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Organic Production of Industrial Crops in Serbia

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Summary: Organic production is a form of sustainable agriculture, protecting human health, and agro-ecosystems, thereby providing a significant economic profit. How is the area under this type of agricultural production increased throughout the world, as well as the production of organic industrial plants recorded trend of permanent increase. The aim was to show the production status and production areas in Serbia, for a period of 2013-2015. During analyzing period (2013-2015), area under this type of production increased by 75%. The highest organic production of industrial plants is concentrated in Vojvodina. In relation to the 2013, the area increased twofold in 2014, while in 2015 a threefold increasing of area is recorded (compared to 2013 data). Serbia has very favorable conditions for organic crop production, as well as an additional investment to support producers, facilitate greater dissemination of their products to foreign markets, which have unlimited demand.

Key words: regions, organic production, industrial crops, area.

Introduction

Organic production is created as a response to human environmental pollution, urbanization and the preservation of flora and fauna, where the use of pesticides in conventional agriculture not only prevents the loss of crop protection from pests and pathogens, but has many negative consequences on the environment, as well as on market, because it leads to an increase of the cost of agricultural products (Golijan and Popović, 2016; Golijan, 2016). The main concept of organic production is made to protect the environment, and existing natural resources (Veličković et al., 2016; Subić et al., 2010; Golijan and Veličković, 2015), so it is technically applicable, socially acceptable and economically sustainable (Ubavić, 2015), and represents the alternative to the conventional production (Popović et al., 2016; Carić and Babović, 2012).

In Serbia, the regions and macrorayons of agriculture are clearly defined, which is of the particular importance in regional development and economic policy of the whole agriculture, not just of the villages (Babović et al., 2005). Serbia has a fertile and significant level of non-contaminated land for a diverse agricultural and organic production. Region deployment and results related to land, air and water quality show that it is possible to develop organic agricultural production and processing successfully. Using modern technologies and biotechnology in production and processing, with adequate global and regional development strategy, can significantly increase the production of organic foods, increase exports, make profits and protect the environment. The structure of agricultural production is conditioned by economic and natural diversity and characteristics of agricultural areas in Serbia. In the lowland area, arable land is most frequent, of which 72% is under corn, 19% under industrial crops, vegetables below 5% and 4% under forage crops. In plain-hilly area of arable land is occupied by 75-92%, with production dominated by cereals and fruits. The hilly-mountain reon has less arable land, only 35-55%, and are the most common pastures and forests, while crop and vegetable production is present to a lesser extent. In the hilly area, the soil quality is weaker, there are small plots and land not suitable for agricultural production. (Babović, 2010; Tasić, 2015).

In 2013, organic production of industrial crops globally spread over an area of 23964 ha, and in 2014 recorded an increase of 4.8% (25123 ha). In European countries, total organic production was carried out on an area of 12378 ha in 2013 to reach in 2014 an increase of 8% (13373 ha) (Willer and Lernoud, 2016; Golijan and Popović, 2016; Popović et al., 2017). Leading industrial plants producing countries are the USA, India, Brazil and China. However, the organic production of industrial plants is mostly carried out in China, Kazakhstan, the USA, Romania, Ukraine and Canada (Willer and Lernoud, 2015). The highest organic shares are in Peru-21% (soybeans and peanuts), El Salvador-15 % (sesame), Austria-10.1% (soya and sunflower seed), Israel-5.9 % and Kazakhstan-5.1 % (Willer and Lernoud, 2014; Willer and Lernoud, 2015). The largest share, in general, occupy the area under organic production of soybean-nearly 30%, while 20% is production of sunflower and peanut (www.organic-world.net).

The aim of this paper was to show the state of the relationship area under organic production of industrial crops in Serbia-according to regions and districts, for a period of 2013-2015.

Material and Method

Organic production of industrial plants occupies a significant share on the global level, in comparison with the entire sector of organic production. Considering the area under organic plant production in Serbia, it is evident that organic production of industrial crops in our country has an important place. The purpose of this paper is to present data on the spread of this type of area under organic industrial production in the last three years. The desk research method was applied. Using literature data covering topics of organic agricultural production, industrial plants, as well as

data available from the Ministry of Agriculture and Environmental Protection and the Serbian Chamber of Commerce, the paper analyzed and graphically displayed (in Microsoft Excel 2007) the movement of land area under organic industry plants on the territory of entire Serbia, as well as to individual regions and districts in the period 2013-2015.

Results and Discussion

Basic characteristics of production of industrial crops in Serbia over the last few years are (www.seedev.org): 1) the participation of soybean crop structure is on extremely high degree (which is not typical for European countries) because Europe, since given up the soybean seed, became dependent on imports of soybean and its meal from the United States, Brazil, Argentina (about 300000 ha were planted), and as a result, more than 40% of soybean production in the EU comes from Serbia; 2) reducing the number of producers of sugar beet, with a significant improvement in productivity and yield (which provides an opportunity for Serbia to produce sufficient quantities of sugar, both for the domestic market and for export); 3) despite the high price in 2014, the production of sunflower has not managed to increase production area (while expectations are that it will have a significant reduction in the surface when the price is reduced and 4) large variability in the total production of industrial crops, especially soybean-large effect of bad and good year for producing.

Organic production in Serbia recorded a rising trend (Veličković and Golijan, 2016). The total area under this type of agricultural production in 2015 spread out over an area of 15298.02 ha (Ministry of Agriculture and Environmental Protection, 2016). In the range of organic production in Serbia tillage plant production takes 72%. The part of the area under organic production in the total used agricultural land is 0.23% (Bošković, 2016). The biggest export value in 2013 was realized by the export to Germany, the Netherlands, the USA, Great Britain and Switzerland. In 2013, 7100 tons of organic products were exported, that is 10.7 million euros worth (The basic information about organic production in Serbia, 2016). Production of industrial crops in Serbia (tobacco, flax, poppy seeds, sorghum, soybean, sunflower, rapeseed), with an area of 2674.38 ha in 2015, is in third place, while the leading role occupied by cereal production (4251.94 ha) (Golijan, 2016, Popović et al., 2017) (Fig. 1).

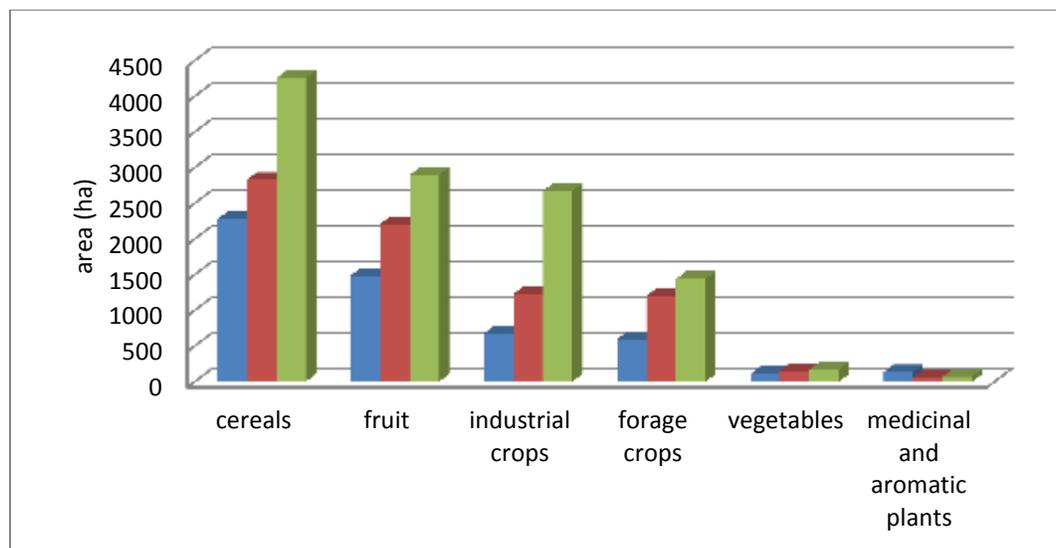


Figure 1. The structure of the organic plant production in Serbia, in period 2013-2015

From industrial plants, according to the report Serbian Chamber of Commerce in 2015, the highest production value achieved soybeans-50.8 million, or 129,585 t, a soybean oil 46.1 million, or 65217 t (Serbian Chamber of Commerce, 2016). In the period from 2013 to 2015, the area under organic production of industrial crops increased by 75%. The lowest area under this type of production are spread in the region of the City of Belgrade-9.5 ha in 2015, while in 2014 had a share of only 0.5 ha and 0.97 ha in 2013 (Fig. 2).

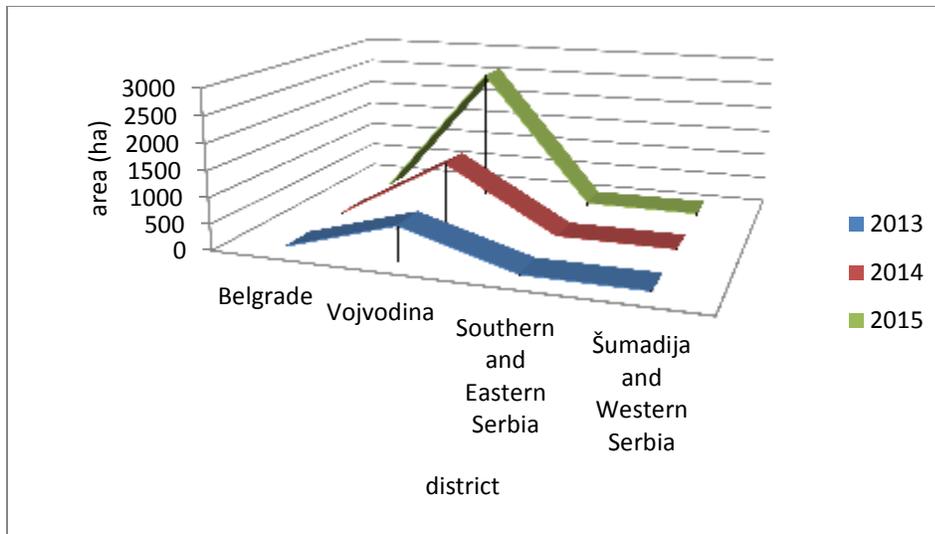


Figure 2. The distribution of area (ha) under organic production of industrial crops by regions in the period 2013-2015

During the period from 2013 to 2015, the largest area under organic production of industrial plants spread out in the region of Vojvodina. South Banat District is a district in which the largest organic production of these plants takes place during the three analyzed years. Compared to the year 2013, in 2014, the area increased threefold, while in 2015, increased twice (2152.04 ha).

Also, in the region of Vojvodina, a very significant area under organic production of industrial plants are located in the South Bačka District, in the amount of 336.09 ha in 2015, which is an increase of 264.44 ha compared to 2014 (Fig.3). The lowest type of production in the region takes place in the Central Banat District (only 6.43 ha in 2015).

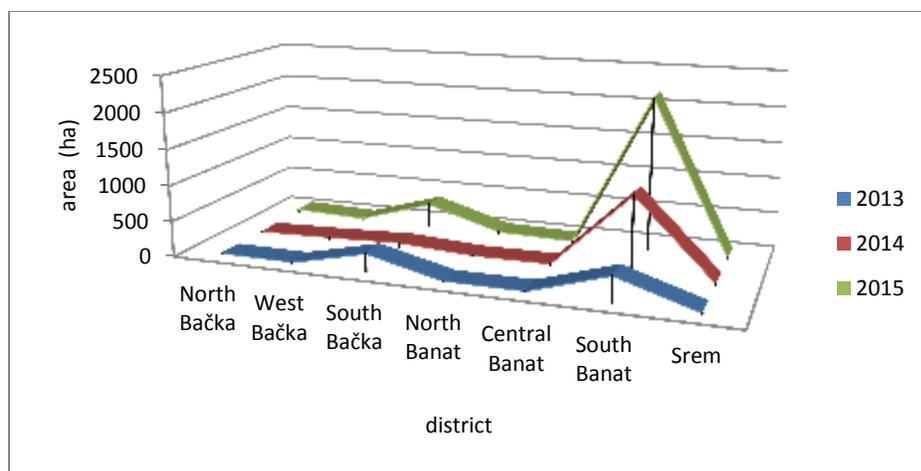


Figure 3. Area (ha) under organic production of industrial crops in the region of Vojvodina (districts) in the period 2013-2015

Organic production of industrial crops during 2015 in the region of Southern and Eastern Serbia took place in an area of 33.47 ha, while in 2014 in either district, the area of this type of agricultural production has not been registered (Ministry of Agriculture and Environmental Protection, 2016). In 2013, organic production was taking place in an area of 14.89 ha. Podunavlje district is the only district in which the registered area under organic production of industrial crops in 2013 and 2015 was, while at the first time in 2015 in Pčinja district organic production, is taking place on the area of only 0.01 ha (Fig. 4)

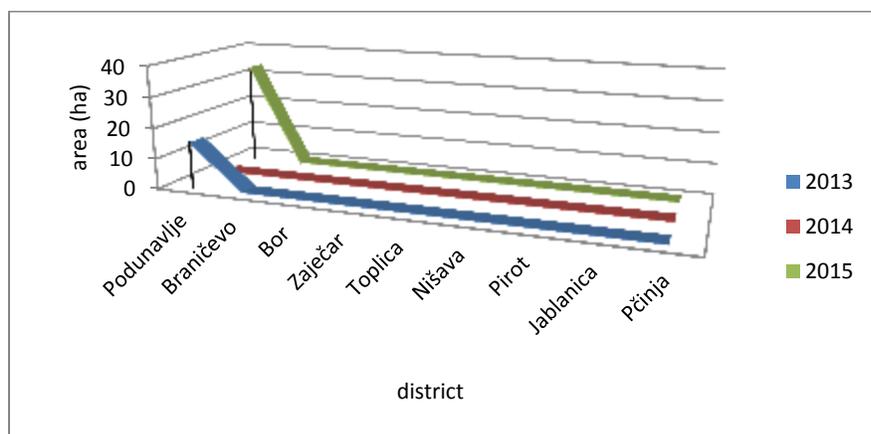


Figure 4. Area (ha) under organic production of industrial crops in the region of Southern and Eastern Serbia (districts) in the period from 2013-2015

In the region of Šumadija and Western Serbia, organic production of industrial crops is on the second position after the Vojvodina in 2013 and is spread over an area of 13 ha, while in 2014 a decline in production by 85% is recorded. In 2015, production reached a area of 37.85 ha (Ministry of Agriculture and Environmental protection, 2016), which is an increase of 94.85% compared to 2014 (Fig. 5). The largest share of organic production of these types of plants in 2015 occupies Mačva district -97.81%, while in 2013 this share was only 5.54%. In addition to Mačva district, the

only district of the region in which organic production of industrial crops takes place is Pomoravlje district. In 2013, with area of 12.29 ha (94.54%), it was the leading district in the region. However, after 2013, the area decreased in this district, which in 2014 occupied a share of only 6.67% and 2.22% in 2015.

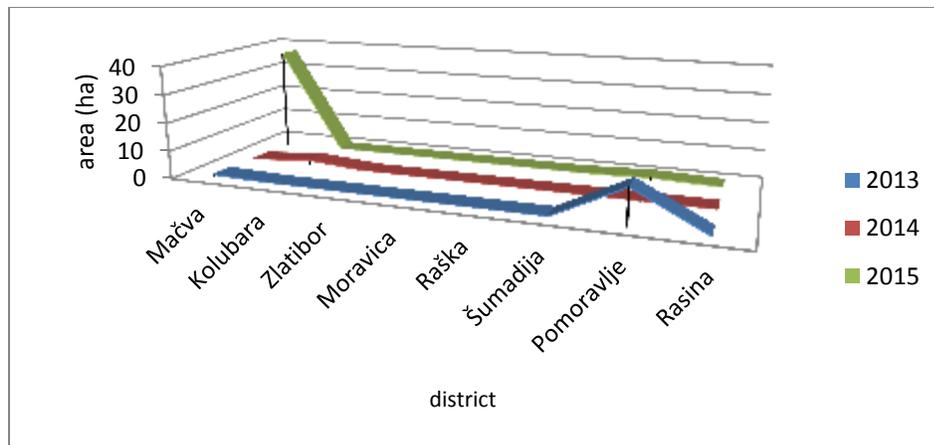


Figure 5. Area (ha) under organic production of industrial crops in the region of Šumadija and Western Serbia (districts) in the period from 2013-2015

According to the altitude and the possibilities for development of agriculture and organic farming, Serbia is divided into four makroreons: lowland, plain-hilly, hilly-mountain and hill and mountain (Marković, 1995, Babovic & Veselinović, 2010; Tasić, 2015):

- 1) Lowland areas up to 200 m above sea level-covers lowland makroreon including five microreons (cereal area; area of industrial crops, vegetables, fruits and grapes, and livestock reon). In this area, under current research of the natural resources, there are very good conditions for diverse organic agricultural production;
- 2) The plain-hilly reon of 200-500 m above sea level-covers several parts of central Serbia (cereal and industrial crops, fruits and grapes, vegetables and livestock reon), in which natural resources are favorable for a diverse organic production;
- 3) The hilly-mountain reon of 500-1000 m above sea level-includes two parts of central Serbia (crop-livestock-fruit-wine region). This sector, from the point of agro-ecological and environmental conditions, is very favorable for the development of organic agriculture;
- 4) The hilly and mountainous areas over 1.000 m above sea level, comprises two parts of central Serbia and Kosovo and Metohija, which have all the conditions for the development of traditional and organic production.

Organic farming is one of the fastest growing sectors. This is supported by the fact that in the last five years, the area under this type of agricultural production increased by almost 300% (Golijan et al., 2017; Kolašinac et al., 2017). In 2015, the percentage of share of area under organic production in the total-used agricultural land has reached a value of 0.44%. In comparison, the average in the EU, according to data from 2013 was close to 5.4% (Center for Organic Production, 2016). In order to expand organic grain production, industrial and herbs, the Ministry of Education and Science of the Republic of Serbia in the period from 2011- 2014, funded by a project of integrated and interdisciplinary research "Sustainable agriculture and rural development in achieving

the strategic goals of the Republic of Serbia the Danube region "(no. 46006 III), in which the stated task was: organic production of cereals, industrial and herbs in order to create brands through a vertical model of association (Berenji et al., 2013). The analyses of the project show (according to the available data) that few examinations have been taking place on the certified organic farms; farmers and their cooperatives and private sector in the whole have not taken part enough in creating the aims of research. The aims of the project are not realized enough and it is usually concluded that they are necessary to be continued. In general, the application of the results in the organic production sector is insufficient.

The main characteristic of organic production in Serbia is that there are two basic groups that is types of organic producers: individual ones who have got directly made agreement with some of controlled organizations and so called cooperatives (Oljača, 2015) whose production is under group certification allowed by the current law of the Republic of Serbia, in this way the producers are in contracted relation with some of the companies that repurchase the whole production for the export markets, and at the same time they support: inputs, education, cover the certification costs, and the holder of the certificate is the company and not the producer themselves (Kalentić et al., 2014).

The characteristic of organic farms in the region of Vojvodina is their specialization for the production of a lesser number of plant species, such as cereals, industrial crops and vegetables, while the average farm size is greater than 10 ha. In contrast, farms in central Serbia are largely related to private cooperative processing facilities, where they carry out procurement of necessary inputs buyers and production carried out in small areas. With a production area of more than 500 ha, large private companies represent the third group of Serbian farms. Their characteristic is the deficiency of infrastructure-specialized equipment and personnel and they are under considerably large investments (for the supply of equipment and machinery (Berenji et al., 2013). In comparison with other segments of the agribusiness sector, organic production can prove a very significant income, even with a small investment, and this fact makes it one of the biggest advantages of investing in this type of environmentally friendly and healthy agricultural production.

Conclusion

Organic agricultural production presents safe, but at the same time economically viable alternative to a conventional production. Areas under this type of production are permanently increased, both globally as well as in Serbia-where in the last three years was recorded increase the area under organic production of industrial crops by 75%, reaching a value of 2,674.38 ha in 2015.

The leading region for the largest production of this plant species is Vojvodina, where the largest share concentrated in the South Banat District, followed by the South Backa-with 336.09 ha. After Vojvodina, in the region of Sumadija and Western Serbia carried, the largest manufacture of industrial plants is carried out according to organic principles, which in comparison to the year 2013 had a decline in production by 85%, after which in 2015 was followed by an increase of 94.85% compared with 2014.

The largest share of production in the region has Macva district, then Pomoravlje district. In the region of Southern and Eastern Serbia, organic industrial crop production takes place in an area of 33.47 ha, which is the only Podunavlje district county with registered production in 2013 and 2015, while in 2015, and in Pcinja district, for the first time production takes place on the area of only 0.01 ha.

The lowest production of organic industrial plants in 2013 and 2015 (0.97 and 9.51 ha respectively) had the city of Belgrade. With regard to organic production of industrial crops in Serbia is in third position, behind cereals and fruits, in addition to favorable natural conditions, especially in

the Vojvodina region, it is necessary to associate their manufacturers, as well as the support of the state in the form of grants and projects in order to improve production and better marketing of their products in foreign markets.

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Organska proizvodnja industrijskog bilja u Srbiji

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Sažetak: Organska poljoprivredna proizvodnja predstavlja vid održive poljoprivredne proizvodnje, štiteći zdravlje ljudi, agro- i ekosistem, a pri tome osiguravajući značajan ekonomski profit. Kako se površine pod ovim vidom poljoprivredne proizvodnje uvećavaju širom sveta, tako i proizvodnja organskog industrijskog bilja beleži trend permanentnog rasta. U tom cilju, želeli smo da prikazemo stanje proizvodnje, tj.proizvodnih površina u Srbiji, za period od 2013-2015.godine. U analiziranom periodu od 2013 do 2015.godine, površine pod ovim vidom proizvodnje uvećane su za 75%. Najveća organska proizvodnja industrijskog bilja skoncentrisana je u Vojvodini. U odnosu na 2013.godinu, u 2014.godini površine su dvostruko uvećane, dok je u 2015.godini, zabeleženo trostruko uvećanje površina (u poređenju sa podacima iz 2013. godine). Srbija poseduje izuzetno povoljne uslove za organsku proizvodnju industrijskog bilja, te bi uz dodatnu investicionu podršku proizvođačima, omogućila veće širenje njihovih proizvoda na inostrana tržišta, koja imaju neograničenu potražnju.

Ključne reči: regioni, organska proizvodnja, inustrijsko bilje, površine