Biblid: 1821-4487 (2017) 21; 3; p 163-167
UDK: 634.711

Original Scientific Paper
Originalni naučni rad

SUSTAINABILITY ORGANIZATIONAL-ECONOMIC MODEL OF VALUE CHAIN ORGANIC RASPBERRY

ODRŽIVOST ORGANIZACIONO-EKONOMSKOG MODELA LANCA VREDNOSTI ORGANSKE MALINE

Dušan MILIĆ[*], Zorica SREDOJEVIĆ[**] Mirjana LUKAČ BULATOVIĆ[*]
[*]University of Novi Sad, Faculty of Agriculture, Trg Dositeja Obradovića 8, 21000 Novi Sad, Serbia
[**]University of Belgrade, Faculty of Agriculture, Nemanjina 6, 11070 Beograd, Serbia
e- mail: milic@polj.uns.ac.rs

ABSTRACT

Of the total production of raspberries in Serbia, even 90 % is exported frozen to the EU market and in Germany, France, Holland, and Austria, and partly to the US market. The total European production of raspberries, Serbia participates with 20 %, and in domestic structure of fruit production from 6.5 %. According to the Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia (2017), under organic production of fruit in Serbia is 1,527 ha, and the areas that are under conversion are located on 357 ha. In western Serbia is 198.94 ha under organic raspberries and 235.19 ha during conversion. Export from Serbia is 1,500 tons of organic raspberries annual which makes up 2 % of total production (and from conventional and organic production).Producers in the practice increasingly improve primary production and modernization of processing and marketing segments of raspberries. One of the concepts is the addition of economic value through organic products, products with protected designation of origin, branding, etc. This research starts from the hypothesis that it is economically profitable to invest in facilities to obtain products with added economic value. The research presented in this paper is a model organization purchase, processing and marketing of organic raspberries. The process of analysis is given on the basis of actual data company that operates in Arilje and brings together a larger number of producers of organic raspberries. By applying the methods of calculation and Cost-Benefit analysis were calculated economic indicators in the production of organic raspberries. Schematic shows the value chain, based on the SWOT analysis, recommendations for improvement and sustainability of such a model, as well as the possibility of its application to other production.

Key words: *organic raspberries, value chain, economic sustainability the model raspberry.*

REZIME

Od ukupne proizvodnje maline u Srbiji, čak 90% se izvozi smrznuto na tržište EU i to u Nemačku, Francusku, Holandiju, i Austriju, a delom i na tržište SAD. U ukupnoj evropskoj proizvodnji maline, Srbija učestvuje sa 20%, a u domaćoj strukturi proizvodnje voća sa 6,5%. Prema podacima Ministarstva poljoprivrede, šumarstva i vodoprivrede Republike Srbije (2017), pod organskom proizvodnjom voća u Srbiji se nalazi 1.527 ha, a površine koje su u periodu konverzije nalaze se na 357 ha. U zapadnoj Srbiji se nalazi 198,94 ha pod organskom proizvodnjom maline i 235,19 ha u periodu konverzije. Godišnje se iz Srbije izveze do 1.500 tona organske maline što čini do 2% od ukupne proizvodnje, tj. i iz konvencionalne i organske proizvodnje. Proizvođači u praksi sve više unapređuju primarnu proizvodnju i modernizaciju segmenate prerade i plasmana maline. Jedan od koncepata predstavlja dodavanje ekonomske vrednosti kroz organske proizvode, proizvode sa zaštićenim geografskim poreklom, brendiranje, itd. Ovim istraživanjem se polazi od hipoteze da je ekonomski isplativo investirati u kapacitete za dobijanje proizvoda sa dodatom ekonomskom vrednošću. Predmet istraživanja u ovom radu je model organizacije otkupa, prerade i plasmana organske maline. Postupak analize je dat na bazi stvarnih podataka preduzeća koje posluje na području Arilja i okuplja veći broj proizvođača organske maline. Primenom kalkulativnih postupaka i Cost-Benefit analize, obračunati su ekonomski pokazatelji u proizvodnji organske maline. Šematski je prikazan lanac vrednosti, a na osnovu SWOT analize, date su preporuke za unapređenje i održivosti ovakvog modela, kao mogućnost njegove primene i na druge proizvodnje.

Ključne reči: *organska malina, lanac vrednosti, ekonomska održivost modela.*

INTRODUCTION

In Serbia there are very favorable natural conditions for growing most of continental fruit species, as well as a long tradition of fruit growing in certain regions. In the total European production of raspberries, Serbia participates with 21.43 %, and in domestic structure of fruit production from 6.87 % *(Lukač Bulatović, 2014)*. The average raspberry production in Serbia amounted to 57,606 t per year with significant annual variations ranging from 17,432 t to 93,982 t in period of last ten years, which was confirmed by a variation coefficient of 41.36 % calculated for the observed period. The total raspberry production in Serbia indicates an increasing trend. The raspberry production in Central Serbia has increased at an average annual rate of change of 5.02 % *(Lukač Bulatović, 2014)*. According to the Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia (2017), under organic production of fruit in Serbia is 1,527 ha, and the areas that are under conversion are located on 357 ha. In western Serbia is 198.94 ha under organic raspberries and 235.19 ha during conversion. By increasing the quantity and quality of products, the competitiveness of domestic production and development of rural areas would open possibilities for employment increase and improve growers' bottom line. Based on the EU experience, the integration of supply through cooperatives, business associations and the use of financial aids from the state support additional progress. At the end, investment in equipment for harvesting, sorting and fruit packing, construction of storage and cooling capacities, investment in infrastructure, would allow the creation of new

jobs, maintaining rural areas and prevent migration of the population to urban areas *(Milic et al., 2011)*. Using the value chain model, the costs and effects of each activity which affects the value are analyzed, and ways for improvement are researched. The features and characteristics of a product which are demonstrated by its ability to satisfy the stated or implied needs are directly aimed at the buyer/consumer. The value chain is a powerful tool for finding ways to create larger "added" value to the products *(Sredojević, 2011a)*.

There are no accurate data on the number of cold stores in Serbia. Based on data from the Ministry of Agriculture, Forestry and Water Management, in 2011, in Serbia there were 363 cold storage facilities for freezing, i.e. storage of fruits, vegetables and mushrooms, with a total capacity of about 550,000 tons *(Sredojević et al., 2013)*. The capacity utilization is around 75 %. Finishing and processing of organic raspberries is performed by the companies which are purchasing the products and have a cold storage or processing line. Such fruits, mostly frozen, are placed on the EU and USA markets. The cold storage "Sirogojno company" and forty agricultural households in Zlatibor village of Sirogojno have international certification for production of organic raspberries, granted to them by the representatives of Swiss control house "SGS"."Sirogojno Company" purchases and processes about 5,000 tons of fruit, mainly raspberry and blackberry, about 97 % of the purchased quantity is intended for export *(Sredojević, 2014)*.

The main objective of this paper is to identify factors that affect the efficiency and competitiveness of the value chains of organic raspberry, to make proposals and a series of recommendations that could contribute to improving the economic and financial performance of the participants in the value chains. The purpose of the given analysis is to create guidelines which will properly influence the producers or management of companies, and also politicians and scholars who deal with these issues, to contribute to the further development and improvement of conducting business in organic production of raspberry, as well as for the larger and economically expedient representation of organic production in Serbia.

MATERIAL AND METHOD

Research methodology includes the use of different statistical and method calculative gross margin for solving such tasks and problems in science and practice. In order to obtain a more complete picture of the satisfaction of producers and consumers, primary data was also collected through interviews of major participants in the value chain, ranging from producers to consumers. In addition to these data sources, the secondary internal information was also used, which was included in internal databases, web sites, via e-mail from farms/entities, regarding the technology of production or processing, procurement of inputs, consumers, etc. Also, the data sources included statistical and other publications, both from domestic and foreign literature.

RESULTS AND DISCUSSION

The Republic of Serbia has favourable soil and climatic conditions for the production of different types of fruits. The significance of this production lies in the fact that it enables better use of the land at various locations and regions with less favourable soil and climatic conditions, including soil of poor physical, chemical and other properties, as well as areas with steeper slopes. The area under orchards in Serbia occupies about 240,000 ha (SORS, 2017).

Serbia accounts for 20 % of the total European production of raspberries, and in the domestic fruit production structure with 6.5 % *(Sredojević, 2014)*. According to the Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia, in 2014, the organic fruit production in Serbia is carried out on 1,527 ha, and 357 ha are in conversion. In the region of Western Serbia, 198.94 ha are under organic production and 235.19 ha in conversion. Relative to the total area under raspberry production in Serbia, 98 % of the total production is located in this region. This is logical, because raspberries grow best in mountainous areas. 90 % of the total production of raspberry in Serbia is exported frozen to the EU markets, Germany, France, the Netherlands, and Austria, and partly to the USA *(Milić & Lukač, 2005; Vlahović et al., 2013).*

Cost-Benefit analysis of organic raspberry production

Raspberry production in Serbia is carried out mainly in the Central and Western parts of the country, with a total production ranging between 40 and 75,000 tons, depending on the year. Based on the available data it can be estimated that annually in Serbia 1,500 tonnes of organic raspberries are exported making up to 2 % of the total production, i.e. conventional and organic production *(Sredojević et al., 2013)*. Program of organic production is very close to the traditional way of producing from the aspect of inputs, but there are significant differences especially in the system of the process control. Only the product controlled and certified by an authorized inspection body can be put on the market labelled "organic product". For this program, which is very close to the traditional method of production, it is extremely important to choose a suitable area (hilly-mountainous area), conscientious producers who understand and are willing to cooperate. It is also very important to build a good system of internal control to monitor, guide and educate producers. Proper selection of land/soil for raspberry is very important because it creates a strong, but shallow root system and a large number of shoots. For the establishment of raspberry crop planting material produced according to organic production methods is used. In the structure of raspberry varieties in Serbia, cultivar Willamette is dominant, with about 90 % *(Sredojević, 2011b)*. This cultivar/variety is lush and creates a large number of vertical strips of medium and long elastic fruiting branches, which are rarely broken under the weight of fruit or under the impact of the stronger wind. It is Medium-early maturing, on average during the first decade of June. The volume of production of organic raspberries is satisfactory, in average 8 t/ha of raspberries. According to SORS (2017), in the period 2013-2016, the producer price of conventional raspberry fluctuated from 0.7 to 1.70 EUR/kg. while sales price in the green market from 1.20 to 1.55 EUR/kg. Based on information from the interviews, the price of organic raspberries and blackberries in that period were 30 to 40 % above the price of conventional production, but also fluctuated. Purchase prices for organic raspberries in 2016 were in the range 1.8-2.1 EUR/kg. The technology of production is controlled by experts hired by contractors, i.e. buyers of their products. Also, the certification of production is specific. The certification is carried out collectively for all related productions, whose owners have a contract with the same company - contracted buyer. In fact, the company purchasing the products is the holder of the group certificate. Given that the company will perform final processing and sales of products from organic raspberries and blackberries, generally, they have the certificate for production and processing. For international markets, they have certificates that are required in the importing countries *(Milić et al., 2012).*

According to the calculations organic raspberry is required and with a high sales price, this production provides a gross margin about 9,800.00 EUR/ha (Table 1). In the region where it is grown raspberries, missing labor force, and at harvest time, producers are often forced to pay high wages for an engaged workforce.

Considering the fact that in this area organic raspberry is still harvested by hand, labour costs have a higher share in the structure of the total cost (58 %). Total costs which include material costs, cost of services or machine work, labour costs and other costs, at regular raspberry production amount to 8,200 EUR/ha. Gross incom rasbarry amount about 18,000 EUR/ha and gross margin 9,800 EUR /ha. Organic raspberry production is characterized by labour-intensive, but producers and cold storage brings great financial benefit.

The value chain of organic raspberry to the region of Western Serbia

With regard to procurement of inputs and sales of finished products, producers of organic raspberries in the region of Western Serbia have specific contracts, which in a certain way relieve them of a number of risks. The major companies in the region, "Zadrugar", "Frikos" and others bring together a large number of individual producers in primary agricultural production. These companies have contracts with individual producers, in which they have committed to provide inputs for the producers and purchase from them raspberries and blackberries as products realized in the contracted production. In this way, by "offsetting" between the payables and receivables for inputs and outputs in their mutual relation, cash payments are avoided, in a form of commodities trade /exchange. Certainly, in financial terms, it benefits both producers and companies. In addition, producers have ensured buyer for their product and this motivates them to get involved in this production. It is important to emphasize that the relationship between producers of organic raspberries and companies that purchase their products, in addition to the signed contract, is based on a considerable mutual trust. Although the supply of inputs, certification, inspection, extension and purchasing of product is under the competence of the companies, producers are aware of the risks for their production and for the company, if they would fail to comply with the rules and methods of organic production. Therefore, they are trying to maintain the gained confidence and it can be said that these cooperative relations are an example of good practice various relevant activities can be identified within the

Table 1. Economic indicators of organic raspberry at regular production in 1 ha area

Economic indicators	***Unit of measure (u.m.)***	***Quantity (size)***	***Price (€/u.m)***	***Amount (€/ha)***
I Gross income *- Yield*	*t*	*9,000*	*2.00*	*18,000*
Total (I):				**18,000**
I I Variable costs				
1. *Costs of material*				
- Manure	t	10	20.00	200.00
- Fertilizers (organic, biological, etc.)	-	-	-	400.00
- Trellis binder	kg	10	5.00	50.00
- Biological plant protection	-	-	-	180.00
Total (1.):	-	-	-	**830.00**
2. *Cost of services (machine work)*				
- Transport and distribution of manure	working hours	6	35.00	210.00
- Fertilizers (organic, biological, etc.)	working hours	2	35.00	70.00
- Transport of packaging	working hours	1	20.00	20.00
- Interrow processing (4x)	working hours	30	5.00	600.00
- Biological plant protection (4x)	working hours	30	5.00	600.00
- Transport of fruit during the harvest	working hours	40	20.00	800.00
- Autumn plowing	working hours	1	50.00	50.00
Total (2.):				**2,350.00**
3. *Costs of labour*				
- Loading and unloading of manure	working day	5	15.00	75.00
- Loading and unloading of org. fertilizers	working day	5	15.00	75.00
- Sprout tying and wire tightening	working day	5	15.00	75.00
- Irrigation	working day	50	15.00	750.00
- Removal of young shoots (3x)	working day	10	15.00	450.00
- Hand hoeing following (2x)	working day	20	15.00	600.00
- Harvest	working day	145	15.00	2.175.00
- Pruning and removal of old shoots	working day	10	15.00	150.00
Total (3.):	-	-	-	**4,350.00**
4. Certification and o*ther costs*	-	-	-	**670.00**
Total costs (1.+2.+3.+4.):				**8,200.00**
I I I Gross margin (II – I)				**9,800.00**

Source: Author's calculation based on the data of organic raspberry production on a agricultural family household

value chain of agricultural products *(Sredojević, 2014)*. The structure of the value chain represents the synthesis of activities performed in order to complete production, packaging, design, marketing process, delivery and for providing support to its products (Figure 1). These activities are grouped into primary, such as the introduction of inputs in the production - input logistics; transforming inputs into the final products - production; transportation and shipping of the final products - the output logistics; marketing and sales; services and etc., as well as support activities or ancillary activities such as technology development, human resource management, organization infrastructure, etc. According to interviews with the producer and processors, organic agricultural products are mainly sold to wholesalers and processing companies, with which almost 70 % of primary producers concluded in retail facilities contracts before the season starts. Classification of the product is done every other farmer, mainly by size, rarely towards quality. Products are packed in plastic containers. Aggravating circumstance when it comes to transport goods is the fact that 40 % of packaged goods in packages with a mass less than 100 kg, while only 36 % is in packages weighing more than 100 kg *(Sredojević, 2014)*. Specially packaged raspberries produced by this company, have found their place in supermarkets in Sweden, Finland, Norway, the UK, Belgium, Japan and Australia.

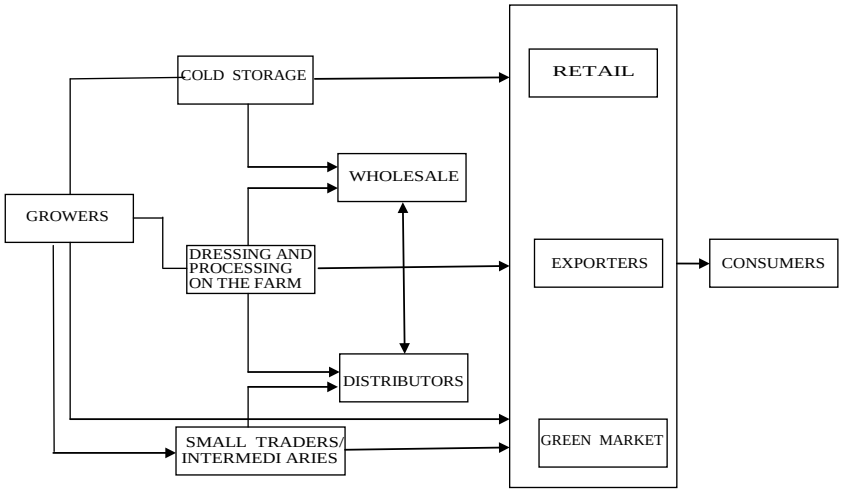

Fig. 1. Scheme of the value chain of organic raspberry in Serbia

SWOT analysis of organic raspberry

This SWOT analysis reflects the Strengths, Weaknesses, Opportunities and Threats identified through analysis of the value chain of organic raspberry in Serbia (Table 2). A significant number of private companies in Serbia engaged in purchasing and processing of organic raspberries have introduced the system of food safety control (HACCP - Hazard Analysis and Critical Control Points). Also, some of them have introduced the GLOBALGAP standard that applies to segments of primary agricultural production. GLOBALGAP standard defines the framework for the application of the rules of "good agricultural practices" which

Table 2. SWOT analysis of organic raspberry

Strengths	***Weaknesses***
o Favorable agro-climate conditions for growing organic products o The interest of producers to increase the area under organic raspberries production o The interest of young people about the cultivation of organic raspberries o Achieving significant economic benefits and revitalization of rural areas o Production of biologically valuable and quality products o A number of companies have developed programs for processing organic products o Biodiversity and Environment suitable for organic raspberries production o Organic farming contributes to the conservation of natural resources o National legislation in organic production is in line with EU regulations	o High input costs and consequently high production costs per unit of product o A large number of small producers, with a series of small parcels, quite distant from each other, which reduces the profitability of production o The high cost of warehousing and storage of organic raspberries to maintain quality o Lack of organized production, processing and distribution of organic raspberries o Weak association of producers in the sector of organic production o Insufficient investment in capacity for processing organic raspberries o A larger number of producers and technology adopted in addition to the primary production of organic raspberries, there is a clear development plan for the processing, packaging, storage and marketing of products
Opportunitie	***Threats***
o Providing a larger amount of incentives to support the development of organic raspberries production of large amounts of financial resources within rural development o Better connection between the participants in the value chain will lead to greater added value of organic raspberries o The recognition of the specific role of the sector of organic production in the sustainable use of natural resources o The inclusion of organic production in the IPARD program when the conditions prescribed by the EU regulations o In areas of growing organic raspberries products develop and rural tourism o Potential increase in selling prices of organic raspberries producers and motivation to achieve greater economic benefits o The increase in value added organic products through, finishing, processing and marketing, quality and packaging design.	o Insufficient support for certification processing capacities for organic products o Insufficient support in integrating stakeholders along the vertical value chain of the organic sector o Incentives for the period of conversion, partial reimbursement of the cost of certification, not the best solution in the long term for producers of organic raspberries o The decline in purchasing power and weak demand for organic products o Lack of manpower and young farmers because of the rural exodus o A significant part of the population does not know the benefits of organic raspberries, while one part of the population has no confidence about the origin of organic raspberries o Lack of control of natural resources - land and water sources for organic production o Lack of respecting the standards and regulations are incomplete, may lead to corruption and other abuses in the sector of organic production

are acceptable to the wholesale and retail systems in the world. Through the application of this standard, all acceptable methods of integrated control of harmful organisms are included in the commercial agricultural production system, which should contribute to the long term sustainability of production. This standard supports the principles of HACCP and encourages their use.

Based on the analysis of the value chain of organic raspberries, it can conclude that in the field of organic production needs a lot of improvement. Actors sector should start to develop relations on existing good practice. This includes gathering around associations and cooperatives, as well as companies with strong brand to establish contractual arrangements and quality criteria to support its marketing strategy. For producers of organic raspberries, Western Serbia, organized purchase by subcontractors - cold storage facilities, represents a key motivation for producers to continue to engage in organic production. As explained above, this relationship is regulated through group certification, the owner of the cold storage facility/company is the holder of the certificate of organic production, and generally assumes all obligations in regard to the inputs and outputs of primary production of organic raspberries.

CONCLUSION

Investing in the packaging lines would be more productive of organic productions and to achieve faster return on investment. All of this is necessary to achieve continuity in the delivery, and this can be achieved either by purchasing of products or forming of associations of producers with the same or similar structure of production. Complex production conditions, the business environment changes, pressure from competitors, and huge fluctuations in demand, are forcing the development of an integrated system. Immediate action should be directed toward establishing an optimal balance between producers and trade institutions, and increasing the interest of all parties in the process of marketing integration.

The growth, profitability and competitiveness of the sector must be improved through investments in all phases (production, processing and distribution) and changes in the export structure. Product packaging, design and transportation should be improved especially for the export markets. For successful production and secure-certain placement of organic raspberries, it is necessary to develop a long-term strategy of organic farming providing guidelines for avoiding or mitigating the potential risks when investing, as well as in the implementation of agricultural-technical and management practices. Despite the problems plaguing the organic production in Serbia, trends of increase of used areas, yield, production and marketing of these products are positive. By eliminating or reducing the above mentioned problems, the trends would become even more positive and would achieve the quality, quantity and continuity in the chain of organic raspberries. All this would contribute to greater profits for producers, processors and exporters and thereby improve the organic production in Serbia.

ACKNOWLEDGMENT: The paper is part of research projects 31058 - Drying of fruits and vegetables from integrated and organic production combined technology; 179028 - The rural labor markets and rural economies Serbia - diversification of income and poverty reduction; and 46009 - Improvement and development of hygienic and technological procedures in the production of foodstuffs of animal origin in order to obtain high-quality and safe products competitive on the world market, funded by the Ministry of Education, Science and Technological Development of Republic of Serbia, in the period 2011-2017

REFERENCES

Lukač Bulatović M. (2014): Ekonomska efikasnost proizvodnje i prerade voća, Monografija, Poljoprivredni fakultet, Novi Sad.

Milić D., Bulatović Mirjana (2005): Stanje i tendencije proizvodnje voća u Srbiji, PTEP- časopis za procesnu tehniku i energetiku u poljoprivredi, Novi Sad, Vol.9, broj 3-4, str. 94-97.

Milić D**.,** Galić D., Vukoje V. (2011): Possibilities for Improvement of Fruit Production in Serbia, Journal on Processing and Energy in Agriculture, Vol.15, No.1, pp.27-30.

Milić D., Sredojević Z., Marjanović S.(2012): Economic Analysis of Integrated and Organic Fruit Production, Journal on Processing and Energy in Agriculture, Vol.16, No.1, pp. 23-27.

Sredojević Z. (2011a): Economic analisysis of production, processing and sale of sweet and sour cherry in Serbia, DAI-USAID Agrobusiness Project, www.agrobiznis.net, (Date of accesion, 20/08/2014)

Sredojević Z. (2011b): Economska evaluacija proizvodnje trešnje i višnje u Srbiji, III savetovanje "Inovacije u voćarstvu" - Unapređenje proizvodnje trešnje i višnje. Zbornik radova. Univerzitet u Beogradu, Poljoprivredni fakultet, str. 5-20.

Sredojević Z. (2014): Value chain analysis of region specific organic products in Serbia Food and Agriculture Organization of the United Nations, Project "Assistance to the Development of Capacity and Support Services for Organic Agriculture in Serbia ", GCP/SRB/001/HUN

Sredojević Z., Kljajić N., Popović N. (2013): Investing in Raspberry Production as an Opportunity of Sustainable Development of Rural Areas in Western Serbia, Economic Insights–Trends and Challenges, Vol. II(LXV) No. 1/201, Online ISSN 2284-8584 pp. 63-72 http://www.upg-bulletin-se.ro/archive/2013-1/6.Sredojevic_Kljajic_Popovic.pdf

Vlahović B., Elenov R., Milić D.(2013); Export of Fruits and Fruit Processed Products from the Republic of Serbia, Internacional Symposium for Agriculture and Food, Thematic Proceedings XXXVII Faculty –Economy Meeting, IV Macedonian Symposium for Viticulture and Wine Production, VII Symposium for Vegetable and Flower Production, Faculty of Agricultural Sciences and Food, Skopje, 1048-1056.

http://webrzs.stat.gov.rs/WebSite/repository/documents/00/01/26/77/09 Poljoprivreda.pdf, Statistical Office of the Republic of Serbia, (Date of access, 28/01/2017).

Received: 01. 03. 2017. Accepted: 09. 08. 2017.