are used in production, animals used for scientific, biomedical and educational purposes, animals used for exhibitions, competitions, performances and other forms of public events, animals for work and official animals, pets, abandoned and lost animals, wildlife in captivity.

General legal protection of animal welfare encompasses the right of all legal and natural persons or entrepreneurs to keep and breed animals in accordance with the prescribed conditions, their obligation to take care of the animals and their duty to treat the animals with commitment of a good owner/host in the sense of providing conditions for keeping the animals and taking care of them in accordance with the specificities of that animal's kind, gender and age and its physical and biological characteristics.

Treatment with commitment of a good owner/host means providing conditions which satisfy the animal needs such as: sufficient quantities of good-quality water and food, having enough space for movement, nutrition and rest, shelter, microclimate and hygienic living conditions, presence and company of the animal's own kind, preserving the animal's physical, physiological and genetic integrity by undertaking and conducting preventive, diagnostic, hygienic, therapeutic and other measures in order to preserve the animal health and prevent injuries, illnesses, stress, pain, suffering, fear and death of an animal. The general legal framework also encompasses a ban on executing any kind of intervention on animals which changes their identity, disguises physical deficiencies or amputates certain body parts. General legal protection of the animal welfare includes the principle of humane slaughter of animals (Blessing, Marshall, Balcombe, 2010) entailing that animals can be deprived of life in when they used for human consumption, when injured or terminally ill, or, when, due to the old age or some infectious disease some of their vital functions have stopped.

Specific legal protection of animal welfare (Camm, Bowles, 2000) encompasses the protection measures in the field of keeping, breeding, selling, transporting, slaughtering and conducting experiments including animals. It relates to the facilities used for keeping and breeding the animals, the ways of transport and registering the carriers, application of humane principles of slaughtering and the ways in which experiments including animals are preformed. In accordance with the stipulated standards, the accommodation standards relate, inter alia, to the fulfilment of the microclimate and hygienic conditions as well as to the conditions which apply to the physical and biological animal needs according to its kind, gender and age. In addition, taking care of the animals, according to the legal provisions, must be performed by a certain number of the trained persons who, together with the owner (Feinberg, 2012), or animal keeper, are responsible for the prevention of technopathy - a disorder which includes disturbance of animal's health caused by some errors made in the process of animal keeping-, physicopathy, (illnesses and injuries) which is manifested in reproduction process, and etiopathy (behavioural disorders). The restrictive legal provision prescribes certain regulations

which relate, among the other things, to transport of pregnant and new-born animals, their protection from weather and climate conditions, and fulfilment of some general and specific requirements regarding the means of transportation of the animals as well as necessary training level of carriers in the field of animal welfare. The experiments including animals (McGrath, Drummond, McLachlan, Kilkenny, Wainwright, 2010) can be performed only in cases regulated by law, particularly when they refer to: the prevention of a disease in humans and animals, testing certain drugs, substances and products as well as in cases of diagnosing and treating diseases in humans and animals, in scientific research (Baumans, 2004), educational and vocational training and forensic medical testing (McGrath, Drummond, McLachlan, Kilkenny, Wainwright, 2010).

Experiments including animals are explicitly banned when they are used for the purposes of testing weapons and war equipment as well as when examining the impacts of radiation, testing cosmetics and disinfectants products, tobacco and alcohol drinks and products designed to increase muscles mass. Animal welfare is regulated by subordinate regulations among which the Rulebook on animal welfare conditions which refer to the space for animals, facilities in which the animals are kept, bred and sold for the production purposes as well as the equipment used in these facilities, the ways of keeping, breeding and selling certain animal species and categories as well as keeping the records of them (Feinberg, 2012).

The Rulebook prescribes accurately the standards for space, facilities and equipment thus preventing unnecessary pain, injuries, suffering and disease of animals. These standards particularly refer to the daily control of the accomplished protection and welfare, the isolation of sick animals in separate facilities, including weather and climate conditions as well as lightning and noise conditions. In terms of keeping, breeding and selling certain species and categories of animals, the Rulebook stipulates, among other things, the conditions according to the age structure when keeping young population of animals in the group, selecting the necessary floor space which depends upon the animal body weight. In the addition, highly important standards relate to enabling social connections among the individually housed animals including a possibility of visual and physical contact.

Criminal law protection of animals

The Animal Protection in the Republic of Serbia has obtained a qualitative legal form with the codification of the substantive criminal legislation from 2005 and, subsequently, within the framework of the amendments in the field of environmental legislation. Namely, the criminal protection of animals has been more concretely specified within the unique Chapter of the Criminal Code (The Criminal Code („*Official Gazette of RS*“, no. 85/2005, 88/2005, 107/2005, 72/2009, 111/2009, 121/2012 and 104/2013) which refers to the ecological offences and environmental offences. The seven offences out of the eighteen criminal offences laid down by this Chapter refer to the direct protection of animals, whereas the animals are protected indirectly with incrimination in five criminal offences and within the qualified forms of the criminal offence. The indirect

criminal law protection of the animals includes incrimination which refers to the: animal killing and abuse, transmission of infectious diseases, providing veterinarian treatment, production of drugs for animal treatment, contamination of water and food for animals, illegal hunting and fishing. Killing and animal abuse represent the most difficult form of incrimination whose basic qualification has been reformulated by the amendments to the Criminal Code from 2009. Thus, animal abuse has been determined as a wider form of incrimination comparing to the previous incrimination of animal cruelty and a new form of incrimination, which relate to organizing animal fighting, has been introduced. According to the explanation of certain authors, “abuse” as a broader expression than torturing or brutality and cruelty, sets up a wider legal framework within which numerous incriminations, including neglect, can be sanctioned (Beirne, 2004). The restrictive legal interpretation defines “abuse” as causing injury and torture, implying that “injury” is usually manifested as physical trauma, while “torture” can be explained as any act by which pain and suffering, whether physical or mental, are intentionally inflicted. The first qualified form of the criminal offence is determined by the consequence and the object of legal protection, or when a larger number of animals is killed or tortured or the offence was committed against the animal belonging to a specially protected species (Ordinance on the proclamation and protection of strictly protected and protected wild species of plants, animals and fungi („Official Gazette of Republic Serbia“, No. 5/2010), Stock listed in Annex I and Annex II. 20). The second qualified form of the criminal offence encompasses the offences of organizing, financing or enabling animal fighting motivated by greed or financial gain by making bets on animals fights (Lazarević, 2006). The farm animals in animal husbandry are the object of criminal law protection from the offence of transmitting infectious diseases among animals. The basic form of incrimination encompasses the failure to act according to the regulations (Petrović, Simić, 1985) decisions or orders of the competent body during the epidemic of an animal disease in the field of cattle breeding. In the addition, if the consequence of this situation is death of an animal or some other occurrence causing serious damage, it represents a form of the criminal offence.

Veterinary malpractice (Huss Rebecca, 2004) implies an incrimination which refers to the prescription of an obviously incorrect medication/drug, mistreatment of an animal, or some other form of professional negligence in the treatment of animals (Sržentić, Lazarević, Đorđević, Stajić, Kraus, 1991) which caused death of an animal or any other significant harm. Manufacturing of harmful drugs and medications in animal medical care encompasses the incriminations which relate to manufacturing drugs for animal treatment and prevention of infectious diseases for selling while having evidences of their harmful effect on life and health of animals.

The sale should be interpreted in terms of all basic and supporting business activities intended for purchase and sales of goods and services (Trade Law („Official Gazette of Republic Serbia“, No. 53/2010 and 10/2013). The qualified form of incrimination exists in case when a certain harmful device caused a fatal consequence for animal or caused some other significant damage. The pollution of water and food for feeding

and watering the animals entails the activity which refers to the use of any harmful substance with which the feed or water are polluted.

The basic forms of criminal offence include causing danger of jeopardising health and life of animals due to the use of harmful substances. While this represents an abstract consequence, the occurrence of death or some other serious physical damage of an animal represents a manifestation of the qualified type of incrimination.

Illegal hunting covers various types of incrimination which, depending on the time and the place of the offence, exists if the game (wildlife) is being hunt during the closed season, in the area wherein the hunting is forbidden or done without permission in the hunting property belonging to a third party. According to the provisions of the Law on Hunting the game/ wildlife represents a certain species of wild mammals and birds determined by law (Law on Hunting Law („Official Gazette of Republic Serbia“, No. 18/2010). The incrimination encompasses killing, wounding and capturing alive game as well as when the means for mass destruction are used in hunting.

The object of protection in the basic form of the offence is any type of wildlife/game, whereas in the case of qualified incrimination the large game or the game whose hunting is forbidden is the protection object. The elements of the criminal offence of illegal fishing according to the time and place of crime exist when fishing is preformed during the closed season and in the waters in which hunting is prohibited. In the addition, the way of execution as an incrimination type encompasses hunting with explosives, electricity, poison, sedative substances or performing any other form which is harmful for the reproduction of animals or responsible for mass destruction of animals.

In the context of penal policy for the above-analyzed criminal offences the legislator has issued the following sanctions: when committed in their basic form the least severe sanction prescribed is the alternative fine or six months sentence. In the addition as the most severe sanction is also alternative fine or up to two years prison sentence. For the offence which is qualified as more difficult the mildest sanction is an alternative fine or up to three years prison sentence, or cumulative sentence from three months to three years and fine as the most severe sanction.

The results and discussion

The empirical research covers the period from 2010 to 2015 and through the application of statistical method as well as quantitative and qualitative analysis methods and correlation, it reports the research findings on factual situation in the criminal law protection of animals in the Republic of Serbia.

When analyzing and discussing the findings and results of the research from *Table 1*, we find out that since being suspected of taking part in and committing offences against animals, 1454 adult persons were reported by filling criminal charges. Of this number 371 adult persons were accused, whereas 176 of the accused were found quilt by the verdict of the court. By applying the correlation method, the finding which shows that

out of the total number of the reported adult persons for the criminal offences against animals, 25% persons were accused, whereas 12% were convicted. The finding resulting from *Table 1* indicates that the loss of crime is in correlation with the number of the reported adult persons suspected for conducting offences against animals and the number of those convicted for committing offences against animals in the territory of the Republic of Serbia and is at the level of 88%.

Table 1. The finding on correlation between the numbers of the adult persons reported, accused and convicted for committing all criminal offences against animals

Sample of research	Finding from the sample of research					
	Years of the sampled sample					
	2010	2011	2012	2013	2014	2015
Number of the persons reported	123	196	178	165	342	454
Number of the accused	28	38	43	57	112	93
Number of the convicted	22	27	23	30	16	58

Source: Bilten broj 578, 588, 603, 617 Republički zavod za statistiku, Beograd, Republika Srbija. ISSN 0354-3641.(eg.l. Bulletin No. 578, 588, 603, 617. The Republic Statistical Office).

The results of the research in *Table 1* show that the number of the adult persons against whom the public prosecutor has dismissed criminal charges since there was not enough elements for starting the procedure by placing demands for investigation is at the level of 73% in the total level of the reported adult persons who were suspected for committing crimes against animals in Serbia.

Table 2. The finding on correlation from the sample of the persons who have been reported to have committed the criminal offence of animal killing and abuse

Sample of research	Finding from the sample of research					
	Years of the sampled sample					
	2010	2011	2012	2013	2014	2015
Number of the persons reported	123	196	178	165	200	205
Number of the accused	28	38	43	57	36	32
Number of the convicted	22	27	23	30	9	23

Sources: Bilten broj 578, 588, 603, 617 Republički zavod za statistiku, Beograd, Republika Srbija. ISSN 0354-3641.(eg.l. Bulletin No. 578, 588, 603, 617. The Republic Statistical Office).

The result of the research from the *Table 2* shows that out of the total number of the reported adult persons for whom there was a grounded suspicion of taking part in committing the offence of killing and abusing animals 22 % were accused, while 13% of them were convicted. When comparing the results obtained from the *Table 3* between number of the adult persons who were reported and convicted in the Republic of Serbia, it can be noticed that there is a particularly high percentage of the loss of crime (Sutherland, Cressey, Luckenbill, 2001) in the case of criminal acts of killing and abusing the animals and is at the level of 87, 00%.

On the grounds of results from the *Table 3* we conclude that out of the total number of the adult persons who were convicted for the criminal offences against animals, the prison sentence was imposed against 89 persons or 16% with regard to the number of the adult persons who were suspected for committing the offences against animals. Based

Table 3. The quantitative finding on the number of the persons who were convicted for committing the crime against animals (the number of prison sentences)

Sample of research	Finding from the sample of research					
	Years of the sampled sample					
	2010	2011	2012	2013	2014	2015
Imposed prison sentences for the offences against animals	11	10	6	9	30	23
Imposed prison sentences for animal killing and abuse offences	0	1	1	5	6	1

Sources: Bilten broj 578, 588, 603, 617 Republički zavod za statistiku, Beograd, Republika Srbija. ISSN 0354-3641.(eg.l. Bulletin No. 578, 588, 603, 617. The Republic Statistical Office).

On the basis of the results of the research arising from the *Table 4*, it can be noticed that out of the total number of the accused persons for the offence of animal abuse and killing, the prison sentence was imposed against 12 person which makes 7% of the number of the suspected adult persons.

Table 4. The finding on the amount of criminal sanctions of the persons for the offences against animals (prison sentence)

Sample of research	Finding from the sample of research					
	Years of the sampled sample					
	2-3 years	1-2 years	6-12 months	3-6 months	2-3 months	1-2 months
Killing and abuse of animals	0	0	1	4	4	3
Transmission of the infectious disease to animals and plants	0	0	1	1	1	0
Veterinary malpractice	0	0	0	0	0	0
Production of the harmful agents for animal treatment	0	0	0	0	0	0
Pollution of water and food for animals	0	0	0	1	0	0
Illegal hunting	1	1	3	6	8	1
Illegal fishing	0	0	2	8	13	11

Sources: Bilten broj 578, 588, 603, 617 Republički zavod za statistiku, Beograd, Republika Srbija. ISSN 0354-3641.(eg.l. Bulletin No. 578, 588, 603, 617. The Republic Statistical Office).

When we analyze the results over the research period from the *Table 4*, we conclude that out of the total number of the imposed prison sentences, in the greatest number of cases the two or three months prison sentence was imposed, while only in one case the person was sentenced for six to twelve months in prison.

Conclusion

The outcome of the research indicates that the animal protection in the Republic of Serbia has been more concretely standardized at the beginning of this century within general and specific legal protection. When the findings from the research are analyzed, it can be spotted that there is a negative correlation between formally and legally standardized animal protection and the way how it is exercised in the field. It has been found that there are a high percentage of dismissed criminal charges, low percentage of convictions as well as an inadequate structure of the imposed criminal sanctions. This indicates a necessity for a change in criminal policy in the field of animal protection and exercising their welfare.

From the results which were received through the application of the scientific legal and dogmatic methods, the analysis of the content, description, qualitative and quantitative correlation a few findings was obtained. The first finding shows that contemporary legal theory and legislation of Serbia do not deny the right to animal protection.

The second finding refers to the fact that within the codification of the substantive criminal law of the Republic of Serbia which was preformed in 2005, the offences which provide legal protection of animals did not receive significant importance, at the first place, since they were not standardized within an independent chapter of the Criminal Code, but were included in the chapter which relate to environmental protection.

The third finding determines that a total of seven criminal offences, classified into four groups according to the object of legal protection, was classified and described under the environmental offences.

The fourth finding indicates that the legal animal protection is dispersed and laid down by several legal acts/laws.

The fifth finding of the research results indicates that the Constitution as the highest law does not recognize specifically prescribed legal obligation to protect animals. The sixth finding shows a high percentage of loss of crime in the criminal offences against life and physical integrity of animals. The seventh finding proves the existence of an extremely low rate in the number of convicted adult persons for committing criminal acts against animals in the Republic of Serbia. In the eighth finding the difference between proclaimed right to animal protection according to the rules prescribed by law in the Republic of Serbia and achieving de facto protection of animals in the field.

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ŽIVOTNA SREDINA I PRAVNA ZAŠTITA ŽIVOTINJA U REPUBLICI SRBIJI

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Sažetak

Cilj ovog rada je bio da se primenom naučnih metoda istraži zaštita životinja u pravnoj legislativi Republike Srbije, kroz delikte o životnoj sredini. Iz rezultata istraživanja dobijenih primenom naučnih metoda pravno dogmatske, analize sadržaja, kvantitativne, kvalitativne i korelacije, izvodi se nekoliko nalaza koji pokazuju da: u savremenoj pravnoj teoriji i zakonodavstvu Srbije se ne poriče pravo na zaštitu životinja, u okviru kodifikacije materijalnog krivičnog zakonodavstva Republike Srbije koja je izvršena 2005. godine. Krivično-pravne norme kojima se pruža pravna zaštita životinja nisu dobili na svom značaju, pre svega zbog njihovog normiranja u okviru ekoloških delikata, a ne u okviru samostalne glave krivičnog zakonika što bi bilo opravdano. Delikti protiv životinja svrstani su u glavu krivičnih dela kojima se štiti životna sredina u okviru sedam krivičnih dela, podeljenih u četiri grupe u zavisnosti od objekta pravne zaštite. Pravna zaštita životinja je disperzirana i propisana u nekoliko pravnih akata-zakona. Najviši pravni akt Ustav ne poznaje posebno propisanu obavezu zaštite životinja. Vremenski i prostorno određeno empirijsko istraživanje obuhvata osmogodišnji period na prostoru Republike Srbije, po parametrima koji se odnose na broj prijavljenih, optuženih i osuđenih punoletnih lica za krivična dela protiv životinja. Rezultati istraživanja u ovom radu ukazuju na negativnu korelaciju između broja podnetih krivičnih prijava protiv počinioca, podignutih optužnica i izrečenih presuda za krivična dela: napad na život, telesni integritet i dobrobit životinja.

Ključne reči: ekološka zaštita, životinje, krivični delikti, sankcije i prestupnik.

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A PANEL ANALYSIS OF PROFITABILITY IN THE FRUIT AND VEGETABLE PROCESSING INDUSTRY IN SERBIA

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Summary

The aim of this paper is to identify the factors that influence the profitability of selected companies within the fruit processing industry in Serbia. Profitability was measured through the accounting indicator of the rate of return on assets (ROA). Profitability of fruit and vegetable processing companies is positive but at relatively low level. In the capacity of independent variables were used the size of the enterprise, debt ratio, quick ratio, inventory, sales growth and capital turnover ratio. The analysis covers the period from 2007 to 2015 (9 years) and includes 198 observation of the companies from the fruit and vegetable processing industry in Serbia. Panel regression model was built. The results of the conducted panel analysis showed that the sales growth and capital turnover ratio showed a statistically significant impact on profitability as a measure of the success of companies in the field of fruit and vegetable processing industry. The size of the company showed a statistically significant impact on the profitability at a level of significance of 10%.

Keywords: *panel analysis, profitability, ROA, fruit and vegetable processing companies.*

JEL: *Q13, C33, M41.*

Introduction

The Serbian economy has very good prerequisites for the development of agriculture and therefore for food processing industry, such as quality arable land and favorable climate. Using these prerequisites, a large number of companies have made agriculture and food processing industry to become a very important in the Serbian economy. Managers of agricultural and food processing companies must have in mind growth and development of companies and sustainable development. While the strategy of investment in agriculture and food industry is focused on emissions, food safety inputs (raw materials, packaging materials, auxiliary materials), outputs (finished

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goods) and tangible components within technological flows, the strategy for sustainable development of the agri-food chain aims availability of finished products through activities and processes with low or zero impact on natural conditions (Dinu, 2016).

Food processing industry has very important role in ensuring food safety and reducing dependence on imports. In Serbia, there is a long tradition within the food processing industry. Food processing industry made one of the main contributions to the growth of overall industrial production (Chamber of Commerce and Industry of Serbia, 2017). Furthermore, food processing industry in Serbia is important for its contribution to overall employment, bearing in mind, that unemployment is one of the high topic problems. According to data from Chamber of Commerce and Industry of Serbia (2017), food processing industry recorded the growth of employment of 3,5% in 2017 and engages 83.653 employees, which present 4,3% of overall employment in Serbia.

One of the main sectors of food processing industry in Serbia is fruits and vegetable production, besides meat and milk processing industries. Serbia has extraordinary soil condition and climate, especially for fruit and vegetable production. Furthermore, Serbia is the world's third-largest producer of raspberries and is recognizable by sour cherries, apples, plums, blackberries, blueberries etc (GFA Consulting Group, 2010). Fruits are processed into juice, marmalade, and jam. Among the vegetables, potatoes (chips), tomatoes (ketchup) and pepper (Ajvar, Ljutenica) are the most processed. Beside processing into other final products, fruits and vegetables are also processed into frozen condition for future consumption. Besides natural resources, relatively low labor costs and quality domestic input of fruit and vegetable processing industry in Serbia presents good opportunities for development of this sector.

At the market, there is the dominant position of a few large fruits and vegetables processing companies such as Frikom, Aleva and Nectar Serbia. Beside these dominant companies, other fruits and vegetable processors are still organized as micro and small companies. According to the Chamber of Commerce and Industry of Serbia (2017), micro and small enterprises present 93% of all enterprises registered as food processors. The dominance of large players in fruit and vegetable processing industry makes that only a few brands from Serbia are internationally recognized. Competition for domestic and international market between large dominant and other small fruit and vegetable processors indicate that companies have to pay attention to the profitability. Earning profit companies create resources for future internal investments or external by increasing credit rating of the company. Therefore, profitability presents the key factor for growth and development of each company.

The aim of this paper is to investigate the profitability of companies in the Republic of Serbia from the section C – Manufacturing, group 103 – Processing and preserving of fruits and vegetables (hereinafter – fruit and vegetable processing companies). First, the descriptive statistic of profitability in the period 2007-2015 will be conducted. Secondly, profitability analysis should give the answer which internal factors have a significant influence on earning power of these companies. Internal factors such as the size of the company, ability to pay the short-term obligation, indebtedness etc. can

have a significant influence on profitability. The question of what factors determine profitability should be one of the high priority for both researchers and practitioners, including managers, investors, debt holders and policy makers (Yazdanfar, 2013).

Literature Review

Profitability is a key factor in the growth and development of each enterprise. Due to this, a large number of research papers are focused on giving an answer to the question which factors have an impact on the profitability. Research papers about profitability factors can be divided into three groups. The first group represents the investigation of external factors which influence on profitability, such as market, business and economic environment (see more: McGahan, Porter, 1997; Callado, Soares, 2014). The second group focuses on the internal factors of profitability such as the size of enterprises, indebtedness, growth, age, lagged profitability and other factors at the level of enterprises (Burja, 2011; Chandrapala and Knapkova, 2013; Margaretha and Supartika 2016, Ke and Hiong, 2016). The third group includes research papers which investigate the influence of both internal and external factors on profitability (Schiefer and Hartman, 2013; Nuševa, Mijić, Jakšić, 2017).

Since the focus of this research paper is the influence of internal factors on the profitability, the future literature review will be a point to this subject. The literature review will point to that there is no unique methodology to investigate profitability factors.

Burja (2011) investigated which internal factors have an impact on enterprise profitability of Romanian chemical industry by using linear regression model. Among the factors with a good influence on profitability were found the efficiency of inventories, debts level, financial leverage, the efficiency of capitals. The positive impacts show also, some of the ways in order to improve the performance (Burja, 2011).

Chandrapala and Knapkova (2013) used pooled and panel cross-sectional time-series techniques to investigate the impact of internal factors on the profitability of 974 enterprises in the Czech Republic during the period 2005-2008. The results show that firm size, sales growth and capital turnover have a positive impact on the return on assets. Furthermore, the results show that debt ratio and inventory have a negative influence on profitability.

Bhutta and Hassan (2013) investigated profitability factors among food sector in Pakistan in period 2002-2016 by using multivariate regression analysis. The results showed that profitability of companies in the food sector is negatively related to the size of firm-specific characteristic.

Margaretha and Supartika (2016) used a linear regression model to investigate the influence of internal firm characteristics on the profitability of 22 enterprises listed on in Indonesia Stock Exchange during the period 2007-2012. The results show while that firm size, growth, lagged profitability have a negative effect on profitability, productivity and industry affiliation have a positive impact on profitability. The variable firm age does not have a significant impact on profitability.

Ke and Xiong (2016) used correlation analysis and regression analysis to investigate the impact capital structure on profitability of the 18 agriculture listed companies in China. The results show a negative correlation between debt ratio and profitability (see more: Ke and Xiong, 2016).

Data and Methodology

Sample and Sample Selection

The aim of this paper is to analyze profitability and explain the dependence of the performance of the fruit and vegetable processing enterprises of the various internal factors.

The original sample includes 25 enterprises from the fruit and vegetable processing companies in Serbia. In order to construct balanced panel data, our sample consists of the enterprises that operated during the whole period 2007-2015 (9 years), so the final sample consists of 22 companies and 198 observations. The data were collected from the databases of Serbian Business Registers Agency and Scoring.

Explanatory and Dependent Variables

The performance of fruit and vegetable processing companies is measured by its profitability. Profitability of the company can be measured in several ways. Return on assets (ROA – Return on Assets) and return on equity (ROE – Return on Equity) are profitability indicators which are the most represented and often used in the analysis (Wals, 2003). In this paper, ROA has a function of the dependent variable. ROA is a more appropriate indicator of company's profitability then ROE. By Vieira (2010) "the return on equity wouldn't provide a good comparison because the small and the negative equity levels of some companies would generate distorted indicators of profitability".

The explanatory variables that are the object of the analysis are internal factors specific to each enterprise – size, debt ratio, quick ratio, inventory, sale growth, capital turnover ratio.

List of variables used in panel model is given in *Table 1*.

Table 1. List of variables

Variables	Type of variables	Indicator	Explanation	Expected Impact
Return on assets (ROA)	Dependent	Indicates company's ability to generate earnings from its assets.	$ROA = \text{Net Income} / \text{Total Assets}$	-
Size	Explanatory	Indicates the size of company	$\text{Size} = \text{Natural log of Total Assets}$	Positive
Debt ratio	Explanatory	Measures the extent of a company's leverage.	$\text{Debt ratio} = \text{Total debts} / \text{Total Assets}$	Negative

Variables	Type of variables	Indicator	Explanation	Expected Impact
Quick ratio	Explanatory	Company's short-term liquidity indicator	Quick ratio = (current assets – inventories) / current liabilities	Positive
Inventory	Explanatory	Shows the portion of assets tied up in inventory	Inventory = Inventory / Total Assets	Negative
Sale growth	Explanatory	Shows increase (decrease) in sales between two time periods.	Sales Growth = (Current Period Sales – Previous Period Sales) / Previous Period Sales	Positive
Capital turnover ratio	Explanatory	Measures capital intensity of firm	Capital turnover ratio = Net Fixed Assets / Sale	Negative

Source: Authors illustration (based on Chandrapala and Knapkova, 2013; Bhutta and Hassan, 2013; Nuševa, Mijić, Jakšić, 2017).

Methodology

The research is based on a panel of data series which implies the necessary use of the methodology in the field of analysis of panel data series. The popularity of the panel analysis is not surprising because it takes into account the time and space component.

The advantage of the panel analysis is that data that was not sufficient for analyzing the time series or for spatial analysis joined in the panel data can provide good empirical results.

In order to analyze the impact of internal factors on profitability, as a measure of the success of the fruit processing companies in Serbia, the following general model (Pooled OLS model) was used:

$$y_{it} = \alpha + \beta_{it}x_{it} + u_{it} \tag{1}$$

where i is a subscript for observation ($i = 1, \dots, N$) and t for time ($t = 1, \dots, T$), y_{it} represents the dependent variable, the α tag for the cut, β is $k \times 1$ parameter vector which needs to be evaluated on independent variables, x_{it} represents $1 \times k$ vector observations on independent variables and u_{it} represents the mark for a random error (Brooks, 2008).

Although it seems simplest, the Pooled OLS model has the most limitations. The Pooled OLS model can serve as a good basis for introducing the panel analysis, and from its transformation can get much more advanced models.

The model of fixed effects and the model of random effects are mostly used regression models in panel analysis.

The model of fixed effects involves taking into account the internal dimensions of the data, while the model of random effects takes into account both internal differences and differences between individual entities (Verbeek, 2008).

A fixed-effect model is a simple linear model in which constant member changes with each observation unit, where it is constant in time, and the general form of this model is found in equation (1).

In the random effects model, the individual enterprise differences are thought to represent random variation about some average intercept for the individual in the sample. Rather than estimate a separate fixed effect for each enterprise, you estimate an overall intercept that represents this average. Implicitly, the regression function, for the sample firms, varies randomly around this average.

The variability of the individual effects is captured by a new parameter, σ_u^2 . The larger this parameter is, the more variation you find in the implicit regression functions for the firms.

Once again, the model is based on equation (1). The difference is that $\alpha = \bar{\alpha}_1 + u_i$ where u_i represents random variation.

The model becomes:

$$y_{it} = \bar{\alpha}_1 + u_i + \beta_{it}x_{it} + u_{it} \quad (2)$$

The new parameter, σ_u^2 , is just the variance of the random effect, u_i .

If $\sigma_u^2 = 0$ then the effects are “fixed” and you can use the fixed effects estimator if the effects are indeed different across firms or the pooled estimator if they are not.

The Hausman test was used to determine which model (fixed or random effects) should be used in regression analysis. After selecting the model for the evaluation of the coefficients, a regression analysis of the panel of data sets was made. Obtained results were tested in terms of identifying potential problems that are characteristic of panel data series (heteroskedasticity, multicollinearity, stationary etc.)

By incorporating internal variables into the previous equation, we obtain a model which assesses the impact of internal factors on the profitability of the company:

$$ROA_{it} = \alpha_{it} + \beta_1 size_{it} + \beta_2 debt_ratio_{it} + \beta_3 quick_ratio_{it} + \beta_4 inventory_{it} + \beta_5 sale_growth_{it} + \beta_6 capital_turnover_ratio_{it} + u_{it} \quad (3)$$

where i is a subscript for each enterprise ($i = 1, \dots, 22$) and t for each year ($t = 1, \dots, 9$).

In accordance with the aim of the research and after a detailed analysis of the research studies of the subject area, the following hypothesis was set up:

H_0 : Firm internal factors, such as size, debt ratio, quick ratio, inventory, sale growth, and capital turnover ratio of Serbian fruit and vegetable processing companies have a significant impact on profitability measured by ROA (return on assets).

Empirical Results and Discussions

Descriptive statistics table indicates the descriptive parameters information for the study variables. In this section, descriptive statistics of the variables used in the analysis are presented to look at the nature and validity of the data. All variables are based upon accounting values and are thus determined simultaneously.

The descriptive statistics regarding the variables in the research sample are displayed in *Table 2*.

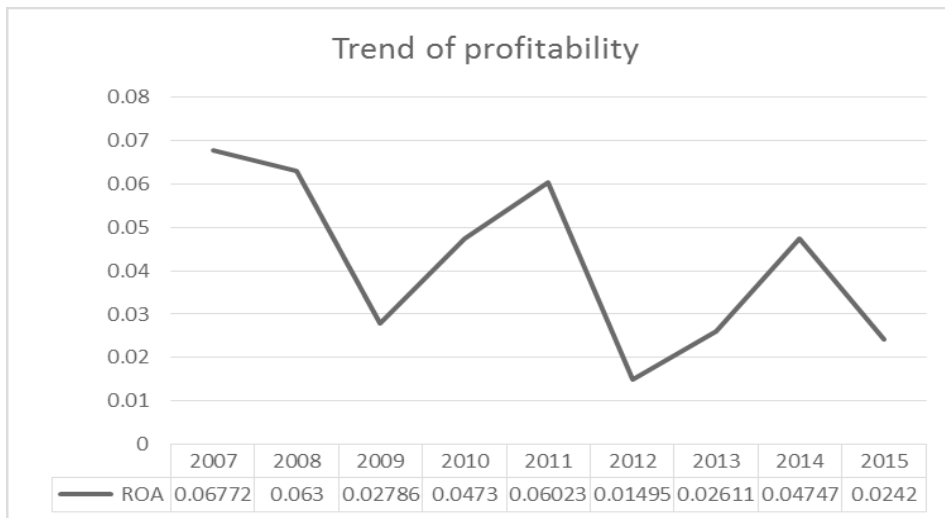
Table 2. Descriptive statistics

	ROA	Size	Debt ratio	Quick ratio	Inventory	Sale growth	Capital turn over ratio
Mean	0.042093	5.857547	0.624252	1.475455	0.297990	0.215152	0.681499
Median	0.041350	5.800345	0.665968	0.770000	0.289840	0.100868	0.423970
Maximum	0.262500	7.143248	1.000000	11.92000	0.702298	6.872516	6.579362
Minimum	-0.640300	4.674236	0.097736	0.010000	0.000000	-0.750331	0.000000
Std. Dev.	0.102950	0.484988	0.243278	2.154358	0.164701	0.717064	0.840148
Observations	198	198	198	198	198	198	198

Source: Author's calculation.

The average profitability of fruit processing companies in Serbia is positive, but still below the referent value of 0.10 (10%) – see *Figure 1*.

Figure 1. Average profitability (measured by ROA) of selected fruit processing companies in Serbia in the period 2007-2015.



Source: Author's illustration

As we can see on *Figure 1*, the profitability of selected fruit processing companies has characteristics of high fluctuation. In 2009 the level of profitability has fallen down to 0.02786 from the level of 0.06 in 2007 and 2008. Over the next two years (2010-2011), profitability grows slightly. If we compare the profitability in 2015 and 2007 it can be concluded that profitability level of fruit processing companies falls down for 64%.

Before forming an econometric model, it is necessary to examine the correlation between the observed independent variables in order to discover the possible problem.

Multicollinearity can cause disorders in estimating the value of parameters, their significance and the direction of influence on the dependent variable.

There is no adequate test for the detection of multicollinearity in panel models. The great number of authors who used panel models in their papers, also are using coefficients of correlation between pairs of potential independent variables for perceiving the problem of multicollinearity.

Correlation among series is displayed in *Table 3*.

Table 3. Correlation matrix

	ROA	Size	Debt ratio	Quick ratio	Inventory	Sale growth	Capital turnover ratio
ROA	1.0000						
Size	-0.1680	1.0000					
Debt ratio	-0.1278	-0.2086	1.0000				
Quick ratio	0.1332	0.1708	-0.6652	1.0000			
Inventory	0.0764	-0.0989	0.4364	-0.3139	1.0000		
Sale growth	0.1822	-0.0153	0.1190	-0.0326	-0.0495	1.0000	
Capital turnover ratio	-0.1921	0.1115	-0.1897	-0.0119	-0.5224	0.0014	1.0000

Source: Author's calculation.

After conducting a correlation test, it can be noticed which pairs of independent variables could cause the problem of multicollinearity.

The correlation between ROA as a dependent variable and the independent variables is positive for all variables except for size, debt ratio, and capital turnover ratio. These variables are negatively correlated with return on the asset in the research sample (see *Table 3*).

Within the correlation matrix, we can see two strong negative correlations between quick ratio and debt ratio (-0.6652) and between capital turnover ratio and inventory (-0.5224) and one medium strong positive correlation between inventory and debt ratio, which means that the simultaneous inclusion of the observed variables could lead to the problem of multicollinearity.

Other values of correlation coefficients are not at a level that could lead to multicollinearity problems.

In order to detect multicollinearity, variance impact factors (VIF) and tolerance of variables are calculated. They are shown in *Table 4*.

Table 4. Variance impact factors of variables

	Collinearity Statistics	
	Tolerance	VIF
Size	0.946	1.057
Debt ratio	0.476	2.100
Quick ratio	0.522	1.917
Inventory	0.587	1.703
Sale growth	0.969	1.032
Capital turnover ratio	0.678	1.475

Source: Author's calculation.

In multiple regression, tolerance and the variance inflation factor (VIF) are used as indicators of multicollinearity. Acceptable level of tolerance value is 0.10 and it is recommended as the minimum level of tolerance (e.g., Tabachnick & Fidell, 2001). The VIF recommendation of 10 corresponds to the tolerance recommendation of 0.10. Since all VIF values are less than 10 and all tolerance values are higher than 0.10 (see *Table 5*), it is concluded that there is no multicollinearity between the variables.

Table 5. Results of panel unit root test

Variables	Levin, Lin & Chu	Im, Pesaran and Shin	ADF - Fisher Chi-square	PP - Fisher Chi-square
ROA	-8.47112 (0.0000)	-3.74898 (0.0001)	90.5362 (0.0000)	103.170 (0.0000)
Size*	-9.71713 (0.0000)	-3.78863 0.0001	105.243 (0.0000)	144.420 (0.0000)
Debt ratio*	-15.8792 (0.0000)	-6.28362 (0.0000)	128.599 (0.0000)	144.806 (0.0000)
Quick ratio	-5.97991 (0.0000)	-1.74465 (0.0405)	67.0305 (0.0142)	82.5625 (0.0004)
Inventory	-9.00824 (0.0000)	-5.05781 (0.0000)	113.783 (0.0000)	119.406 (0.0000)
Sale growth	-20.2542 (0.0000)	-6.42689 (0.0000)	121.212 (0.0000)	86.2699 0.0001
Capital turnover ratio	-31.0010 (0.0000)	-7.20104 (0.0000)	106.837 (0.0000)	110.413 (0.0000)

Source: Author's calculation.

Note:

- probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.
- p-values are shown in brackets and t-statistics in normal characters above.
- * after taking the first difference.

Common (Levin- Lin-Chu) and Individual (Im- Pesaran-Shin, ADF - Fisher Chi-square) Unit Root Tests are performed, in order to ensure stationarity of variables in the sample. The results of panel unit root tests are illustrated in *Table 5*. There is no significant difference between the tests.

As we can see in *Table 5*, the probability value for Levin, Lin & Chu method is less than 5%, so we can reject the null hypothesis and accept the alternative hypothesis meaning that our ROA and all other variables do not have unit root at level.

The same conclusion is for testing the null hypothesis by Im, Pesaran and Shin methods, as for ADF and PP Fisher Chi-square method. They all show that ROA and the others variables included in the sample does not have unit root at level.

Choosing a model

When conducting empirical research, the issue of suitability of a particular model is frequently raised. In other words, is it better to use a fixed-effect model or random-model model?

The selection of appropriate model between the pooled OLS and the fixed effect is based on the joint significance of differing group means ($p= 0.0000$). A low p-value means that fixed effects model is more appropriate than the pooled OLS model (*Table 6*). Breusch-Pagan test statistic also showed that random effects model is adequate, rather than the pooled OLS model ($p=0.0000$). The Breusch-Pagan test is used for testing the null hypothesis: Variance of the unit-specific error = 0 ($\sigma_u^2 = 0$) against the alternative: Variance of the unit-specific error > 0 ($\sigma_u^2 > 0$). The p-value is less than 5% which means that the Breusch-Pagan test rejects the null hypothesis that the effects are not random and accept the alternative that the effects are random.

The selection of appropriate model between random effect and the fixed effect is based on the Hausman test The Hausman test result indicates the use of random effect model ($p=0.541979$ is greater than 0.05). The random effects do not appear to be correlated with the regressors and random effects can be used.

Table 6. Panel model diagnostic (assuming a balanced panel with 22 cross-sectional units observed over 9 periods)

Diagnostics	Asymptotic test statistic	p-value	Null hypothesis	Decision
Joint significance of differing group means:	F(21, 170) = 5.70473	0.0000	The pooled OLS model is adequate	A low p-value counts against the null hypothesis that the pooled OLS model is adequate, in favor of the fixed effects alternative.

Breusch-Pagan test statistic	LM = 83.5794	prob(chi-square(1) > 83.5794) = 0.0000	The pooled OLS model is adequate	A low p-value counts against the null hypothesis that the pooled OLS model is adequate, in favor of the random effects alternative.
Hausman test statistic	H = 5.01431	prob(chi-square(6) > 5.01431) = 0.541979	the random effects model is adequate	p value is higher than 5%, so the null hypothesis is accepted

Source: Author's calculation.

After providing all assumptions, the random model is performed. The coefficients estimations are given in *Table 7*.

Table 7. Random-effects (GLS) model

Dependent variable	ROA			
	Coefficient	Std. Error	t-ratio	p-value
Const	0.316223	0.145195	2.1779	0.03064
Size	-0.0405865	0.0232301	-1.7472	0.08222**
Debt ratio	-0.0749109	0.0515944	-1.4519	0.14816
Quick ratio	0.00635083	0.00459743	1.3814	0.16877
Inventory	0.0381857	0.063136	0.6048	0.54602
Sale growth	0.0360337	0.00836064	4.3099	0.00003*
Capital turnover ratio	-0.0266062	0.0102106	-2.6057	0.00989*
Mean dependent var	0.042093	S.D. dependent var		0.102950
Sum squared resid	1.801394	S.E. of regression		0.096862
Log-likelihood	184.3211	Akaike criterion		-354.6422
Schwarz criterion	-331.6243	Hannan-Quinn		-345.3253

Source: Author's calculation.

Note:

- * level of significance 5%
- ** level of significance 10 %

Based on the results of the panel analysis (see *Table 7*), it can be concluded that the variables sales growth and capital turnover ratio are statistically significant at the level of significance of 99%, while the variable size is statistically significant at the level of significance of 90%. Furthermore, from the presented results it can be concluded that the variable sale growth (0.0360337) has a positive influence on the ROA, while the variable size (-0.0405865) and capital turnover ratio (-0.0266062) have a negative influence. Other variables have not a statistically significant impact on the dependent variable. That means that the null hypothesis was partially accepted.

Conclusions

Fruit and vegetable processing companies in the Republic of Serbia have many opportunities for developing good business, such as quality domestic fruit and vegetable as input, relatively low labor costs, a long tradition in food processing, the constant demand for food etc. Serbia is a relatively large market with more than 7 million inhabitants (Statistical Office of the Republic of Serbia, 2017). Besides the possibility for the companies to sell products on the domestic market, fruit and vegetable processing companies have great export opportunities (eg. Free trade agreement with Russia, customs-free access to EU market-CEFTA). On the other side, Serbian companies are faced with the problem low purchasing power of domestic consumers, which indicate that fruit and vegetables participate with only 9,5% of the trade turnover of food products (Statistical Office of the Republic of Serbia, 2016).

The results of the investigation the profitability of fruit and vegetable processing companies in the period 2007-2015 indicate two problems. Firstly, during this period average profitability is constantly above the reference value of 0.10. Secondly, profitability has a generally downward trend in the period 2007-2015. If we compare the profitability in 2015 and 2007 it can be concluded that profitability level of fruit and vegetable processing companies decreased by 64%. Besides these, fruit and vegetable processing companies in the Republic of Serbia have one more red flags in business and that is indebtedness. The average debt ratio of 0.62 indicates that fruit and vegetable processing companies finance business activities with 62% from borrowed funds and 38% from the capital. Traditionally, debt ratio should be 0.5 and some fruit and vegetable processing companies have debt ratio 1.0 which means that all business activities are financed from the borrowed funds. Negative relations between debt ratio and profitability indicate that additional borrowing is primarily using for servicing existing liabilities. Furthermore, the results of quick ratio test indicate that fruit and vegetable processing industry do not have problem of paying short-term liabilities. The average quick ratio of 1.47 is higher than referent value of 1.0 and shows that fruit and vegetable companies have more financially secure in the short-term.

The results of research which internal factors have an influence on the profitability of fruit and vegetable processing companies in the Republic of Serbia show the following factors as significant: size of company, sale growth and capital turnover. Size of company is negatively related to the profitability. Large companies earn more profit in absolute amount, but on the other side higher cost of interest, exchange loss etc. are reducing the profitability rate. Fruit and vegetable processing companies are increasing profitability by achieving growth in sales. Increasing sale growth has a positive significant impact on the profitability of fruit and vegetable processing companies in the Republic of Serbia. Capital turnover has a negative significant impact on profitability. This is expected, because the lower value of the capital turnover ratio may imply greater efficiency in capital utilization, which will result in higher profitability of companies.

The results of this research will enable management, owners, and potential investors to better understand the factors that influence the success of the company's business, based in which they will be able to analyze the advantages and disadvantages of

investments in fruit processing enterprises in Serbia. Also, more information about the impact of some internal factors on profitability will enable investors' easier choice of the company they need to invest in and which will, with greater certainty, allow them to return to invested funds.

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PANEL ANALIZA PROFITABILNOSTI U INDUSTRIJI PRERADE VOĆA I POVRĆA U SRBIJI

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Sažetak

Cilj ovog rada je da identifikuje faktore koji utiču na profitabilnost odabranih kompanija u okviru sektora za preradu voća i povrća u Srbiji. Profitabilnost je merena preko analitičkog pokazatelja stope povrata imovine (ROA). Analiza profitabilnosti ukazuje na pozitivnu, ali relativno nisku profitabilnost. Grupu nezavisnih varijabli čine veličina preduzeća, koeficijent zaduženosti, tekuća likvidnost, koeficijent zaliha, rast prodaje i koeficijent obrta kapitala. Analizom je obuhvaćen period od 2007. do 2015. godine (9 godina) i uključuje podatke iz 198 opservacija u okviru industrije za preradu voća i povrća u Srbiji. Panel regresioni model je izgrađen. Rezultati sprovedene panel analize pokazali su da su rast prodaje i koeficijent obrta kapitala ispoljili statistički značajan uticaj na profitabilnost kao meru uspešnosti preduzeća iz oblasti industrije za preradu voća. Veličina preduzeća je ispoljila statistički značajan uticaj na profitabilnost preduzeća pri nivou signifikantnosti od 10%.

Ključne reči: panel analiza, profitabilnost, stopa povrata imovine, preduzeća za preradu voća i povrća.

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SERBIAN AGRICULTURE LOANS WITH THE AIM OF IMPROVING THE CURRENT SITUATION¹

Vera Zelenović², Željko Vojinović³, Drago Cvijanović⁴

Summary

Agriculture is characterized by a number of specificities (seasonal and organic character, high risks of the production cycle, slow turnover of capital, inability to specialize production and low capacity utilization), due to which it is more demanding in terms of financing than other economic activities. Considering that the agriculture is one of the most important branches of the economy, which even in such difficult conditions and circumstances still yields profits, the subject of this work is to discuss the conditions of financing both by the state and by commercial banks, without which it is almost impossible to imagine the process of agricultural production. The aim of the paper is to point out the importance of stable and continuous financing of agriculture. Unfortunately, interest rate subsidy programs do not include consultations with the financial sector when programs are designed, and as a result, the way in which the programs are built does not motivate banks to increase lending to the agriculture sector. Farms need constant financial support because of the need to invest in production all at once and at a large scale, in accordance with the nature of production, the long retention period of the assets involved, ie the low turnover of the invested funds, and the low profit that the primary agricultural production generates makes it impossible to create own accumulation, or own sources of financing.

Key words: *agriculture, financing, subsidies, credit.*

JEL: *Q18, Q28, Q48*

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Introduction

Agriculture as an economic branch has great economic and social significance in the Republic of Serbia. It is characterized by a large number of organizational characteristics, which primarily arise from the use of natural conditions and the biological character of agricultural production. The planned production growth is based on rational production on already existing production areas and on the increase of yields, ie on the implementation of a series of measures of more efficient economy. Agriculture, and especially agricultural production, is characterized by a number of specificities (seasonal and organic character, high risks of the production cycle, slow turnover of capital, inability to specialize production and low capacity utilization), which in terms of financing is more demanding compared to other economic activities. These specifics condition that in agriculture there is a need to engage significant financial resources in the short term, which remain in the production process for a long time, and there is also a discrepancy between the time of investment in the valorization of production. Whether viewed in the narrow sense, as primary agricultural production, or in a wider sense as multifunctional agriculture, agriculture is “privileged” and has financial support in market-developed economies (Madžar, 2014).

Primary agricultural production, in the period after the breakup of the former SFRY, operates in extremely unstable, unpredictable and unfavorable conditions and is characterized by an unchanged production structure in, above all, capital-intensive production. All this occurs as a result of insufficiently effective measures of RS agricultural policy (Gulan, 2013).

On the other hand, the agriculture of Serbia and other countries in transition is characterized by a chronic lack of investment capital necessary for the development and structural adjustment of the domestic agricultural industry to a successful market economy (Vasiljević, 2017).

Agricultural policy is a part of the economic policy of a national economy or wider integration that focuses on directing the development of agriculture and its directly related activities and on various bases. Observed in the broadest sense, agrarian policy can be defined as the program of directing the development of agriculture within the already chosen model of development as a whole. The subject of agrarian policy is the entire vertical of agro-industrial production, which includes (Stankovic, 2012):

- production of agricultural inputs,
- production of primary agricultural products,
- production of agricultural products - food products,
- including traffic,
- final consumption and population nutrition policy.

Serbia has very favorable natural conditions (land and climate) for various agricultural production (both herbal and cattle), experienced producers, top experts and scientists. In the structure of the created value of agricultural production, 70% is from plant

production, and 30% from livestock production. For comparison, in the EU, 70% of the value in agriculture is from cattle breeding and 30% from plant production. Agriculture and food industry in the creation of a social product of the country (GDP) participate with a share of around 11.9% (<http://www.pks.rs/PrivredaSrbije.aspx?id=13&p=2&>)

Methodology

The subject of research in this paper is the presentation of the current situation in agriculture, from the aspect of financing agriculture both by the state and by commercial banks. The aim of the paper is to point out the importance of stable and continuous financing of agriculture, which should be in the function of its further development. During the research, written primary sources of data were used and analyzed, through analysis of content and using the statistical method.

Current situation in agriculture

The area of agricultural production is a very specific area of the entire economy of the Republic of Serbia. In the Republic of Serbia, agriculture significantly contributes to the creation of total value, and this is considerably more than is the case in many countries. Also, agricultural production directly and indirectly engages a large part of the total workforce of the country. It directly provides the basic source of income for all persons engaged in agricultural production activities.

Looking at the socio-economic structure of farms according to the income sources of their members, it indicates that in Serbia 326,015 family farms (52% of the total number) have no other income except agriculture. In addition, it indirectly ensures livelihoods for persons engaged in production and transport processes that do not take place exclusively in the sphere of agriculture but for the purpose of its support (production of artificial fertilizers, agricultural machinery, packaging equipment and transport of agricultural products). Apart from this, agriculture is expected to be a motor for the development of rural areas of the country and thus contribute to the reduction of rising regional disparities (Bogdanov, Babović, 2014).

Frequent changes in the agrarian policy of the country, accompanied by insufficient budgetary allocations for the promotion of agriculture and rural development, have made it impossible to use the potential of agriculture in a higher degree. Structural reforms of the sector have not been completed and the business climate for dealing with agriculture has not been improved to the level that would make this area attractive for investment. From the aspect of creating an adequate environment for business in agriculture in the coming period, the implementation and monitoring of the national agricultural policy, which will be stable, predictable and consistent over the long term, is needed, which was not the case so far. Only in this way can the agricultural-food production sector be provided through the necessary basis for long-term planning of production processes, which are very often perennial (Bogdanov, Babović, 2014).

Very important for the successful transformation of this sector of the economy is the successful completion of the privatization process in the field of agriculture. Still, significant resources in the field of agriculture are engaged in a way that does not lead to the maximization of the use of very favorable land, but also of objects within the entities in which the issue of ownership is not defined. The liberation of this potential, through the transformation of property to more productive users from the existing ones, would significantly improve the performance of the agriculture of the country and contribute to the creation of a higher total value (Bogdanov, Babović, 2014).

Table 1. Production of agricultural goods and services at producer prices of the current year, Republic of Serbia (million RSD)

	2007	2008	2009	2010	2011	2012	2013	2014
Production of agricultural goods and services	330.174	417.832	407.851	466.811	519.960	502.684	544.442	569.387
Production of agricultural goods	320.756	407.406	396.221	455.753	509.125	491.597	531.469	554.639
Plant production	217.274	278.825	265.101	328.981	359.103	324.451	358.223	376.110
Livestock production	103.482	128.581	131.119	126.772	150.022	167.146	173.246	178.528
Agricultural services	9.418	10.426	11.630	11.058	10.834	11.087	12.973	14.748

Source: Statistical Office of the Republic of Serbia, (2016) Statistical Yearbook of the Republic of Serbia, Belgrade, p. 228

Table 1 contains data on the production of agricultural goods and services in Serbia in the period from 2007 to 2014. The value of agricultural production in Serbia in the analyzed period has a tendency of growth, except in 2009 and 2012 when it fell by about 3.5% in comparison with the previous years. Serbia was hit by extreme drought in 2012, the second most severe year in the series since 1951, (www.hidmet.gov.rs/podaci/meteorologija/latin/2012.pdf), with the consequences of which were major shortcomings in the crop. Although in the mentioned years a slight decline in agricultural production was recorded, it can be concluded that in the analyzed period average production growth was around 72.5%.

Serbia's agrarian foreign trade, accounting for a quarter of total exports, recorded a tendency for growth in agricultural production surpluses. It represents a serious potential for growth and development, balance sheet balancing and ensuring the stabilization of macroeconomic indicators. Agriculture with the food sector participates in the total exports of the Republic of Serbia from 23% in recent years, which can be seen in the following table.

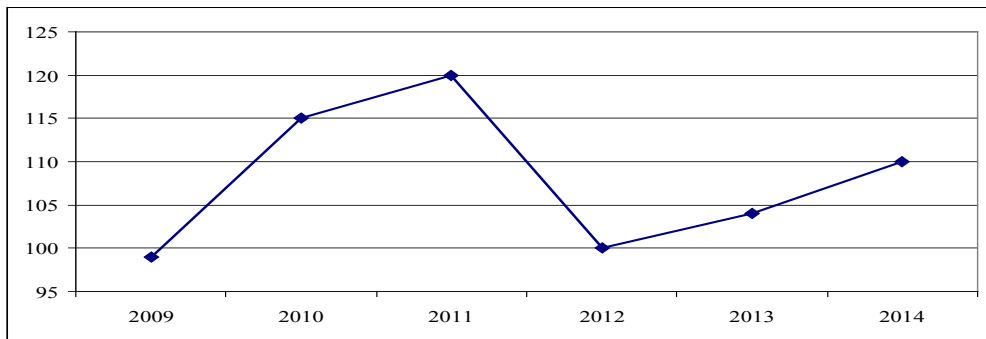
Table 2. Participation of the agricultural food sector in the trade balance of the Republic of Serbia in the period from 2009 to 2013

	2009	2010	2011	2012	2013
Participation of agriculture in total exports of Serbia in%	23,4	23	23,2	24,1	23,4
Participation of agriculture in total imports of Serbia in%	8,7	6,6	7,4	8,3	8,2
Coverage of export with import in %	140,8	207,6	185,8	147,5	178,8

Source: *Strategy of Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024. (2014) "Sl. glasnik RS", no. 85/2014, Ministry of Agriculture, Belgrade, p. 8*

World trade in agro-food products includes high-quality and safe products in terms of consumer health, as well as food offer at affordable prices for consumers. The significance of the agricultural sector for Serbia is very large, and in Figure 4 it shows the movement of exports of agro-food products.

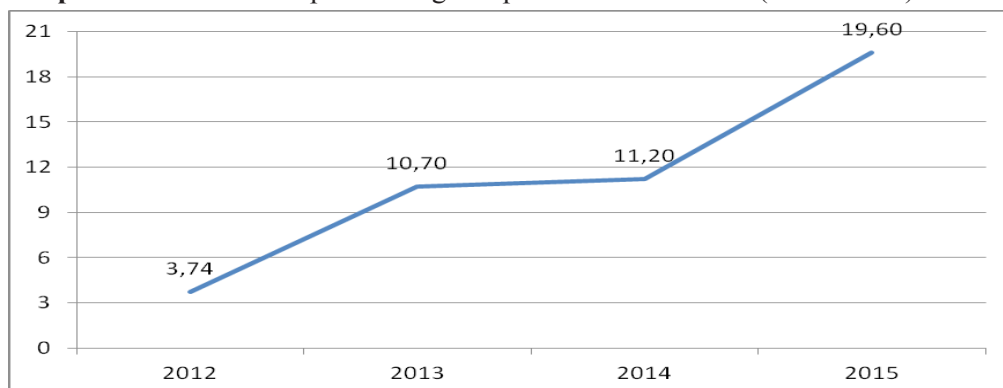
Graph 1. Movement of the total export of agro-food products of Rebulika of Serbia



Source: *Statistical Office of the Republic of Serbia*

In 2009, there was a significant drop in exports as a result of the economic crisis, while in 2012 the export was also significantly lower than in the observed years due to weather conditions.

In line with the trend of organic farming in recent years, Serbia has recorded an exceptional growth (424%) of the value of exports of organic products. In 2015, the value of export of organic production amounted to € 19.6 million, of which 70.4% of exports for the final destination had the EU, where the largest importer is Germany (Simić, 2017).

Graph 2. The value of exports of organic products from Serbia (in million €)

Source: Customs Administration

The export structure of Serbia is characterized by export of agricultural products and products of lower level of finalization. The future growth of export of agricultural products should include stable and sustainable growth in production, product range and product quality. It is necessary to adjust the export structure to demand, to affirm the internal business economics and to improve competitiveness in order to maximize the comparative advantages in production and export. All export products have priority in development and agrarian policy. In order to realize the strategic definition, besides the prominent, it is necessary to operate operatively (Božić, Bogdanov, Ševarlić, 2011):

- To improve the poor assortment of food products by developing a high-quality quality assortment;
- Increase the use of production capacity in poultry, increase the existing export assortment and introduce new lines and a set of new products to increase economy, competitiveness and exports;
- To increase the export of quality certified products from organic production to the markets of developed countries;
- Establish integral business relations between manufacturers, processors and traffic, strict compliance with quality standards, labeling, product design, packaging and packaging of products;
- Establish a business organization of producers in cooperatives or collectives and further promote shareholder engagement with processing and trade;
- Financial support and stimulation of production and products for export to the regional and world market. Our mission abroad is to attract investments and increase exports from the Serbian economy and agriculture.

Financing agriculture

Serbian agriculture has been producing relatively limited effects for years. One of the important factors is the financial system's incompetence to its needs, despite the fact that there are a significant number of different sources of funding. This contributes to the

availability of financial resources for farmers and agricultural SMEs that can be judged to be least adequate in comparison with other sectors (Pejanović, Njegovan, 2009).

Despite its economic and political importance, the Serbian agricultural sector continues to hamper a number of restrictions that limit its full potential. In addition to obsolete production technologies and machines, the lack of adequate infrastructure (eg storage / cooling) and inadequate irrigation and drainage systems, the lack of sufficient agricultural finance compared to other sectors, many observers consider as one of the main obstacles to growth and sector development (Njegovan, Filipovic, Pejanovic, 2009).

Agribusiness faces significant restrictions on access to finance due to high risk and lack of market understanding by banks (Njegovan, 2005).

Table 3. Budget of the Ministry of Agriculture for the period from 2001 to 2014

Year	Official Gazette Republic of Serbia	Total budget (funds from the budget, total revenues and expenditures)	Budget of the Ministry of Agriculture			
			Budget funds		Total funds	
			Amount	% from the national	Amount	% from the national
2001	21/2001	129.369.200.000	5.256.000.000	4,06%		
2002	74/2001, 86/2002	217.379.629.540	5.406.925.000	2,49%	5.626.925.000	2,59%
2003	86/2002, 35/2003	318.691.919.000	9.058.777.000	2,84%	10.990.102.000	3,45%
2004	33/2004, 115/2004	362.045.252.000	18.059.553.000	4,99%	20.144.553.000	5,56%
2005	127/2004, 66/2005	400.767.778.000	16.269.962.000	4,06%	18.983.562.000	4,74%
2006	106/2005, 108/2005	505.820.602.000	23.593.481.000	4,66%	27.543.882.020	5,45%
2007	58/2007	595.517.786.100	21.410.029.000	3,60%	26.095.751.714	4,38%
2008	123/2007, 102/2008	695.959.075.793	27.634.337.342	3,97%	32.895.369.077	4,73%
2009	120/2008, 31/2009	719.854.143.000	16.964.071.000	2,22%	26.690.456.000	3,71 %
2010	107/2009, 91/2010	825.884.941.052	20.572.438.000	2,49%	31.577.881.000	3,82%
2011	101/2010, 78/2011	922.232.037.407	22.533.211.000	2,44%	33.676.039.091	3,65%
2012	101/2011, 93/2012	1.018.633.424.655	40.876.729.559	4,01%	40.876.729.559	4,01%
2013	59/2013	1.040.014.339.000	44.699.546.000	4,30%	44.699.546.000	4,30%
2014	116/2014	1.110.120.984.547	5.427.166.241	4,09%	45.427.166.241	4,09%

Source: Law on the Budget of the Republic of Serbia for the relevant years

In the previous period of 14 years, the amount of the agrarian budget, in terms of the amount of state subsidies defined for the promotion of agriculture and rural development, varied considerably. The total amount of the agrarian budget ranged from 2.22% of the national budget (2009) to 4.99% (2004). In absolute terms, the agrarian budget reaches its maximum in 2014 (45.4 billion dinars) and the minimum in 2001 (5.5 billion dinars).

Bearing in mind that the own revenues of the Ministry of Agriculture, which are acquired from different legal bases, are passed on to beneficiaries (entities of agribusiness) through various agrarian / rural policies, the analysis also includes these funds as part of the agrarian budget, that is, the total budgetary funds spent to encourage the development of agriculture.

Serbian agriculture could face very difficult challenges on the path of European integration, but that sector at the same time probably will benefit greatly from membership in the European Union; if Serbia is a member of the European Union, it would receive about 1.6 billion euros a year from agricultural and rural development funds, which in 2010 totaled 55 billion euros. Serbia will have to adapt to EU regulations and standards on the road to EU membership, which will significantly alter the situation in Serbian agriculture. (http://euinfo.rs/files/Publikacije-srp/31_Poljopriceda_i_EU.pdf).

Subsidized loans in agriculture

Banks that focus on lending to agribusiness indicate uncertainty in planning, inconsistency in Serbian agricultural policy, poorly designed interest rate, subsidy programs, and lack of borrowers as the main obstacle to increasing lending. The relevant ministry has a high turnover of key people and changes its priorities very often. This leads to unpredictability of cash flows in agribusiness and reduces the creditworthiness of potential clients. Interest rate subsidies programs do not include financial sector consultations when programs are designed, and as a result, the way in which the programs are built do not motivate banks to increase lending to the sector. Moreover, subsidized loans negatively affect the credit market sending wrong signals to agribusinesses about the costs of financing. Lack of effective Cooperative Law and non-efficient agribusiness associations aggravate the ability of banks, offer products that do not rely on the creditworthiness of individual borrowers (Jolović, Njegovan, Čavlin, 2014).

The state provided subsidies in terms of finding the favourable financial resources in form of part of interest rate or insurance premium. The bank and insurance companies' representatives have assessed that this program will significantly contribute to the agricultural production improvement, in individual holdings, and the interest for this has been growing from year to year. The contracts are concluded with the following banks (Vojinović, Zelenović, Cvijanović, 2017):

- Commercial Bank
- ProCredit Bank
- Credit Agricole Bank

- Hypo AlpeAdria Bank
- BancaIntesa
- Sberbank
- AIK Bank
- NLB Bank
- Unicredit Bank
- OTP Bank

On the other hand, the contracts were concluded also with insurance underwriters :

- Dunav insurance,
- Delta Generali insurance,
- DDOR Novi Sad,
- Triglav insurance,
- Globos insurance.

Insurance of agriculture is voluntary in Serbia. General conditions of crop insurance, except husbandry, predict contracting franchises in the range from 5% to 50%. Farmers pay a lower premium through the introduction of franchisees but when damage occurs they are not satisfied with it, because they expect to be paid the total amount of damage they have suffered. Since the damage to fruit compared to secured areas are by far the largest, insurance companies insist on franchising these crops, usually 10-20% (Birovljev, Vojinović, Balaban, 2015).

Subsidized loans from the Ministry of Agriculture, Forestry and Water Management are intended for farmers in cooperation with commercial banks that approve loans while the Ministry of Agriculture subsidizes interest on these loans. State credit support is a kind of incentive to facilitate access to credit for agricultural holdings⁵.

Table 4. Conditions under which subsidized loan in agriculture is granted

Purpose	In the development of animal husbandry, in the development of agriculture, fruit growing, viticulture, horticulture and flower growing, investment in new agricultural machinery and equipment, the supply of animal feed, investment in certain types of machinery and equipment used in plant agricultural production.
Currency	RSD without currency clause
Nominal interest rate	Fixed interest rate of 3% per annum
Deadline for repayment of the loan	From 1 to 3 years

⁵ Banks that grant credits to farmers in Serbia do not publicly announce how much funds have been approved on this issue

Grace period	From one year
Loan repayments	Loans with a repayment term of up to three years are repaid in monthly, quarterly, six-month and annual annuities, and loans repayable from three to five years are repaid in six-month annuities.
Loan amount	Individual- the owner of a commercial family farm and entrepreneur can exercise the right to credit support up to 6,000,000 dinars. A legal entity can exercise the right to credit support provided that the total loan amount is up to 18,000,000 dinars.

Source: <http://subvencije.rs/kredit/subvencionisani-krediti-ministarstva-poljoprivrede/subvencionisani-krediti-ministarstva-poljoprivredesumarstva-vodoprivrede/> 22.05.2017.

In the APV Development Fund, 8 credit lines have been opened for the development of economy, agriculture and local self-governments. The main objectives of the loan allocation are the provision of financial resources to support the development and improvement of the agricultural sector by increasing the level of technical equipment, increasing the volume, efficiency and intensification of agricultural production, increasing productivity, raising the level of competitiveness and protecting the environment as well as encouraging the joint participation of several holders of individual agricultural holdings in the realization of a joint investment in agriculture to improve the market position of individual farms. The right to participate in the competition is held by an individual - bearers of registered agricultural holdings in the territory of AP Vojvodina, who have active status of the household.

In addition, the Fund has made a major contribution in the last few years, cofinancing amounts up to 60% for investments in procurement of irrigation systems, procurement of anti-ship networks, construction of silo, refrigerators and other storage capacities. Also, the Guarantee Fund plays an important role in the agriculture of Vojvodina, which greatly facilitates the taking of loans for large investments.

Table 5. Conditions for granting long-term agricultural loans by DF APV

Purpose	Purchase of agricultural machinery for agricultural production (tractors, combines and connecting machines), procurement of equipment for agricultural production, procurement of quality breeding material in livestock and breeding flocks, procurement of perennial fruit plants, grapevine and other perennial plantations with equipping surface areas, procurement of anti-ship network with backbone, procurement of equipment for protected area, construction of wells and procurement of equipment and irrigation systems, procurement of equipment for capacity increase and modernization of lines for processing primary agricultural products, construction, adaptation and equipping of storage capacities - cold storage and floor storage, construction and adaptation buildings for livestock production in order to protect the environment and fulfill the standards in the field of agricultural production.
Currency	Application of currency clause, middle exchange rate of euro on the day of received payment or outgoing payment

Nominal interest rate	2% per annum for loans secured by a bank guarantee and 3% per annum for loans secured by mortgages; The interest rate for credit beneficiaries who perform their business activities in the territories of cities and municipalities of APV classified in the third and fourth development groups is reduced by one percentage point. Own participation: at least 20% of the estimated investment value (excluding current assets).
Deadline for repayment of the loan	5 years, except for the purchase of breeding flocks, bee hives and hives with accompanying equipment when the return period is 3 years
Grace period	From one year, except for the financing of the purchase of quality breeding material in livestock and for financing programs in the field of fruit and wine growing and the establishment of other perennial plants, when the grace period is 24 months.
Loan repayments	Annuities are calculated and paid quarterly. In the grace period, intercity interest in the amount of the agreed interest rate is paid quarterly.
Loan amount	From 300,000,00 to 10,000,000,00 dinars
Securing loans	Personal bills of the individual of the holder of the registered agricultural holding. Guarantee of a commercial bank or mortgage - a pledge right of first order or lower if the Fund is the only mortgage creditor on agricultural land in favor of DF APV. Novi Sad, whose minimum ratio of the estimated market value and the required loan is 150%, or a pledge on a newly-acquired agricultural agricultural machine financed by loan funds.

Source: <http://www.rfapv.rs/index-412.html>

Non-performing loans in agriculture

The branches that handle troubled loans are the processing industry, trade, construction, education and real estate, agriculture and transport, hotels / restaurants.

Table 6. Gross NPL for companies by branches 2013-2016 (in billion RSD)

	Years			
	31.12.2016.	31.12.2015.	31.12.2014.	31.12.2013
Economic branches				
Manufacturing industry	60639	69086	79892	81986
Trade	38151	58062	62013	63652
Construction	24494	27770	36152	44276
Education and real estate	21337	25799	29030	26110
Agriculture	4067	6257	9852	9133
Transport, hotels / restaurants, communications	8613	10906	10726	12440

Source: Authors' view based on downloaded data https://www.nbs.rs/internet/latinica/55/55_4/kvartalni_izvestaj_IV_16.pdf, str. 21 10.10.2017.

From Table 7 we can see that from year to year the gross amount of problem loans in all sectors is reduced, observing the period from 2013 to 2016. Reduction can be

attributed to active operations in the field of credit risk management and a greater focus on collecting receivables. The same situation is when the agriculture is in question, namely in the observed period, the NPL has a downward trend, except in 2014, which is partly the consequence of the large floods that had occurred in Serbia at the time. After 2014, NPL in agriculture records a credible rate of decline, which is evidence that the market is stabilizing, as there is often a chain reaction related to the stability and health of the economy.

Conclusion

Despite its economic and political importance, the Serbian agricultural sector continues to hamper a number of restrictions that limit its full potential. One of the key reasons for this is the incompetence of the financial system to its needs, despite the fact that there are a significant number of different sources of funding. This contributes to the availability of financial resources for farmers and agricultural SMEs which can be assessed as least adequate in comparison with other sectors. The next major problem of our agrarian sector is the insufficient consolidation of the estate, a large number of small plots scattered by different ataries of only one village, which leads to high production costs, loss of productivity and economy, which additionally complicates the situation when financing is in question. Experience has shown that reduced subsidies have drastically influenced the quality and quantity of agricultural production, as with reduced incentives, investments have also been reduced (fertilizers, hybrid seeds, spraying agents). The unfavorable conditions for financing the agrarian sector can lead to the collapse of a large number of small agricultural holdings, which will be forced to offer their possessions to foreign and domestic large-scale capital. Therefore, the role of the state in subsidized funding is extremely important, because commercial banks have exclusive interest in profits when it comes to credit placements. Farmers as individuals, most often put a mortgage on the land when taking loans, making them very attractive to banks. The state's influence is essential and necessary, and the financial resources that the state has at its disposal should be in the function of developing agricultural production, while the policy of their spending should be in the context of national interest.

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KREDITIRANJE POLJOPRIVREDE SRBIJE SA CILJEM UNAPREĐENJA POSTOJEĆEG STANJA

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Sažetak

Poljoprivredu karakteriše niz specifičnosti (sezonski i organski karakter, visoki rizici proizvodnog ciklusa, spor obrt kapitala, nemogućnost specijalizacije proizvodnje i nizak stepen iskorišćenosti kapaciteta) zbog kojih je sa aspekta finansiranja zahtevnija u odnosu na druge privredne delatnosti. Obzirom da je agrar jedna od najvažnijih grana privrede, koja i u ovako teškim uslovima i okolnostima ipak donosi profit, predmet rada je razmotranje uslova finansiranja kako od strane države, tako i od strane komercijalnih banaka, bez kojih je skoro nemoguće zamisliti proces poljoprivredne proizvodnje. Cilj rada je da se ukaže na značaj stabilnog i kontinuiranog finansiranja poljoprivrede. Nažalost, programi subvencioniranja kamatne stope ne uključuju konsultacije sa finansijskim sektorom kada su programi dizajnirani, i kao rezultat, način na koji su programi izgrađeni ne motivišu banke da povećaju kreditiranje u sektor poljoprivrede. Poljoprivredi je neophodna stalna finansijska podrška zbog potrebe da se sredstva ulože u proizvodnju odjednom i to u velikom obimu, u skladu sa prirodom proizvodnje, dugim periodom zadržavanja angažovanih sredstava, odnosno niskim obrtom uloženi sredstava, te niskim profitom koji ostvaruje primarna poljoprivredna proizvodnja, a koji onemogućava stvaranje sopstvene akumulacije, odnosno sopstvenih izvora finansiranja.

Ključne reči : *poljoprivreda, finansiranje, subvencije, kredit*

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ACCOUNTING ASPECTS OF AUDITING THE BUDGET SYSTEM

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Summary

Until recently the main instrument of state funding, the budget was only controlled by the existing system of a country's administrative control. Today there is budget audit as a special form of political control, which should contribute to a more appropriate and purposeful budget execution. It is still a condition sine qua non, i.e. an inevitable requirement for healthy public finances.

Key words: *accounting, budget, audit, finance*

JEL: *H61, H83, Q19.*

Introduction

Even though there is budget control, mistakes and irregularities in its execution are inevitable. It is for those reasons that budget audit exists. Budget audit is a state's instrument that permanently reminds its budget executors to work properly, in order to avoid irregularities and a need to find the accountable. This is why budget executors try to work regularly, in order to eliminate irregularities that perhaps even audit would not find, which decreases the inherent risk. In this way, budget audit is an addition to budget control and a guarantee of establishing budget discipline in public finances. Basic questions in budget audit from which its effect and efficiency depend are her assignment, scope and organization.

Budget audit has an assignment to question and determine whether budget executors complied with the procedure during the budget year, on questions of legality, rationality and usefulness. Two basic tasks of budget audit are securing proper budgeting i.e. budget execution according to budget regulations and securing finance for budget tasks with the goal to meet the country's interests at the highest level.

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In its work regarding legality, budget audit questions the work of budgetary accountants and managers. It states budgetary facts, compares them to the budget, questions their legality, and on its basis determines budgetary deviations determined and gives opinions.

The question of satisfying state interests relates only to managers who have discretionary right to use the budgetary funds. In this part budget audit questions whether budgeting was in accordance with state interests.

The scope of budget audit covers all budgetary operation, as well as all other work having to do with management of state assets related to the budget. In short, it can be systematized through the following: gathering i.e. payment of public revenue, execution of public expenditure and management of public assets.

Since the scope and missions of budget audit are very diverse and extensive, it is clear that its organization cannot be simple. Organization of budget audit shows significant differences in different countries and regions, but certain basic similarities exist. Many countries have built in laws on audit of the public sector within the provisions of the Lima declaration regarding the jurisdictions of budget audit and audit of public companies. For example, 24 member states of the EU have regulated in their laws on public sector that the Supreme Audit Institution (SAI) can audit the public sector.

Literature review

Since great part of public expenditure is financed by citizens, there is great interest in their purposeful use, and their unintended expenditure represents a harmful behavior. Republic of Serbia has perceived mechanisms for strengthening control of financial discipline in the public sector, such as fiscal rules anticipated by Law on budget system, which regulates the behavior of all users of public funds (Šuput, 2012).

State audit is one of the most important institutions, which conducts supervision of Budget expenditures (Filipova, 2015). Amongst the several control tools of risk management, internal audit is primarily used as an effective tool to manage operational, financial, legal and regulatory risks (Vijayakumar, Nagaraja, 2012). Achieving control on lawfulness of budget execution by independent audit institutions is an essential question for every country. Establishing an efficient system of external audit of budget expenditure is the best way in preventing state officials from unlawful expenditure of budget assets and one of the most important assumptions against successfully fighting crime (Lončar, 2012).

Each individual SAI has a different „personality“ in the role that they aspire to when executing a performance audit. SAIs face strategic choices in further development of performance audits (Pollitt, 2003).

Organization of state audit

State audit and within it budget audit existed in many countries for hundreds of years and during their existence they changed their organization, way of functioning, jurisdictions etc. Today there are three basic models of organizing state audit through the SAI:

- Judicial model, with judicial jurisdictions and authorizations;
- Judicial model without judicial jurisdictions and authorizations and
- With Head – Auditor General at the helm.

SAI is organized as a collegial body by a judicial model, with judicial jurisdictions and authorizations, also called the Napoleon's model. It is the oldest model of institutionally organizing SAIs that appeared at the beginning of the 19th century in France (Bojić, 2009). SAIs that were organized in this way were a part of the judicial system of a country, which function as courts, auditors have the rights and obligations of judges in regular courts. In names of those SAIs, the word court is used as Court of auditors or Audit court. Today SAIs are organized in this way in France, Belgium, Luxemburg, Spain, Portugal, Italy, Greece and Romania. Considering that SAIs are organized as courts with judicial jurisdictions and authorizations, their work is primarily focused on compatibility audit.

Basic characteristics of SAIs organized according to this model are: accountants from Ministry of Finance are placed as head accountants in ministries and other institutions of the public sector, which gives more responsibility to the Ministry of Finance for the state in the public sector; head accountants are independent from the institutions of the public sector in which they are assigned; Ministry of Finance determines the regulations and rules based on which all head accountants act; audit court – court of auditors which implements a yearly audit of financial reports of all public sector institutions and all head accountants; court of auditors – audit court reports to the Parliament, Government and Ministry of Finance on conducted audits on a yearly basic.

SAIs organized as collegial bodies by a judicial model without court jurisdictions and authorizations are organizationally similar to courts, however not in the way they function. They are not a part of the judicial system and the reviewers do not have the rights and obligations of judges in regular courts. This model of SAI is the least prevalent type of this organization today and the institutions organized according to this model exist in Germany, Netherlands and the Czech Republic. The European Audit Court, the EU audit institution is organized and functions in this way. Basic features of SAIs organized in this way are: unlike SAIs who are headed by Auditor General, the function of Auditor General is performed by a collegial body – the board; all members of the board have the same status and all decisions are made by a consensus; other than the board there can be several Subcommittees and the Appeals Board which has the jurisdiction to arbitrate between Subcommittees; the principle of decision-making process through a consensus can be slow and difficult which calls into question the efficiency of the SAI.

SAI headed by Head – Auditor General is also called a parliamentary, monocratic or Anglo-Saxon model of organizing SAIs. This organization model is most widespread, i.e. most SAIs are organized in this way. Basic characteristic of this organization model and the difference from the other two is that the head of the audit institution is not the collegial body but a person, Head – Auditor General. Responsibilities, rights and obligations of the Auditor General are regulated by the constitution or a law that governs the matter of the public sector. This organization model is most consistent with

the provisions of the Lima Declaration, which is to say that it exists and has the highest level of independence. SAIs organized in this way perform a financial audit within which audit of financial reports and performance audit is accentuated i.e. they perform a comprehensive audit of the public sector.

Basic features of SAIs based on this model are: the Parliament approves the budget for the Government and its institutions; Government and its institutions execute the budget and they deliver a report to the Parliament on its execution; Audit is performed by SAI; SAI delivers a report on the performed audit to the competent Parliamentary Committee i.e. Parliament that discusses it with the Government and SAI; The Government reports to the Parliament regarding the measures taken by the Parliament, Parliamentary Committee and SAI; all rights, authorizations and responsibilities regarding audit of the public sector are concentrated in the hands of the Auditor General. SAIs organized by model are in USA, England, Canada, Sweden, Denmark, Finland, Ireland, Austria, Hungary, Croatia and Estonia (Bojić, 2009).

It should be mentioned that until recently, another model of organizing budget audit existed and it does not exist today, SAI within the governing structure. Such model of organization existed in Sweden and Finland. Changing the constitution and laws that regulate the matter of the public sector in Finland in 2002 and in Sweden in 2003, SAIs are no longer within government structures, but within the Parliament and they are classified within the order of SAIs organized with Auditor General.

Laws that regulate audit of the public sector among other things regulate the jurisdictions of SAIs regarding which institutions within the public sector revise SAIs. There are very significant differences in jurisdictions of SAIs, from the possibility that they audit the central government and its institutions, whether they revise the central government, regional and city – municipality governments and institutions in their jurisdictions, to whether they revise other public bodies next to the aforementioned institutions and public sector. The following table shows the jurisdictions of certain SAIs.

Table 1. Organization of state audit in certain countries

Name of the country	Central government	Regional government	Municipalities	Public sector	Other public bodies
Austria	*	*	*	*	*
Belgium	*	*		*	*
Denmark	*				*
Finland	*			*	*
France	*			*	*
Germany	*			*	*
Greece	*	*	*	*	*
Ireland	*				*
Italy	*	*	*	*	*
Luxemburg	*			*	*

Netherlands	*			*	*
Portugal	*	*	*	*	*
Spain	*	*		*	*
Sweden	*			*	*
Great Britain	*				*

Source: Bojić, 2009

Jurisdictions of SAIs directly determine the number of clients they audit so for example NAO in Great Britain audits a few hundred clients per year and has 3000 clients it audits in the period of several years. Naming an Auditor General is differently regulated in different countries and there are three practices:

- Naming the Auditor General is under strict authority of the legislative authority, which is the case in Germany, Austria, Hungary, Croatia, Spain, Belgium, Sweden, Finland and Denmark;
- Naming the Auditor General is under the authority of executive authority which is the case in Portugal, Italy and Greece, and
- Naming the Auditor General is under the authority of legislative and executive authority, which is the case in Netherlands.

In certain countries, naming the Auditor General is significantly important and that is why the process includes the highest authorities of those countries such as the president in Ireland and the queen in Great Britain.

The length of the term is very different in different countries: four years in Portugal, six years in Sweden, eight years in Croatia, ten years in Spain, twelve years in Germany, Austria and Hungary, and a lifelong term in England and France, however the maximum age is limited to 68.

The way in which Auditor Generals are chosen and the length of their term are regulated by laws regarding audit of the public sector and directly influence the independence of the Auditor General and SAI, especially organizational and functional independence.

It is especially important for financial independence of the Auditor General and SAI that the budget of SAI is adopted only by Parliament and Parliamentary Committee for audit, whereas the Government – Ministry of Finance can be included. There are a couple of typical ways of adopting the budget of SAIs: in Denmark the budget of SAI is under the exclusive jurisdiction of the Parliament, after its proposal from SAI; in Finland the Parliament adopts the budget of SAI which as an integral part of the Parliament's budget; in Great Britain the budget is proposed by SAI to the Parliamentary Committee and the Parliamentary Committee proposes the budget to the Parliament which adopts it; in a number of countries (Germany, Austria, Spain, Portugal) the Government and Ministry of Finance have a significant role in the creation of SAI's budget.

From the above mentioned it is obvious that the organization of state and with it budget audit can be established as an individual institution of state audit institution or audit court,

i.e. internal audit organization located either within each ministry or within the Ministry of Finance. Independence of audit institutions points to efficiency of audit and it is in direct correlation with the level of independency.

It is essential to create prerequisites for the work of budget audit, and the most important one is making and adopting the Annual Statement of Accounts (More available in Milojević, 2008).

Preparing the Annual Statement is required for control of all managers. In parliamentary organization, this is quite pronounced since Annual Statement of Accounts is made after the portfolio is released by the head manager. For example the examination of paying expenses and making revenue point to the work of accountants. On the other hand, purpose of issued orders points to the work of managers.

With that in mind, it is crucial to pass a law on responsibility of head managers, which should anticipate the civil responsibility for irregular budget execution (Andžić, 2013). This law would have its flaws in the form of hostility of capable individuals in accepting certain positions and prevention of executing certain very useful state tasks.

Tasks of budget audit

Control of a budget's execution always leaves voids that should be filled in order to establish healthy public finance system. These voids are compensated by budget audit. It is oriented towards the elements that are not covered by budget control, and above all it relates to appropriate budget execution and in some cases legality of doing business.

Budget control partially examines lawfulness in procedures when issuing and reevaluating an order by a manager or an accountant, but it does not question the purpose of such orders. Having that in mind, budget control will not hold the manager accountable if those orders are irrational. For a proper public finance system, the question of purposefulness and rationality is as important as lawfulness. This is the reason why void left by budget control should be compensated by budget audit.

On the other hand, budget control does not have full inferences to stop an execution of irregularly issued orders. For example, in cases when a manager thinks objections made by controllers are unfounded regarding the regularity of issued orders or that execution of an illegally issued order (irregular changes to budgetary expenses etc.) is useful for the country. These voids should be compensated by budget audit which should additionally question whether executing the budget is rational, i.e. whose interpretation of regulations is correct, the managers' or accountants'. Institutionalization of such observed audit started in Lima with the declaration on the IX congress INTOSAI⁴ in 1977. It is considered a primary document when auditing the public sector based on which all other documents relate to when auditing the public sector including audit standards (Gavrić, 2015) for the public sector.

4 The International Organization of Supreme Audit Institutions is an international organization, organized by supreme audit institutions. INTOSAI was founded on the first congress of INTOSAI held from 02-09.11.1953. in Havana (Cuba).

The main goal of Lima declaration is establishing and maintaining independence of SAIs. SAIs cannot survive and function unless they establish independence. It points out the need for provisions on independence of SAI to be incorporated into the legislative on audit of the public sector.

The Lima declaration consists of seven parts: general provisions; independence of audit and auditors; relation of audit with the Parliament, Government and public administration; jurisdictions of SAIs; methods of audits, auditors and international exchange of experiences; reporting on an audit and auditing subjects.⁵

General provisions relate to the purpose of auditing the public sector and types of audits. When purpose of an audit is in question, an audit isn't a formal act, but an integral part of a regulatory system with a goal to discover deviations in relation to adopted standards and breaking the principles of legality, rationality, efficiency and effectiveness when managing financial and other assets, in order to enable taking corrective measures and make the responsible accountable in order to take steps in discovering and preventing such transgressions. When types of public sector audits are in question, the Lima declaration differentiates audits according to criteria of time when they are performed, institutional positioning and jurisdictions.

Regarding the way that an audit is implemented it can be ex-ante and ex-post audit (unlike private sector audits, which are always ex-post controls). Ex-ante audit represents an overview before presenting the situation, administrative and financial activities and ex-post audit is done after presenting the situation. Ex-ante audit has the advantage of being able to prevent harm, but an imperfection of giving auditors a great deal of work, and SAIs do not have sufficient resources to perform such work. An ex-post audit is not able to prevent harm but it can influence compensation for damages, prevent their repetition and initiate assessment of responsibility (Stanojević, et al., 2016). Every country determines whether SAIs will perform ex-ante audits through their regulations, while ex-post audits are a compulsory activity of SAIs.

According to institutional positioning, Lima declaration differentiates internal and external audits in the public sector. Internal audits are organized within the organizational structure of the Government and its institutions and external audits are organized outside the organizational structure of the Government and its agencies. External audits are organized as SAIs. Among other things external audits have a mandate to revise the work of internal audits.

According to jurisdictions and subjects of an audit, Lima declaration differentiates financial audits (audit of financial statement and legality of doing business) and performance audits. Historically and traditionally SAIs are oriented towards financial audits – compatibility of doing business, however perspectives for development of public sector audits point out that SAIs in the future will be oriented towards performance audits. Aims of audits in the public sector⁶ performed by SAIs are of equal importance however regulations can decide to which type of audit SAIs will dedicate greater attention and priority.

5 www.INTOSAI.org – Lima Declaration

6 Lawfulness, economy, efficiency and purposeful use of budget assets.

Provisions on independence imply independence of SAIs and auditors. SAIs can fulfill their role only if they are independent from the institutions that they audit and from other influences. Even though it is difficult to achieve complete independence of SAIs, they are expected to have organizational, functional and financial independence.

Relations of SAIs with the Parliament are regulated by highest normative regulations of state entities. The relation of SAIs with Parliamentary Committee regarding audit is especially important. When the relation of SAIs and the Government and its institutions are in question, SAIs should be protected from the influence of the Government and its institutions.

Jurisdictions of SAIs are determined by normative regulations and imply determining the subject, area, method of an audit, unhindered access to objects, assets, files, documents, other data and information important for performing an audit and open reports on a performed audit.

Provisions on work methods, auditors and international cooperation imply that SAIs will conduct their audit in accordance with plans and programs of an audit and that they will determine audit methods, techniques and procedures freely and independently. It is recommended for SAIs to base their audit manuals on modern audit theories and international auditory practice while respecting international specificity in order to ensure professional, independent and unbiased approach to the audit process and quality work of auditors. Lima declaration points out the need for qualifications, motivation, education and moral integrity of auditors. When international cooperation is in question, it is recommended to exchange experiences and ideas within INTOSAI and regional organizations such as EUROSAI and certain forms of bilateral cooperation.

Provisions on reporting treat reports for the Parliament and the public. SAIs are authorized and obliged to report to the Parliament i.e. competent Parliamentary Committee on audit results. Reports submitted to the Parliament are public reports – public documents available to the public in a way and form as decided by normative regulations. Lima declaration states basic authorizations of SAIs, i.e. subject of an audit, which can be the budget on various levels, taxes, public contracts, audit of electronic data processing, audit of public companies, institutions with subventions and international organizations.

According to the aforementioned, the audit of the public sector performed by SAI relates to budget audit. Tasks of budget audit consist of the following:

- It should question, i.e. decide whether the orders are according to regulations, especially in cases when there is a dispute between managers and accountants,
- It should question whether the violation of regulations done by managers when giving orders (especially for budget overruns) was justified i.e. purposeful and useful for the country.
- It should determine whether issuing orders, even within the budget and full respect of regulations was purposeful and useful for state interests.

Scope and process of budget audit

Considering the mentioned tasks of state audit, it includes the work of all managers and accountants in the public finance system but it is de facto directed at head managers and accountants.⁷ This is justified by the fact that lower managers perform their work according to the instructions and control of head managers, which also relates to accountants in cases of their rights in repeated orders. This indicates that control of head managers' work includes the work of lower managers.

As a supreme legislative body, which controls the work within a country, the Parliament relies on the report of budget audit and based on it, makes the final decision. In this case budgetary audit participates as an assisting authority which helps the Parliament in the decision making process. Its work consists of gathering and preparing materials with the report necessary for Parliament to make a decision on the work of executive bodies.

Budget audit is conducted through certain phases and three most important ones are preparation, middle and final phase.

During preparation, it is the task of budget audit to gather data necessary for making the necessary opinion. This material most often consists of results and statements of budget controllers, financial statements on certain portfolio and other explanations by the manager.

Budget audit relies on data given by budget controllers during their work, taking into consideration a control risk (Damnjanović, Mihajlović, 2012). Every portfolio makes their financial statements individually, whereas the financial portfolio makes the final financial statement, where it shows and explains the financial operations from the related budget year. Explanations made by the manager generally relate to overdraft or explanations of certain parts of financial statements.

Budget audit processes the gathered material, taking into consideration control risk and completes its report with a certain opinion. An example of this report is delivered to the Parliament and the executive government. Budget audit should usually deliver recommendations on budget financial reforms to the Parliament in the attachment of the report.

Middle phase begins when budget audit delivers its report with certain attachments to the Parliament, which then directs it to the Parliamentary Committee who is assigned to study the report and make a document that will serve the plenum as a basis and a starting point for discussion and decisions.

When studying the submitted report, the committee should pay special attention to the following facts: whether there are budget violations, especially in cases when there were controversial interpretations between managers and controllers, reasons and motives that managers gave when justifying budget violations and whether budgeting was regular i.e. expedient.

⁷ Lower managers and accountants only work within the limits of jurisdictions delegated by head manager.

Third i.e. final phase of budget audit is completed in Parliament's plenum i.e. Parliament. Auditor General states the significant parts of the report made by auditors in the Parliament, which serves as a basis for studying, discussion and decision-making. In this part of work by Parliament, attention is given to basic facts stated in the report. After discussion, Parliament makes the decision that can be a discharge, indemnity or a condemnation.

If budget execution was regular according to legal norms, the Parliament gives the executive government a discharge, if there were budget violations during its execution (overruns etc.) but the executive government manages to convince the Parliament that those violations were justified, i.e. useful for state interests, the Parliament will give an indemnity and if the Parliament finds that budgeting wasn't purposeful it will determine responsibility of the executive government.

In most countries, the Parliament adopts the financial statement with the aforementioned decision, while in some it only discusses it without its adoption.

From the said it can be concluded that efficiency of budget audit mainly depends on whether the question of head managers' responsibility is regulated, if it exists budget audit will be effective, otherwise it will be ineffective.

Conclusion

Head managers should be held responsible for their procedures in budgeting with: criminal responsibility, civil liability and political responsibility. For civil and criminal responsibility there are courts and for political responsibility the Parliament has jurisdiction, whose conviction consists of a declaration of mistrust. Theoretically head managers could be held responsible through civil and political responsibility and eventually criminal. Past practice showed that most often there is only political responsibility.

There are multiple reasons that confirm the statement that head managers who violated budget discipline were not held responsible through civil or criminal responsibility.

Budget overruns are undoubtedly legal violations, but those violations can be very useful, not to say necessary. If head managers were to answer for budget violations, then they would start avoiding orders that are according to state interests, making such actions a violation to the budgetary law. It is for this reason that many experts do not accept positions of head managers.

Considering violations made regarding purpose of the budget, those should be dealt by the ones who adopted it. Head managers will elaborate on all budget violations to the Parliament. According to their justification, the Parliament will adopt them, give the executive government indemnity or announce a condemnation. This represents the only possible sanction. This confirms that there are no precautions, which will save the state from damages if public finances are in the wrong hands and a million political condemnations do not contain any compensation for damages.

Timely writing of financial statements is a condition of efficiency of budget audit. If financial statements do not arrive in time, budget audit is without a subject, the Parliament

does not have interest to study budget procedures that happened a long time ago and there is no effect in publicly condemning people who abandoned their positions as head managers many years ago.

Finally, it is necessary to mention the usefulness of budget audit depends on whether the Parliament is guided by interests of public finance or by its political party when making decisions. It is a necessity for the Parliament to be guided by interests of public finance when making their decisions.

It is very harmful to public finances if the executive government is certain in its Parliamentary majority and finds it reassuring when performing budget violations even when they are not necessary. On the other hand it is harmful if the executive government is not able to perform those deviations, which would be useful due to lack of certainty in Parliamentary majority.

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RAČUNOVODSTVENI ASPEKTI BUDŽETSKE REVIZIJE

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Sažetak

Izvršenje budžeta, kao osnovnog instrumenta državnog finansiranja, donedavno je bilo praćeno isključivo postojećim sistemom državnih administrativnih kontrola. Danas kao poseban vid političke kontrole javlja se budžetska revizija, koja u svom radu treba da doprinese što pravilnijem i celishodnijem izvršenju budžeta. Ona je danas uslov sine qua non, dakle neminovan uslov za zdrave javne finansije.

Ključne reči: računovodstvo, budžet, revizija, finansije.

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BEER AND BEER INDUSTRY IN SLOVAKIA

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Summary

Tradition of beer industry in Slovakia takes origin in 19th century, when production of beer primarily appeared in this country. Slovaks love beer, which is confirmed by gradually increasing number of beer producing facilities. Production of beer has significant impact on development of Slovak economy, direct foreign investments, creation of new jobs, technology modernization etc. There are also many significant multinational corporations operating in Slovakia such as Heineken International, Topvar, Steiner and others. Significant revolution is going on also in the sector of small independent craft breweries in Slovakia. The objective of this paper is to emphasize the importance and impact of beer industry on Slovakian economy and to analyze advantages and disadvantages of the sector in this area.

Keywords: Beer, beer industry, investments, market.

JEL: L66, M21, Q00

Introduction

Beer is almost as old as our civilization. The favorite drink over the whole world and according to some researches it has also medicinal properties due to medicinal substances which beer contains. It is a fermented beverage which is made from grains of cereals with the addition of hop. In the previous century and at the beginning of

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this century it was a common believe that beer originated from Egypt. This was due to the pictures saved on stone panels and texts found in pyramids in Sahara desert which originated from the fourth century and the beginning of third millennium BC.

The oldest brewery in Slovakia is situated in thy city of Vyhne, founded in 1473, while the second most important one is brewery of Trnava city - known as free royal city – founded in 1532. From geographical perspective, the most important centers of beer are in mining towns (Kremnica, Banska Bystrica, Banska Stiavnica), as well as: Spis region towns (Kezmarok, Levoca), and other cities such as: Bardejov, Presov, Kosice and south-western area of Slovakia (Trencin, Trnava and Bratislava) are well-known and famous for beer production.

Beer which is consumed today maintains its taste and flavor from the eighteenth century. The best beer was made in eighteenth and nineteenth century in towns of Trencin and Kezmarok. During that period beer industry was established and in the second half of the nineteenth century developed in a way to be focused on industrial production which led to decrease in craft production of beer (typical for small entrepreneurs who raised hop). However, consumption of beer during this period was very small in comparison with other beverages (Historia piva, 2017). Increase of beer consumption happened only during the fast, when people started to consume beer instead of milk. The largest changes came in the second half of XX century when modern breweries were founded and started their businesses. Furthermore, the quality of beer went up and the price of beer was also more attractive and affordable to people which led to higher consumption of beer.

The impact of beer industry on Slovakian economy

Beer production through the time has been very important source of revenues from the government perspective and was traditionally considered as a creator of new working places and a relevant factor in employment increase. In 2003 beer consumption has fallen down, while after 2010 it was stabilized on the earlier levels, which was confirmed by the Statistical Office of Slovakia data. Breweries in Slovakia recorded moderate growth in consumption by 6% last year. In 2015 in Slovakia the total consummation of beer amounted 372 million liters, meaning on average 73 liters of beer per citizen.

Government budget, recorded growth of approximately 110 million EUR last year on taxes from beer sale, Beer industry intends to invest approximately 130 million EUR each year for purchases of goods from its suppliers, mostly Slovakian agriculturists and in such way contributes to the incentives for development of domestic economy. Each Euro that is paid to suppliers in Slovakia by breweries means stimulus for economy and creates added value of 2.38 EUR.

Beer industry creates about 19,000 working places within the Republic of Slovakia. In breweries more than 1,500 employees are directly employed, while each of them creates another 12 working places in the supply chain, the catering and trade industry.

Breweries invest almost 2 million EUR per year in the sector of hotel management and catering (abbreviated: HoReCa). Multinational companies bring significant investment recovery into Slovakian beer industry, technological innovation, new management style and corporate culture.

Slovaks are great consumers of beer

Slovaks lead in beer consumption which is proved by continuous increase of number of breweries in Slovakia. Together beer producers produce almost 3 million hectoliters of beer per year in total. The largest quantity of beer Slovaks drink in summer, almost 60% of total year production.

The quality and popularity of Slovakian beer is showed by an average consumption of 73 liters per citizen each year, which classify Slovaks as nation with high culture of beer consumption with continuous increasing trend. Slovakian beer hides its secret not only in extremely high quality of its ingredients starting from quality water, grain, hop and beer yeast but also in a well-known mastery for cooking of craft beer. The quality and various flavors of Slovakian beers depend upon the way of cooking as well as adequate mixing of ingredients during cooking.

The most popular beer among Slovaks is “Lager”. The word “lager” has German origin and its meaning is “keep it safe” “store” or “protect”. After preparation phase, this beer is left to lie down on low temperatures around zero, several months. Lager beer is the “beer of low fermentation” meaning that for its preparation yeast cultures which are precipitated on the ground are used and fermentation is made at low temperatures (“cool fermentation”). Lager is the most popular type of beer in the world, due to various flavors inherent for it, from sweet to bitter, with various palettes of colors from dark to gold; it is highly carbonated drink, very full flavor, different smells, with a lot of additives of hop and stable foam. The most famous are German, Czech and Netherland types of Lager beer. The consumption of Lager beer is almost two thirds (64.3%) of total beer consumption. On the next place is the beer consumption with higher percentage of alcohol, with share of 18.5% of total beer consumption.

Very successful line of beer Radler has a 10% share in total beer market. Radler beer became trendy so its consummation rises, as one of the type of non-alcoholic beer. Apart from the fact that it is flavored and filtered it also became part of life style of active people as an alternative on their jobs, during driving or while they are actively engaged in sport.

Slovaks prefer mostly light beer (53.3%), dark beer (23.1%) but also Radler (15.3%). Data from Statistical Office of the Republic of Slovakia shows the trend of beer consummation preference of Slovaks at home, in weekend cottage, at different manifestation or in the friend circle. According to data from Trade Association, the beer consumption in restaurants and pubs is 37%, while the sale of beer in supermarkets is almost doubled and amounts 63%.

Type of beers in Slovakia

During the typical production phase of beer in Slovakia, 85% of raw materials which came from the territory of Republic of Slovakia is used.

Multinational companies, engaged in production and sale of beer, contributed by their investments in Republic of Slovakia to significant investment recovery, technological innovations, new management style, corporate culture and opening of new working places.

Slovakia has totally 60 breweries, while 4 of them are large breweries and 56 are small craft breweries.

Beer market in Slovakia is under the huge impact of domination of two largest companies, Heineken Slovakia and Topvar brewery. Both companies are in the majority ownership of foreign investors.

Heineken Slovakia is part of world group Heineken International and has portion on Slovakian market of 45% with following types of beer: Zlatý Bazant, Corgon, Kelt, Martiner and Gemer.

The second largest brewery in Slovakia is Topvar, part of the world known company SABMiller, with 28% share on the Slovakian beer market with following types of beer: „Saris“ and „Smadny Mnich“.

Third ranked brewery is also the oldest Slovakian beer producer - Pivovar Steiger (types of beer: Steiger, Stein, Grosak, Sitnan), which is in the majority ownership of British company Endemit and majority co-ownership of Czech company PMS.

On the fourth place according to its size is Banskobystrická pivara (types of beer: Urpiner, Kapral), in the ownership of entrepreneurs Lubomír Vančo and Branislav Čvík.

Remaining part of the beer market is made up of 30 small domestic breweries.

Against multinational breweries and their presence in the Republic of Slovakia, demonstrates the Association of small independent breweries of Slovakia, which founded “Pivobrání” initiative in order to advocate their beer and breweries which are not in the ownership of the large multinational companies.

Heineken Slovakia

Heineken Slovakia is a part of global group Heineken International, which operates in more than 70 countries and employs more than 70,000 people. This group is one of the largest breweries in the world (currently, third according to the size) and within Europe. Heineken Company has the most famous world brands of beer, such as: Heineken and Amstel, and also takes over production and sales of local and international brands with more than 200 brand names (214 million hectoliters produced by 140 different breweries worldwide). (Heineken Slovensko, 2017).

At the end of 1995, Heineken Company invested more than 200 million EUR in the Republic of Slovakia in the development and modernization of equipment and process of production. Heineken Slovakia is currently a leader on the beer market with beer brand called Zlatý Bazant, which is in their portfolio since 1996. Heineken Slovakia possesses three companies (with 750 employees) for production, distribution and sale of beer in Slovakia. Heineken Slovakia is in the 100% ownership of international beer group Heineken International which started operations and business on territory of Republic of Slovakia in 1998.

Revolution of small breweries

Republic of Slovakia experiences real revolution in the area of small breweries. Until 2009, the number of small breweries was relatively low and amounted to about 10, nowadays the

number of small breweries has increased to 70 with the possibility of further growing to 80 breweries on this territory until the end of 2017. Each year in Slovakia at least between 8 and 10 new small breweries is opened. Problems which small breweries face are usually of bureaucratic nature, such as administrative issues of obtaining certificates which can last even several months. In Slovakia, there is a modest fall in beer consumption inherent to the large breweries, but interest in small family craft breweries records continuous increase. Small independent breweries differ by type and the way of beer production. A lot of people are already tired from classic beer with same flavors so it is the reason for increasing demand and popularity of small breweries in Slovakia. Beside this, small breweries offer its consumers suitability during beer consummation such as: family atmosphere, tradition and new experiences related to beer and environment in which the beer is consumed. This is something what large beer industries cannot afford and offer to their consumers. Visitors of small breweries also can take insights into production, materials and whole production process, while some breweries offer some bonuses such as beer cosmetics or weekend packages to visit medicinal spa centers.

Conclusions

There are various kinds of beer and a wide palette of their flavors. The development of beer industry and its contribution to the economy development is very important. Multinational companies achieve huge profits but also small producers nowadays have a great chance to obtain consumers and improve its business in order to be in line with competition and large companies. The saturation of the market and similar taste of beer made by large companies are the advantage of small craft breweries, because their production and product finds the path to their customers. Raw materials and the production process are also very important, because they define the quality of beer, which is crucial for the competitiveness in terms of quality and price formation in relation to large companies as a prerequisite for profit achievement. In that sense, government should support and improve the development of those small entrepreneurs and to strengthen this economic area, due to the fact that new working places which are opened here could contribute to the general progress. Germans, which are leaders in the beer industry, can create a good example of how to use this field to help their economic development and to contribute and support of their economic sector.

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PIVO I INDUSTRIJA PIVA U REPUBLICI SLOVAČKOJ

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Sažetak

Tradicija pivarske industrije u Republici Slovačkoj datira iz 19 veka, kada se i pojavljuje prva proizvodnja piva. Slovaci su veliki ljubitelji piva, što je primetno velikom konzumacijom istog ali i povećanjem broja pivara. Proizvodnja piva je veoma značajna za razvoj privrede u Republici Slovačkoj, jer time privlači strane direktne investicije, otvara nova radna mesta, modernizuje sam proces proizvodnje, uvode se nove mašine i oprema, modernizuju se preduzeća, podstiče se primena novih tehnologija, itd. Na teritoriji Republike Slovačke otvaraju svoje sedišta i fabrike i najveće multinacionalne korporacije iz pivarske industrije kao što je Heineken International, pivara Topvar, kao i Steiner ali i mnoge druge svetski poznate pivare. Velike promene Republika Slovačka beleži otvaranjem malih nezavisnih pivara. Cilj ovog rada je da prikaže na veliki značaj i uticaj koji ima pivarska industrija na ekonomiju Republike Slovačke, kao i da prikaže pozitivne uticaje na samu privredu ali i nedostatke koji se pojavljuju u ovoj oblasti.

Ključne reči: *Pivo, pivarska industrija, investicije, tržište.*

JEL: *L66, M21, Q00*

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POSSIBILITIES OF RURAL TOURISM DEVELOPMENT IN THE AREA OF THE MUNICIPALITY OF TRSTENIK

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Summary

Favourable geographical position of municipality of Trstenik, which is located in a fertile valley of the West Morava river, would enable the local people to deal with rural tourism which lacks attention despite potentially positive effects which would be created due to its development. The primary aim of this research paper was the insight into the potentials of the municipality, which would contribute to a rural tourism development. The research was performed during the period from July 20 to September 2 of 2017 on a sample of 138 respondents. For the research purposes the following methods were available: quantitative approach by questioning public opinion via questionnaires close-ended and anonymous type, method of analysis, method of sample, as well as method of description. The results of the research showed the following: the territory of this municipality possesses potential for rural tourism development despite deficiency of accomodation facilities and insufficient motivation of the local people to deal with tourism, whereas social networks could contribute to its promotion and development. The limit of the research paper is reflected in a small extent of the target group of respondents, which leaves the possibility for widening of research outside the boundaries of the territory of this municipality.

Key words: rural tourism, Trstenik, potentials, promotion, social networks

JEL: Z32

Introduction

Since the moment when its first forms appeared till today, tourism has passed through many stages of its development. The necessity of the emergence of various forms of tourism, with the aim to satisfy all affinities of different segments of tourist demands, indicates its importance which has increased during the time. Rural tourism has distinguished itself as the specific form of tourism. In the 19th century people noticed rural areas as those which possess valuable elements to attract tourist attention. That's

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the reason why the special attention was paid to the rural tourism development in rural areas of the European countries during the 1970s. Then it became some kind of organized economic activity, in which many countries saw the solution to some important problems such as: migration of young people to urban areas, deficiency of various activities and underdevelopment of rural areas (Milenković, Utvić, 2013).

Therefore, tourism starts to be considered as a way to enhance and renew the rural areas, that is the rural community. The focus is gradually shifting from rural area as an area in which people are exclusively dealing with agricultural production to the insight into additional possibilities that this area gives. According to Cavaye (2001), when we talk about rural community development, we think on its entire development, not only from the aspect of economic progress. Through many different activities which tourism brings in the rural area, the vitality of the community which exists in the rural area can be achieved. Authors such as Čikić, Jovanović (2015) are adducing that for rural tourism development a rural area itself is insufficient. That area must have sufficient quality resources for tourism activity realization. The territory of the municipality of Trstenik, from the aspect of natural and anthropogenic potentials, leaves the possibility of rural tourism development. The idea of rural tourism in the territory of this municipality comes from its ability to alleviate the problems almost all rural areas (among others also those in this part of Serbia) are faced with and to lead to rural development. However, the question is: Would rural tourism contribute to rural development in the territory of this municipality? The answer depends on degree of motivation of local community to deal with this activity, on its ability to use available resources in the right way for the necessities of tourism and to create attractive tourist offer.

The aim of this research paper is to determine if the territory of the municipality of Trstenik has the potentials for rural tourism development, which, besides agriculture activity as the dominant in rural areas of this municipality, would contribute to the improvement of current state from the aspect of living standard of local population. Development of tourism activity in rural areas of this municipality would mean the employment of new workers with the aim of satisfying potential tourists' needs, as well as the incentive for young people to direct their knowledge and creativity towards this process through their staying in the countryside. Through the insight into the current state in rural areas, rural tourism and limiting factors for its development in this part of Serbia, as well as the role of social networks in its promotion, the possibilities for development of this type of tourism will be thus considered.

Review of literature

Many authors have dealt with the topic of rural tourism from different aspects. According to tendencies of 'Tourism Development Strategy of the Republic of Serbia for the Period from 2016 to 2025' ('Official Gazette of RS', 2016), the document whose author is the Government of the Republic of Serbia, rural tourism in Serbia could become an activity people from the rural areas will deal with, which points to the fact that it holds the sixth place on the list of most demanded tourism products. This

encouraged the author of this research paper to deal with the topic of rural tourism by adducing those authors who are greatly dealing with the same topic.

Cavaye (2001) is talking primarily about empowerment of local community which should provide development of rural area and then also a realization of rural tourism. It is about an empowerment of community through ongoing economic, social and environmental progress. The concept of empowerment of local communities in the territory of the municipality of Trstenik for this municipality would mean the possibility for realization of rural tourism as an activity which is, according to Čikić, Jovanović (2015), more than ordinary spending time in rural area for tourists and more than getting money for local people who deal with it.

Maksin (2012) highlights the space as initial resource which gives an opportunity to a certain rural area to realize rural tourism. With respect to this, from the aspect of theoretical determination of rural area in Serbia and percentages which are recorded in the context of territory and the population of the inhabitants, Cvijanović, Ružić (2017) have dealt with this topic. The area itself doesn't give the possibility for development of this type of activity if some preconditions are not fulfilled. Todorović, Štetić (2009) give the review of activities that should be available to potential tourists in the certain destination of rural area in order to meaningfully fulfill the time during their stay. With the concept of sustainable development, with the help of which conservation of natural and anthropogenic resources can be achieved, were dealing Maksin, Pucar, Korać, Milijić (2009), and that attractiveness of these resources is important precondition and motivation for destination choice is also confirmed by Vojnović, Cvijanović, Stefanović (2012). Rosić, Popesku (1999) are talking about possibilities for rural tourism development from the aspect of provision of transport infrastructure, funds and necessity of services' standardization and categorization.

The authors such as Đorđević-Milošević, Milovanović (2012) have dealt with the specific problems that rural areas in Serbia are faced with, pointing out that agriculture development should not be equated with development of rural areas and rural tourism, as well as Đukić, Glavaš-Trbić, Banjac (2017) by focusing their attention on the problems of depopulation and senilization on Fruška gora.

In tourism, as well as in other activities, it is necessary to create such an offer which will surpass competitors' offer and to be presented in the best possible way. According to Cvijanović, Mihailović, Vukotić (2016), both an offer and a marketing should be created as authentic as possible. It is considered that the internet and social networks would significantly contribute to this field. The researches which have been carried out by Stojković (2013), but also by foreign authors such as Saravanakumar, SuganthaLakshmi (2012), Stelzner (2016), as well as Okazaki, Andreu, Campo (2016) confirm this fact.

Methodological framework

During the research process the author used those scientific research methods which would respond to object and aim of this research paper and bring relevant data: method

of questioning public opinion for gathering informations, method of analysis applied for observation and separation of essential characteristics, method of sample for identifying target groups which will participate in a research, as well as methods from the domain of descriptive statistics for graphic view and description of collected data.

The process of gathering informations has been achieved through two questionnaires which are characterized as close-ended and anonymous type which is quantitative approach to research. The author of this research paper chose that type of questioning public opinion in order to get responses as objective as possible. Adults from the territory of the municipality of Trstenik took part in the research process, which belongs to the domain of sampling method. The first questionnaire, which was structured so as to explore the state and the perspectives of rural tourism development on the territory of the municipality of Trstenik, included 22 questions and 87 respondents. The set of the first ten questions, which belong to this questionnaire, was created so that gives basic demographic information about respondents (gender, age, educational structure, place of living from the aspect of rural and urban areas, frequency of visiting rural areas by respondents who live in urban area, time spent in the countryside during the visit, as well as reasons for visiting countryside). The following three questions pertain to the familiarity of respondents with the situation of rural areas on the territory of this municipality. The remaining questions (nine questions) explore the attitudes about possibilities for current and future rural tourism development. The other questionnaire, created to explore the extent of social networking sites usage, as well as the impact of social networks on rural tourism promotion, included 17 questions and 51 respondents. The necessity of creating other questionnaire arose as result of literature analysis, which was used during the research process for this research paper and which indicated clearly that social networks contribute significantly in a domain of certain product promotion, in this case tourism product promotion and therefore leads to the increase in number of potentially interested clients. Whereas the aim of this research paper is focused on insight into the possibilities for rural tourism development on the territory of the municipality of Trstenik, the research included also potential impact of social networks which would contribute to its development. This questionnaire gives first of all basic demographic information about respondents, then attitudes about Internet usage and finally attitudes about social networks usage and their importance in the field of tourism. Collected data were analyzed, as well as presented in a form of tables and graphs. The research was performed during the period from July 20 to September 2 of 2017.

Rural tourism and preconditions for its development

Initial resource, as an important precondition for rural tourism development, is the surrounding area. According to Maksin (2012), it is about a complex system. What does that complexity reflect on? It reflects on the existence of numerous subsystems, which compose the area and which are characterized by relation of interconnection and conditionality: natural, economic, social, technical, infrastructural and political. With the same approach to the surroundings many authors such as Ambrosio-Albalá,

Bastiaensen (2010) were also dealing by adducing the following: 'In a wider sense, a rural territory can be conceived as a social-ecological system shaped by both social and ecological subsystems in interaction'. In the context of rural tourism, we talk about the rural area as the specific space for development of this type of tourism. The theoretical determination of rural area has been given by many of the authors and, among others, by the Organization for Economic Co-operation and Development (OECD). All of them have agreed in one thing: rural area is the area with a population density below 150 people per square kilometer. This theoretical description of rural area has been complemented with its participation percentage in total area of the certain territory, which is 85%, as well as participation percentage of rural population of 55,5%. The participation percentage of territorial rurality in Serbia is a bit less, it amounts to 70% and on the total area there is 43% of total population (Cvijanović, Ružić, 2017).

The necessity for rural tourism appeared as the result of man's confrontation with the features of the modern period. Rural tourism is considered to be as a specific type of tourism, which comprises 'all activities in rural area and which is characterized by quite environment, preserved natural environment, absence of noise, communication with householders, domestic food and getting acquainted with rural jobs' (Štetić, Šimičević, Ćurčić, 2013). What attracts tourists to spend and direct their leisure time towards the nature and the way of living which differs significantly from the everyday lifestyle? The answers should be sought in man's desire to improve the quality of his life by getting in touch with a healthy environment and acquiring healthy lifestyle habits. When we talk about these habits, we mean resting and recreation in a healthy environment which is presented by various activities: tours (walking, mountaineering, horse riding, ecotours), water activities (swimming, fishing, diving, rafting), aerial activities (paragliding, flying with balloon), sport activities (golf, tennis, skiing), cultural activities (archeology, folklore and gastronomy courses) and many other (Todorović, Štetić, 2009). Tsai (2016) is adding one more element which completes the certain tourist destination experience. It is about local food which is offered to tourists within the entire tourist offer. He considers that this element provides an unforgettable experience to tourists because it implies an involvement of many senses in its consummation. Furthermore, he is adding that this element is recognized as very important because in its promotion many travelling TV programmes, magazines, books are participating increasingly, as well as social networks where tourists exchange their experiences.

However, in order for this kind of tourism to be fully realized and developed in certain area, it is necessary for rural tourism to fulfill the appropriate preconditions. The first one on the list of preconditions is a concept of sustainable tourism development. The devotion to this concept was started in 1987 by the World Commission of the United Nations on Environment and Development with the publishing of the document 'Our Common Future'. Sustainable tourism development implies activities which are directed towards a provision of life and environmental quality, raising awareness of available resource usage, as well as awareness of equal territorial development. The fulfilment of these factors would contribute a conservation of natural and anthropogenic resources from the aspect of

three criteria: economic, social and environmental (Maksin, Pucar, Korać, Milijić, 2009). The rural tourism development also depends on the resources which exist in a certain destination and whose attractiveness would contribute to the development. The resources are divided into the natural (climate, hydrographic potential, relief, flora and fauna) and the anthropogenic (cultural and historical elements). All of these resources affect the potential tourists' perception of travel destination quality, the state which as result has creation of its long-term image (Vojnović, Cvijanović, Stefanović, 2012). Rosić and Popesku (1999) have also added transport infrastructure development, provision of funds, as well as services' standardization and categorization to this list of preconditions. All of the above-mentioned preconditions, however, are insufficient for the realization of rural tourism if local people are not motivated to deal with this type of tourism activity. This has been also confirmed by Markov (2006), who has adduced the motivation as the leading factor. He adds that the absence of this precondition often turns into a limiting factor of rural tourism development. Finally, Valrabenštajn (2007) is talking about the tourist product image and brand, which affect its quality and tourist product increase. Furthermore, he adds that by branding, as the kind of tool in the field of marketing and management, the authenticity of a product can be achieved, which plays an important role in its image-building.

Rural tourism in Serbia and limiting factors of its development

In the context of rural tourism and within the European borders, Serbia could significantly contribute to its development. It is considered that rural areas possess diversity of natural and anthropogenic potentials and agriculture is seen as the leading activity that people deal with. However, the problem arises in the moment when people equalize agricultural development with development of rural areas. Agriculture development doesn't signify necessarily development of rural areas, as indicated by high unemployment rate and migration of young population to towns (Đorđević-Milošević, Milovanović, 2012). Đukić, Glavaš-Trbić and Banjac (2017), using the example of Fruška gora as the area which settlements are mainly rural, adduce limiting factors for rural tourism development. Although the area of Fruška gora is protected and as such suitable for development of agriculture production, it is faced with problems of depopulation and senilization. As the solutions for rural tourism development, these authors adduce that, except for agriculture, provision of appropriate rural infrastructure should be also included, as well as development of other activities which would become the source of income for local people. According to 'Tourism Development Strategy of the Republic of Serbia for the Period from 2016 to 2025', which has been adopted by the Government of the Republic of Serbia in November 2016, the rural tourism took 6th place on the list of most demanded tourism products in Serbia ('Official Gazette of RS', 2016). In this document certain tendencies have also been adduced which are expected to be fully realized over the foreseen period in rural tourism domain: vacation which implies getting in touch with village spirit, glamping tourism, visiting cultural and historical landmarks, trips with the gastronomic offer.

According to the above-mentioned document of the Government of the Republic of Serbia, rural areas in Serbia, among others, also those who belong to the territory of

the municipality of Trstenik, are faced with problems which are seen as limiting factors for (rural) tourism development. Here are some of these problems: local people are not motivated to deal with rural tourism, young population is moving to towns, transport infrastructure is underdeveloped, the standard of living is low and the territory of the municipality doesn't have sufficiently accommodation facilities for the necessities of rural tourism. Insight into the potential effects from rural tourism development is a step towards its realization. According to Njegovan (2016), in the context of rural tourism we can talk about its positive and negative effects. Positive effects, seen as a whole, are reflected by an increase of living standards in rural areas: employee engagement, reducing of the unemployment rate, raising awareness of environmental protection, revenue realization from the agriculture, but also the rural tourism related activities. However, if an appropriate strategy of rural tourism development has not been created at the beginning, negative effects gradually occur: intensive assimilation of local people with tourists could cause the loss of village authenticity, uncontrolled exploitation of natural resources causes biodiversity disruption, whereas rapid increase in the number of tourists could result in an inability of local people to respond to tourists' needs. Therefore, something that would enable the municipality of Trstenik to develop rural tourism is the creation of an appropriate strategy, which implies: insight into all the potentials, creating of counseling centers for local people with the aim of their encouragement to categorize households for the necessities of tourism, facing the problem of underdeveloped transport infrastructure, designing educational programs, more intensive involvement of local authorities and tourism organization as the support to the local population, as well as tourist offer promotion by using diverse promotional material and social networks (Škorić, 2013). Beyond these elements, the strategy would involve also the investigation of potential tourists' needs and motives. McKercher (2016), who has dealt with a research from a domain of attractivenesses as a motive for taking a trip, stated that the attractiveness of the certain destination is closely related to the nature of tourists' needs. Thus, he considers that attractivenesses should be viewed from two aspects: as attractions, which include individual elements (monuments, buildings, natural phenomena) and as cultural heritage, which implies a set of cultural and historical elements. Therefore, an offer should be created by relying on these two aspects. Something that is not represented in our tourism industry and that, according to Sheenan, Vargas-Sanchez, Presenza, Abbate (2016), would lead to sustainable and competitive development of tourist destination is opening of Destination Management Organizations (DMOs). Under their jurisdiction are activities which include different sectors of tourism industry, among others also the coordination of relations between supply and demand.

Rural tourism and social networks

In order for tourists to recognize the potentials of some tourist offer and to satisfy their needs, it is necessary for the offer to be presented in the best possible way. Cvijanović, Mihailović and Vukotić (2016) are adducing the following fact: 'From the aspect of marketing, tourism is in the process of maturity which is characterized by the saturation with existing methods of meeting needs'. This means that something new

and authentic should be offered to tourists. However, except the offer, the authenticity should be also noticed in the way of its presenting. Changes that 'hit' tourism have also affected marketing, something that had been especially noticed in the second half of the 20th century, more precisely in the 1970s. Then the importance of service sector was perceived ; therefore, marketing has also included it. Its success has been reflected by its ability to outperform the service that competitor offers.

The changes have been caused by the globalization process, which, except the improvement of transport and means of transport, implies also the use of ICT (information and communication technologies), which gains a competitive advantage in the marketplace (Damnjanović, Petronić-Petrović, Tešić, Urošević, 2015). The special attention should be given to Internet and social networks. With Stojković (2013) we come across the information according to which the Internet usage for the purposes of tourism has been noticed in 80% of cases considered at a global level. A large part of that refers to social networks. The reason for this lies in the possibilities which social networks give to their users if they decide to present their offer through social networks: fast identifying of target group and directing attention to it, results of promotional activities are noticeable and their analysis can be carried out, whereas promotional activities include set of textual, visual and auditive elements. Saravanakumar and SuganthaLakshmi (2012) add that we can treat the Internet and social networks as achievements which, after Industrial Revolution, have a great importance for humanity. Their application can be seen in all the fields, whereas their potentials were recognized by big brands such as IBM (International Business Machines Corporation), Dell and Burger King. During the 2012 one fact was recorded according to which the percentage of companies which wanted to present their business activities to their consumers through social networks amounted to 39% and the tendencies in 2016 were indicating the percentage share of 47%. The conducted researches for the necessities of this research paper indicate that in the field of tourism the following social networks stand out: Facebook, Instagram, Pinterest and Trip Advisor. With this part of research have been proven statements of the certain foreign authors, more precisely statements of Stelzner (2016), whose research points out Facebook as the social network to which 55% of entrepreneurs showed confidence, whereas 86% of them got access to ads and commercials by using it. The authors such as Okazaki, Andreu, Campo (2016) were doing researches in a domain of social networks, concretely Facebook and Trip Advisor and pointed out an increase of their popularity. From 2011 to 2015 Trip Advisor marked a significant increase in revenues, as well as an increase in a number of users of Trip Advisor mobile application, while over 60% of Americans make a decision about accomodation selection by using this service.

Results and discussion

Before we deal with the presentation of results, we should indicate some facts about how the results are divided. The first part refers on the presentation of current situation in rural areas within the municipality of Trstenik, the second one presents the current

situation of rural tourism and the possibilities for its development in the future and the third one is dedicated to the analysis of social networks' influence in the field of rural tourism from the aspect of respondents' attitudes.

Analysis of the current state in rural areas of the municipality of Trstenik

In order to explore the state of rural tourism in area of this municipality, first of all we tried to perceive the situation in rural areas from the aspect of local people's attitudes. In *Table 1* are presented basic demographic data of respondents.

Table 1. Demographic data of respondents (gender, age, place of living)

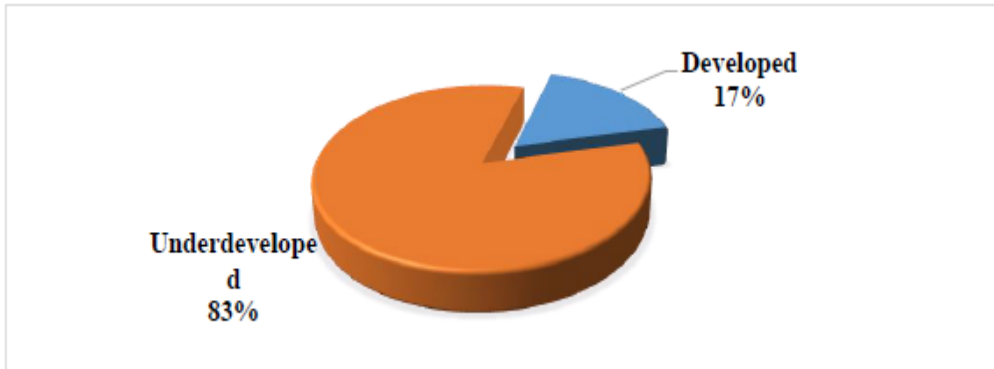
Gender of respondents	
Male: 49%	Female: 51%
Age structure of respondents	
18-21	9,2%
21-30	44,8%
31-40	18,4%
41-50	9,2%
51-60	14,9%
over 60	3,9%
Place of respondents' living	
Rural area	53%
Urban area	47%

Source: Results based on author's collected data

From 47% of respondents who live in urban area, 78% of them visit countryside. The main motive of their visit is not tourist visit to the countryside, but primarily visiting friends and relatives, as well as spending leisure time in their own house or cottage. When we talk about frequency of these departures, most of respondents go once a month (36,6%), while 80,5% on that occasion stay no more than five days.

It was very important to investigate to what extent the respondents are familiar with the status of village, i.e. with the state of rural areas, as well as to investigate if and in what aspect they consider the rural areas to be developed or underdeveloped. Answers which were given by respondents show the following facts: 31% of respondents are completely informed about state of rural areas, 57,5% of them are informed partially, and for 10,3% of them this topic is not attractive. From the aspect of development or underdevelopment, a large percentage of respondents consider these areas as underdeveloped, whereby they adduce a low living standard as the main reason, whereas a group of respondents with an opposite opinion observes development through available potential of rural areas so that people could deal also with those activities which are not agricultural (*Graph 1*).

Graph 1. Respondents' attitudes from the aspect of development of rural areas of Trstenik

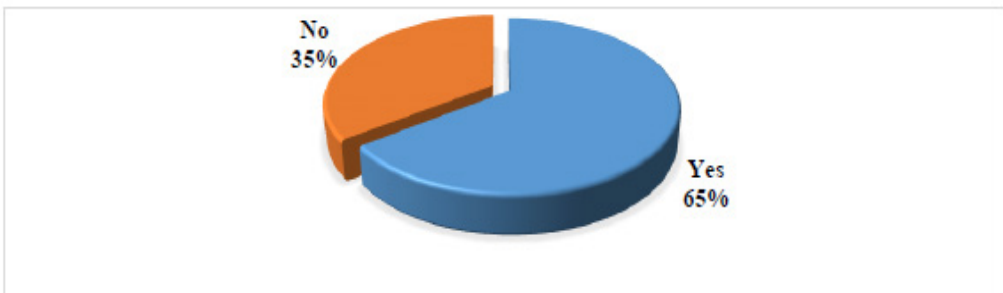


Source: Results based on author's collected data

Analysis of possibilities for rural tourism development in the area of the municipality of Trstenik

This analysis requires a complex approach to the topic because it implies a few elements which should be explored. What are those elements? First of all, it concerns attitudes of respondents about possibilities for the current rural tourism development (*Graph 2*), as well as about limiting factors for its development (*Table 2*). Results of the research about possibilities for the current rural tourism development indicate the positive attitude of respondents. In the total number of respondents, 65,5% consider that this activity could be developed currently. However, the group of respondents with an opposite opinion left open the possibility for the limiting factors of its development to be yet explored. The first on the list refers on insufficient involvement of local authorities in the process of rural tourism development. The other factors follow: the insufficient motivation of local people, lack of awareness about importance of rural tourism, deficiency of rural tourism households, lack of educational programs and bad transport infrastructure.

Graph 2. Could the rural tourism be developed currently in the area of the municipality of Trstenik?



Source: Results based on author's collected data

Table 2. Limiting factors for the current rural tourism development

Limiting factors	Percentage share of respondents
Insufficient involvement of local authorities	76,7%
Insufficient motivation of local people	73,3%
Lack of awareness about importance of rural tourism	70%
Deficiency of rural tourism households	56,7%
Lack of educational programs	50%
Bad transport infrastructure	46,7%
Deficiency of natural and anthropogenic potentials	6,7%
Geographical position of the municipality	3,3%

Source: Results based on author’s collected data

Note: Respondents had a possibility to give more answers on this question

We must not neglect above mentioned limiting factors in spite of positive attitude of most respondents from the aspect of current rural tourism development. On the contrary, we should observe these factors as the current state which should be improved with the aim of rural tourism development. We should also add to these limiting factors the fact that local people are not informed about existence of rural households for the necessities of rural tourism. In the total number of respondents, 61% of them are not informed about this topic (Table 3). The reason for their not being well informed lies in the lack of these rural tourism households’ promotion (Table 3).

Table 3. Views of informed respondents about existence of rural tourism households in the area of Trstenik and reasons why people are not informed about their existence

Are you informed about existence of rural tourism households in the area of Trstenik?		What is the reason of your not being informed about existence of these households?	
Yes	No	Indifference for rural tourism	Lack of households’ promotion
39%	61%	15%	85%

Source: Results based on author’s collected data

Table 4. Respondents’ attitudes about development of rural tourism and its specific types in the area of Trstenik in the future

Do you consider that rural tourism could be developed in this area in the future?		Do you consider that within rural tourism there could be developed specific types of tourism (sport and recreational, cultural, religious...)?	
Yes	No	Yes	No
89,7%	10,3%	97,7%	2,3%

Source: Results based on author’s collected data

Results of the research indicate positive attitudes of respondents about rural tourism development in the area of Trstenik in the future. This refers, first of all, on availability

of natural and anthropogenic potentials for tourism development, as well as favorable geographical position of the municipality (in *Table 2* we saw that small number of respondents adduced these elements as limiting factors). Furthermore, even 89,7% of respondents consider that this part of Serbia has a chance to develop the rural tourism in the future (*Table 4*). As a confirmation to this information follows a respondents' attitude according to which specific types of tourism such as sport and recreational, cultural, religious, hunting, gastronomic, wine, camping or nautical could be developed at the same time with rural tourism. This is very important for rural tourism development, especially if we bear in mind that tourists of modern age demand active vacation during their stay (Todorović, Štetić, 2009).

Analysis of social networks' impact in the field of (rural) tourism

This part includes the survey questions with a topic of social networks in the context of (rural) tourism. The usage of social networks is indeed present among the tourists, as shown by information according to which 96% of respondents are using social networks.

The research involved four social networks: Facebook, Instagram, Pinterest and Trip Advisor. According to extent of usage, the Facebook took the first place, Instagram the second, whereas Pinterest and Trip Advisor share the third place (*Table 5*).

More than half of respondents (58,8%) consider that social networks help partially to their users when receiving the information on the tourism topic is concerned. This result gave us an opportunity to investigate to what extent the respondents are using social networks as means of getting the information (*Graph 3*). The majority are periodically using social networks for informing in the field of tourism. In order to find out what is attitude of respondents towards impact and importance of social networks in the field of tourism and its promotion, we made two questions: 1) Could the above mentioned social networks have a positive impact on a promotion and an affirmation of rural tourism? (*Table 6*), 2) If you decided to deal with tourism, would you present your offer through social networks? (*Table 6*).

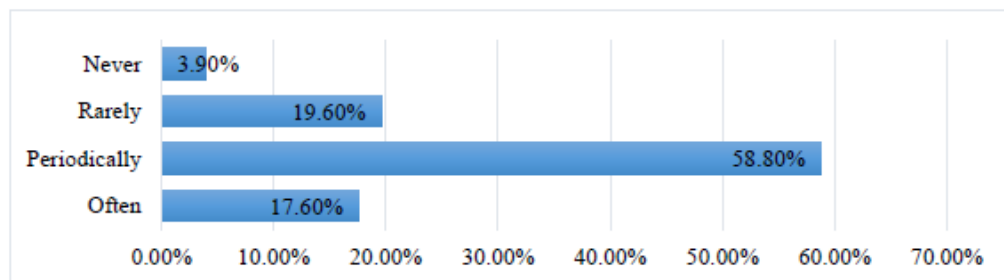
Table 5. Extent of social networks' usage among respondents

Social networks	Which of the above mentioned social networks are you using?	If you are visiting more than one social network, which of them in the greatest extent?
Facebook	94,1% of respondents	78,4% of respondents
Instagram	52,9% of respondents	13,7% of respondents
Pinterest	17,6% of respondents	0% of respondents
Trip Advisor	17,6% of respondents	0% of respondents

Source: Results based on author's collected data

Note: Respondents had a possibility to give more answers on this question

Graph 3. Frequency of social networks’ usage as an information source in the tourism field



Source: Results based on author’s collected data

Table 6. Impact of social networks on a rural tourism promotion and respondents’ attitudes about social networks’ usage for presenting own tourist offer

Could the above mentioned social networks have a positive impact on a promotion and an affirmation of rural tourism in the municipality of Trstenik?		If you decided to deal with tourism, would you present your offer through social networks?	
Yes	No	Yes	No
94,1%	5,9%	94,1%	5,9%

Source: Results based on author’s collected data

Table 7. Impact of social networks on a rural tourism promotion (respondents’ attitudes per age groups)

Could the above mentioned social networks have a positive impact on a promotion and an affirmation of rural tourism in the municipality of Trstenik?	Age structure of respondents						Total number of respondents
	18-21	21-30	31-40	41-50	51-60	over 60	
Yes	9	12	13	9	5	0	51
No	1	0	0	1	0	1	
Number of respondents per age groups (absolute values)	10	12	13	10	5	1	
Percentage share of respondents with an affirmative answer per age groups	17,65	23,53	25,49	17,65	9,80	0	

Source: Results based on author’s collected data

According to *Table 7* we can conclude that the group of respondents which belongs to an age structure from 31 to 40 years mostly considers that social networks would have a positive impact on a rural tourism promotion. Something we have expected and the results are not pointing to is a higher participation of respondents from an age group 41-50 years (in *Table 1* we can also notice relatively poor participation of this group of respondents). Why? We were guided by the thought that a vacation in rural area would be necessary to this group of people as a group with already formed families and active business engagement. Furthermore, we noticed that a percentage share of these respondents coincide with a percentage share of respondents from 18 to 21 years (*Tables 1* and *7*). These results leave us a possibility to investigate as follows: should we connect a poor participation of these groups of respondents with their indifference to this type of tourism or it is about other reasons, such as small sample on which a whole research is performed? In order to develop tourism itself, it is important to create an offer in the right way and in order to create an adequate offer, we should know which group of people it would be intended for.

Conclusion

This research paper has had the aim to perceive all possibilities for rural tourism development in the territory of the municipality of Trstenik. After processing of collected data we have come to the following conclusion: this part of Serbia has a possibility to develop the rural tourism although it is faced currently with a deficiency of accommodation facilities and depleted motivation of local people to be involved in the development process. Social networks, as one of the means for rural tourism promotion, would contribute significantly to that process.

If we want the rural areas of the municipality of Trstenik to find their place on a tourist map, it is necessary to create preconditions for tourism activity development. Tourism, like every other activity, implies first of all existence of human resources, which should utilize natural and anthropogenic potential in an adequate manner. However, the results of the research indicated the lack of motivation of local people and insufficient involvement of local authorities in a direction of rural tourism development (*Table 2*). The aim is to create a vision and an appropriate strategy which include primarily insight into the rural areas through total potential and limiting factors. Thereafter we should realize the potential effects which rural tourism development would bring and which provide an incentive to local people and local authorities to engage themselves in this activity. Development of this type of tourism would also start up the other specific types of tourism because a geographical position of the municipality and the potentials that it has enable that (*Tables 2* and *4*).

Directions of further research would also include the following questions: Which group of people would a tourist offer be created for? To what extent rural tourism development would lead to a reduction of unemployment rate and an improvement of a quality of life in the territory of the municipality of Trstenik? How much would that influence the reduction of unemployment rate observed at a state-level? Could rural tourism on the

territory of the municipality of Trstenik develop itself to the extent to become a model for achieving same results in other places of Serbia? In order to get the answers to these questions, we should broaden the research outside the boundaries of this municipality because an extent of this target group is insufficiently large for a full insight into the topic.

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MOGUĆNOSTI RAZVOJA RURALNOG TURIZMA NA PODRUČJU OPŠTINE TRSTENIK

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Sažetak

Povoljan geografski položaj opštine Trstenik, koja je smeštena u plodnoj dolini Zapadne Morave, omogućio bi lokalnom stanovništvu da se bavi ruralnim turizmom, kome je posvećeno nedovoljno pažnje uprkos potencijalnim pozitivnim efektima koje bi njegov razvoj doneo. Primarni cilj ovog istraživačkog rada bio je sagledavanje potencijala opštine, koji bi doprineli razvoju ruralnog turizma. Istraživanje je sprovedeno u periodu od 20. jula do 2. septembra 2017. godine na uzorku od 138 ispitanika. Za potrebe istraživanja na raspolaganju su bile sledeće metode: kvantitativni pristup ispitivanja javnog mnjenja u vidu anketnih upitnika zatvorenog i anonimnog tipa, metod analize, metod uzorka, kao i metod deskripcije. Rezultati istraživanja su pokazali sledeće: teritorija ove opštine raspolaže potencijalom za razvoj ruralnog turizma uprkos nedostatku smeštajnih kapaciteta i nedovoljnoj motivisanosti lokalnog stanovništva za bavljenje turizmom, a društvene mreže bi mogle pružiti doprinos njegovoj promociji i razvoju. Ograničenje rada se ogleda u malom obimu ciljne grupe ispitanika, što ostavlja mogućnost za proširenje istraživanja van granica teritorije ove opštine.

Ključne reči: *ruralni turizam, Trstenik, potencijali, promocija, društvene mreže*

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PRO-POOR TOURISM FOR THE PURPOSE OF RURAL ENVIRONMENT DEVELOPMENT¹

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Summary

The subject of the research in this paper is the development of entrepreneurship based on Pro-poor tourism principles in rural destinations. The aim of the research is to project development models of entrepreneurship based on Pro-poor tourism in the rural environments in Serbia. General analytical-synthetic research method has been applied, in the span of bibliographic-speculative, to empirical approach. The poverty of rural population is a heated problem in many countries, Serbia included. Developing entrepreneurship in the field of tourism stands out as one of the most efficient ways to solve this problem. Focusing on the just allocation of material and immaterial goods in a local community area includes adopting the concept of tourism and entrepreneurship development based on Pro-poor tourism. This includes the development of micro type businesses, small and family companies, the development of tourism business through diversification of products and activities traditional for the households in rural areas, and including the development principle that focuses on the interests of the poorest members of the local community. For this reason, reliance of local resources with promoting local capacities and increasing the participation level of the local community in developmental activities is the key of success of Pro-poor strategies.

Key words: *Pro-poor tourism, rural development, rural destination, Serbia.*

JEL: *Q01, O18, Z32, I33*

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Introduction

The drop of the living standard and the growth of poverty in Serbia in the past two decades are, primarily, the consequences of a significant lowering of economic activity. The problem of poverty and social exclusion is made significantly more severe due to the impact of the global economic crisis. Considering that during the transition period a large number of workers were left unemployed on various bases in Serbia, as well as that the world economic crisis has additionally impacted the lack of employment possibilities of countryside population in non-agrarian activities and the cities, a growing number of countryside households started to use the available natural, housing, and agricultural resources to diversify their activities and to engage in tourism as an additional activity. The purpose of such activities was to decrease the poverty of countryside population (Ševarlić, Petrović, 2012). According to UNDP, 53.4% of agricultural population lives below the poverty line in Serbia, and 38.7% of the countryside population lives below absolute poverty line (Živkov, 2010).

The Republic of Serbia is primarily a rural country traditionally turned to agriculture and activities characteristic of rural areas. For this reason, it is perfectly justifiable that the Tourism Development Strategy of the Republic of Serbia accentuates rural tourism as one of the strategic directions of tourism development in Serbia. As a unit of various activities that tourists can engage in in rural space, rural tourism itself is a very wide term incorporating countryside tourism, agrio-tourism, craft tourism, ethno tourism, but also camps, various forms of tours, craftsmanship, cultural events, sports and recreation, hiking trails, and all forms of heritage. In other words, each tourist activity directly or indirectly connected with rural environment and space is a form of rural tourism. However, rural environments in Serbia have been facing the process of depopulation and senilization for decades, meaning the decrease in the number of inhabitants and increase of the average age of the population.

Low living standard in rural environments compared with urban environments is the basic reason of village abandonment. One of the possible ways to revitalize villages is to develop rural environments by developing entrepreneurship in the field of tourism. Being that rural environments are most often those with a low living standard and a low degree of economic development, it is necessary to focus on the population categories in greater risk of poverty. Tourism development is precisely based on Pro-poor tourism (PPT) development as a form of tourism that directs the net-profits towards the poor population, which should ensure maximum profit precisely for the most jeopardized population segments of local rural communities. Tourism development should be led by entrepreneurship development in the field of tourism and complementary areas with a primary reliance on the local resources. Entrepreneurship in the field of tourism in accordance with Pro-poor principles should strive towards higher work intellectualization based on permanent innovation, diversification of the rural economy in the direction of sustainable agriculture, but also various non-agricultural activities characteristic of the rural environments, as well as on the basis of social, cultural, ecological, and other functions of rural communities.

Creating a development model based on Pro-poor tourism principles includes the analysis of previous scientific research studies in the relevant fields that relate to the development of entrepreneurship in rural environment for the purpose of decreasing poverty of the local population. This also includes the analysis of various case studies dealing with the creation and implementation of entrepreneurial development models, or identifying entrepreneurial development factors in comparable local communities that can serve as a model for further development of rural communities in the territory of the Republic of Serbia.

Rural environments

There is no unified definition of ruralness. Defining ruralness is a a complex task and is most often seen from three different viewpoints. The first viewpoint is the population density and settlement size, the second is the purpose of the land, meaning the domination of agriculture and forestry, and the third is the traditional social structure, community identity and heritage (OECD, 1994). OECD defines rural areas as those with a population density of up to 150 inhabitants per square kilometer. According to the European Council, the term rural area describes a strip of land in the interior or on the coast, which includes smaller cities and villages, where the main part of the territory is used for economic and cultural activities of the population of that rural area (craftsmanship, industry, services), then non-urban recreation and free activities, as well as for other purposes – for example, habitation (European Parliamentary Research Service, 2012). Rural areas in Serbia are defined as a space, the main physical and geographic characteristic of which is the use of land for the production of agricultural and forestry products (Svetozarević, 2012).

The role of rural areas can be seen as needed for ensuring the existence for the part of the population which cannot be included in the official economy, then as the basis for ensuring agricultural products for the total population, as well as a territory with a wide array of ecological and bio-energetic resources (Delić,2012). Due to the importance of rural areas, active support for the development and preservation of these areas is the primary goal of the national government and international organizations. Rural development policies must primarily have the task to create a plan of rural development on a national level, combined with the support given from the local level as well, meaning that the support must be decentralized (Fotiadis, 2012).

The term rural space includes natural areas, rural environment, small settlements and villages, isolated farms with agriculture and forestry as the main economic sectors (Demonja, Baćac, 2012). Local rural resources are the foundation of rural tourism product. They are a potential for tourism that can be turned into rural touristic attractions and can be thematically profiled into an extremely diverse tourism product of rural space. Lane points out rural resources as the most significant element of rural tourism system (Lane, 1999). Some authors identify rural resources as “rural capital” (Garrod et al., 2006). Local management in local rural environments can encourage and focus local development and “create, strengthen or stabilize activities by using resources of an area in the best way possible”, as Gref points out (1994).

According to OECD criteria, rural areas in Serbia make up 85% of the total territory with almost 55% of the total population (Milić, 2011). Rural space in Serbia is one of the most socially and naturally diverse in Europe, which is why managing its development is very complex. Due to turbulent history, but also oversights in rural development policy support, it is greatly economically and socially destroyed and depressed (Đorđević Milošević, Milovanović, 2012). The basic obstacles to the development of rural areas in the territory of Serbia are the predominance of natural and semi-natural agriculture, high unemployment rate, covert unemployment and weak workforce movability, while the competitive advantages are the low price of the workforce and high-quality natural resources.

Rural tourism

Rural tourism is most frequently organized as a family business in a local community. That is the source of its strength necessary to initiate self-employment in rural areas, as this is a work intense activity. Sustainability of rural tourism is widely defined through: preservation of the local culture and the identity of the local community, villages and natural environment preservation, preservation and sustainable development of rural economy, pointing out the importance of local, regional and national authority support, but also through a balance between touristic activities in rural areas and other activities (Rikalović et al., 2012). Rural tourism can be seen as one of the reproductive mechanisms of rural economy and rural way of life (Čikić et al., 2015).

In defining the term rural tourism, some authors take as a starting point the dilemma whether the term should be rural tourism or tourism in rural areas, thus wondering whether tourism is something completely specific or whether tourism only takes place in a specific context when in rural space. Author Nina Noveli (2005) describes rural space as an important macro field, within which there are separate, specific macro niches (for example, family farms, festivals and events, craftsmanship and national artwork, gastronomic offer). Rural tourism is the most represented term including all forms of tourism in rural areas (Lane 1999; Garrod et al., 2006; Silva, Leal 2015).

Saksena et al, introduce the term “integrated rural tourism” - IRT as tourism explicitly tied to the economic, social, cultural, natural, and human structure of the location where it takes place (Saxena et al., 2007). In essence, it emphasizes the importance of territorial identity and the strategic commodification of resources and location, as well as the significance of non-local powers in initiating local activities (Petrou, et al., 2007). The goal of managing rural tourism is to encourage sustainable development of rural areas, by respecting their specificities, preservation and affirmation of authentic regional and cultural values, but also the quality of the natural environment (Škrbić et al., 2015). Rural tourism development does not only mean the development of tourism in one specific area, but further development of neighboring geographical areas as well, thus providing their tourist valorization (Petrović et al., 2017). In essence, rural tourism is based on the concept of sustainable development of local communities. The idea is to encourage rural communities to include new sources of income as additional rather than as replacement for the existing activities by developing tourism (McAreevei, McDonagh, 2010).

Even though there are numerous studies dealing with rural tourism, there is no universal definition of this term in scientific literature. An adequate definition of rural tourism was created by “Trav Info India”: “Any form of tourism that showcases the rural life, art, culture and heritage at rural locations, thereby benefiting the local community economically and socially, as well as enabling interaction between the tourists and the local community for a more enriching tourism experience can be termed as rural tourism” (www.travinfoindia.com). It is multi-functional and knowledge oriented, and is also based on the preservation of cultural heritage and tradition. It is characterized by highly personalized relations, strong individual activities and a high degree of tourist participation in the creation of the experience, as well as eco and etno framework. Successful rural tourism must be organized by local actors, as they are more familiar with the strengths and weaknesses of their destinations and are the most interested in nature preservation, preservation of cultural heritage and promotion of the wealth of their rural areas. Rural tourism is one of the alternative options of rural environment development and leads to the development of rural areas and a better territorial balance in the economic and social sense through activity diversification (Shtaltovna, 2007). It impacts economic revitalization, but also the preservation of local culture and resources, which means it has an influence on the increase of the trust of the local population (Andrić et al., 2010). Direct impact of rural tourism can be seen in product increase and ensuring secure placement of agricultural products, increased employment of the local population and the growth of their wages, increased birth rate, and indirect impact of tourism can be seen through the development of accompanying activities, such as traffic infrastructure and cultural development of the community (Đuričić, 2011).

Rural tourism in Serbia is developed in some parts of Vojvodina, Central and Western Serbia, but is still an insufficiently recognized tourism product on the national level. The basic problems slowing down the development of entrepreneurship in the field of rural tourism in Serbia are underdeveloped infrastructure, unfavorable age structure of the population, insufficient education level, lack of organization in the field of agricultural production, lack of organization in the market and lack of offices providing consulting services of various kinds. Underdeveloped brands of regional products (souvenirs), low accommodation capacities and their low quality level, bad tourism signalization, lack of management in tourism destinations, etc., should be added to this (European Economic and Social Committee, 2011).

Pro-poor tourism as a development principle

The concept of Pro-poor tourism is a relatively new one. It has been presented for the first time by the Department for International Development of the United Kingdom in 1999 (De Beer, 2011). Pro-poor tourism (PPT) is not a tourism product, nor a form of tourism, but it is a development principle that can and should be implemented in all development strategies and plans, the field of which is the development of tourism, related or complementary activities for the purpose

of decreasing poverty of the jeopardized local communities. PPT principle is implemented into development strategies and activities for the purpose of a more just division of net positive effects of tourism.

World Tourism Organization (UNWTO) recognizes tourism as an instrument for decreasing poverty, and has initiated a program Sustainable Tourism for Eliminating Poverty – STEP, in 2002. For the developing countries, tourism is a very important activity both in the material and in the non-material sense. The number of tourist arrivals in the most non-developed countries tripled during 1998-2008, with an average yearly growth of 13% (International Labor Organization, 2011). However, these data do not show a complete image of tourism impact, as they do not include the impact of domestic tourism on the total gross domestic product, nor the impact of tourism on the local economy, even though some remote rural regions make a living exclusively from domestic tourism (Deloitte & Touche, IIED, ODI, 1999).

Pro-poor tourism strategies have as their aim to create more opportunities for the poor in the tourism sector, and not to expand the total size of the sector. These strategies should be combined with the strategies of general tourism development (Bennett et al., 1999). As far as Pro-poor tourism is concerned, it can be said that it meets economic goals by ensuring permanent or temporary employment, develops entrepreneurial possibilities in the field of tourism, improves other existential conditions, such as market access, health protection, improving the participation possibilities of the poor in the decision making process (Jamieson et al., 2004). As long as the local poor population has net-benefits from tourism (creates more positive effects and income than negative effects and expenses), tourism can be classified as Pro-poor, even if the richer classes of population achieve bigger gain. Necessary cooperation between numerous interested parties on various levels is necessary for a successful development and implementation of Pro-poor tourism strategies, as well as the understanding of common and individual interests of all parties. Just as Pro-poor strategies must be complementary with the general developmental tourism strategies (higher level strategies), so Pro-poor tourism cannot succeed without a successful development of the entire tourism destination (Ashley et al., 2001).

Pro-poor tourism strategies are focused on three areas: *increasing the economic gain* - expanding business opportunities for the poor, increasing employment and ensuring common benefits; *positive non-economic impacts* - improving the quality of knowledge, skills, and abilities of the poor local population, mitigating negative impacts on the environment, and focusing the social and cultural impacts of tourism; and *policy and process reform* - creating strategies and plan frameworks that would further support the interests of the poor, promoting participation of the poor, and partnership of the private sector in Pro-poor tourism strategies (Ashley et al., 2001). Strategies concerning Pro-poor tourism differ from the regular tourism development strategies and must sensibly fit in with the other general strategies, which are the umbrella development documents. In the largest number of cases, tourism support is incorporated into wide strategic programs, such as the programs related to the conservation and protection,

entrepreneurship development or infrastructural projects (Deloitte & Touche, IIED, ODI, 1999). Pro-poor strategies strive to create a combination and optimization of three goals: more tourists, higher tourist spending, and a larger share of benefits that would actually reach the poor (Ashley, 2006).

As previously mentioned, as far as poverty is concerned, rural areas are the most jeopardized, and precisely for that reason, most Pro-poor strategies and activities are implemented in rural areas. Some authors list the advantages of agro-tourism in Pro-poor tourism as primary (Roe, Urquhart, 2001):

- Agro-tourism increases the possibility of a wider participation of the non-formal sector;
- Tourists reach the products on their own, meaning countryside households, and therefore, the poor population does not have travel expenses and distribution expenses;
- Agro-tourism is based on natural resources and local culture. These resources the poor *do* have, even if they do not have the financial means;
- Agro-tourism can be more work intense than production;
- Compared with other sectors, a larger part of the benefits is focused towards the female population.

Meyer (2007) sees the sector of accommodation services as leading in the field of Pro-poor tourism. He divides this sector into two wholes based on the activities – key and secondary. The key activities create formal employment through basic and complementary tourism activities. Secondary activities include extracting activities such as laundry washing, entertainment, etc. Within the tourism economy, the non-formal sector provides significant possibilities that could be used by even the poorest population and women to gain net-benefits (Deloitte & Touche, IIED, ODI, 1999). Strengthening of the non-formal sector increases the possibility of engagement in more occasional or temporary jobs, which leads to diversification of income sources, which in turn significantly decreases the risk of poverty in rural population. Apart from the accommodation services and agriculture, craftsmanship, art, construction, and many other types of services can be implemented into Pro-poor tourism strategies and can significantly contribute to better life quality of the poor rural population by increasing employment, increasing income, preserving the local tradition, culture, values, etc.

Methodology and data sources

The aim of this research is to discuss an approach that would improve the implementation of entrepreneurship within the framework of Pro-poor tourism in the rural communities in Serbia. The research employs analytic-synthetic, bibliographic-speculative and empirical methods. General analytical-synthetic research method is used in the paper, spanning from the bibliographic-speculative to empirical approach, with the application of document content analysis technique. Case studies, scientific papers, implemented projects, and reports and recommendations of international organizations have been used

as data sources necessary for the analysis. Research results indicate possible guidelines and models for further development of entrepreneurship in tourism in rural communities.

Case studies

European Centre for Eco Agro Tourism – ECEAT CZ

The experiences of the Czech Republic (Holland et al., 2003) can be very significant for the application of Pro-poor tourism strategies in Serbia, due to the reason that the Czech Republic is also a former communist country that has faced problems related to transition and privatization. In the Czech Republic, as well as in Serbia, during the communist period, private property and entrepreneurship were not present in a bigger volume and all economic activities of the country took place through a central-plan system. As far as the development level of tourism in rural areas and resource basis for further touristic development are concerned, the Czech Republic, similarly to Serbia, was at the time at the very beginning of development, without any tourism products, and in possession of only pure, unpolluted environment in the observed areas, without any capital for further investments in entrepreneurship, as well as without any will or desire for partnership and joint activity.

The application of Pro-poor tourism in rural areas of the Czech Republic occurred in various phases. The carrier of this program was a non-profit non-government organization ECEAT CZ (European Center for Eco Agro Tourism). The first phase took place in the period of 1995 to 1998. The goal of this phase was to build infrastructure capacities, to perfect the knowledge and the skills in the field of tourism business, and to create a tourism product. The first step included the analysis of the needs, strengths and weaknesses of all identified interest parties from the government, private and non-government sector from the territory of the observed five regions, as well as to build institutional capacities. Using seminars, training and education, they tried to raise awareness of the common goals and interests which arise with developing rural tourism. They also worked on strengthening mutual cooperation for the purpose of a successful implementation of the long term development strategy. Developing skills and knowledge necessary to be included in the tourism offer was the next step, where the training focused on the local inhabitants of the observed municipalities. Through education, seminars and printed material, they tried to develop awareness of the importance of tourism development for the local communities and individuals, then to raise the participation level of the local population in decision making, and they worked on standardization and quality of tourism products and services, as well as on preserving the environment in accordance with sustainability principle. The idea of developing capabilities was seen as a long-term network-type activity.

The second phase occurred in the period of 1998 to 2000, and it dealt with the development of tourism routes based on tradition and heritage. The process included four key steps:

- building partnerships,
- identifying tourism products of the route,

- training of the interested parties and strategy development, and
- route marketing.

The basic problem occurring in this period was inadequate political and financial support. Institutional frameworks were a problem due to political instability and frequent staff changes. Despite the problems, ECEAT CZ decided to continue with the activities, and in expanded volume. Apart from creating the tourism products, the primary goals, among others, were to fully utilize the resource capacities, as well as “alternative” vacations trend, include new municipalities in rural tourism, include additional or complementary elements of the tourism product, expand the offer and increase tourist spending in the observed areas. Further continuation of activities transcends national frameworks and it becomes included in the EU PHARE program activities, the goal of which is to regenerate the rural economies of Central, Eastern, and Southeastern Europe that used to be under the communist regime. The example of the Czech Republic depicts a well planned multi-phase approach to the creation and implementation of Pro-poor tourism strategies from all levels of activity for the purpose of rural development and decreasing poverty. The experiences of countries with similar resource and political frameworks are a valuable instrument and guide for the development and the application of Pro-poor tourism strategies in Serbia.

Artisanal handicrafts – case study from Nepal, Laos and Indonesia

The study “Tourism, the poor, and other stakeholders: Experience from Asia” (Overseas Development Institute – ODI, 2000, according to: Epler-Wood, 2002), states that the income from sales of handicrafts in Nepal participated with nearly 15% in the total tourism income in 1990. In a specific case, government authority and private tourism operators gave their support to the manufacturers of handicrafts in the Nepal region of Kullu, which developed an advanced production of souvenirs, with scarfs, hats, gloves, etc., which are now important export articles. On the other hand, numerous examples indicate that women from the local community, as well as in the Sa Pa area in Laos, create first class original artwork with decorative embroidery and similar, just for those to be sold for extremely low prices, in the same range as imitation products, in order to make money that their families depend on. In many cases, the local population has excellent products suitable for sale, but they lack marketing skills and partnership relations with tourism operators. In this situation, they are forced to sell those unique products as cheap imitations. According to the aforementioned study, this problem could be solved if the agencies would intervene with the promotion, for example, by organizing exhibitions that would create a more favorable position for all the handicraft manufacturers. In Irian Jaya in Indonesia, they organize yearly artwork exhibitions that would prevent this problem and create significant profit for the local artisans – carpenters.

The government and the local population on the same task – Sikkim area in India

Agro-tourism based on natural resources and local culture initiated the development of a small poor country – Sikkim, in India. This mountain area in the north of India is famous

for its inaccessible terrain, underdeveloped industry and lack of infrastructure. The problems that had limited the development of this area for centuries have been turned into advantages, by placing topographic diversity, pleasant climate, rich bio-diversity and cultural heritage as attraction factors for the tourists. The government is conducting a project of sustainable tourism based on ecological, economic and socio-cultural aspects of tourism development, with the intention to establish a suitable balance between these three dimensions in order to guarantee its long-term sustainability. The project was in accordance with the Government decision from the year 2003, according to which this area should completely turn to organic agricultural production and become an area with sustainable organic product, as was achieved. Tourism development generated both direct and indirect employment for the local population by developing countryside, eco, and agro tourism, with favoritism of the local population to use local resources and local work force in the highest possible measure for the purpose of generating as significant benefits as possible for the local population. Intense tourism promotion by the state lead to a fourteenfold increase in profit in the period the period of 25 years (Sattar, 2014). This is a good example how the government incentives aimed at using the available local products and active participation of the local population create multiple benefits from tourism, primarily for the poor rural community.

Implementation factors of Pro-poor tourism strategies – empirical experiences analysis

In “Global Entrepreneurship Monitor 2013” report, identifying the factors of entrepreneurial development as a whole has been done based on three groups of sources. The first source consists of the previous scientific research, the second source is examining the opinions and thoughts of national experts, while the third group of information is given by the population through questionnaires (Amorós, Bosma, 2013).

In previous research studies a wide range of factors have been identified impacting Pro-poor tourism project implementation. Content analysis is a practical technique used to identify those factors. This includes comparison of the existing knowledge regarding strategies and activities of Pro-poor tourism and the experiences from project management, tourism planning and previous research development (Tolkach et al., 2012).

Taking into consideration the extremely high number of scientific papers, case studies, reports, and recommendations dealing with the problem of principles and strategies of Pro-poor tourism, and for the purpose of reaching a systematic, wide ranging and relevant overview of influencing factors, a table overview has been created (Table 1) of the most relevant factors of entrepreneurship development in accordance with Pro-poor tourism principles in relation to each document included in this analysis (scientific papers, case studies, reports, and recommendations). Each of the analyzed documents is available to the public, and with the help of bibliographic data, original document can be accessed.

Considering the high number of documents created in various periods, by various authors, for various purposes and based on different methodologies, complete standardization of observation and analysis was not possible, but the authors strove towards achieving as high degree of equable exit information as possible for the purpose of further analytic-synthetic observation and elaboration, as well as to achieve comparison of the results gained. For this reason, all identified factors/groups have been observed in their neutral form (e.g. group of financial factors), even though in individual original documents they would be presented in the positive (induction) form (e.g. available subsidized loans) or in the negative (limiting) form (e.g. lack of favorable sources of finance).

Table 1. An overview of entrepreneurship development factors based on the documents analyzed

Document/Author	Finances	Education	Partnership and networking	Characteristics of entrepreneurs, internal surroundings	State policy, management and procedures	Market strategy, competitiveness	Local community	Material-resource basis, infrastructure
<i>Factors Contributing To The Success Or Failure Of Bumiputera Entrepreneurs</i> (Abdullah, Hamali, Rahman Deen, Saban, Zainoren Abg Abdurahman, 2008)	+	+	+	+	+	+	+	+
<i>Examining success factors: Entrepreneurial approaches in mountainous regions of Pakistan</i> (Saleem, Abideen, 2011)	+	+	+	+	+	+		+
<i>Barriers to Entrepreneurial Endeavors in a Developing Economy</i> (Bizri, Kojok, Dani, Mokahal, Bakri, 2012)	+		+	+	+		+	+
<i>Entrepreneurial environments and growth: evidence from Malaysia GEM data</i> (Ahmad, Xavier, 2012)	+		+		+		+	+
<i>Overcoming entrepreneurship development constraints: the case of Bangladesh</i> (Chowdhury, 2007)	+	+			+			+
<i>Methodology for Pro-poor Tourism Case Studies</i> (Ashley, 2002)	+	+	+		+	+	+	+
<i>Practical strategies for pro-poor tourism, Wilderness Safaris South Africa: Rocktail Bay and Ndumu Lodge</i> (Poultney, Spenceley, 2001)	+	+	+		+	+	+	+
<i>Small rural households in Serbia and rural non-agrarian economy</i> (Bogdanov, 2011)	+	+	+		+	+		
<i>Strategic management of rural tourism development – problems and guidelines</i> (Krajnović, Čičin-Sain, Predovan, 2011)		+	+		+	+	+	+

Document/Author	Finances	Education	Partnership and networking	Characteristics of entrepreneurs, internal surroundings	State policy, management and procedures	Market strategy, competitiveness	Local community	Material-resource basis, infrastructure
<i>The opinion of European economic and social committee regarding rural development and employment in the countries of Western Balkans (European Economic and Social Committee, 2011).</i>		+	+		+		+	+
<i>The study of sustainable tourism and poverty elimination, Report to the Sector for international development (Bennett, Roe, Ashley, 1999)</i>	+	+	+	+	+	+	+	+
<i>Pro-poor Tourism: A Vehicle for Development in Trinidad & Tobago (Lewis & Brown, 2007)</i>	+	+	+		+	+	+	+
<i>Diversifying the product and expanding the benefits in rural Uganda and the Czech Republic (Holland, Burian, Dixey, 2003)</i>	+	+	+		+	+	+	
<i>Entrepreneurship as an economic force in rural development (Sherief, 2008)</i>	+	+				+		+
<i>Pro-poor Tourism Development in Viengxay, Laos: Current State and Future Prospects (Suntikul, Bauer, Song, 2009)</i>	+	+		+	+		+	
<i>Pro-poor Tourism Strategies: Making Tourism Work For The Poor (Ashley, Roe, Goodwin, 2001)</i>	+	+	+		+	+		+
<i>Small Business Development and Poverty Allerviation in Alexandra South Africa (Agupusi, 2007)</i>	+	+	+		+			+
<i>Global Entrepreneurship Monitor 2013 Global Report Fifteen Years of Assessing Entrepreneurship Across the Globe (Amorós, Bosma, 2013)</i>	+		+	+	+	+	+	+
<i>How Can Governments Boost the Local Economic Impacts of Tourism? Options and Tools (Ashley, 2006)</i>	+	+	+		+	+		+
<i>Pro-poor Tourism: Putting Poverty at The Heart of the Tourism Agenda (Ashley, Boyd, Goodwin, 2000)</i>	+	+	+		+	+		+
<i>Rural tourism development: a viable formula for poverty alleviation in Bergville (Mthembu, Rural tourism development: a viable formula for poverty alleviation in Bergville, 2012)</i>	+	+	+			+	+	+
<i>Community Tourism Entrepreneurship for Sustainable Tourism Management in Southern Africa: Lessons from Zimbabwe (Chiutsi, Mudzengi, 2012)</i>	+	+	+			+		
<i>Pro-poor tourism as a means of Sustainable Development in the Uctubamba Valley, Northern Peru (Wood, 2005)</i>	+	+	+	+	+	+	+	+

Document/Author	Finances	Education	Partnership and networking	Characteristics of entrepreneurs, internal surroundings	State policy, management and procedures	Market strategy, competitiveness	Local community	Material-resource basis, infrastructure
<i>Contribution of Tourism to Poverty Alleviation Pro-poor Tourism and the Challenge of Measuring Impacts</i> (Jamieson, Goodwin, Edmunds, 2004)	+	+			+	+		+
<i>Limiting factors of the local economic development in the Republic of Serbia</i> (Maksimović, 2011)		+	+	+	+		+	+
The participation percentage of a group of factors in the documents analyzed	88%	88%	84%	32%	88%	72%	60%	84%

The analysis indicates that, in previous research regarding entrepreneurial factors in rural tourism, the most presented factors were those related to finance, education, as well as state policies and procedures. On the other hand, the least represented factors were those related to the local community, as well as the characteristics of entrepreneurs and internal surroundings.

This table overview provides the starting basis for further empirical research, for example, examining the level of significance of the defined entrepreneurial development factors in tourism in rural, local communities in Serbia by determining the opinions and stances of the interested parties. In this way, it is possible to define a wider list of individual factors with different impact on the development of rural entrepreneurship for each group of factors, which make up the specificity of each local environment. So, for example, within a group of factors related to finances it is possible to identify the following individual factors: non-refundable means used for initiating the entrepreneurial activity; selective financial benefits (decreased tax rate, etc.); subsidized loans by the state; local grant funds; means from donations and foreign funds for the development of specific entrepreneurial activities (youth employment, women employment, revitalization of old craftsmanship and similar) etc.

Conclusion

Focusing on the fair and just division of the material and immaterial benefits in the area of a local community means the adoption of tourism development and entrepreneurship based on Pro-poor tourism principles, where the focus is placed on achieving net-benefits for the poorest members of the community. For this reason, relying on local resources by improving local capacities and increasing the participation level of the local population in developmental strategies is the key to success of Pro-poor strategies.

The analysis of previous scientific and expert research studies, as well as practical experiences, indicate a certain level of factors that have a strong influence on the development of entrepreneurship in rural tourism based on Pro-poor principles. Eight factor groups have been identified with a large number of individual factors. It is of great importance to determine the significance level, or the influence and importance of individual factors in a specific rural environment.

During the analysis of the empirical application of various Pro-poor tourism strategies in the world (through materials available in the form of scientific papers, case studies, reports and recommendations), the problem of data and information systematization occurred due to various approaches to the research subject. Furthermore, the observation level in various studies was different (from macro level, to the regional level). By relying on the available theory, a framework concept of systematization of various factors according to the defined groups has been created.

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PRO-POOR TURIZAM U FUNKCIJI RAZVOJA RURALNIH SREDINA*Vaso Jegdić⁵, Iva Škrbić⁶, Srđan Milošević⁷***Sažetak**

Predmet istraživanja u ovom radu predstavlja razvoj preduzetništva po principima Pro-poor turizma u ruralnim destinacijama. Cilj istraživanja jeste projektovanje modela razvoja preduzetništva po principu Pro-poor turizma u ruralnim sredinama Srbije. Primenjen je opšti analitičko-sintetički metod istraživanja, u rasponu od bibliografsko-spekulativnog, do empirijskog pristupa. Siromaštvo ruralnog stanovništva predstavlja gorući problem mnogih zemalja, pa tako i Srbije. Razvijanje preduzetništva u oblasti turizma ističe se kao jedan od najefikasnijih načina za rešavanje ovog problema. Fokusranje na pravičnu raspodelu materijalnih i nematerijalnih koristi na području lokalne zajednice podrazumeva usvajanje koncepta razvoja turizma i preduzetništva po principima Pro-poor turizma. To obuhvata razvoj poslovanja u formi mikro, malih i porodičnih preduzeća, razvoj turističkog poslovanja kroz diverzifikaciju proizvoda i aktivnosti koje su tradicionalne za domaćinstva u ruralnim sredinama i uključivanje principa razvoja koji u fokus stavlja interese najsiromašnijih pripadnika lokalne zajednice. Zbog toga je oslanjanje na lokalne resurse uz unapređenje lokalnih kapaciteta i povećanje nivoa participacije lokalnog stanovništva u razvojnim aktivnostima ključ uspeha Pro-poor strategija.

Ključne reči: *Pro-poor turizam, ruralni razvoj, ruralna destinacija, Srbija.*

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ALTERNATIVES FOR EXITING THE LOSS ZONE FOR MEDIUM-SIZED AGRICULTURAL ENTERPRISES IN THE REPUBLIC OF SERBIA¹

Sonja Đuričin², Isidora Beraha³, Duško Bodroža⁴

Summary

The research objective is to identify causes and alternatives for exiting the loss zone for agricultural enterprises in Serbia. The subject of the research is financial performance of agricultural enterprises in 2010-2014. Economic and financial power of all medium-sized agricultural enterprises was determined by applying financial analysis. Based on the sample of least successful entities, the causes and alternatives for exiting the loss zone were identified. The results show that loss appears due to a reduction in operating income or in contribution margin, or due to an increase in financial expenses. The first suggested alternative refers to increasing the volume of production and sales at current global price parity, while the second assumes shifting global price parity in favour of sales prices at current real capacity utilization rate. The effects of proposed alternatives are evaluated by two measures of profitability - return on assets and return on equity.

Key words: *loss zone, agricultural enterprises, medium-sized enterprises, financial analysis, economic and financial power*

JEL: *Q12*

Introduction

The alternatives for exiting the loss zone are determined based on the evaluation of economic and financial power of agricultural enterprises in the period 2010-2014.

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The focus is on medium-sized enterprises since they play a key role in economic development of the Republic of Serbia (RS). Although with a modest share in the overall structure of business enterprises and in the sector of small and medium-sized enterprises (SME), according to key developing indicators these enterprises represent the backbone of national economies (Erić, D. et al., 2012; Ivković, D. et al., 2012, pp. 31; Erić, D. et al., 2011, pp.70; Đuričin, S. et al., 2016).

According to the latest data from the National Bank of Serbia (NBS), medium-sized enterprises account for only 2% of total number of business entities in the Republic of Serbia, but generate 16% of total employment. Although they account for only 2% of the total number of enterprises, medium-sized enterprises generate 17% of revenues, 16% of the expenditures, 16% of total net income, and 14% of total net loss of all business entities in the country.

According to their share in key developing indicators of the SME sector, medium-sized enterprises account for only 0.7% of the total number of SMEs but generate 48% of total export, 40% of import, 29% of employment, 30% of turnover and 33% of GVA.

According to the Business Registers Agency's data for 2015, there were 1,004 medium-sized enterprises registered on the territory of the Republic of Serbia. Business entities registered in the sector A: Agriculture, forestry and fishing account for 7% of the total number of medium-sized enterprises. The regional analysis pointed out to the uneven geographical distribution of medium-sized agricultural enterprises. Out of the total number of agricultural enterprises, 82% was registered on the territory of Vojvodina, 7% on the territory of South and East Serbia and on the territory of Sumadija and West Serbia, while only 4% was registered on the territory of Belgrade.

Out of the total number of agricultural enterprises registered on the territory of the Republic of Serbia in the period 2013-2014, 11% recorded a net loss. Medium-sized enterprises which in the observed period of time operated with a net loss accounted for 19% of total employment of all enterprises of this size belonging to sector A: Agriculture, forestry and fishing. In the structure of medium-sized agricultural enterprises which in the period 2013-2014 recorded a net loss, entities registered on the territory of Vojvodina and Belgrade accounted for 75% and 25% respectively. Out of the total number of entities which recorded a net loss, 63% were engaged in crop production, while 37% were engaged in stock-farming. In the 2013-2014 period of time, a net profit was recorded in medium-sized agricultural enterprises on the territory of South and East Serbia and on the territory of Sumadija and West Serbia.

The subject of the research was selected by considering the fact that 11% of the total number of observed enterprises which account for 19% of total employment of medium-sized enterprises recorded a net loss in the period 2013-2014. The subject of the research refers to the financial performance of all agricultural enterprises. The objective of the research is to identify the alternatives for exiting the loss zone for those enterprises which in the period 2013-2014 recorded a net loss. For that reasons, the narrow and broad subject of the research is distinguished. The broad subject of

the research refers to the period 2010-2014 when an economic and financial power of medium-sized agricultural enterprises was determined. The narrow subject of the research refers to the period 2013-2014 when the causes and alternatives for exiting the loss zone were identified.

The research begins with defining the hypothesis according to which implementation of suggested alternatives contributes to the higher profitability of enterprises. The effects of the proposed alternatives are evaluated by using two measures of profitability i.e. return on assets (ROA) and return on equity (ROE).

Materials and methods

In order to accomplish an overall research objective, the following methods were used: qualitative and quantitative financial analysis, common data collection and analysis methods, and description and synthesis methods (Đuričin, S. and Beraha, I., 2013, pp. 124; Neogradi, S., 2017, pp. 77).

By applying financial analysis (Đuričin, S. and Bodroža D., 2013, pp. 26; Mitrović, A. et al., 2015, pp. 1067; Majstorović, A. et al., 2016, pp. 1380) the economic and financial power of all medium-sized agricultural enterprises was determined. The analysis of economic and financial power of enterprises covered the period 2010-2014 which enabled the data comparability over time, as well as the notification of the dynamics movement of basic developing indicators. Financial analysis was conducted based on the information disclosed in the official financial statements of enterprises which are publically available on the Serbian Business Registers Agency web site. The subject of analysis is financial performance obtained from both summary and separate financial statements of medium-sized agricultural enterprises.

Considering that in the period 2010-2014 no stable trend in the number of enterprises ending a business year with net loss was determined, as well as that every year different enterprises recorded unprofitable operations, the research begun with identifying which enterprises and in what period of time showed a stable trend of operating with a net loss. The results indicate that a stable trend of operating with a net loss was observed only in the period 2013-2014. This way, the implementation of the common data collection and analysis methods (Đuričin, S. and Beraha, I., 2012; Petrović, P. and Vuković, D., 2016, pp. 1435) enabled narrowing the research subject which then referred only to 2013-2014 period of time.

Given that business is successful when a regular operating result is positive (Rodić, J et al., 2007; Đuričin, S, 2012), the enterprises which in the period 2013-2014 recorded a net loss as a result of regular operating activities were firstly identified by applying financial analysis method. Secondly, the causes of loss appearance were analysed for the previously identified enterprises. Accordingly, the main criterion for selecting the subject of research in the narrow sense refers to net loss from regular operating activities. Consequently, the further analysis includes only 8 enterprises out of which 3 enterprises are engaged in stock farming, while the other 5 are engaged in crop production. The

causes of loss appearance from regular operating activities were determined based on the analysis of the relationship between global sales and purchasing price parity, the real capacity utilization rate and the efficiency of resource utilization (Rodić, J et al., 2007, pp. 217-222; Đuričin, S, 2012, pp. 165-170).

Further analysis aimed at identifying alternatives for exiting the loss zone was conducted only for those enterprises for which causes of unprofitable operation were adequately identified. An adequate identification of causes of unprofitable operation assumes that negative impact on financial result is greater than stated loss. Causes of unprofitable operation, as well as alternatives for exiting the loss zone were appropriately identified for 4 enterprises with equal representation of those engaged in stock farming and those engaged in crop production.

The elements that were formed by using the analysis method were then connected and brought into an interactive relationship by implementing the synthesis method (Đuričin, S. and Beraha, I., 2014, pp. 692; Savić, B. et al., 2014, pp. 1007). After a description was given on the determined relationship between the elements, conclusions were drawn about the possible solutions. The alternatives for exiting the loss zone were suggested for 4 enterprises for which the causes of non-profitable operation in the period 2013-2014 were adequately identified.

Suggested alternatives represent the unique economic method because the calculated value of financial performances, which was based on the data contained in separate financial statements, took into consideration all economic changes that occurred in observed enterprises, in observed period of time, and in the concrete sector. That also means that all specificities related to agricultural production which are relevant for agro-meteorological conditions, volatility in agricultural product prices/inputs, etc. which influenced economic changes in observed enterprises and were reflected in their separate financial statements were taken into consideration.

Through identified alternatives for exiting the loss zone, this research proposes a general solution for improving business performance. However, the implementation of suggested alternatives requires further analysis and individual approach to every single enterprise. This is primarily because agricultural production is rather specific comparing to other industries i.e. agricultural production is inflexible and its supply is both inelastic in the short term and dependent on weather conditions. Using an individual approach to every enterprise when selecting the most appropriate alternative or making the best combination of alternatives requires further analysis which would consider all specificities of agricultural production and carefully interpret profitability, yield and financial position assessment results.

Given that financial statements do not contain all the information necessary for identifying the causes of loss appearance (physical consumption of direct materials, labour and energy and services), the implementation of the identified alternatives had different impact on the profitability of analysed enterprises. In some cases it caused a reduction of negative rates of return, while in other enterprises it caused profitable

operation. The effects of proposed alternatives are evaluated by using two measures of profitability i.e. return on assets (ROA) and return on equity (ROE).

Since general conclusions are made based on the research results, stating names of enterprises for which causes of loss were identified is avoided, while interpretation of final results considers all specificities of stock farming and corps production.

Results

In order to identify the objective of the research, the evaluation of economic and financial power of all medium-sized agricultural enterprises was conducted for the period 2010-2014. In the observed period of time, at the level of all medium-sized enterprises, a dominant share of operating income in total income amounting to an average of 94.79% was recorded. Operating income is largely burdened by operating expenses (an average burden of 86.08%). At the level of all medium-sized agricultural enterprises, every Serbian Dinar (RSD) of operating income on average participated in the accumulation of 9.18% of operating profit and of 5.76% of net profit. Every RSD invested in total assets and equity gained on average 4.01% and 7.42% of net income respectively.

According to profitability ratios, in the period 2010-2014 the larger number of medium-sized agricultural enterprises operated with positive financial result. For that reasons, a positive net profitability effect at the level of summary balances of medium-sized agricultural enterprises was recorded. In the five-year period of time, the dynamics of the overall revenues and expenses of these enterprises resulted in the appearance of a positive gross financial result.

In 2010, 12% of the total number of medium-sized agricultural enterprises operated with a net loss, while in the 2011-2012 period 5% and 14% respectively recorded a net loss. Only in the period 2013-2014, it was determined that the same enterprises operated with a net loss in both years. In the period 2013-2014, 11% of the total number of medium-sized agricultural enterprises operated with a net loss.

The results of the analysis show that the loss appeared in the period 2013-2014 is a result of a reduction in operating income, a reduction in contribution margin and an increase in financial expenses. A reduction in the operating income occurred due to the worsening of global sales and purchasing price parity. A decline in the value of contribution margin appeared as a result of an insufficient real capacity utilization, while inefficient use of current assets increased the value of financial expenses.

A decline in operating income that appeared as a result of a worsening of global sales and purchasing price parity was detected in all medium-sized agricultural enterprises which in the period 2013-2014 operated with a loss. The enterprises recorded lower global price parity compared to its average value for the sector which in the period 2013-2014 amounted to 1.89 and 1.85 respectively.

The worsening of global price parity stipulated lower revenues than those that would have been gained in case the value of the parity remained at the sector average. The

largest decline in the operating income that occurred as a result of a worsening of global price parity was recorded in enterprise number 4 in 2014, while the lowest was recorded in enterprise number 2 in 2013.

Table 1. Decline in operating income as a result of global parity worsening, - in 000 RSD -

Enterprise	Year	Variable material costs	Sector's average global parity	Operating income at sector's average global parity	Real operating income	Decline in operating income due to reduction in global parity
		1.	2.	3. (1. x 2.)	4.	5. (3. - 4.)
1	2013	741,700	1.89	1,401,812	1,378,033	23,779
	2014	754,772	1.85	1,396,329	1,384,959	11,370
2	2013	578,219	1.89	1,092,835	1,089,194	3,641
	2014	473,316	1.85	875,635	724,807	150,828
3	2013	588,379	1.89	1,112,036	951,465	160,571
	2014	458,276	1.85	847,810	679,309	168,501
4	2013	791,213	1.89	1,495,392	1,120,124	375,268
	2014	810,386	1.85	1,499,214	1,118,934	380,280
5	2013	400,821	1.89	757,552	592,364	165,188
	2014	269,237	1.85	498,089	416,285	81,804
6	2013	288,271	1.89	544,833	304,352	240,481
	2014	290,024	1.85	536,544	386,363	150,181
7	2013	136,323	1.89	257,650	203,700	53,950
	2014	98,598	1.85	182,406	136,285	46,121
8	2013	387,589	1.89	732,544	635,768	96,776
	2014	345,107	1.85	638,448	577,681	60,767

Source: Authors' calculation based on data obtained from official financial statements

A reduction in the contribution margin that occurred as a result of an insufficient real capacity utilisation was detected in all medium-sized enterprises which in the period 2013-2014 operated with a loss. In the period 2013-2014, the real capacity utilisation rate ranged between 45-98% which stipulated lower value of the contribution margin than it would have been recorded in case capacity utilisation was 100%.

Significant differences in terms of an intensity of impact of insufficient real capacity utilisation on the value of contribution margin were observed by analysing data over time e.g. in enterprise number 2 the effects of insufficient real capacity utilisation were more than two times greater in 2013 comparing to 2014. The largest decline in the contribution margin due to an insufficient real capacity utilisation was recorded in enterprise number 2 in 2013, while the lowest was recorded in enterprise number 5 in 2014.

A loss recorded in the observed enterprises in the last two business years occurred also due to the inefficient current asset management. In order to determine the extent to

which financial expenses increased because of an inefficient current asset management, an average turnover ratio at the sector level for the period 2013-2014 was identified. An increase in the value of financial expenses that appeared due to the inefficient current asset management was calculated by dividing current assets at an average turnover ratio by real current assets (Table 3).

Table 2. Decline in contribution margin due to insufficient real capacity utilisation, - in 000 RSD -

Enterprise	Year	Contribution margin	Real capacity utilisation rate (%)	Contribution margin at 100% real capacity utilisation	Decline in contribution margin due to insufficient real capacity utilisation
		1.	2.	3. (1./2.) x 100	4. (3. – 1.)
1	2013	636,333	70	909,048	272,714
	2014	630,187	70	900,267	270,080
2	2013	510,975	55	929,045	418,070
	2014	251,491	55	457,256	205,765
3	2013	363,086	90	403,429	40,343
	2014	221,033	90	245,592	24,559
4	2013	328,911	75	438,548	109,637
	2014	308,548	75	411,398	102,849
5	2013	191,543	98	195,452	3,909
	2014	147,048	98	150,049	3,001
6	2013	16,081	45	35,735	19,654
	2014	96,339	45	214,087	117,748
7	2013	67,377	85	79,267	11,890
	2014	37,687	85	44,338	6,651
8	2013	248,179	70	354,541	106,362
	2014	232,574	70	332,249	99,675

Source: Authors' calculation based on data obtained from official financial statements

Inefficient current asset management is typical only for certain enterprises i.e. enterprises which are determined to have positive difference between the value of real current asset and the value that would had been achieved in case an average turnover coefficient remained at the sector level.

An increase in the current asset value due to the inefficient management is present in enterprises number 2, 4, 6, and 7 in both business years, and in enterprise number 5 in 2014.

For enterprises in which an inefficient current asset management was identified, the amount of an increase in financial expenses was determined (Table 4).

The negative effects of inefficient current asset management are caused by the turnover ratio as well as by the level of indebtedness and the terms of obtaining external financing sources.

Table 3. Increase in the value of current assets due to inefficient management, - in 000 RSD -

Enterprise	Year	Operating income	Average turnover ratio at sector level	Current assets at sector's average turnover ratio	Real current assets	Increase in current assets due to decline in turnover ratio
		1.	2.	3. (1./2.)	4.	5. (4.-3.)
1	2013	1,378,033	1.47	934,676	823,424	-111,252
	2014	1,384,959	1.23	1,124,285	751,572	-372,713
2	2013	1,089,194	1.47	738,766	1,114,923	376,157
	2014	724,807	1.23	588,385	684,742	96,357
3	2013	951,465	1.47	645,349	405,799	-239,550
	2014	679,309	1.23	551,451	459,639	-91,812
4	2013	1,120,124	1.47	759,745	1,491,488	731,743
	2014	1,118,934	1.23	908,331	1,366,523	458,192
5	2013	592,364	1.47	401,782	242,229	-159,553
	2014	416,285	1.23	337,933	398,409	60,476
6	2013	304,352	1.47	206,432	1,187,947	981,515
	2014	386,363	1.23	313,643	1,320,344	1,006,701
7	2013	203,700	1.47	138,163	156,189	18,026
	2014	136,285	1.23	110,634	117,141	6,507
8	2013	635,768	1.47	431,221	239,056	-192,165
	2014	577,681	1.23	468,951	335,019	-133,932

Source: Authors' calculation based on data obtained from official financial statements

An increase in financial expenses due to inefficient current asset management is determined as a product of the value of an average interest rate and an increase in current assets caused by a decline in their turnover ratio. For the purpose of the calculation, an average interest rate is calculated as a ratio of financial expenses and liabilities causing interest rates payment.

The analysis results indicate that the greatest increase in financial expenses due to inefficient current asset management is recorded in enterprise number 6, while the lowest is recorded in enterprise number 7. In case of enterprises number 1, 3 and 8, in both business years, no increase in financial expenses was recorded. In enterprise number 5, an increase in financial expenses due to inefficient current asset management was recorded only in 2014.

Table 4. Increase in financial expenses due to inefficient current asset utilisation, - in 000 RSD -

Enterprise	Year	Financial expenses	Liabilities causing interest rates payment	Average interest rate	Possible decline in financial expenses
		1.	2.	3. (1./2.) x 100	4. (5* x 3.) / 100
1	2013	60,787	761,596	8	-8,880
	2014	79,003	729,403	11	-40,369
2	2013	110,597	979,735	11	42,462
	2014	144,703	703,474	21	19,820
3	2013	13,647	296,077	5	-11,042
	2014	23,974	390,381	6	-5,638
4	2013	181,425	1,665,426	11	79,713
	2014	241,959	1,903,376	13	58,246
5	2013	53,564	870,902	6	-9,813
	2014	51,747	1,004,658	5	3,115
6	2013	339,498	2,025,018	17	164,553
	2014	271,006	2,095,649	13	130,185
7	2013	13,278	381,567	3	627
	2014	30,250	398,428	8	494
8	2013	41,618	686,689	6	-11,647
	2014	95,944	858,045	11	-14,976

Source: Authors' calculation based on data obtained from official financial statements

Remark: * Number 5 is from Table 3

The total negative impact on financial results is illustrated in Table 5. A decline in the operating income due to global parity worsening, a decrease in the contribution margin due to the insufficient real capacity utilization and an increase in the financial expenses due to the inefficient current asset management are taken into consideration. In all enterprises in which the negative impact on financial result is greater than 100%, a cause of the loss appearance is adequately identified.

Therefore, the causes of loss appearance in both business years are adequately identified in enterprises number 1, 3, 4 and 8. Concerning enterprise number 2, the causes of loss appearance are adequately identified only in 2013, while concerning enterprises number 5 and 6 only in 2014. The causes of loss appearance were not adequately identified in either business year in enterprise number 7.

Further analysis aimed at identifying the alternatives for exiting the loss zone is conducted only for those enterprises for which the causes of loss appearance are adequately identified in both business years i.e. in enterprises 1, 3, 4 and 8.

Along with an adequate financial performance based identification of the causes of loss, and before proposing alternatives, it is necessary to point out to some of the potential causes of unprofitable business which are specific to crop production and stock farming. Since crop production and stock farming are closely linked, the causes of loss from regular activities are also linked. The potential causes of loss appearance in stock farming, besides specific factors causing unprofitable operation, include all those elements that cause loss in crop production. This is mainly due to the fact that crop production presents the first level of agricultural production and is largely used for the development of the second level of agricultural production i.e. stock farming. One of the most common factors that caused loss certainly refers to drought that occurred in 2012 and whose consequences were felt in 2013 as well. The significant interdependence determined between the value of crop production yield and the meteorological movements points out to the low level of investments in the irrigation systems and to the large number of individual farms which are not capable of financing preventive measures and mechanisms of protection against drought thus limiting an extensive agricultural production (Vukelić, G and Đuričin, S, 2012). Besides extreme meteorological conditions, the loss also appears due to the fact that in the Republic of Serbia agricultural products with high production potentials are being imported, that the buyers of agricultural products hold a monopoly, and that there are significant oscillations in the volume and quality of production which along with existing external financing conditions resulted in bad price parity and put into question the self-financing of simple reproduction and survivor of agricultural enterprises (Ibid.).

Table 5. Examination of negative impact on financial results, - in 000 RSD -

Enterprise	Year	Decline in operating income due to global price parity worsening	Decline in contribution margin due to insufficient real capacity utilisation	Increase in financial expensed due to inefficient current assets utilisation	Total negative impact on financial result	Current year loss	Negative impact on financial result compared with loss (%)
		1.	2.	3.	4. (1.+2.+3.)	5.	6. (4./5.) x100
1	2013	23,779	272,714	0	296,494	10,816	2,741
	2014	11,370	270,080	0	281,450	47,148	597
2	2013	3,641	418,070	42,462	464,173	51,461	902
	2014	150,828	205,765	19,820	376,413	527,591	71
3	2013	160,571	40,343	0	200,913	36,451	551
	2014	168,501	24,559	0	193,060	110,477	175
4	2013	375,268	109,637	79,713	564,618	369,782	153
	2014	380,280	102,849	58,246	541,375	538,361	101
5	2013	165,188	3,909	0	169,097	331,648	51
	2014	81,804	3,001	3,115	87,920	80,941	109

6	2013	240,481	19,654	164,553	424,688	944,713	45
	2014	150,181	117,748	130,185	398,114	305,209	130
7	2013	53,950	11,890	627	66,468	237,906	28
	2014	46,121	6,651	494	53,266	57,655	92
8	2013	96,776	106,362	0	203,138	76,793	265
	2014	60,767	99,675	0	160,441	112,857	142

Source: Authors' calculation based on data obtained from official financial statements

The possibilities for exiting the loss zone are examined in terms of two alternatives. The first alternative refers to analyzing the possibilities of increasing the real capacity utilization i.e. increasing the volume of production and sales at the current global price parity. The second alternative refers to analyzing the possibilities of shifting the global price parity in favor of sales prices at current real capacity utilization rate i.e. current volume of production and sales. Two aspects of exiting the loss zone are analyzed for both alternatives. The first aspect assumes the corrections on the expenditure side, while the second aspect excludes those corrections. The analysis of the possibilities of exiting the loss zone by implementing the aforementioned two alternatives requires the consideration of the following assumptions:

- Real data on income is not corrected to higher values for the amount determined by analyzing the global price parity. An identified increase in expenses which could have occurred in case the worsening of global price parity did not appear is not taken into consideration since the research aims to determine the global price parity that is necessary in order to exit the loss zone.
- The achieved contribution margin is not corrected to higher value for the amount of decline determined based on underutilization of real capacity because the research aims to determine the real capacity utilization rate which is necessary in order for enterprises to exit the loss zone.

Table 6. Alternatives for exiting the loss zone, - in mil RSD -

No.	Enterprise Year	1		3		4		8	
		2013	2014	2013	2014	2013	2014	2013	2014
1.	Operating income	1.378	1.385	951	679	1.120	1.119	636	578
2.	Variable expenses	742	755	588	458	791	810	388	345
3.	Contribution margin (CM)	636	630	363	221	329	309	248	233
4.1.	Fixed expenses	494	503	392	306	527	540	258	230
4.2.	NFE*	59	77	13	23	150	237	41	95
4.3.	Decline i NFE due to inefficient asset management					80	58		
5.	Share of CM in operating income (3/1)x100	46%	46%	38%	33%	29%	28%	39%	40%

No.	Enterprise	1		3		4		8	
	Year	2013	2014	2013	2014	2013	2014	2013	2014
6.	Utilization rate RC**	70%	70%	90%	90%	75%	75%	70%	70%
7.	A	1.199	1.276	1.062	1.010	2.308	2.817	767	808
8.	B	554	1.276	1.062	1.010	2.308	2.817	767	808
8a	C					2.037	2.606		
9.	D	46%	100%	100%	100%	100%	100%	100%	100%
9a	E					88%	93%		
10.	F	-60%	-8%	12%	49%	106%	152%	21%	40%
10a	G					82%	133%		
11.	H	-6%	-4%	4%	16%	31%	42%	8%	16%
11a	I					11%	5%		

* Net financing expenses; **Real capacity; *** Neutral result; **** Global price parity; WC- without correction; WIC - with correction; A – Income at 100% RC $(1/6) \times 100$; Volume of production and sales for achieving NR WC $((4.1.+4.2.)/5) \times 100$; C - Volume of production and sales for achieving NR WIC $((4.1.+4.2.-4.3.)/5.) \times 100$; D - RC for achieving NR at current GPP WC $(8/7) \times 100$; E - RC for achieving NR at current GPP WIC $(8a/7) \times 100$; F – Increase in volume of production and for achieving NR at current GPP WC $((8-1)/1) \times 100$; G - Increase in volume of production and for achieving NR at current GPP WIC $((8a-1)/1) \times 100$; H - % change GP for achieving NR at current RC WC $((4.1.+4.2.-3.)/1.) \times 100$; I - % change GP for achieving NR at current RC WIC $((4.1.-4.2.-4.3.)) - 3./1.) \times 100$

Source: Authors' calculation based on data obtained from official financial statements

In accordance with the research results and given assumptions, both alternatives in terms of both aspects are analysed only for enterprise number 4. This is because only in case of enterprise number 4 it is possible to correct the net financing expenses to lower values due to the inefficient current asset management. In case of all other enterprises which in the period 2013-2014 operated with a loss, i.e. in case of enterprises number 1, 3 and 8 the above average efficiency of current asset management which has no impact on increase in financial expenses is determined. The alternatives for exiting the loss zone for each enterprise in the period 2013-2014 are the following:

- Enterprise number 1 can achieve a neutral financial result at the current global parity of sales and purchasing prices by decreasing the volume of production and sales which assumes the real capacity utilization rate of 46% and 100% respectively. Also, this alternative assumes a reduction of 60% and 8% respectively in the physical volume of production and sales. A neutral financial result at the existing volume of production and sales can be achieved by enterprise number 1 only if the global parity of sales and purchasing prices shifts in favour of purchasing prices by 6% and 4% respectively.
- Enterprise number 3 can achieve a neutral financial result at the current global parity of sales and purchasing prices by increasing the volume of production and sales which assumes the real capacity utilization rate of 100% and an increase of 12% and 49% respectively in the physical volume of production and

sales. A neutral financial result at the existing volume of production and sales can be achieved by enterprise number 3 only if the global parity of sales and purchasing prices shifts in favour of sales prices by 4% and 16% respectively.

- Enterprise number 4 can achieve a neutral financial result at the current global parity of sales and purchasing prices by increasing the volume of production and sales which assumes the real capacity utilization rate of 100% in case no correction of expenses is made i.e. 88% and 93% respectively in case the correction of expenses is made. The first alternative requires that the physical volume of production and sales increases up to 106% and 152% respectively in comparison with the existing volumes, and the second alternative requires an increase of 82% and 133% respectively. A neutral financial result at the existing volume of production and sales can be achieved by enterprise number 4 only if the global parity of sales and purchasing prices shifts in favour of sales prices by 31% and 42% respectively in case of first alternative i.e. by 11% and 5% respectively in case of second alternative.
- Enterprise number 8 can achieve a neutral financial result at the current global parity of sales and purchasing prices by increasing the volume of production and sales which assumes the real capacity utilization rate of 100% and an increase of 21% and 40% respectively in the physical volume of production and sales. A neutral financial result at the existing volume of production and sales can be achieved by enterprise number 8 only if the global parity of sales and purchasing prices shifts in favour of sales prices by 8% and 16% respectively.

In order to exit the loss zone, enterprises will choose the alternative that is possible to implement at the given moment in time or will decide to combine certain elements from both alternatives. The elements from both alternatives are to be combined in case a question is raised regarding the amount of global price parity at the real capacity utilization rate of 100%.

Table 7. Changes in global price parity at 100% real capacity utilization rate, - in mil RSD -

No.	Enterprise Year	1		3		4		8	
		2013	2014	2013	2014	2013	2014	2013	2014
1.	Operating income	1,378	1,385	951	679	1,120	1,119	636	578
2.	Variable expenses	742	755	588	458	791	810	388	345
3.	RC utilization	70%	70%	90%	90%	75%	75%	70%	70%
4.	Operating income at 100% RC (1./3.)x100	1,969	1,979	1,057	755	1,493	1,492	908	825
5.	Variable expenses at 100% RC (2./3.)x100	1,060	1,078	654	509	1,055	1,081	554	493

No.	Enterprise	1		3		4		8	
	Year	2013	2014	2013	2014	2013	2014	2013	2014
6.	Contribution margin at 100% RC (4.-5.)	909	900	403	246	439	411	355	332
7.	Fixed expenses and Net financing expenses	554	581	405	329	678	777	299	325
8.	% change of GPP In favor of sales prices at 100% RC utilization $((7.-6.)/4.) \times 100$	-18.04	-16.16	0.17	10.99	16.02	24.50	-6.08	-0.85

Source: Authors' calculation based on data obtained from official financial statements

In the period 2013-2014, in order to achieve a neutral financial result at the real capacity utilization rate of 100%:

- enterprise number 1 can reduce the sales price by 18.04% and 16.16% respectively;
- enterprise number 3 should increase the sales price by 0.17 and 10.99% respectively;
- enterprise number 4 should increase the sales price by 16.02% and 24.50% respectively, and
- enterprise number 8 can decrease the sales price by 6.08% and 0.85% respectively.

After results of the analysis are being presented, the production, purchasing and sales experts decide on the alternative for exiting the loss zone. The selected alternative or combination of elements of various alternatives must be the realistically feasible one. When deciding on the suitable alternative, the experts have to consider all technical and natural limitations, as well as limitations of the sales and purchasing markets. After an appropriate alternative is selected, the plan for exiting the loss zone is being prepared and presented to the management of the company. Due to the specificity of agricultural production, when selecting the most appropriate alternative it is necessary to perceive the impact of their implementation on the value of financial performance used to measure business success. For example, when selecting the most suitable alternative or the combination of alternatives and when examining the impact of their implementation on the efficiency of current asset management it is necessary to consider that agricultural enterprises are specific in terms of production cycle and product redemption. Also, when assessing the impact of selected alternative on business profitability it is necessary to consider specificities of product range of concrete agricultural enterprise. This is mainly due to the fact that sales of finished products is the most important profit category and it is highly influenced by the flexibility of inventory storage and the possibility of its realisation when the best market price occurs.

Since achieving neutral financial result is never a company's overall objective, the management decides on the alternative which will enable higher profits in the following accounting periods.

Discussion

Inferior global price parity in the agricultural production of the Republic of Serbia has been a significant problem for over decades (Vukelić, G and Đuričin, S, 2012). Such price parity is mainly a result of the monopoly positions of large buyers of agricultural products, import of products for whose production the Republic of Serbia is highly potential and large oscillations in the production volume and quality. The inferior price parity is reflected in poor input purchasing mechanism and final agricultural product sales. According to the existing mechanism, the purchasing price is defined in Serbian dinars, while the input prices are given in Euro. At the same time, due to cash shortages, the producers often use barter trade to acquire necessary inputs thus suffering huge losses. A decline in operating income due to global price parity worsening at current external financing market conditions stipulates the absence of simple reproduction renewal ability, inferior technical facilities and high percentage of representation of outdated machinery (Bubić, J. and Hajnrih, J, 2012).

Improving market chain in the agricultural production and establishing efficient price parity mechanism would stipulate positive effects for individual producers, as well as for the entire sector and state through increased budget revenues. The first step in market chain improvement refers to establishing a productive input acquiring and production support mechanism. A productive mechanism assumes monopoly suppression in input market, maintaining quality control systems for inputs and final products, maintaining a system in which input prices are in line with final product price movement, subsidizing input purchasing and renewal of outdated depending on the previous returns, etc.

Insufficient real capacity utilization is determined in all analysed enterprises. This implies that the use of fixed assets is irrational. A decrease in real capacity i.e. in the possibility of using the built-in capacity in most cases is due to worsening conditions for business processes. These conditions mainly refer to the quantity and quality of productive output, production requisites and their characteristics, labour force and its professional competence, level of organization, technology procedures, etc. In case of analysed enterprises, the insufficient real capacity utilization, under the impact of fixed costs, stipulates the need for an increase in the cost price. Since the market conditions did not allow the cost price growth, a decrease in the value of financial result and profitability of the analysed enterprises occurred.

Inefficient current asset management stipulated the growth of financial expenses only in case of enterprise number 4. Consequently, the positive effects of implementation of identified alternatives were examined only in terms of absence of expenses corrections. The effects of implementation of both alternatives are determined based on the value of profitability performance ROA and ROE. Impossibility of using accounting data

for the purpose of determining the effects of physical consumption of direct material, labour, energy and services on unprofitable operation caused improved profitability of all enterprises but not the complete removal of negative result. In case of enterprises where the value of ROA and ROE improved but the loss remained, it is necessary to implement the suggested alternatives in several consecutive accounting periods. The continuous implementation of suggested alternatives along with the constant examination of provided effects and adjustment of parameters would enable exiting the loss zone as well as entering into the positive financial results zone.

Table 8. Effects of implementation of suggested alternatives for exiting the loss zone

Position	Enterprise 1		Enterprise 3		Enterprise 4		Enterprise 8	
	2013	2014	2013	2014	2013	2014	2013	2014
ROA before the alternatives implementation	-0.79	-3.70	-4.76	-14.18	-9.46	-14.40	-2.29	-3.24
ROA after increase in production and sales	-0.32	-3.40	-4.19	-7.23	0.57	7.49	-1.81	-1.94
ROA after change in global price parity	-0.74	-3.55	-4.57	-11.91	-6.52	-8.35	-2.11	-2.72
ROE before the alternatives implementation	-3.85	-20.17	-10.65	-49.85	-24.21	-52.93	-3.23	-4.99
ROE after increase in production and sales	-1.54	-18.55	-9.37	-25.42	1.45	27.53	-2.56	-2.99
ROE after change in global price parity	-3.62	-19.36	-10.22	-41.88	-16.71	-30.70	-2.98	-4.19

Source: Authors' calculation based on data obtained from official financial statements

Alternative 1 – in the 2013-2014 period of time after the implementation of the alternative which assumes the growth of production and sales at the current global price parity, the following effect was recorded:

- Instead of realizing 0.79% and 3.70% of net loss respectively on every RSD invested in total assets, enterprise number 1 realizes 0.32% and 3.40% of net loss respectively. Instead of realizing 3.85% and 20.17% of net loss respectively on every RSD invested in equity, enterprise number 1 realizes 1.54% and 18.55% of net loss respectively;
- Instead of realizing 4.76% and 14.18% of net loss respectively on every RSD invested in total assets, enterprise number 3 realized 4.19% and 7.23% of net loss respectively. Instead of realizing 10.65% and 49.85% of net loss respectively on every RSD invested in equity, enterprise number 3 realizes 9.37% and 25.42% of net loss respectively;

- Instead of realizing 9.46% and 14.40% of net loss respectively on every RSD invested in total assets, enterprise number 4 realizes 0.57% and 7.49% of net income respectively. Instead of realizing 24.21% and 52.93% of net loss respectively on every RSD invested in equity, enterprise number 4 realizes 1.45% and 27.53% of net income respectively;
- Instead of realizing 2.29% and 3.24% of net loss respectively on every RSD invested in total assets, enterprise number 8 realizes 1.81% and 1.94% of net loss respectively. Instead of realizing 3.23% and 4.99% of net loss respectively on every RSD invested in equity, enterprise number 8 realizes 2.56% and 2.99% of net loss respectively.

Alternative 2 – in the period 2013-2014 after the implementation of the alternative which assumes the change of the global price parity at the current volume of production and sales, the following effect was recorded:

- Instead of realizing 0.79% and 3.70% of net loss respectively on every RSD invested in total assets, enterprise number 1 realizes 0.74% and 3.55% of net loss respectively. Instead of realizing 3.85% and 20.17% of net loss respectively on every RSD invested in equity, enterprise number 1 realizes 3.62% and 19.36% of net loss respectively;
- Instead of realizing 4.76% and 14.18% of net loss respectively on every RSD invested in total assets, enterprise number 3 realizes 4.57% and 11.91% of net loss respectively. Instead of realizing 10.65% and 49.85% of net loss respectively on every RSD invested in total assets, enterprise number 3 realizes 10.22% and 41.88% of net loss respectively;
- Instead of realizing 9.46% and 14.40% of net loss respectively on every RSD invested in total assets, enterprise number 4 realizes 6.52% and 8.35% of net loss respectively. Instead of realizing 24.21% and 52.93% of net loss respectively on every RSD invested in equity, enterprise number 4 realizes 16.71% and 30.70% of net loss respectively;
- Instead of realizing 2.29% and 3.24% of net loss respectively on every RSD invested in total assets, enterprise number 8 realizes 2.11% and 2.72% of net loss respectively. Instead of realizing 3.23% and 4.99% of net loss respectively on every RSD invested in equity, enterprise number 8 realizes 2.98% and 4.19% of net loss respectively.

The research results indicate that the implementation of both alternatives has positive effects on the profitability of enterprises. In case of the implementation of the first alternative, better operating results are recorded in all analysed enterprises. In case of the implementation of the second alternative, enterprise number 4 would exit the loss zone and enter the zone of positive financial results and profitable operation.

Conclusion

The main objective of the paper which refers to the identification of causes and alternatives for exiting the loss zone for agricultural enterprises registered on the territory of the Republic of Serbia is completely accomplished by the conducted research. The research results showed that the loss recorded in the 2013-2014 period of time occurred as a result of a decrease in operating income, decline in contribution margin and increase in financial expenses. A decrease in operating income was caused by the worsening of global parity of sales and purchasing prices. The value of contribution margin decreased as a result of insufficient real capacity utilization, while the recorded growth of financial expenses was due to inefficient utilization of current assets.

In order to exit the loss zone, two alternatives are suggested. The first alternative refers to the analysis of possibilities for increasing the volume of production and sales at the current global price parity, while the second alternative assumes the analysis of the possibilities for shifting the global price parity in favour of sales prices at the current rate of real capacity utilization i.e. current volume of production and sale.

The research results point out to the positive effects of the implementation of both alternatives for exiting the loss zone. In the majority of enterprises, the implementation of both alternatives causes the decrease and not the complete absence of negative profitability indicators. Neutralizing non-profitable operation and entering the zone of neutral and afterwards the zone of positive operating results requires the implementation of suggested alternatives in a number of consecutive accounting periods.

The first alternative which assumes the growth of production and sales at the current global price parity gave better results in all analysed enterprises. In case of enterprise number 4, the implementation of this alternative caused exiting from non-profitable and entering profitable operation zone. In enterprises in which this alternative caused a decrease in negative profitability rates, an introduction of a larger number of jobs is recommended in order to increase the real capacity utilisation and further growth of production and sales.

The research results confirmed the hypothesis according to which the implementation of suggested alternatives contributes to higher profitability of enterprises. Besides the effects on individual enterprises, the implementation of alternatives has the wider social impact as well. Through higher profitability of enterprises, it indirectly leads to higher profitability of sectors and the economy as a whole. Strengthening medium-sized agricultural enterprises contributes to greater employment of the workforce and its more significant participation in the key macroeconomic indicators.

Individual and in-depth analysis aimed at selecting one of suggested alternatives requires evaluation of all specificities of crop production in case of enterprises number 3 and 4, and of stock farming in case of enterprises number 1 and 8. For example, if examining the impact of implementation of the certain alternative on profitability it is necessary to consider the values of ROA and ROE, but also the ownership structure of financing, solvency of operation, etc.

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ALTERNATIVE ZA IZLAZAK IZ ZONE GUBITKA SREDNJIH POLJOPRIVREDNIH PREDUZEĆA U REPUBLICI SRBIJI

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Sažetak

Cilj istraživanja je da se identifikuju uzroci i alternative za izlazak iz zone gubitka preduzeća registrovanih na teritoriji Republike Srbije u sektoru A: Poljoprivreda, šumarstvo i ribarstvo (poljoprivredna preduzeća). Predmet istraživanja su finansijske performanse svih srednjih poljoprivrednih preduzeća u periodu 2010-2014. godina. Naglasak je na srednjim preduzećima iz razloga što ona, shodno učešću u ključnim makroekonomskim indikatorima, predstavljaju nosioce privredne aktivnosti u Republici Srbiji. Primenom metoda finansijske analize izvršena je ocena ekonomsko finansijske moći svih srednjih poljoprivrednih preduzeća u Republici Srbiji, a zatim su na primeru najneuspešnijih entiteta identifikovani uzroci i predložene alternative za izlazak iz zone gubitka. Rezultati istraživanja pokazuju da se gubitak javlja kao posledica smanjenja poslovnih prihoda, smanjenja marže pokrića i povećanja finansijskih rashoda. Za izlazak iz zone gubitka predlažu se dve alternative. Prva alternativa se odnosi na analizu mogućnosti povećanja obima proizvodnje i prodaje pri postojećem globalnom paritetu cena, dok druga alternativa podrazumeva analizu mogućnosti pomeranja globalnog pariteta cena u korist prodajnih cena pri postojećem stepenu iskorišćenja realnog kapaciteta, odnosno pri postojećem obimu proizvodnje i prodaje. U istraživanju se polazi od hipoteze da implementacija predloženih alternativa doprinosi rastu profitabilnosti srednjih poljoprivrednih preduzeća. Performanse po osnovu čijih vrednosti je izmeren efekat implementacije predloženih alternativa su return on assets (ROA) i return on equity (ROE).

Key words: zona gubitka, poljoprivredna preduzeća, srednja preduzeća, finansijska analiza, ekonomsko finansijska moć

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FINANCING AS A KEY FACTOR OF THE STRATEGY OF SUSTAINABLE RURAL TOURISM DEVELOPMENT IN THE REPUBLIC OF SERBIA¹

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Summary

The important reason for the lack of rural tourism development, in most rural areas in Serbia, is undefined strategic development directions and the lack of financial investment. The aim of this paper is to highlight the need for the adoption of the strategy for sustainable development of rural tourism in the actual transition period in the Republic of Serbia, with clearly defined development priorities and modalities of financing for all segments of rural tourism offer. The adoption of this strategy is necessary in the Republic of Serbia, in the actual transition period, in order to develop rural areas, to reduce regional differences in economic development, and in order to stop actual depopulation process of rural areas. Defining innovative and additional sources of funding is necessary, because the existing are limited and insufficient. The paper used a method of analysis and synthesis, descriptive, and comparative method.

Key words: rural tourism, development, financing, strategy, the Republic of Serbia

JEL: O18, Q01

Introduction

The Republic of Serbia has comparative advantages for the development of rural tourism due to the fact that 85% of its territory (according to the categorization of the Organization for Economic Cooperation and Development (OECD)), consists of rural areas. The favourable geographical position, rich historical and cultural heritage, preserved traditional village

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architecture, attractive ethnic characteristics, numerous ethnographic and gastronomic events, as well as the traditional hospitality of the population are among the resources of rural tourism. Rural tourism in the Republic of Serbia started to develop in the 70-ies of XX century. This was the beginning of rural tourism, not only in Serbia but also in the whole of the Socialist Federal Republic of Yugoslavia (Marković et al., 2012).

Development of rural tourism in the Republic of Serbia, in actual transition period, is a possibility, but also a necessity, because in spite of the many quality resources, rural areas are generally underdeveloped. The current development of rural tourism in the Republic of Serbia can not be compared with the development of this type of tourism in European countries with a similar length of the developmental period. The reason for this are varied and numerous factors on both sides - the offer and the demand side of tourism. These are, above all, political, economic, social, legal and regulatory, institutional, organizational and management factors. Political events in the last decade of the twentieth century were unfavorable and caused devastating effects on the tourism industry, especially in the rural tourism, which has just started to develop. The disintegration of the Socialist Federal Republic of Yugoslavia, wars in the region, international sanctions, the bombing of areas of the Republic of Serbia, have left a negative impact on the natural, physical, social, human and financial resources and caused long-term stagnation in the development of rural tourism offer and demand.

The economic crisis, which is continuously present in the whole transition period, caused restrictive investment in the maintenance of transport and utility infrastructure, lack of maintenance of existing accommodation capacities in rural areas, as well as reduced investments in the maintenance of cultural and historical monuments, events and all the factors that shape rural tourist facilities. On the other hand, lower purchasing power caused a drop in demand for rural tourism products. This phenomenon is especially pronounced at the beginning of the second decade of the XXI century and is the result of socio-economic factors - the “disappearance of the middle class”, which has traditionally been a consumer of the rural tourism product.

Legal and regulatory framework of rural tourism in the Republic of Serbia began to form in recent years, but it is still not compatible with the needs of service providers and focused on the rapid development of the industry. At the same time, the development of rural tourism limits unresolved institutional, organizational and management issues. All of the above adverse factors have a common bond, and those are finances, or the lack of funding models, both on tourism offer and demand side. Sources of funding are, if not sufficient, but certainly a necessary condition for the development of tourism and their quantity, quality and continuity are of great importance for the dynamic development of rural tourism.

These factors are the reason that at the end of the first decade of XXI century, only 514 or 0.7% of the total of 631,552 agriculture entities are dealing with rural tourism in the Republic of Serbia (Census of Agriculture, 2012, p. 190-197). Also, rural tourism in the Republic of Serbia is undevelopment. The greatest number of service providers engaged in rural tourism are present in Šumadija and Western Serbia (*Table 1*).

Table 1. The territorial distribution of agricultural households in the Republic of Serbia engaged in rural tourism

Name of the Region	Number of farms engaged in tourism
Belgrade Region	14
Vojvodina Region	93
Region Šumadija and West Serbia	295
Region South and Eastern Serbia	112
Region Kosovo and Metohija	-
Total	514

Source: Census of Agriculture 2012 - Agriculture in the Republic of Serbia (2012): Volume II, National Institute for Statistics, Belgrade, pp.190-197.

The Republic of Serbia is one of the most rural European countries, while in rural areas “dominate the diversification of household income, not the diversification of the industry” (Bogdanov, 2007, p. 53). The representation of rural tourism in other profitable activities on agriculture entitets is the largest in the territory of Vojvodina (1.11%), while in the Belgrade region is only 0.48% (Bogdanov et al., 2014).

Development of rural tourism would have positive economic and financial effects on the level of service providers (frequently agriculture entites), on the level of local economic communities, as well as at the macro level and at the state level, in actual transition period . In particular, the development of rural tourism would allow the diversification of the rural economy, additional income for rural population, would reduce unemployment and differences in economic development between rural and urban areas. Development of rural tourism would allow the evaluation of the work of women, as well as the employment of young people and elderly residents, who are statistically listed as inactive working rural population. At the same time, it would enable the creation of new jobs, which could encourage the migration of population from cities to villages, for the purpose of employment. The Republic of Serbia mainly exports primary (unprocessed) agricultural products, while rural tourism is a possibility for food products to be sold on the domestic market to foreign tourists, and to realize the “invisible exports” and foreign exchange inflow.

Literature review

According to the definition that is widely accepted within the European Union, rural tourism comprises all tourist activities that can be implemented in rural areas. Rural tourism is one of the work most intensive industries, which represents a potential contribution to creation of new workplaces and economic development of rural areas, which is often the most important element in rural development strategies (Mitchell et al., 2005). According to the attitude of the World Tourism Organization, the highest economic importance of rural tourism is that this activity helps poverty elimination (Jing, 2006). According to the same author, rural tourism is mainly developed in areas that have limited financial resources, but have extraordinary natural resources, which could be a platform for economic development.

Authors Roberts and Hall (2003) highlighted that rural tourism can be a relatively “sensitive” element of rural development. These authors classified financial resources among the limiting factors of development. More specifically, they state that investments, the opening of new businesses and employment may be limited due to the small tourist traffic. Also, the tourist season is often short, which causes a short period for the implementation of revenue, or for “supply of capital”. Examples of the European countries, which have developed rural tourism, confirm that financial support is necessary for the development of this activity from the state in the initial stage.

External support, i.e. support of institutions at the local, regional and national level is very important, because its absence may be one of the reasons for the failure. Lack of investment, education, experience and inefficient marketing are the main reasons for the termination of small businesses in rural areas or are the barriers for the entry to the tourist market (Sharpley, 2002). Financial support for rural tourism development was present in each country which developed this activity during transition period. The possibility of obtaining financial support, favourable bank loans or providing other innovative modalities of financing represents one of the key factors that ensure the development of rural tourism.

Financing of rural tourism is complex because it is closely related to the financing of agriculture. Authors Todorović and Štetić (2009) pointed out that there is an important link between agriculture and tourism. These economic activities are mutually complementary and multiply connected. Agriculture is a producer, and tourism a consumer of agricultural products. In the Republic of Serbia, the financing of agriculture is constant and the unresolved problem of the domestic economy (Radović, 2014). Adverse economic and financial situation of agriculture causes that entities do not have sufficient “economic strength” to independently develop tourism activities on their holdings (to earn additional income and improve living standards). According to Svržnjak and associates (2014) financing is usually the most difficult part of the development path for rural tourism due to the fact that some studies suggest that finding ways for funding, requires the most time (resources) for making (implementation) of development projects.

Radović (2013) pointed out that the problems in the development of rural tourism in Serbia are numerous. Primarily, it is the lack of financial resources, lack of defined standards and register of rural tourism, insufficient offer of tourist attractions, as well as undeveloped local infrastructure and tourist signaling. One of the problems is a lack of association of service providers, their education, as well as the incompatibility of rural tourism service providers defined in legal solution with the current situation in practice. Large development problem is the underdevelopment of tourism intermediation or insufficient involvement of travel agencies in the promotion and sale of rural tourism products.

Some authors (Niskanen et al., 2007) pointed out that rural areas of Europe are facing with rapid economic changes caused by the decline in the profitability of agriculture and the lack of additional sources of income. The same authors stated that rural tourism has

been recognized in many countries as a method of diversification of economic activities, as well as a factor in the stabilization of the rural population. The development of this type of tourism can contribute to reducing disparities between regions (especially between urban and rural areas), and can be a significant source of additional (or base) household income.

Ateljević (2007) stated that by the end of the twentieth century in Europe, a large number of studies were connected with the operation of small tourist enterprises and were focused on rural tourism, with special emphasis on the sector of accommodation, but still greater attention is paid to the major travel companies located in the urban areas. Studies have shown that one of the most important characteristics of small and medium-sized enterprises is striving to overcome difficulties in securing funding for their survival, growth and development. Also, Vos and associates (2007) pointed out that small businesses, more than any others, are faced with a lack of finances and that problem is particularly acute in countries in transition due to uncertainty in the availability of financial resources, business profitability, market trends and unequal distribution of profits.

Small businesses and agriculture households in Serbia, are facing with a lack of financial resources, which causes the need for the development of innovative financing modalities. According to Vujović, Vukosavljević and Bjeljac (2014), self-financing is the dominant current form of financing for (rural) tourism in the Republic of Serbia.

The aim, methodology and data sources

The aim of this paper is to highlight the need to adopt a sustainable development strategy of rural tourism in the Republic of Serbia, as a special development document, with clearly defined development priorities and modalities of financing for the development of all segments of rural tourism.

Defining innovative and additional sources of funding for development rural tourism in the Republic of Serbia is necessary, because the existing are limited and insufficient (Radović, 2016). The adoption of this strategy is necessary in the Republic of Serbia, in the actual transition period, in order to develop rural areas, to reduce regional differences in economic development, and in order to stop actual depopulation process of rural areas.

The main hypothesis in the paper is: Rural tourism in Serbia is underdeveloped due to the lack of strategy of rural tourism and high-quality sources of funding. The paper used a method of analysis and synthesis, descriptive, and comparative method. Descriptive, as well as the method of analysis is used to analyze the current legislative framework and defined sources of funding in accordance with it. The analysis of the available literature, and within it the most popular forms of financing of rural tourism, were used to define the potential modalities of financing, which should be an important segment of the Strategy of sustainable development of rural tourism in Serbia, whose adoption is proposed in this paper .

Results

In order to prove the main hypothesis, we conducted research which consisted of two parts. The first part of the research included the analysis of the current legislative framework and in compliance with it the defined mode of financing rural tourism in Serbia. The second part of the research involved the analysis of the available literature, and within in the most popular forms of financing of rural tourism.

Analysis of the current legislative framework

The normative framework for the financing of rural tourism in the Republic of Serbia is strategically and legally defined by: (a) The Law on Agriculture and Rural Development; (b) The Law on Incentives in Agriculture and Rural Development; (c) Tourism Development Strategy of the Republic of Serbia for the period from 2016 to 2025; (d) the Strategy for Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024; (e) Master Plan for sustainable development of rural tourism in the Republic of Serbia; (f) Program of development of sustainable rural tourism in the Republic of Serbia; (g) Marketing strategy of tourism of the Autonomous Province of Vojvodina.

The Law on Agriculture and Rural Development defines that agricultural and rural development policies in the Republic of Serbia include measures and activities taken by the relevant authorities, and within them the most important for the development of rural tourism are: (a) measures to provide support to rural development; (b) measures to ensure high quality and healthy food; (c) measures to protect the environment from the negative impacts of agricultural production.

The Law on Incentives in Agriculture and Rural Development regulates the non-repayable funding of agriculture and rural development from the state budget, where all kinds of incentives are defined, as well as the conditions for entitlement to them and methods for their use. Incentives for development of rural tourism are comprised within the incentive for the improvement of the rural economy, which are implemented in order to improve the quality of life in rural areas. This group of incentives includes: (1) investments for the improvement and development of rural infrastructure; (2) the improvement of economic activities in the village through the support for non-agricultural activities; (3) the economic activity in terms of adding value to agricultural products, as well as the introduction and certification of safety and food quality, organic products and products with indications of geographical origin; (4) improving training in the field of rural development. The Law on Incentives in Agriculture and Rural Development has determined that the right to incentives could be given to agricultural holdings registered in the Register of agricultural households. The law also specifies that the beneficiaries of incentives are required to use funds for that purpose, and the obligation of the Ministry of Agriculture to keep the Register of incentives.

Tourism Development Strategy of the Republic of Serbia for the period from 2016 to 2025 defines only two measures of support and investment. Those are grants and loans with a lower interest rate. Grants are of small amounts and are intended to co-finance

various projects and activities in tourism. Loans for co-financing investments in tourism are with a lower interest rate than the market and are sold through the Development Fund of the Republic of Serbia. In order to develop tourism, defined by the Strategy, the new measures, programs and institutions for supporting the tourism development should be created according to the structure of entities that can realistically generate new entrepreneurship and innovation programs and investment projects, taking into account their size and possible real contribution to the development of tourism. In this Strategy are listed and public-private partnerships, as possible financial instrument and model for rural tourism development.

Strategy for Agriculture and Rural Development of the Republic of Serbia for the period 2014 – 2024 puts the diversification of the rural economy, which needs to be implemented, in priority development goals: (1) a diverse offer of products and services of rural households; (2) development of rural tourism; (3) increase in number of products and services based on the local identity of rural areas; (4) protection and preservation of cultural heritage; (5) strengthening the vertical and horizontal coordination of actors in rural development; (6) the improvement of utility and land infrastructure.

Master plan for sustainable development of rural tourism in Serbia is a project in whose creation were involved: Ministry of Agriculture, Forestry and Water Management, Tourism Department of the Ministry of Finance and Economy, Tourist Organization of Serbia (TOS) and five UN agencies: The Food and Agriculture Organization (FAO), The World Tourism Organization (UNWTO), the Fund for Children (UNICEF) and the United Nations Development Programme (UNDP). The national government has, on the basis of this project, adopted a Program of development of sustainable rural tourism in the Republic of Serbia, in November 2011.

Program for development of sustainable rural tourism in the Republic of Serbia defines that the main objective of this document is diversification of the rural economy through the reduction of poverty, improvement of quality of life, preservation of the cultural wealth of the country, environmental protection and balanced regional development. The Program also defines limits for the development of rural tourism in the Republic of Serbia: (a) lack of awareness of population in rural communities about the values of natural and cultural resources and tourism potentials; (b) insufficient capacity for rural tourism; (c) lack of managerial and organizational links to national, regional and local level, which is essential for the management of rural tourism in an efficient and sustainable manner. Twelve territorial regions - clusters of rural tourism on the territory of the Republic of Serbia, where this form of tourism should be a development priority, were determined by the Program. Clusters that were grouped into four groups are: Central and Western Serbia, Southern Banat and lower Danube, Eastern Serbia and cluster consisting of Vojvodina and the upper Danube.

Marketing strategy for tourism of the Autonomous Province of Vojvodina defines the development of rural tourism in Vojvodina as a tourist product of high potential.

Based on the analysis of the current legislative framework, it can be concluded that
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rural tourism is recognized as a key factor in the development of rural economies and opportunities and constraints for the development of this type of tourism are defined, but they are not sufficiently discussed and sources of funding are not defined. In particular, financial limited grants, which are placed from the state budget, are defined only, and these grants are inadequate source of financing for (rural) tourism. Also, as a source of financing are defined and loans with lower interest rate, but here, the state budget funding source subsidizing interest rates, and this modality of financing is limited.

It can be concluded that the analysis proved that the defined sources of funding in the current regulatory framework are limiting factor for the development of rural tourism in the Republic of Serbia. This confirmed the auxiliary hypothesis H_2 . In order to develop rural tourism in Serbia, additional, innovative funding modalities for rural tourism are required. Therefore, this paper proposes the adoption of specific rural development strategy, which should define and other terms of financing that would enable the development of this type of tourism in the Republic of Serbia, in actual transition period.

Possible modalities of financing for rural tourism in the future strategy

The analysis of the available literature, and within it the most popular forms of financing of rural tourism, were used to define the potential modalities of financing, which should be an important segment of the Strategy of sustainable development of rural tourism in Serbia, in actual transition period.

In order to develop rural tourism in the Republic of Serbia, it is necessary to adopt the Strategy for the sustainable rural tourism development, as a special development document. This Strategy should enable the sustainable development of this type of tourism from the economic, ecological and sociological aspects. Also, it is necessary that potential funding modalities are also defined in the Strategy of development of rural tourism. In addition to the existing means of financing, mainly based on state support and loans of commercial banks, it is important to implement in the domicile financial system also new financial institutions, as well as new funding modalities. The strategy should be written for the next ten-year period, and should include the development of all forms of rural tourism, that already exist, and can also be developed in the Republic of Serbia. It is necessary to define the method of financing of rural tourism offer in the narrow sense (accommodations and hospitality), and infrastructure, education of rural tourism operators, as well as the development of tourist attractions, promotions and sales channels.

Available literature offers a few popular modalities for financing the rural tourism, so we compared them with the results of the survey research and formulated potential modalities for financing rural tourism in the Republic of Serbia. Those are:

- (a) *Microcredit organizations;*
- (b) *Joint venture;*
- (c) *Business angels;*
- (d) *Public-private partnerships (PPP);*

- (e) *Specialized Agricultural Bank (SAB);*
- (f) *Pre-accession funds of the European Union.*

Microcredit organizations - The need to innovate financial system in the Republic of Serbia is located in the current economic literature. For example, Šoškić (2017) emphasizes the need for the introduction of non-bank credit institutions in the domestic financial system, and, above all, savings and credit cooperatives and microfinance institutions. These institutions could also be an important source of funding for rural tourism.

These financial institutions would be able to get actively involved in financing the development of rural tourism in the Republic of Serbia due to the fact that they have an important role in supporting the development of entrepreneurship and self-employment category of the population that have no access to conventional banking market. In addition to activating the unemployed, investments of microcredit organizations are also important for ensuring the necessary sources of financing to farmers who do not have a continuous source of income, necessary to get loans from commercial banks, but they have a vision for the development of rural tourism. According to (Erić et al., 2012) microloans primarily mean providing financial services to individuals with lower incomes in order to start their own business and be economically independent and strong.

There are great opportunities and needs of investments of microcredit organizations in order to develop rural tourism. This applies primarily to the development of the tourist offer, i.e. construction of accommodation facilities, the development of restaurants and tourist attractions. The limiting factor for the application of lending by microcredit organizations in the Republic of Serbia is the lack of legal framework for their operation. Therefore, microcredit organizations have to invest their loans through commercial banks, which significantly increase this way of financing.

Joint venture is a specific form of foreign direct investment with the owner of the capital not acting independently, but in cooperation with local partner (Andrić et al., 2005). The importance of financing through joint ventures is that the funds are obtained from foreign partners without the cost of financing, and tangible and intangible assets are obtained without purchase, which is positive for micro and macro aspect, for it has a favourable effect on the balance of payments. The essence of the joint ventures is that partners share profit, but also the risks and losses of joint engagement in proportion with the invested funds. Obligations of partners are defined by the contract, whose period of validity can be linked to the period until the invested funds from profit of joint work are refunded, but also to the longer period.

Joint ventures can be an important modality of financing the development of all segments of the rural tourism in the Republic of Serbia. For example, joint ventures can be realized between domestic rural tourism entities (rural tourism households, rural hotels or ethno village) with foreign investors. They could jointly finance construction for example of an aqua park within the municipality which has the developed rural tourism. In this kind of funding could also be actively involved representatives of diaspora, who originate from the municipality in which the investment is planned.

Business angels - Financing the development of rural tourism in the Republic of Serbia can be achieved also through “business angels” as a kind of non-institutional private investors who invest in entrepreneurial firms, in the initial stage of their development. These investors typically have sustainable professional experience, and have free financial resources and necessary contacts, so they want to invest their professional wisdom in start-up companies so that they could have successful business and development, but also to verify their business reputation (Eric et al., 2012). In most cases, the invested money is not returned but is exchanged for co-ownership and exactly this characteristic distinguishes “business angels” from micro-credit organizations.

Financing through “business angels” can be implemented in order to develop small and medium enterprises in the field of rural tourism in the Republic of Serbia. It is particularly suitable for newly established micro enterprises, which do not have the “credit history”. It is adequate for financing of all segments of the rural tourism offer: the construction or reconstruction of accommodation facilities, development of restaurants and tourist attractions, training and development of staff and leaders, as well as for financing of promotion. The advantage is that this way of financing and consulting is free of charge and profit-oriented, which synergistically may be a generator of development of rural tourism. This modality of financing could especially be interesting to people from the diaspora, who would in this way be able to invest free capital, but also to implement their experience and business contacts, and take active role in the development of rural tourism in the Republic of Serbia.

Public-private partnerships (PPP) as a form of business cooperation emerged in the 90s of the 20th century in the United States, where it was originally used to finance education, municipal services and infrastructure (Yescombe, 2010). Public-private partnership is a method that connects the interest of the public sector (common good), private sector (profit) and civil sector (special interests) in meeting the specific needs to increase the quality and/or availability of services and products (Perić et al., 2006). The same authors believe that this method of financing is used for the purposes for which the public sector has insufficient funds, while the private sector does not have enough interest to individually invest funds. Therefore, their most common use is in financing the construction or reconstruction of transportation or utility infrastructure. Public-private partnerships provide funding without paying the cost of financing, through them the business risk is divided, and greater availability of funds from the European Union is also allowed. This method of financing could be applied to finance construction or reconstruction of infrastructure in rural areas in the Republic of Serbia, which could initiate the development of rural tourism, and consequently rural, regional and overall economic development of the country and the region.

Specialized Agricultural Bank (SAB) - Establishment of Specialized Agricultural Bank of the Republic of Serbia is necessary in order to develop agriculture, but also non-agricultural activities, i.e. rural tourism in the context of agricultural holdings. The Specialized Agricultural Bank loans should be with lower interest rates and other favourable conditions of lending. For that purpose, Specialized Agricultural Bank requires providing specific structure of funds, which could only be provided with the

support from the state, and the state should have a crucial role in policy lending funds, which would be in line with economic, social, but also strategic objectives related to the need for the development of rural tourism in Serbia. It is important to arrange the establishment and operations of Specialized Agricultural Bank (SAB) by a special law, which should define the initial capital and sources of financing, as well as operations, i.e. business objectives, and in accordance to them also lending conditions. It is essential to prevent the centralization of resources and decision-making, as well as the political influence on the management of the bank (Radović, 2014).

Favorable loans, placed by Specialized Agricultural Bank, could be a quality and a significant source of funding for the development of all segments of the rural tourism supply side. Specifically, these loans could be used to finance the construction of accommodation facilities, for the development of tourism facilities, education, and for the development of tourist services through the development of organic food production.

Pre-accession funds of the European Union - By receiving the status of candidate on March 1st, 2013, the Republic of Serbia won the right to use funds from the IPARD pre-accession component. IPARD is the most complex IPA component and it comprises measures that can be grouped into three axes. Financing of rural tourism is implemented via third axis measures that include activities related to the development of rural infrastructure and diversification of the rural economy. For the development of rural tourism from the aspect of the individual entity the most important measure is 302, and within it happen the following investments: (a) in construction and/or reconstruction and/or equipping of facilities for provision of tourist and hospitality services; (b) facilities for the breeding of animals for tourism purposes; (c) facilities for recreational activities; (d) tourist camps; (e) facilities outdoors (thematic tracks, equestrian tracks, etc.); (f) the restoration of old buildings (traditional architecture). Financing from IPARD is realized on the principle of co-financing. More specifically, for the financing of projects part of the funds is provided from the Fund, and part has to be financed from domestic funds, the participation of the public sector can be up to 50%, while the rest of the funds have to be provided from the resources of the private sector. In order to implement the measures of the third axis it is necessary to provide funds for co-financing at a minimum of 10%, and at a maximum of 50-70% of the project value. The Republic of Serbia, within IPARD in the program period from 2014-2020, has available 175 million Euros, or 230 million Euros, if we take into account also funds from national funds. IPARD funds are not yet available to rural tourism stakeholders in Serbia due to administrative reasons.

Conclusion

The authors believe that the lack of quality sources of financing is the biggest limitation for the development of rural tourism in the Republic of Serbia. Rural tourism entities do not generate adequate profits that would allow them to self-finance their activities, and existing funding modalities are inadequate or insufficient. Therefore, the authors advocate defining innovative financing modalities.

In order to resolve the problem of financing rural development and rural tourism, authors propose the adoption of a new strategy, which will primarily deal with the problem of financing, as a fundamental development problems of rural areas in the Republic of Serbia, in actual transition period. Also, it is necessary to define the modalities of financing of all segments of the rural tourism offers: accommodation facilities, hospitality sector, tourist attractions, promotion, sales channels, as well as the development and training of staff, and development of rural infrastructure.

Authors analyzed available literature and suggest the introduction of new institutions in the domestic financial system, such as micro-credit organizations and Specialized Agricultural Bank which require redefinition of the legal framework. Also, it is necessary to include in the financing of rural tourism, as stated in the current Strategy for Agriculture and Rural Development, and the pre-accession funds of the European Union (IPARD), but also the potential modalities of financing, such as public-private partnerships, joint ventures, and “business angels” as innovative funding modalities in the Republic of Serbia. The above-mentioned potential modalities of financing should be a part of the future rural tourism development strategy, as well as their active application in practice. Development of rural tourism can induce rural development in order to ensure the reduction of different level of economic development between regional region in order to stop the actual depopulation of rural areas in the Republic of Serbia.

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FINANSIRANJE KAO KLJUČNI ELEMENT STRATEGIJE ODRŽIVOG RAZVOJA RURALNOG TURIZMA U REPUBLICI SRBIJI

Gordana Radović⁵, Kristina Košić⁶, Dunja Demirović⁷

Sažetak

Jedan od značajnih faktora koji utiče na neadekvatan razvoj ruralnog turizma, u većini ruralnih oblasti u Srbiji, je nepostojanje definisanih strateških pravaca razvoja, neadekvatan uticaj državne administracije, a posebno nedostatak investicija, na nacionalnom i lokalnom nivou, za razvoj ruralne infrastrukture. Cilj rada je da se istakne potreba donošenja Strategije održivog razvoja ruralnog turizma u Republici Srbiji, u aktuelnom tranzicionom periodu. Strategija bi trebalo da ima jasno definisane razvojne prioritete i modalitete finansiranja svih segmenata ruralne turističke ponude. Definisanje inovativnih i dodatnih izvora finansiranja je neophodno jer su postojeći izvori ograničeni i nedovoljni.

Ključne reči: *ruralni turizam, razvoj, finansiranje, strategija, Republika Srbija*

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THE FINANCIAL RELATIONSHIPS BETWEEN FARMERS, CREDIT INSTITUTIONS AND PUBLIC AUTHORITIES – SHORT REVIEW

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Summary

Agriculture is the sector that satisfies the demand for food of the population of a state, thus providing key solutions for combating poverty and / or hunger. The need for funding in agriculture is increasingly debated at international level, especially as discrepancies arise in relations between the main actors involved, namely: farmers, credit institutions and national and European public authorities with the aim of the European funds management. The relational problems, and not only, of the three actors mentioned above are manifested in various forms. These are discussed in this paper. Under these conditions, it is proposed to strengthen the relationship between the three actors, first by assessing the existing problems and, secondly, by solving them.

Key words: agriculture, credit, European funds, farm, financing.

JEL: Q14

Introduction

Agriculture is the factor that meets the demand for food for the population of a state, thus providing key solutions to combat poverty and / or hunger. In this way, the funding role of this economic sector should benefit from a hierarchical prioritization in terms of the allocation of funds, as it mediates commodity transactions that simultaneously meet characteristics such as nutritional safety and sustainability (Reti and Bak, 2016).

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As can be seen from the studies carried out so far (Miteva, 2005 and Bojnec, 2012), different parameters may give a different form to land capital markets and agricultural financing systems, the auspices to which these indicators are subjected are decisive for the final stage in which the population has access to planned economic structures at the level of a political body.

The multifunctionality of the roles that agriculture develops within a country's borders can be borne out by various and different economic mechanisms, as folding on the structure of farms and, in particular, their size, they are demanding agricultural policies geared to the agrarian needs of a country, many times, even if they are part of the European Union, they have characteristic features very different from the country that is part of the same alliance (Hungary and Slovenia, Slovenia being a small country, the most common agricultural organizations we find in the form are the family farms, and in Hungary, a country with larger land plots, the highest frequency of business is represented by large agricultural companies), and this also requires adapted agricultural policies and government support. (Bojnec et al., 2014)

In this context, the present research aims to revise the relations between farmers and credit institutions, respectively the relations between farmers and the public authorities with their object of managing the European funds. The subject discussed from the perspective of the need to finance agriculture, refers to both international situations and specific situations, such as Romania.

The relationship between farmers and credit institutions

In order to sustain the competitiveness of Romanian agriculture in the first year since Romania obtained its status as a member country of the Union, in 2007, it was applied to agricultural policy measures involving a single payment scheme on the land used up to various forms of financial support in the intervention sector in penetrating and maintaining the agri-food business market. (Alexandri and Luca, 2012)

The combination of non-reimbursable European funds and of the crediting of agriculture by different institutions in this field leads to the development of Romanian rural in the parameters of market mechanisms. As the absorption of these amounts is deficient due to the co-financing component to be supported by the project beneficiary, Romania cannot cope with the rigid EU deadlines, some of them reorienting to banks to purchase agricultural credit services from their portfolio.

There are some opinions (Stratan, 2014) who argue that the liberal-type policy applied in agriculture should be coupled with the interventionist type because measures such as price subsidies and production factors as well as preferential lending may be small changes to give a better version of agriculture as a whole. A solution to not regress the Romanian agriculture could be represented by the guarantee of the real price of the domestic market, but the limitation of this is driven by the conditioning imposed by the forms of production storage, or even more frequently, by the lending programs.

In literature (Dodson, 2014) believe that small banks are based on establishing a credit relationship built with a subjective assessment of creditworthiness. This advantage can be considered from a hierarchical perspective because the organizational structure and bureaucracy are lower, and in this way the distraction between the loan officer and the company management is lower, so the time of eligibility and credit granting analysis is also lower. (Berger and Udell, 2002)

Smaller agri-food businesses can be more powerful candidates in the agricultural credit market because it is easier for them to maintain more detailed financial records compared to intermediate or large and very large ones. (DeYoung et al., 2004). Berger et al. (2001) found that banks are more reluctant to lend information to opticians, while small lending institutions have proved to be better at processing and assessing credit applications for small firms.

In order to find out and rank risk ratings, large banks are gaining ground because they are likely to have access to larger databases such as small ones, with homogeneous groups of local investors, which allow the lender to assess the risk of the lender transaction. In calculating borrowing performance, banks have lately used in an intensive manner technologies involving the use of asset-based lending and adapted to the financial situation as well as the credit score instrument. (Berger and Udell, 1998)

The risks arising from the relationship between farmer and credit institutions have attached unexpected variations in the cost and availability of credits. Their sources come from the coercive forces on the market and the creditors' responses to the risks on the agricultural market and their creditworthiness. Empirical evidence from studies on risk from the creditor shows that the loan made by farmers is directly correlated with farm incomes, so it can be concluded from this relationship that there is a stronger correlation in the case of loans supporting the development of capital than those made for supporting operational systems. Increased credit risk is more prominent in the market by diversifying the credit portfolio made available by lending institutions. (Barry and Ellinger, 1989)

Agriculture and the businesses that this business sector involves are full of challenging challenges for operators of any kind, age or size. This business sphere calls for ample investment because the capital needed to put it into operation is not at all negligible in value. There is a need for investment in land, buildings, equipment, seeds, or if the zoo is concerned, then a significant number of animals and feeds are needed. Oscillating, unreliable commodity prices, fuel, interest rates, and meteorologically negative events put the entrepreneurs on the agri-food market in a hurry, making both investors and creditors alike think their involvement on this market. These challenges are especially felt by young people, novices or small producers. That is why they need not only a credit from the lending institutions, but also a handful of help from them, which is necessary for the establishment of potential clients.

Currently, agri-food lending markets need to be flexible in their approach, as demand in the market is divided, with predominantly small customers. Access to credit is considered in the literature (Besley, 1995 and Zeller and Meyer, 2002) as a key requirement of economic growth and then of raising the standard of living in more or less developed rural areas.

Poor households in transition or developing countries often have the main source of income for agriculture, and at the macroeconomic level this is the branch of the economy that contributes most to the GDP of the country. In these cases, it is necessary to consider the clients and to rationalize the amounts that banks generally make available to consumers. (Petrick, 2004)

Taking into account a macroeconomic approach it is necessary to maintain prosperous relations between small and large farmers and credit institutions in order to develop Romanian agriculture, because through its evolution the Romanian agri-food businesses will not only produce raw materials but will process what they obtain within their enterprise, and this will create gross added value, a taxable element by state forces.

The main conditioning of this business relationship between the two entities mentioned above is through the interest that customers have to pay to the lender. Its variability is conditional on the activity flow of small farms. In Romania, at present, agricultural loans are granted for a maximum of 20 years. In 2017, the Romanian bank CEC Bank announced a variable interest rate on agricultural loans of 4.31% per year.

Granting loans to subsistence farms or micro-farms is a delicate issue, and lending institutions are reluctant to do so because these small businesses can easily remain without liquidity. Due to the fact that they do not engage in large capital and sufficient labor, these investments can easily fail the lender to recover the borrowed amount and the price for it, the interest.

On a large scale, in a theoretical scenario, if a lending institution would predominantly support small businesses, beginners and subsistence farms, it would have a chance to go bankrupt in a very short time, because operators quoted earlier may enter the crisis facility liquidity.

Their liquidity crisis will also arise over the debtor institution under the domino effect, because when it operates with money deposits it runs through lending, with the institution's profit being the difference between lending interest and deposits. If loans and lending rates are not honored by clients, they will not have sufficient financial resources to honor the time deposits, sorting out the financial institution to failure.

The precaution that the banking institutions have in the agricultural sector has its origin and the many risks that the work in this field has to do. In particular, the borrower cannot assume the risk of the incidence of meteorological events in the form of calamities that would cause the farmer to temporarily stop the farmer's income streams, so he would not allow him to pay in due time his credit and interest. Even though the profile institutions come with a great diversity in the lending area in their portfolios, the rate of absorption of these financial services is predominantly low because the eligibility of potential clients is below the allowances considered admissible for the borrower. (Winter-Nelson and Temu, 2005)

Reasons behind government programs to make farmers available to direct lending can lead to information asymmetry problems in capital markets, and the benefits that are made available to customers can lead to a national financial relaxation that is not always desirable.

Whether government intervention on credit markets can achieve legitimate objectives, it depends on the mechanism chosen for the implementation of dedicated credit. In some cases, the marketing constraints that agri-food entrepreneurs may have may hinder reimbursement terms which farmers can accept for good credit management and in this situation government coercion is insufficient. In other cases these problematic situations are avoided by establishing credible market mechanisms to ensure the allocation and reimbursement of credits. (Calomiris and Himmelberg, 1993)

The relationship between the farmer and the lending institutions can take tense or stable forms; in Romania the preponderance is unfortunately the first option, often due to the instability of the Romanian or the political taxation, which stops programs destined to allocate funds for development sustainability of Romanian agriculture.

In these circumstances, it is proposed to strengthen the relationship between the two actors, first by evaluating the existing problems and then by solving them.

The relationship between farmers and the public authorities with the aim of evaluating, managing and monitoring the European funds

One of the most prominent problems in line with EU funds for agriculture is their low absorption rate, with Romanian farmers being able to access only a small percentage of the sums allotted through programs aimed at supporting them, and at the macroeconomic and general level, the development of rural life as a whole.

The primary cause of the low absorption rate of the Structural Funds is correlated with the delays in the development of the programs at national level and because of the decisions taken from Brussels, reported to the European Union budget. Another issue of concern is the lack of transparency in the government, especially in the administrative management of programs, in which case the responsible ones avoid accepting that there are challenges and vulnerabilities in ongoing projects, showing only positive aspects of European projects. Avoided solving and looking for solutions to the blockage of European funds, creates economic harm first and foremost to the farmer, and secondly to the national economy.

Another problematic interest point in the rate of absorption may be the banking system, setting conditions that are difficult to meet for the average farmer, and in most cases they cannot come up with a sufficient co-financing budget.

We also encounter bureaucracy, in some cases it is present in excess, and this can degenerate in cases of corruption. Romania's recent years had to deal with political conflicts which then turned into real crises, the economic barometer also recording irregularities in allocating according to the plan communicated to the population. Thus, due to the tense relations between the executive branch and the potential beneficiaries, but also within the executive branch, one can easily see how the deadlines of the agro-alimentary financing programs reach maturity, when they actually do not even have in the Romanian space beginning.

Diversification of income sources is a strategy that aims to reduce the risk to the farmer of losing his purchasing power in the input market, because the absence of this market

in the role of buyer would make him obvious, non-existence in the output market. It can therefore be seen in this context the importance of maintaining a good relationship between the farmer and the authorities in charge of the management and good course of money from European programs as a food security perspective.

The availability of money from European funds increases both incomes and consumption as a result of increased productivity thanks to investments and the degree of modernization of agrifood businesses (Schroeder, 1996, pp. 345) at national level. Rural financial institutions dealing with the allocation of financial resources for agriculture must have a flexible and understandable approach for small farms or young farmers by providing them with education services in terms of support. In this way long-term food insecurity can be avoided by providing non-reimbursable farmers to support the productive process that is politically threatened by rising fuel or commodity prices or weather threatened by the weather in climate change.

For the current period, 2014-2020, through the program for rural development, NRDP, it is worth about 9.3 billion euros. (Rus Ma et al., 2015). The achievement of the European average relative to the western rural environment, the standard of living, the level of modernization and the overall socio-economic development of those areas as a whole, are under the sign of the above-mentioned amount of money, through its good management, diminishing the existing disparities the current moment.

At the level of European funds monitoring, there can be a lack of a serious audit tool that will accurately check the investment of the financial resources allocated after the winning of the project. And so, it can also be called the small shortcomings of the risk analysis seen from the point of view of the need to refine financial statements. Also, the provisions, which imply the taken measures in the case of the insolvency of a company that is running a program which has allocated European funds, most probably non-reimbursable, are also perfect.

From the same perspective, authorities managing Structural Fund allocations have no protection against the political risk of Romanian political instability. Also, no device performs and does not require the use of time-frames to build a dedicated profile with which to establish a potential co-financing or reimbursement capability, as the case may be.

One of the issues raised in the relationship between the farmer and the public authorities is the internalization of the capacity for evaluation and monitoring of the funds, respectively the client, which currently suffers from a large deficit. As this process is cumbersome and unfruitful, it often calls for external assistance, and this process is expensive and could be reduced by good human resource management.

Another negative effect is that, at present, the outsourcing mentioned above does not go to native companies but foreign ones, this fact not holding the positive evolution of the Romanian economy. The appreciation that there will be a rebate on the quality of the service is unfounded, the services offered by a Romanian or foreign company being with the same nature but differentiated costs. (Kehew, 2000)

A solution that could address these problems would be, firstly, the outsourced services provided by enterprises with Romanian capital, and then the staff of the public authorities should be trained according to the needs of the workplace.

A not negligible threat of absorption of European funds is a lack of rigorous procedures and methodologies for public sector authorities operating with this type of finance.

At present, there is great pressure in Romania to quantify the progress of structural funds absorption and to identify adjustments to the shortcomings found during the running of the programs, in this manner desiring the design of public policies in the country's supposed ideology. (May, 2006)

Over the past two decades, the European Commission has played a decisive role in shaping a culture of project outcome evaluation or project implementation, introducing elements of cost-benefit analysis as a tool for monitoring the gradual need for funding. (Mairate and Angelini, 2006) In Romania there are several institutes dealing with this evaluation research, among which the Romanian Academy, the European Institute in Romania or the Center for European Policies in Romania. (Cace et al., 2011)

The Economic Growth Stimulation Policy addressed by U.E. is based on endogenous growth patterns such as those suggested by Robert Lucas in 1998, or by Grossman and Helpman in 1991. The main instruments the Union uses to achieve economic growth consist of subsidies for private or public operators. This management of structural funds has often had the questionable ethics. (Hapenciuc et al., 2013)

According to specialized studies using modeling of economic processes as a forecasting tool (Zaman and Ahmad, 2008), the absorption of European funds could have a significant impact in Romania, helping to smooth the process of convergence and also to reduce disparities and disparities. According to the estimates, for the period 2004-2020, Romania could have an annual economic growth that would vary between 0.1% and 0.2%. However, in reality, the absorption of the financial resources made available has been greatly diminished by the lack of experience of potential applicants and the lack of trust due to insufficient and faulty promotion of this service at national level.

With the previous crisis, which started in 2008, unnecessary needs and problems emerged that still require a reconfiguration of the manners of allocating, managing and absorbing structural funds. (Neculita, 2013)

At present, in Romania, the relationship between the farmer and the public institutions which have as their object the management of European funds is superficial and cumbersome due to the multitude of eligibility criteria that a farmer has to present and on the other hand the effective transfer of money resources to the project winner, long delayed due to various factors of influence. The instability of this relationship further blocks the absorption of structural funds into Romanian agriculture, asking both sides about the ethics of the business partner and the Romanian economy remains suffering due to political, social and educational limitations.

Under these circumstances, it is proposed to strengthen the relationship between the three actors, first by evaluating the existing problems and then by solving them. The evaluation can be carried out at local, regional or national level depending on the degree of diversity of each country, by means of an inquiry which can highlight the prospects of each party investigated and the points of inconsistency to be resolved in order to facilitate the financing of agriculture.

Conclusion

The approach of the economic agents involved in agricultural activities must not affect the national limitations but rather address a wide macroeconomic angle that follows the global economic development network in terms of sustainability. The development of each field of activity is produced by constant, qualitative and quantitative monitoring of its structures, substructures and implicit mechanisms. So, the importance of an efficient financing apparatus is justified by the operation of an investment regime able to sustain the macroeconomic dynamics of the dynamics of a given economy. This analytical body requires a constant adaptation to the structure of input-output flows in order to connect to a simple and not simplistic system based on the basic economic principle of the minimum and maximum. Therefore, this observation angle aims to increase the entrepreneur's ability to control the management of the resources involved and the quantity and quality of the finished product he will have.

The agriculture financing process has not only a financial, but monetary, but it goes on, describing a science that exceeds monetary limitations, being tangent to the social dimension.

The importance of financing agriculture is becoming more and more aware of both farmers, credit institutions and national and European public authorities, but these actors are hardly able to eliminate the distortions that have arisen in today's agriculture. The relational problems, and not only, of the three actors mentioned above are manifested in various forms that have been discussed in this paper.

In Romania, the relationship between the farmer and the lending institutions is tense by the instability of Romanian or political taxation. Also, the relationship between the farmer and the public institutions which have as their object the management of European funds, which is often difficult, creates bottlenecks in the absorption of structural funds for Romanian agriculture.

Finally, the relational problems between farmers, credit institutions and national and European public authorities, which have as aim the management of European funds, generate the diminishing of the efficiency of programs meant to allocate money resources for the sustainable development of the Romanian agriculture. Therefore, it becomes necessary to improve the relationship between these actors.

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*Povodom osamdesetog rođendana***PROF. dr BRANKO KRSTIĆ – ČOVEK VISOKIH KRITERIJUMA****1. Biografija**

(Izvod iz knjige: Manojlović, L. (2011).
Zavičajne i porodične priče. Off-set, Tuzla, BiH)

1.1. Četvorica veličanstvenih

Kada su se rađali, odrastali i školovali, njima je siromaštvo bilo gotovo plemenito. Velika Obarska, u kojoj su likovi iz četiri priče rođeni, bila je siromašno selo dobrih i plemenitih ljudi. Živjelo se u sirotinji, sirotinjski, ali se težilo boljem, ljepšem i sadržajnijem životu. Njihova djela, Branka, Živorada, Milenka i Branislava, su samo mala vidljiva kora njihovih života. Svoj pravi život čovjek vodi samo u svojoj glavi i on je poznat samo njemu.

Nakon Drugog svjetskog rata, 1941-1945. godine, u selu je bilo malo pismenih i školovanih ljudi. Tih godina, pomalo stidljivo, nakon četiri razreda osnovne škole, samo uporni i „hrabri“ nastavljali su školovanje u Bijeljini. Do grada se išlo pješke i zimi i ljeti sa komadom proje u džepu i knjigama u torbi. Ljeti se radilo na njivama da bi se zaradilo za školovanje u Sarajevu, Beogradu. Te teškoće i stvorile su ljude. Druge nije bilo. Ta sirotinja gotovo je bila plemenita. Ona te podstiče da ideš dalje. Postalo je već pravilo: dok je sirotinje, biće i napretka i naprednih ljudi. Sirotinja je pratila i naše Velikane Velikoobarčane. Težak je i trnovit put do zvijezda, a oni su taj put prešli uspješno. Kao takvi, zaslužili su da žive na stranicama knjige Zavičajne priče...

1.2. Naučnik svjetskog ugleda

Dr Branko Krstić, redovni profesor univerziteta u penziji, rođen je 17.02.1938. godine u selu Velika Obarska, opština Bijeljina, Bosna i Hercegovina. Osnovnu školu završio je u rodnom selu 1949. godine. U Bijeljini je završio nižu (1953) i višu (1957) gimnaziju. Poljoprivredni fakultet u Beogradu završio je 1961. godine. Magistarske studije iz oblasti agroekonomije završio je na Poljoprivrednom fakultetu u Beogradu 1965. godine. Specijalističke studije završio je u Bari-u (Italija) školske 1966/1967. godine (Istituto Agronomico Mediterraneo). Doktorsku disertaciju iz oblasti agroekonomije odbranio je na Poljoprivrednom fakultetu u Beogradu 1974. godine. Radni vek (1961-2002) proveo je na Poljoprivrednom fakultetu u Beogradu. Prošao je kroz sva univerzitetska zvanja (od asistenta do redovnog profesora) učestvujući u nastavnom procesu osnovnih i posle-diplomskih studija, kao i u komisijama za izradu, ocenu i odbranu nekoliko stotina diplomskih radova i nekoliko desetina magistarskih i doktorskih teza, u svojstvu mentora ili člana komisije na fakultetima u Beogradu, Novom Sadu, Subotici,

Sarajevu, Banjaluci i Osijeku, kao i u Višoj poljoprivrednoj školi u Šapcu. Nastavna aktivnost vezana je za sadržaje mikro agroekonomskih nastavnih disciplina. Objavio je preko 200 naučnih radova, monografija, studija i projekata u zemlji i inostranstvu. Učesnik je ili organizator većeg broja naučnih skupova. Recenzirao je mnoge naučne radove i udžbenike, uređivao časopise i zbornike radova sa naučnih skupova i držao uvodna izlaganja na naučnim skupovima. Preko 30 puta je sa referatima učestvovao na naučnim skupovima čiji su organizatori bile pojedinačne naučne institucije ili jedna od sledećih međunarodnih organizacija:

IAAE – International Association of Agricultural Economists,

CIOSTA – Commission internationale de l'organisation scientifique du travail en agriculture,

AFSRE – Association for Farming Systems Research/Extension,

FPH – Fondation pour le progres de l'homme,

FEZ – Federation europeenne zootechnique.

Rukovodio je naučnoistraživačkim projektima koje su finansirale državne ili privredne institucije u zemlji, kao i projektima u okviru međunarodnih naučnoistraživačkih mreža:

RAFAC- Reseau Recherche Compare sur l'Agriculture Familiale – Centre international de Hautes Etudes Agronomiques Mediterraneennes,

APM – Agriculture Paysannes et Modernisation.

Bio je direktor Poljoprivrednog školskog dobra u Zemun Polju (1972-1973), šef Katedre za organizaciju i ekonomiku proizvodnje (1988-1991) i direktor Instituta za agroekonomiju u sastavu Poljoprivrednog fakulteta u Beogradu (1991-1995).

Kao ekspert tehničke pomoći, posredstvom Jugoslovenskog zavoda za međunarodnu tehničku saradnju, boravio je u Tanzaniji (1974-1975) i Beninu (1978-1979), gde je radio projekte iz oblasti prostornog planiranja i osnivanja poljoprivrednih preduzeća.

Priznanja i odlikovanja za rad:

1. Kao student učestvovao je u omladinskim radnim akcijama na izgradnji autoputa „Bratstvo-jedinstvo“. Za zalaganje na radu dodeljena mu je pohvala 1959. godine, a 1960. godine proglašen je udarnikom za naročito zalaganje i lični primer na radilištu i u naselju.

2. Završio je četvorogodišnje studije za 3 godine i 9 meseci sa najvišom prosečnom ocenom, za šta je dobio nagradu i proglašen za studenta generacije koja je upisala studije 1957. godine a završila 1961. godine.

3. Kao pitomac Škole rezervnih oficira intendantsko-finansijske službe, povodom dana JNA, 1964 godine, nagrađen je knjigom Daleko je sunce (Dobrice Ćosića) za primerno zalaganje i pokazani uspeh na savlađivanju nastave, primerno vladanje i ponašanje i pravilne međusobne odnose.

4. Povodom 50 godina od osnivanja Poljoprivrednog fakulteta u Beogradu dodeljena mu je 1969. godine Povelja za naročite zasluge u unapređenju nastavnog procesa.

5. Povodom 4. aprila, dana studenata Beogradskog univerziteta, dodeljena mu je 1972. godine Plaketa Saveza studenata Beogradskog univerziteta u znak priznanja za rad i saradnju sa organizacijom Saveza studenata.

6. Viša poljoprivredna škola u Šapcu dodelila mu je zahvalnice 1970. i 1980. godine za doprinos radu škole povodom 10- godišnjice i 20-godišnjice osnivanja i rada škole.

7. Povodom dana Poljoprivrednog fakulteta u Beogradu dodeljena mu je Plaketa 1977. godine za posebne zasluge i postignute uspehe na uzdizanju stručnog i naučnog kadra.

8. Ukazom Predsedništva SFRJ od 20. aprila 1989. godine odlikovan je Ordenom rada sa zlatnim vencem za naročite zasluge i postignute uspehe u radu od značaja za napredak zemlje.

9. Savez poljoprivrednih inženjera i tehničara Jugoslavije, povodom 40 godina postojanja naučnog časopisa Ekonomika poljoprivrede, dodelio mu je 1995. godine Povelju kao izraz priznanja i zahvalnosti za doprinos izgradnji časopisa.

10. Institut za agroekonomiju Poljoprivrednog fakulteta u Beogradu dodelio mu je zahvalnice 2003. i 2008. godine povodom 40 i 45 godina postojanja Agroekonomskog odseka za ukupan doprinos radu i razvoju Agroekonomskog odseka i Instituta za agroekonomiju.

Živi i radi u Beogradu i Velikoj Obarskoj. (2010.).

2. Stavovi prema struci i stručnjacima

Utisak o visokim kriterijumima prof. dr B. Krstića zasniva se na njegovim objavljenim radovima, ali i na njegovom odnosu prema sebi i svome okruženju u okviru svoje profesije i van nje, od početka radne karijere do danas. Prošao je kroz sva univerzitetska zvanja radeći predano na usavršavanju sebe kao stručnjaka i kao ličnosti. Sa sticanjem više znanja i iskustva, sve više se primećivao njegov doprinos unapređenju nastavnog procesa i naučnoistraživačkog rada u oblasti agroekonomije. Ispoljio je u radu i ponašanju gotovo sve osobine poželjne za naučnika i profesora univerziteta. Čini se da među njima dominira ona koja je navedena u naslovu ovoga rada. Na takav zaključak upućuju mnogi njegovi stavovi, od kojih treba posebno istaći ove:

1. Praćenjem većeg broja stručnjaka od studentske klupe pa do zrelog doba, a u nekim slučajevima i do penzionerskog statusa, nameće se zaključak da stručnjak može da opravi svoju (pre svega fakultetsku) diplomu ako shvati da svojom delatnošću treba da menja svet, naravno na bolje. Koji svet? Pre svega svet oko sebe. Ali često, osim sveta oko sebe, ispostavi se kao neophodno da se mora menjati svet u sebi. Da bi menjao svet u pozitivnom smeru, ponekad čovek mora da menja samoga sebe, odnosno svoj pogled na svet, moralne stavove, sistem vrednosti. Ako se ovaj stav primeni na agronoma, odnosno

zootehničara, onda to znači da se njegovim delovanjem primetno i u kontinuitetu mora poboljšavati stanje u biljnoj ili stočarskoj proizvodnji, odnosno u sektoru koji stručno vodi. To poboljšanje treba da bude izraženo i naturalnim, i finansijskim, i zdravstvenim, i ekološkim, i moralnim, i socijalnim, i pravnim, i estetskim kriterijumima. Zato, kad posmatramo nečija dela, moramo ih ceniti i sa stanovišta doprinosa pozitivnoj promeni sveta. (Ovaj stav naveden je u projektu optimalnog upravljanja funkcionisanjem i razvojem jednog poljoprivrednog deoničkog društva, koji je prof. Krstić radio 2014. godine).

2. Kad se govori o merama za finansijsku konsolidaciju, važno je uzeti u obzir koliko je privredni subjekt osposobljen da pribavljena finansijska sredstva racionalno iskoristi. Ima li dovoljno znanja i iskrene želje da se pribavljena finansijska sredstva iskoriste na način koji će efikasno delovati na ozdravljenje finansijskog stanja, pokretanje i unapređenje proizvodnih aktivnosti i ekonomsko jačanje privrednog društva? Kada to nije obezbeđeno, finansijska agonija privrednog subjekta može da se nastavi i izaziva stalnu potrebu za novim finansijskim injekcijama. Uz to treba najozbiljnije sagledati da li su dobro zatvoreni svi ventili kroz koje može nekontrolisano da curi dohodak privrednog društva. Ovom privrednom subjektu, radi ekonomskog oporavka, potrebno je, pored ostalog, da obezbedi kadrove koji pristupaju svojim radnim zadacima sa entuziazmom, koji prate savremena dostignuća u svojoj stručnoj oblasti i stvaralački ih primenjuju u praksi. Ako se navedena pitanja ne reše na valjan način, nikakvi projekti modela optimalnog upravljanja ili novi investicioni zahvati neće moći da negativne tokove preusmere u pozitivne. (I ovaj stav preuzet je iz teksta projekta navedenog u prethodnoj tački).

3. Paralelno sa nastojanjem da se pokrene određena privredna aktivnost, treba intenzivirati sve uobičajene mere za čišćenje ovog prostora od svih vrsta zagađivača i sprečavanje dodatnog zagađivanja. Ali treba pri tome istaći da ove mere predstavljaju samo otklanjanje posledica jedne nepovoljne aktivnosti. Ako se samo na tome ostane, naponi za ekološki čisto područje mogu se pretvoriti u jednu klackalicu na čijoj se jednoj strani nalaze oni koji otklanjaju sekundarne sirovine, a na drugoj oni koji neprekidno zagađuju prostor novim količinama sekundarnih sirovina. Da bi se došlo do trajnog poboljšanja ekološkog stanja, potrebno je identifikovati i otklanjati uzroke koji izazivaju nepovoljno stanje. U traženju uzroka, dobro bi bilo poći od stava da je ekološko stanje na određenom fizičkom prostoru odraz stanja u duhovnom prostoru ljudi koji žive na toj teritoriji. Savremena tehnika i tehnologija (plastika, hemikalije, otrovni gasovi i sl.) predstavljaju opasno oružje u rukama ljudi čiji duhovni razvoj zaostaje iza materijalnog razvoja. Unapređenje duhovnog stanja je mnogo teži poduhvat od navedenih fizičkih aktivnosti, ali to ne treba da bude razlog da se od takvog nastojanja odustane. I u toj oblasti postoje kako teorijske koncepcije, tako i praktična iskustva. Njih bismo mogli iskoristiti ako se odlučimo da radimo na poboljšanju ekološkog stanja. (Ovaj stav preuzet je iz rada koji je prof. Krstić saopštio 2015. godine na skupu posvećenom unapređenju ekološkog stanja na jednom području).

4. Kao i svaka privredna delatnost, poljoprivreda, kao deo razvoja ruralnog prostora, može i treba da se stalno unapređuje na različite načine, ali se oni uglavnom svode na unošenje više znanja u tu oblast. Poseban aspekt unošenja više znanja u poljoprivre-

du, teorijski i praktično razrađen je u knjizi prof. Krstića i saradnika, pod naslovom: -Knjigovodstvo na seljačkom gazdinstvu kao osnova za unapređenje menadžmenta. U centru pažnje toga dela stoji ideja da seljačko gazdinstvo treba da postane predmet sistematskog praćenja poslovnih aktivnosti, njihove analize i naučnog istraživanja. To bi omogućilo da gazdinstvo poboljša ne samo tehnologiju proizvodnje nego i kompletan menadžment. Time bi unapredilo svoje poslovne rezultate, povećalo konkurentnost, obezbedilo porast životnog standarda domaćinstva i podstaklo interes za bavljenje ovom profesijom. Možda neko gleda sa skepsom na ovakve mogućnosti, ali ako je usmeravanjem naučne energije (i odgovarajućeg kapitala) čovek uspeo da ostvari neverovatne prodore u svet mikrosistema (atoma) i makrosistema (kosmosa), da li treba sumnjati da je to moguće učiniti i sa jednim (nazovimo ga) mezosistemom oličenim u seljačkom gazdinstvu. (Ovaj pasus preuzet je iz rada koji je prof. Krstić sa saradnicima objavio 2007. godine na međunarodnom naučnom skupu održanom na Jahorini).

5. Kao učesnik u stvaranju prvog nastavnog plana obrazovnog profila agroekonomiste na Poljoprivrednom fakultetu u Beogradu, zalaže se da se sačuva njegovo izvorno značenje. Ono podrazumeva sposobnost diplomiranog stručnjaka da shvati biološke (agronomske, zootehničke) i ekonomske zakonitosti, da ih sintetizuje i, kao novi kvalitet, primeni u praksi poljoprivredne proizvodnje radi unapređenja poslovnih rezultata. Stoga smatra neprihvatljivom pojavu da se neko proglasi agroekonomistom zato što može da prokomentariše neke statističke podatke o poljoprivredi, ne ulazeći u tumačenje agroekonomskih zakonitosti. On to objašnjava sledećom paralelom: "Ako neko prokomentariše statističke podatke o broju bolesničkih kreveta u zdravstvenim ustanovama, da li se može proglasiti lekarom?". Ako je odgovor na ovo pitanje određen, moralo bi se na sličan način rezonovati u slučaju stručnog profila agroekonomiste.

6. Učestvujući u raspravi o karakteru i realizaciji nastavnih sadržaja stručnog profila agroekonomiste, primetio je da neki nastavnici smatraju da diplomirani agroekonomista treba da bude sposoban da identifikuje i opiše probleme u oblasti koju proučava ili u praksi unapređuje. On smatra da je takav stav neprihvatljiv, nego se mora ići korak dalje. To znači ne treba se zaustaviti na opisu problema, već treba tražiti njegovo rešavanje, što je inače u skladu sa prirodom inženjerskog posla i u drugim stručnim oblastima. U prilog toga on podseća na dosta široko prihvaćeno mišljenje onih koji proučavaju razvoj naučne misli uopšte. Po tome shvatanju, dosadnji razvoj naučne misli može se podeliti u tri osnovne metodološke etape:

- etapa metoda opažanja (i opisa),
- etapa analitičkih metoda i
- etapa sistemskih metoda.

Iz ovoga se može zaključiti da se nalaze u prvoj (početnoj) etapi razvoja naučne misli oni nastavnici koji se zadovoljavaju time da studente osposobe samo za opisivanje pojava. Razume se da i današnja istraživanja u mnogim slučajevima moraju proći kroz fazu opisa i fazu analize, ali one su samo priprema za primenu faze sistemskih metoda.

Ovi metodi u većini slučajeva lakše dovode do rešenja problema ako se primenjuju odgovarajući postupci i ako se problemu pride multidisciplinarno, interdisciplinarno ili transdisciplinarno. Ovo je preporučljivo zato što problemi u poljoprivredi i na poljoprivrednom gazdinstvu (ili privrednom društvu) gotovo nikada nisu monodisciplinarnog karaktera. Izbor najpovoljnijeg pristupa treba prilagoditi prirodi problema koji je predmet rešavanja.

7. Kad se radi o unapređenju naučnog rada kroz proces izrade doktorskih disertacija u mikro agroekonomskoj oblasti, prof. Krstić smatra da je jedna proceduralna promena u načinu usvajanja (odobravanja) tema izazvala negativne efekte. Naime, umesto ranije procedure po kojoj se proces odobravanja tema u celini završavao na fakultetu, početkom devedesetih godina prošloga veka završni čin (odluka o odobravanju teme) ove procedure prenesen je u nadležnost komisije ekonomskih nauka na nivou univerziteta. Ne treba sumnjati u dobre namere kreatora ove promene, ali se u praksi pokazalo da to ometa produbljena agroekonomska istraživanja. Po pravilu, u toj komisiji nema dovoljno stručnjaka za mikro agroekonomske probleme (ekonomika linija poljoprivredne proizvodnje, unapređenje menadžmenta poljoprivrednog porodičnog gazdinstva i sl.) i ona ispoljava odbojan odnos prema temama iz te oblasti. Takav stav delovao je obehtrabujuće na potencijalne predlagače tema iz te oblasti. Time se jedna dobronamerna zamisao pretvorila u svoju suprotnost. Ako u međuvremenu nisu izvedena neka poboljšanja, bilo bi korisno da se ovaj nedostatak otkloni što pre. Moguće je naći organizaciona rešenja koja zadovoljavaju oba zahteva (da odluka o odobravanju teme ostane na nivou univerzitetske komisije i da se omogući izrada tema koje se bave produbljenim istraživanjem mikro agroekonomskih problema).

8. U novije vreme usmerena je znatna istraživačka energija na proučavanje ekonomskog siromaštva. Često se ono razmatra izolovano od proučavanja bogatstva. Priroda tih obeležja pokazuje da su to dva pola na istom organizmu. Promena na jednom polu odražava se i na stanje drugog pola. Zato bi rezultati istraživanja bili povoljniji ako bi se ovom pitanju pristupilo kompleksno, obuhvatajući istovremeno oba pola. To bi omogućilo da se do rešenja dođe u kraćem roku i da ono bude održivo u dužem periodu.

9 Koncept ekonomske nauke u prošlosti, pa i danas, mogao bi se staviti pod znak pitanja ako bi se prihvatio stav da rezultati naučnih istraživanja treba da doprinesu pozitivnoj promeni sveta oko nas i u nama. Iz dosadašnjeg iskustva moglo bi se zaključiti da je taj koncept zasnovan na merenju poslovnog uspeha koji je pretežno motivisan zadovoljavanjem prirodnog nagona čoveka za (samo)održanjem. Previše izražene predatorske osobine, uz često surov odnos između učesnika u ekonomskim aktivnostima, kao i prema prirodnim dobrima, prihvaćeni su kao normalne pojave. Za takve odnose razvijeni su odgovarajući metodi podsticanja aktivnosti i merenja poslovnog uspeha. U uzajamnom odnosu biznisa i (ekonomske) nauke formirana je spirala međusobne podrške. Moglo bi se reći da ta spirala ima negativan tok u odnosu na navedeni kriterijum da nauka treba da doprinese pozitivnoj promeni sveta. Umesto pozitivne promene sveta u celini, došlo je do njegove pojačane polarizacije i na lokalnom, i na regionalnom, i na globalnom nivou.

Ukupno stvoreno materijalno bogatstvo jeste impresivno povećano u odnosu na prošle vekove, ali je ono skoncentrisano u rukama malog broja ljudi u poređenju sa ukupnim brojem stanovnika, kako na globalnom, tako i na nižim nivoima posmatranja. Stvara se jedan paradoks po kome prejaka želja za održanjem života vodi ka uništenju života (kroz destruktivno delovanje pojedinca na svoje fizičko i društveno okruženje).

Ako bi se prihvatio stav da ovakav tok materijalnog razvoja nije pogodan za budućnost, može se postaviti pitanje na koji bi način ekonomska nauka mogla pomoći da se on poboljša. Možda bi tome mogla doprineti promena u metodu merenja poslovnog uspeha i metodima njegovog podsticanja. Ako se sada poslovni uspeh meri profitom ne ulazeći u odnose između učesnika u njegovom stvaranju, trebalo bi pokušati da se u budućnosti meri pokazateljem koji bi se uslovno mogao nazvati „plemeniti profit“. To podrazumeva da se paralelno sa izračunavanjem poslovnog uspeha, određenim sistemom pokazatelja ocenjuje koliko je u uslovima sticanja dohotka bilo plemenitog odnosa između učesnika u procesu stvaranja proizvoda ili obavljanja usluge. I u procesu raspodele (trošenja) profita možda bi se mogle učiniti neke intervencije koje će uneti više plemenitosti u oblast biznisa.

Navedene promene mogle bi da budu važan doprinos ekonomske nauke težnji da se dejstvo prirodnih nagona na ljudsko ponašanje stavi pod kontrolu zdravog razuma u većoj meri nego do sada. Nedovoljan uspeh u tome u prethodnom periodu možda može da se sagleda ako sadašnje stanje uporedimo sa stanjem iz prošlosti. Ako se, na primer, podsetimo stanja koje opisuje Šekspir u svojim delima, može se uočiti kako je u tome vremenu bilo mnogo malih i velikih ljudskih slabosti koje su kroz dramske zaplete i rasplete izvrgnute podsmehu (ili kritici ili osudi), kao što su uspešno izložene pohvali ljudske vrline. Nivo razvijenosti materijalnog stanja u vremenu koje opisuje Šekspir može se sagledati iz tri karakteristične pojave, Prva se odnosi na najvažnije oružje – to je bio mač, druga na najvažnije kopneno prevozno sredstvo – to je bio konj, a treća na najvažnije sredstvo prenošenja vesti – to je bio čovek-glasnik. Prošlo je od vremena Šekspira blizu pola milenijuma. Za to vreme u razvoju navedenih i drugih oblasti materijalne proizvodnje ostvaren je takav napredak kakav je mogao da se nasluti samo u nekoj „žilvernovskoj“ mašti. A šta se dogodilo u oblasti duhovnog razvoja čoveka? Ostale su i dalje sitne i krupne ljudske slabosti uz opasku da se one danas samo pakuju u povoljniju ambalažu. Moglo bi se reći da je duhovni razvoj u oblasti međuljudskih odnosa nazadovao. U Šekspirovom vremenu između suprotstavljenih pojedinaca ili grupa ljudi bilo je mnogo više viteškog odnosa nego danas. Naravno da su u posmatranom periodu ostvareni impozantni uspesi i u duhovnom razvoju ako se pod tim podrazumeva oblast stvaralaštva u nauci, umetnosti, književnosti i sl. Ali je ostao problem da čovekovim ponašanjem i dalje pretežno upravljaju prirodni nagoni. Negativne posledice toga mogu se primetiti u svakoj sredini i na svakom nivou organizovanosti ljudske zajednice.

Problem je suviše dubok i širok da bi ga mogla rešiti samo ekonomska nauka ili nauka u celini. Ali ona ipak treba da učini ono što može i da pokaže da nauka prednjači u pozitivnom smislu u odnosu na ostale vidove čovekove aktivnosti. Ako bi i ostali akteri

učinili u svojoj sveri ono što je moguće i ako bi se ostvario dovoljan stepen koordinacije, možda bi se mogao očekivati neki ozbiljniji pomak u duhovnom razvoju čoveka u smislu uspešnijeg stavljanja dejstva prirodnih nagona pod kontrolu zdravog razuma.

10. Osim na globalnom nivou, zanimljivo je sagledati duhovno stanje na nivou regiona u kome živimo. O našem (balkanskom) mentalitetu govori znatan broj književnih dela poniklih na ovome prostoru ili van njega. Za ovu priliku bilo bi zanimljivo istaći ova tri:

- Pismo iz 1920. godine (Ive Andrića),
- Čujte Srbi (Arčibalda Rajsja) i
- Stradija (Radoja Domanovića).

Bilo bi korisno da ova (i njima slična) dela imamo stalno pri ruci, da se često vraćamo njihovom ponovnom čitanju i da nam budu podsticaj za promenu našeg ponašanja u pozitivnom smeru.

11. Uspostavljanju povoljnijeg duhovnog i fizičkog stanja čoveka, može doprineti njegovo osposobljavanje da se približi stanju ravnoteže. Koje ravnoteže? Ravnoteže u sebi i oko sebe. Ravnoteža u sebi, između ostalog, podrazumeva usklađen odnos između želja i mogućnosti jedne ličnosti, kao i između onoga što može da primi od svoga okruženja i da mu da itd. Na fizičkom planu, ravnoteža podrazumeva usklađen odnos između količine i strukture hranljivih materija koje se unose u organizam i njihovog utroška obavljanjem fizičkih i umnih aktivnosti. Ali pitanje ravnoteže se može postaviti i mnogo šire, tako da ona dobija neku vrstu magičnog prizvuka. Sile koje teže njenom uspostavljanju i činioci koji je remete mogu se uočiti u mnogim procesima koji se odvijaju u nama i oko nas, u odnosima čoveka i okruženja, u svakom delu prostora od najsitnije čestice do kosmosa. Ravnoteža je poželjna i u poslovanju privrednih subjekata (bilans uspeha, bilans stanja), u budžetu države i njenih delova, u privrednoj razmeni države sa inostranstvom (odnos izvoza i uvoza, platni bilans), u budžetu domaćinstva, u odnosu između trošenja i regeneracije obnovljivih prirodnih resursa, između emisije zagađenja prirodne sredine i njegove asimilacije, između ponude i tražnje, odnosno proizvodnje i potrošnje ljudske i stočne hrane, između stvaranja i raspodele društvenog bogatstva (ili siromaštva), između cena kojima se obezbeđuje prihvatljiv stepen konkurentnosti pojedinih proizvoda i usluga. Ravnoteža se uspostavlja i remeti i između predmeta koji se nalaze u vasioni.

U ovom kontekstu ravnoteža se ne posmatra kao statička kategorija koja bi jednom uspostavljeno stanje konzervisala, nego kao dinamička kategorija koja se neprekidno narušava i ponovo uspostavlja na drugom nivou. Ona je cilj kome određeni sistem teži pod uticajem sila koje deluju konstruktivno, ali dostizanje cilja ometaju činioci koji imaju destruktivno dejstvo. Slični su odnosi između organizacije i entropije u oblasti kibernetike. Moglo bi se reći da, tako shvaćena, ravnoteža predstavlja proces kontrolisanih promena u sistemima koji su pod kontrolom čoveka.

3. Stavovi prema sebi

O visokim kriterijumima u odnosu na svoje ponašanje i radne obaveze, posebno sve- doče ovi stavovi:

a) Posle odbranjenog magistarskog rada, koji je ispitna komisija ocenila vrlo povoljno, uskoro mu je ponuđeno da iz zvanja asistenta bude (bez doktorata) unapređen u nastav- ničko zvanje (predavača). Nije tu ponudu prihvatio, uz obrazloženje da treba još da radi da bi proširio i produbio stručna znanja i time stvorio jaču podlogu za unapređenje u zvanje nastavnika.

b) Nekoliko godina pre penzionisanja bio je najstariji profesor u svome radnom ko- lektivu. Dok su neki očekivali da se u njegovom ponašanju primete znaci umora, on je često na sastancima stručnih organa izjavljivao da profesor mora svakodnevno da se dokazuje, uz opasku da se to odnosi i na njegove radne rezultate.

c) Prof. Krstiću dodelio je dva priznanja časopis Ekonomika poljoprivrede. Prvo je po- velja dodeljena 1995. godine. Drugo je zahvalnica dodeljena 2013. godine. Dokument o drugom priznanju predale su mu u njegovoj kući u rodnom selu njegove mlađe kole- ge. Tim povodom priređena je skromna svečanost na kojoj mu je omogućeno da izrazi svoje zadovoljstvo ovim priznanjem i zahvali se kolegama. Ali je on na kraju svoga izlaganja postavio i pitanje da li je zaslužio ovo priznanje. Posle dodatnog objašnjenja o kriterijumima za dodelu priznanja, prihvatio je odluku nadležnog organa časopisa.

d) Početkom 60-ih godina prošlog veka istraživačima u našoj zemlji postali su pri- stupačni relativno komplikovani matematičko-statistički metodi. Neki od njih bili su vrlo pogodni za unapređenje menadžmenta u poljoprivredi, ali zbog komplikovanog algoritma i primitivne računarske tehnike koja je istraživačima stajala na raspolaganju, izbegavana je njihova primena u istraživačkim projektima. Najsavremenija računarska tehnika koja je tada istraživačima stajala na raspolaganju bile su elektromehaničke mašine, pa i one u vrlo ograničenom broju. Uočavajući korist koja bi se postigla prime- nom tih metoda, prof. Krstić je po sopstvenoj odluci pristupio istraživačkim zadacima koji uključuju upotrebu linearnog programiranja, tehnike mrežnog planiranja i analize proizvodnih funkcija. Pri tome je upotrebljavao elektromehaničke računarske mašine. Kakav je to poduhvat, može se sagledati po tome što je obrada nekih problema trajala više meseci, a danas na personalnom računaru takav problem obradi se u vremenu koje se meri sekundama ili delovima sekunde. Za mnoge posmatrače to je bila avantura. To jeste avantura, smatra prof. Krstić, ali ističe da je ona predstavljala značajan podsticaj ubrzanom metodološkom osavremenjavanju i nastave i naučnog istraživanja, posebno u mikro agroekonomskoj oblasti.

Značajna promena u poboljšanju računarske tehnike dogodila se na fakultetu počet- kom 70-ih godina prošlog veka, kada su istraživačima postali dostupni stoni i džepni digitron. Personalni računar postao je dostupan generaciji prof. Krstića par godina pre penzionisanja. To stanje sa računarskom tehnikom predstavljalo je veliko ograničenje za unapređenje naučnog rada u mikro agroekonomskoj oblasti. Ali prof. Krstić ističe i

jednu pozitivnu stranu toga procesa. Radeći ručno (elektromehaničkim mašinama) na primeni metoda zasnovanih na komplikovanim algoritmima, uporni istraživači imali su priliku da te metode upoznaju „iznutra“, da uoče neke važne detalje i da steknu sposobnost da prevaziđu izvesne nedostatke tih metoda.

4. Doprinos razvoju naučnog rada i nastavnog procesa

Mogućnost za ublažavanje ili otklanjanje nedostataka matematičko-statističkih metoda, kao i za proširenje polja njihove primene, iskoristio je prof. Krstić zahvaljujući upoznavanju njihovih detalja tokom primene uz upotrebu elektromehaničkih mašina. Evo nekoliko primera koji svedoče o tim poboljšanjima:

U metodu linearnog programiranja (LP) uveo je agregatne aktivnosti u biljnoj proizvodnji i upotrebu strukturne jedinice u stočarstvu da bi prevazišao problem ograničenog kapaciteta softverske podrške u tada dostupnim računarskim programima. Upotrebio je model LP za rešavanje makro agroekonomskih problema i unapređenje prostornog planiranja. Uveo je pojmove ulaznih, izlaznih i projektovanih cena, kao i aktuelizovanje pariteta cena iz prošlog perioda „podizanjem“ na nivo tekućih cena. Upotrebio je model LP za izračunavanje optimalnog pariteta cena proizvoda, kao i utvrđivanje njihove interne konkurentnosti. Ukazao je kako se otklanjaju nedostaci izazvani linearnošću i statičnošću modela LP. Dokazao je da u modelu LP nije neophodno unositi u ekonomsku funkciju maržu pokrića (ili drugi finansijski pokazatelj rezultata). Umesto toga, razradio je koncept kako da se u ekonomsku funkciju direktno unose cene inputa i proizvoda, a da se kao rezultat obrade modela dobije maksimalna marža pokrića. Ovo je naročito značajno za utvrđivanje optimalnog proizvodnog programa fabrika prehrambene industrije gde nije moguće objektivno utvrditi maržu pokrića za svaki finalni proizvod primenom metoda kalkulacija. Ukazao je na mogućnost upotrebe modela LP za eksperimentisanje na privrednom subjektu „in vitro“. Do tada je bilo moguće samo eksperimentisanje „in vivo“. Ono je, međutim, suviše skupo, sporo daje rezultate i vrlo je rizično, pa zato ima više teorijski značaj a manje praktični. Ako se razvoj mikro agroekonomske nauke kretao sporijim tempom od biotehničkih nauka, jedan od razloga tome je nemogućnost izvođenja eksperimenata sa privrednim subjektom kao celinom u periodu do pojave modela LP.

- U primeni tehnike mrežnog planiranja (TMP) za rešavanje problema u poljoprivredi, skrenuo je pažnju na stepen raščlanjavanja operacija i stepen detaljizacije mrežnog dijagrama kao elemente kojima se menja kvalitet konačnog rešenja i količina informacija za donošenje odgovarajućih odluka.

- Primena analize proizvodnih funkcija za rešavanje problema u ekonomici linija poljoprivredne proizvodnje doživela je veliku ekspanziju između 1960. i 1990. godine pod uticajem E.O. Haedy-a, velikog autoriteta među agroekonomistima širom sveta. I u našoj stručnoj literaturi ovaj metod je dobio veoma zapaženo mesto, ali uz nekritičko preuzimanje saznanja do kojih je došao Haedy. Kada je prof. Krstić dublje ušao u su-

štinu metoda uz njegovo kritičko sagledavanje, postavio je pitanje zašto se najpovoljnija ekonomska rešenja u marginalnoj analizi nikada ne podudaraju sa najpovoljnijim tehnološkim rešenjima. Odgovor na ovo pitanje našao je u sveri matematičke teorije na kojoj počiva analiza proizvodnih funkcija. Osim toga, primetio je da se u razmatranju međusobne zamene inputa, u nekim istraživanjima tvrdi da se čisti elementi u hemijskim đubrivima mogu međusobno zamenjivati (na primer, nedostatak azota kao biljnog hraniva može se nadomestiti većom upotrebom fosfora ili kalijuma i obratno). On je skrenuo pažnju da je to sa statističkog gledišta metodološki ispravno ali sa bio-hemijskog stanovišta nije prihvatljivo. U ovom slučaju izostala je sinteza bioloških i ekonomskih zakonitosti i zbog toga je iz istraživanja izveden pogrešan zaključak. Iz ovih saznanja proizašao je stav prof. Krstića da polje primene analize proizvodnih funkcija u ekonomici linija poljoprivredne proizvodnje treba da bude suženo samo na one slučajeve gde se matematičke i biološke karakteristike s jedne strane i ekonomska logika s druge strane međusobno ne isključuju. Time je doprineo da se upotreba proizvodnih funkcija u agroekonomskim istraživanjima svede u realne okvire.

Na planu unapređenja metodologije u ekonomici stočarske proizvodnje razradio je model optimalnog iskorišćavanja priplodnih grla, optimalnog trajanja tova stoke, optimalnog intenziteta plodnosti, prihvatljive granice izlučivanja grla iz stada i optimalne telesne mase kao uzgojno-selekcijskog cilja u stadu životinja, pri čemu je u svim slučajevima pokazao kako se mogu sintetizovati biološke i ekonomske zakonitosti i upotrebiti za utvrđivanje najpovoljnijih rešenja. Analizirao je koncept „jeftine stočne hrane“. Založio se za primenu ispravnih kriterijuma u vrednovanju te hrane i dokazao da je koncept pogrešan.

Razjasnio je protivrečnost koja se decenijama provlačila kroz neka istraživanja. Ona se sastojala u tome da analiza statističkih podataka pokazuje da manja seljačka gazdinstva postižu povoljnije finansijske rezultate od većih gazdinstava. Taj je stav izazivao zabunu jer se ne podudara sa ekonomskom teorijom. Dubljom analizom, prof. Krstić je dokazao da je ta protivrečnost posledica metodološke greške istraživača.

Kada se u istraživačkom projektu koji se odnosio na konkurentnost poljoprivrednih proizvoda suočio sa problemom nepostojanja pogodnog metoda za izračunavanje konkurentnosti, otklonio ga je time što je konstruisao nov metod koji je nazvan ravnotežnim odnosom cena (ROC). On je do danas postao svojina znatnog broja istraživača kako u našoj zemlji, tako i u njenom okruženju. Među povoljnim osobinama ovog metoda posebno se ističe mogućnost interpretacije rezultata njegove primene uz upotrebu jednostavnog jezika. Potreba za jednostavnim jezikom u tumačnju rezultata postavlja se za sva primenjena istraživanja u poljoprivredi. Razlog tome je što se primenom tih rezultata u poljoprivrednoj praksi još uvek pretežno bave osobe sa veoma skromnim školskim obrazovanjem.

O odnosu prof. Krstića prema obavezama u nastavi govore podaci da je na novoformiranom (agroekonomskom) odseku izgradio novu nastavnu disciplinu (Organizacija i ekonomika proizvodnje i prerade stočnih proizvoda) i za nju napisao i studentima stavio na raspolaganje i udžbenik i praktikum za vežbe.

5. Zaključne poruke

Profesoru Krstiću blizak je stav sadržan u aforizmu: “Znanje je kap, neznanje je more“. Na osnovu svoje kapi znanja formirao je stavove i poruke izložene u prethodnom tekstu, kao i neke slične ovima, a koji nisu navedeni zbog ograničenog prostora. Ocene o dobru i zlu, pozitivnim i negativnim stanjima, kretanjima, pojavama, ponašanjima i procesima, imaju relativno značenje jer zavise od koga sistema vrednosti se polazi pri izricanju stavova. Radi se o sudu vrednosti a ne o sudu stvarnosti. Vrhovna vrednost prema kojoj prof. Krstić formira svoje stavove je: usavršeno, prosveteno ljudsko biće, sposobno da prirodne nagone stavi pod kontrolu zdravog razuma i da neguje plemenit odnos prema svome fizičkom i društvenom okruženju. Ta vrhovna vrednost shvata se kao cilj kome čovek teži da se približi. Na osnovu sopstvenog iskustva, čini mu se da život u miru, tišini, na čistom vazduhu, okružen prirodnim zelenilom, u stanju relativne psihičke opuštenosti, pomaže čoveku da uspostavi ravnotežu u sebi i oko sebe. Provođeci penzionerske dane u seoskoj sredini, on živi u takvim uslovima i trudi se da, pored ranije spomenutih, uspostavi još jedan oblik ravnoteže. To je ravnoteža između svojih fizičkih i umnih aktivnosti. Radi pojačavanja fizičkih aktivnosti, između ostalog, bavi se proizvodnjom, za sopstvene potrebe, povrća, voća i grožđa, bez upotrebe hemikalija i poljoprivredne mehanizacije.

Prof. Krstić bio je, a i sada je, spreman da sasluša primedbe na svoje stavove i da na njih reaguje na odgovarajući način, uključujući i mogućnost da neke stavove promeni ako mu se ponude za to ubedljivi argumenti.

Zainteresovani mogu uputiti svoje poruke prof. Krstiću na e-mail adresu: branko.k@telrad.net

U Beogradu, 17.02.2018.godine

Drago Cvijanović

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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)¹

Anđela Marković², Petar Petrović³, Mirko Mirković⁴

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)*

1 Paper is a part of research within the project no. III 46006 - Sustainable agriculture and rural development in the function of accomplishing strategic objectives of the Republic of Serbia in the Danube region, financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia. Project period: 2011-2014. ***This segment is not obligatory within the paper.***

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Introduction

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.

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For **equations and formulas** use the Microsoft Equation Editor or addition for equations writing MathType (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).

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Table 5. The distribution cost of packaged goods from Subotica to retail-store objects

Indicators	Period			Total
	Month 1	Month 2	Month 3	
Distance crossed (km)	12.926	11.295	13.208	37.429
Fuel consumption (litre)	3.231	2.823	3.302	9.356
Value of fuel consumption (RSD)	242.378	211.790	247.653	701.821
Total time spend on touring (hour)	314	266	417	997
Value of total time spend on touring (RSD)	47.048	39.890	62.570	149.508
Number of tours	98	77	102	277
Toll value (RSD)	0	0	0	0
Number of pallets transported (piece)	1.179	976	1358	3.513
Total weight transported (kg)	602.600	429.225	711.116	1.742.941
Vehicle maintenance costs (RSD)	203.858	164.970	224.806	593.634
Lease costs (RSD)	480.938	454.214	565.784	1.500.936
Total sum (RSD)	974.222	870.864	1.100.813	2.945.899

Source: Petrović, 2012;

Note: Values within the table are calculated without Value Added Tax (VAT)

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).

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ŠABLON: NASLOV RADA (CENTRIRAN, TNR SIZE 12, BOLD, SVA SLOVA VELIKA, MAKSIMALNO DVA REDA)¹

Anđela Marković², Petar Petrović³, Mirko Mirković⁴

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.

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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)

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- 1 Paper is a part of research within the project no. III 46006 - Sustainable agriculture and rural development in the function of accomplishing strategic objectives of the Republic of Serbia in the Danube region, financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia. Project period: 2011-2014. ***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
 - 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
 - 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

Introduction

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Table 5. The distribution cost of packaged goods from Subotica to retail-store objects

Indicators	Period			Total
	Month 1	Month 2	Month 3	
Distance crossed (km)	12.926	11.295	13.208	37.429
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Total sum (RSD)	974.222	870.864	1.100.813	2.945.899

Source: Petrović, 2012;

Note: Values within the table are calculated without Value Added Tax (VAT)

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