

## POSSIBILITIES FOR ORGANIC PRODUCTION IN PROTECTED AREAS OF THE LOWER DANUBE REGION

*Bojana BEKIĆ, BSc, research-assistant,  
Marijana JOVANOVIĆ, BSc, research-trainee,  
Lana NASTIĆ, MA, research-assistant<sup>1</sup>  
Institute of Agricultural Economics, Belgrade, Serbia*

*Organic agriculture is fully controlled production and aims to facilitate sustainable development. In order to establish the patterns of organic production on one area must be met clearly defined criteria: isolation of plots of land, livestock farms and processing facilities from potential sources of pollution, water quality suitable for irrigation, the coordinated development of crop and livestock production and unpolluted soil content pollutants below the maximum allowable amount.*

*Lower Danube (Carpathian region), National Park “Đerdap” covers the territory and cadastral municipality Golubac, Toponica and part of the cadastral municipality Majdanpek and is a protected area of great importance for Serbia.*

*The aim of this work will be to present the current situation in organic agricultural production in Serbia, with special emphasis on the situation of the territory of the Lower Danube. It will be presented and opportunities for future development of organic farming in greenhouses NP Đerdap, in accordance with the improvement of natural resources and protection of plant and animal associations that are found in a given locality.*

**Key words:** *organic agricultural production, Lower Danube Region, protected area NP Đerdap*

### **Introduction**

Organic farming involves completely controlled phase of the manufacturing process and the formation of high-quality products that are completely correct and healthy for consumption, both humans and animals. The manufacturing process requires fulfilling the previously defined conditions: isolation of agricultural land and livestock farms from all sources of contamination by creating a so-called protective areas growing; finding available sources of high quality water for irrigation, non-contamination of soil with heavy metals or products from agricultural production. It is necessary to harmonize the development of crop and livestock production and thereby form a cyclic ring in which there is an exchange and to use nutrients with minimal contamination of natural resources.

The economic justification of organic production, particularly in developing countries, the Republic of Serbia would bring: the optimal use of agricultural resources, a higher rate of economic growth, increase exports, increase local agricultural production, improving the standard of people living in rural areas. Caused to rural development, and the preservation and maintenance of the rural population.

Based on data obtained from the analysis carried out by GIZ<sup>2</sup>, a period when the Law on organic production was not effective in the Republic of Serbia, in 2010. The organic production is performed on 826,000 ha, whether the products are already

<sup>1</sup> Institute of Agricultural Economics, Volgina 15 Street, Belgrade, Serbia. Corresponding author: Bekić Bojana, e-mail. [bojana\\_b@iep.bg.ac.rs](mailto:bojana_b@iep.bg.ac.rs), ph. + 381 11 29 72 852; Jovanović Marijana, e-mail: [manajov@yahoo.com](mailto:manajov@yahoo.com).; Nastić Lana: [ivlanaa@yahoo.com](mailto:ivlanaa@yahoo.com). This paper is part of Project III 46006 named “Sustainable agriculture and rural development in the function of achievement goals of Republic Serbia within Danube Region” and Project 179028 named “Rural labor markets and rural economy of Serbia - the diversification the income and reducing the rural poverty”, financed by Ministry of Education and Science of the Republic Serbia, project period 2011-2014.

<sup>2</sup> GIZ - Deutsche Gesellschaft für Internationale Zusammenarbeit,

certified or are in the process of obtaining certification for organic products. This information includes the area used for collecting wild berries, mushrooms and herbs. Arable land used for organic farming occupies an area of about 8500-9000 ha or 1 to 1.1% of the total surveyed area. Of the total area under organic production, perennial species are grown on about 40% of the land, kind of a one-year to about 16%, meadows and pastures are present in 44% of the area. In the category of perennial species, dominated by apples and plums, and berries of which the most important are raspberries. Grains, soybeans, and vegetables are the most common types of annuals. Although the berries major export species, manufacturers are opting for other species, mainly apples and plums.

Through financial support to producers of organic products and innovating manufacturing plants by taking advantage of the natural resources that exist in the region of the Lower Danube, it can be expected that there is enormous potential for the development of organic farming in this area.

### **Matherial and methods**

The development of organic agricultural production in the Lower Danube region will be one of the tools for animating the local population to return, because the degradation of the rural population and the urbanization process enabled further accelerated shutdown of certain industries in small towns. Based on the statistical data of public institutions and the results achieved construed current situation in this objasti agricultural production. Data were analyzed using the analytical-synthetic and holistic scientific method.

### **Results and discusion**

The Carpathian area (Lower Danube) in the Republic of Serbia extends into eastern Serbia and includes the municipalities of Golubac, Kladovo, Kučevo, Veliko Gradište Majdanpek and Negotin. The whole area gravitate to the Danube river, and orthographically belongs to the southern Carpathians. It covers 732.35 km<sup>2</sup> and includes the Iron Gate and NP "Đerdap". For intensification of the organic agriculture it is necessary to have high-quality initial resources: land, water, air and climate parameters.

According to the data, climatic factors, conditioned the possibility for the development of agricultural production in the Lower Danube. This is indicated by the data obtained from the Meteorological Service of Serbia, so the long-term average maximum air temperature values lie in the range of -12,9 ° C (January) to 35,2 ° C (July). The average amount of rainfall was 613,6 mm for the entire year, and during the growing season rainfall is 305,7 mm. Number of hours of sunshine in this region is 2107,3, with winds in the range of 1,1 - 1,8 m / s.

Characteristics of the land on which the organization may indicate that agricultural production is lower Danube region is characterized by a variety of soil types. On the territories of the Lower Danube Region can be found the following soil types: chernozem, brown forest soil, podzol, alluvial sediments, vertisol, humogley, peskuše, pseudogley loessivized brown acidic soil. Variety of soil types and cultivation has enabled a variety of crops, mainly cereals and for establishing vineyards and wine production.

Hydro potential of the Lower Danube represents the backbone of the development of the whole area, because the Danube River, the second largest river in Europe, except in the role of agriculture, has a role in the multilateral development of the entire region and connecting major market centers in the country and abroad, with small local markets . In this way, the Pan-European Corridor VII-Danube, is essential for the export of agricultural intensification processes and their products as well as products from other industries.

The basis for the development of organic farming and organic products getting late, have knowledge of the potential areas in which it is planning a future production. According to official statistical data on the territories of the Lower Danubian organization in agricultural land, most of the surface are the fields and gardens, in three of the five municipalities surveyed. It is a good precondition for the start organic farming in the region.

**Table 1. The structure used land in 2010, year (%)**

	Agricultural land (ha)	Fields and gardens (ha)	Orchards	Vineyards	Meadows	Pastures
Golubac	15.530	8.525	588	237	2.626	3.550
Negotin	70.461	36.388	1.112	2.800	18.145	11.918
Kučevo	34.366	15.525	2.365	137	8.094	8.214
Kladovo	28.806	17.401	289	869	7.104	3.141
Majdanpek	20.089	6.515	1.372	49	9.467	2.682

Source: Statistical Office of the Republic of Serbia (2011). The municipalities and regions in the Republic of Serbia.

Presence fields and gardens in total agricultural area ranges from 60,41% in the municipality of Kladovo, through the municipality Golubac (54,84%) and the Municipality of Negotin (51,64%). In Kučevo proportion of arable land and gardens is 45,18%, while the least arable land and gardens recorded in Majdanpek (32,43%).

In *Table 2*, shows the structure seeded arable land and garden in 2010. The highest representation by the crop structure with grains, whose involvement ranges from 37, 57% to 58, 28% Kladovo to share in the crop structure of Golubac. Industrial crop production is most intense in the territory Golubac, with a share of 9, 84%, and is completely absent, ie. not registered in the production of Majdanpek. Production of vegetable plants is most intense in the territory Kladovo with participation in crop structure seeded arable land and gardens (13, 84%), and Majdanpeku (11.47%). Areas under forage crops are the most common in Golubac (21, 10%), Majdanpeku (20, 40%) and Kladovo (18, 42%).

**Table 2. The structure of seeded of arable areas in 2010 year (%)**

	Fields and gardens (ha)	Cereals	Industrial crop	Vegetable	Roughage
Golubac	8.525	4.969	130	733	1799
Negotin	36.388	19.822	3.582	3.548	4.571
Kučevo	15.525	6.841	31	571	2.603
Kladovo	17.401	6.539	886	2.409	3.206
Majdanpek	6.515	3.448	-	747	1.329

Source: Statistical Office of the Republic of Serbia (2011). The municipalities and regions in the Republic of Serbia.

An important characteristic of the region of Lower Danube is a natural potential for fruit and grape production. The claims are supported by data on areas that are under these crops. Thus it can be stated that most orchards in the area sown to crop structure has Kučevo (6,88%) and Majdanpek (6,82%), while the largest area of vineyards located in Kladovo (4,18%) and Negotin (3,97%). Climatic and geographical conditions are favorable for growing high-quality grape varieties, but improper use of soil management, crop potential can be significantly reduced.

Surface of meadows and pastures, which are represented in the crop structure of sown areas, emphasize the potential of this area to forage production and grazing locals practicing animal husbandry. The largest areas of pastures are in Kučevo (23,90%) and

Golubac (22,86%), and the largest area under natural meadows are, in Majdanpek (47,13%) and Negotin (26%).

Livestock production, in the Republic of Serbia is affected by the devastation of low investments in this branch of agriculture. As the trend of low agricultural support, unstable and insecure channels purchase of raw milk and meat producers who do not provide the optimal price, there is a degradation / reduction of livestock in all branches of livestock, especially swine. According to the limited data, it can be concluded that in the territory of the Lower Danube has been a decline of livestock production, despite all the favorable natural conditions for its development.

In order to achieve this type of growth in agricultural production, it is necessary to follow and respect the framework conditions and trends. Compared with European countries, where the production of organic products has a long history, the total value of organic products from 11 billion euros in 2003. year, increased to 18 billion euros in 2009. year, which justifies the cost of this kind of production. As the consumption of organic products in the EU grew faster than production, disproportionately increased imports from third countries. Retail sales of organic food reaches the value of 0.5 billion euros, as is the case in Austria, the Netherlands, Belgium, Spain and Denmark, 3 to 4 billion euros in Germany, Switzerland, France and the UK, so the market does not show signs of saturation, which may be the impetus for the expansion of organic farming in this region.

According to the data, in the Lower Danube region, the primary crop production is oriented to the production mostly of cereals and forage, but not negligible proportion of industrial plants, vegetables and some fruit crops, as well as medicinal herbs. This can be beneficial, as the largest consumer market of organic food in their economic niches, the market of products, can be found in *Table 3*.

**Table 3. Organic products from the region of the Lower Danube region with significant market potential in the EU**

Category	Products	Using
Cereals	Cors/wheat/barley/oats	Nutrition
Plant roots	Potatoes	Food
Vegetable	Onion, beans, garlic, pepers, etc.	Market of fresh vegetable
Fruits	Apples, grapes, etc.	Marketplace of processing and fresh fruit market

Source: GIZ, Serbia 2011.

At the level of processing of organic products, further reducing costs and improving production efficiency is necessary. Apple juice, jam, marmalades, muesli, grain products, wines with a geographical indication of origin, which are offered in European supermarkets, are only slightly more expensive than the same products from conventional production. In the case of Serbia, improving efficiency across the entire value chain of organic products requires large investments, and better education and training, not only on a technical level, but also at the level of farms, economics, management, marketing and presentations. Of course, it is understood and the full respect of EU legislation related to food safety, hygiene, packaging and transportation. Any deviation from these rules could seriously disrupt marketing photo products from Serbia and Lower Danube.

One of the concerns of which may endanger the development of organic farming, the movement of population migration flows, which have in the rural area of the lower Danube, constantly decreases due to the process of urbanization. Such a situation exists in almost the entire territory of the Republic of Serbia. This leads to a reduction of arable land in mountain areas in general, and this induced reduction of area under

organic production. In this way, the potential for organic meat production, since a reduction in the number of heads, decreased. Production of organic meat and dairy products depends mainly on the production of feed organic matter, ie. production of grains and oilseeds.

Benefit consumption of the fact that the EU indicate ovarian their markets as the products of the region, offers a chance to get together with the development of organic farming, and came to help modernize the agricultural system and integration into the CAP. The European Commission recognizes the importance of organic agriculture in the further development of a rural area, with the adoption of the Codex alimentarius on organic production that was made by the United Nations Food and Agriculture Organization (FAO), which is based on the strategy of organic farming in the EU, organic farming is complete production management system that promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity.

Characteristics of the Lower Danube and the presence of a protected area of the National Park Đerdap, which are rich in flora and fauna, various relict and endemic species, condition as strategic positioning of this region on the map of Europe Development. Natural resources, water, air and land in the first place are excellent initial potentials, and their dormancy is one of the reasons that this area becomes interesting in this kind of farming. Through the process of integration of Serbia into the European Union, environmental reorientation of agricultural production in the traditional, sustainable way of doing business, create a stable basis for the application of organic production. In addition to raising farms that grow organic crops and livestock breeding, will be coming to a reduction in pollution from agricultural products, primarily nitrite and nitrate, which is a prerequisite for doing well in this mode of production.

One of the limiting factors of the development of local areas may be:

- fragmentation of large individual holdings,
- poor farmers pooling of interests,
- lack of organized production and sales.

On the Lower Danube, there are problems arising as a result of unplanned use of agricultural resources and negligent attitude towards the environment. Although organic farming in this area can be very successfully carried out, due to the presence of industrial existence of the municipalities around the region have harmful effects, especially through the discharge of wastewater into the Danube and soil pollution. Unplanned deforestation may threaten the biodiversity of mountain regions and cause erosion process. A large number of old landfills and illegal waste can lead to contamination of groundwater. Underutilization of the potential for biomass production and obtaining bioethanol and biogas, complex administrative procedures, together with Insufficient information producers and consumers may make the slow process of revitalization of the agricultural sector. Although these facts are present as an alarming factor in the initiation of the production process, reorientation to new production methods, including organic production and all aspects of tourism development will cause the entire region.

### **Conclusion**

Based on the data, it can be concluded that the area of the Lower Danube agricultural area in which it is possible to rebuild manufacturing processes. Development of agricultural production are favorable climatic characteristics, the presence of sufficient amounts of rainfall, sufficient number of hours in a year and growing seasons, and the favorable characteristics of the land. Gravitation areas of the

river Danube, may be an advantage in this region of the eye later linking with markets in neighboring countries and later facilitate transport of agricultural products of high quality. The crop structure dominant area of biotech crops and forage crops, and the farming and industrial crop production represented in smaller production areas. The territory of the Lower Danube are also suitable for the development of horticulture, and the mountainous regions are characterized by the presence of meadows and pastures.

Serbia's accession to the European Union opens new potentials for the development of rural areas. In the first place the production of organic food may be potential for development, given that the current EU members show no saturation of these products. How favorable conditions, the production of cereals, especially maize, wheat and oats, then the production of potato, vegetable and fruit production that is labeled organic product is the backbone of future development. It can be concluded that the observed municipalities there is potential for organic agriculture, especially in the field of medicinal plants and beekeeping and processing of high value and high quality health products from beef, sheep and goat milk and meat.

The Municipality of Negotin can be seen as the future center of organic grape production and trade, as it is in 2011. On the territory of the municipality established center for organic production of grapes and wine, which aims to certify the existing production of grapes and wine by organic methods.

Mitigating the negative consequences of the process devastation of the rural areas, educating people about the benefits of sustainable farming, using organic methods, can be achieve significant progress in approximation of the region and of the whole European Union.

Another advantage for the development of organic agriculture in the region, and is its genetic variability and richness of biodiversity, which provide opportunities for the intensification of agricultural production, with irrigation measures and reduce erosion.

A positive feature of the existence of a potential for the development of power plants and biomass / biogas and bioethanol, which would contribute to the achievement of independence on farms regarding the use of common resources of energy. With creation of a positive environment for small businesses, their connection to the network, as well as direct to the particular type of production, there may be a resurgence of agriculture in these region, with an emphasis on organic production method.

### Literatura

1. Republički Zavod za Statistiku. (2011). Opštine i regioni u Republici Srbiji, 2011.
2. <http://www.hidmet.gov.rs/ciril/meteorologija/agro.php>, Republički hidrometeorološki zavod Srbije. (2011).
3. Nacionalna asocijacija za organsku proizvodnju "Serbia Organica". (2012). Organska poljoprivreda u Srbiji za 2012. godinu. Serbia Organica i GIZ.
4. SO Negotin. (2011.). Strategija održivog razvoja opštine Negotin, za period 2012- 2021. godine.
5. Jovanović Marijana, Njegovan Nikola, Nastić Lana. (2011). "Advantages of rural development in municipalities of the Serbia- Danube Region" Međunarodna konferencija "Politike ruralnog razvoja iz perspektive proširenja EU", tematski zbornik, Ečka 8-9.09.2011. Institut za ekonomiku poljoprivrede. ISBN 978-86-6269-004-3. str 23-29.
6. Vesna Popović, Radolica Sarić, Marijana Jovanović. (2012). Sustainability of agriculture in Danube region. Časopis međunarodnog značaja, Ekonomika poljoprivrede Vol. LIX, No 1 (1-176), 2012. UDC 338.43:63, ISSN 0352-3462, pregledni članak, UDC 631:147(282.243.7), str. 73- 87