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ORGANIC PRODUCTION AND ITS ROLE IN ENVIRONMENTAL PROTECTION

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Abstract

Serbia, as a relatively small country, which dos not have a lot number of comparative advantages in the process of globalization can only be, in addition to human resources, rely on their natural resources. Favorable climate, large areas of arable land and forests, healthy environment conducive to the development of organic farming, which may be a response to the process of European integration and the necessity of trade across national borders. Methods of organic agriculture that are already use in many countries in the world, has shown excellent results in the conservation of soil biodiversity, soil and water purification from pesticides and fertilizers. Biological control of pests, the use of natural substances in disease control, fertilizer use, such as manure and compost to increase soil fertility measures that are in accordance with the requirements of a healthy environment, and measures to allow maintenance of the ecological balance in nature. This paper seeks to address the conditions that are important for organic production and considering the natural resources and new agricultural techniques to reduce pollution by analyzing the controlled production conditions and identify measures for sustainable development of high quality food, protection of ecosystems, as well as maintaining and increasing soil fertility.

Key words**:** *environmental protection, natural resources, organic farming, Serbia, sustainable development,*

INTRODUCTION

Agricultural production is based on natural resources, manpower and technical means of production. With the increasing population of the Earth, the natural food resources are scarce and a man is trying to influence them. New knowledge and activities of man, created pesticides, fertilizers to increase yields in crop production, machinery for faster and more efficient performance of agricultural practices and irrigation systems for intensive agricultural production.

However, all human activities in addition to the positive impact on increasing agricultural yields have negative consequences from the ecological point of view; such pesticides and fertilizers affect the agro ecosystem, environment and biosphere. Also, mechanized farming affect the soil pressure, which is why lees absorbing rainfall, while the remaining water, which flows through the compacted soil carries with it particles of harmful substances and chemicals that pollute the immediate environment. Also irrigated land affected by a hydrothermal and soil conditions, leading to a significant of relating nutrients to the deeper layers and the increase in harmful biological agents.

Like some kind of reaction to environmental degradation, which becomes more pronounced, the deterioration of food quality and consequently a growing threat to human health, has developed an organic agriculture.

Concepts, alternative, ", ecological ", or " biological, organic agriculture " means the science and practice of systems and ways of performing plant and animal production that are contrary to your usual traditional agriculture. Under these synonyms are considered farming systems in which the dominant economic principles brought to possible compliance with environmental requirements [1].

Production of organic products is a great chance for Serbian agriculture given the great natural resources and the fact that over 80 percent of the land in Serbia is not contaminated, which an essential prerequisite for the successful development of organic is

farming. When we add to the quality of soil with high humus content, it can be concluded that all the natural conditions for the development and justification of dealing with organic production.

Also, the potential is the presence of large areas of meadows and pastures that are not used in rural areas as a result of decades of continuous decline in the number of livestock in the country. These regions are often avoided because of the underdevelopment of the chemicals and pollution that accompanies development, and the natural communities and habitats preserved. Very strong resistance of indigenous breeds to their growing without major investments in health care and treatment, and in this way obtain special quality animal products for human consumption, which does not contain residues of various antibiotics and pesticides [2].

In recent years significantly increased interest in organic agriculture, in response the increasing environmental degradation, deterioration in the quality of food and the growing threat to public health of the human population.

Organic farming as a system takes into account environmental, economic and social aspects of agriculture at the local, national and global level. Therefore, the goal of organic agriculture is producing sufficient quantities of high - quality food to the rational use of natural resources and the environment.

One of the important aspects of organic farming is the socio-economic aspect. In fact, this kind of production requires a small investment in terms of products, materials and equipment, and thus the production can be included a large number of small producers. On the other hand, organic products are sold at higher prices that allow a fair income for producers and compensate for reduced yields and increased levels of the organic production method. The inclusion of small producers in organic production positively affecting the security of their existence at the place where they are located, and that affecting to on regional development and to on economy of the country[3].

Steady growth in demand for organic products in the world suggests that this production method can be very profitable if properly used natural resources, knowledge and production experience.

MATERIALS AND METHODS

This paper presents the results of a statistical analysis of the percentage of the structure of agricultural land by type of crop production and the structure of organic livestock production in Serbia, and the number of farms and the ratio of the areas of arable land under organic crops in comparison with conventional areas in the world. These data can serve as a solid basis for predicting the performance of certain features and prospects of development of organic production in Serbia, due to the preservation of nature and environmental aspects that exist. Also, comparative analysis of the data shows the development of organic farming in the world and Serbia.

For this purpose, the published material is used and the Federal Republic Bureau of Statistics and the Ministry of Education, Science and Technological Development, World Bank data, the Food and Agriculture Organization (FAO), as well as numerous consulted the literature.

RESULTS AND DISCUSSIONS

Organic Farming

Scientific basis of organic farming are set 80s, based on research conducted in Europe, Japan and the United States. The primary research categories were : [4]

- crop production
- livestock production
- horticultural production
- reducing the risk of health and safety
- economics and sociology
- assessment and the use of basic resources and
- management of pasture and woods.

The basis of all primary category represents crop production because of plant production is used to feed livestock and livestock provide

organic fertilizer for plant nutrition. The investigations so scientifically developed following najznačalnija issues crop production and organic farming. For our production requirements of special importance:

• crop rotation
• exchange of energy from conventional to organic farming method
• green manure
• cover crops
• intercropping
• use manure
• composting
• organic matter in the soil and its maintenance and its role in crop production ;
• biological nitrogen fixation ;
• land microbiological studies on pest control;
• new crops specifically for small farms ;
• genetics and Selection of low pH and limited land fertility;
• machinery and equipment for organic cropping and small farms and
• economic and sociological evolution of the system of organic farming.

The above questions are not only important for biological farming system (organic cropping), but can be, in general, relevant to all areas of plant production.

In modern processing plant production area has a special place. In conventional processing system, applicable to heavy machinery and tools, which a large number of walk consume large amounts of energy, and in addition have a negative impact on the physical and other properties of soils. Here, then, are the reasons why it is necessary to review and some changes in the processing of land for major agricultural crops. It is believed that the conventional treatment reduced gradually in order to find a rational technology. Future solutions in streamlining the traditional treatment system will go towards reducing energy consumption and a smaller proportion to the investment. The concept of sustainable agriculture, tillage will have conservation character (above 30 % of crop residues remains on the soil surface), which will play an important role in preserving fertility and prevent degradation of land as a natural resource[5].

It should be noted that the success in finding environmentally friendly solutions in the technology of crop production largely depend on environmentally educated people in agriculture and their involvement in the transfer of environmental knowledge and technology in agricultural practices. This is especially important if we consider our great advantage because still preserved and less polluted soil compared to developed Europe. Therefore, it is our opportunity far greater production of high-value and safe food and its export to foreign markets.

Organic farming in the world and in Serbia

Organic production in the world is becoming more prevalent and economically significant, and about the importance of this type of production is the fact that today is conducted in 140 countries, at 32.2 million acres, on 633 891 farms, totaling 0.7 percent of the agricultural land on the planet and that its value exceeds $ 25 billion. World sales of organic production is increasing annually by 15%. The most important organic food markets are the U.S., Canada, Europe and Japan. In Europe, the largest consumers of organic food are: Germany, Great Britain, Italy and France.World sales of organic production is increasing annually by 15%. The most important organic food markets are the U.S., Canada, Europe and Japan. In Europe, the largest consumers of organic food are: Germany, Great Britain, Italy and France.

According to the 2011th The countries with the largest organic areas are Australia , which has 11.8 million ha, Argentina with 3.1 million hectares , 2.3 million hectares of China and the United States with 1.6 million acres[6]. However, the number of farms and the ratio of area of arable land under organic crops in comparison with a conventional, is the largest in Europe. The percentage ratio of the areas of organic production in the surface states, gives a completely different picture with regard to the fact that the top 10 countries represented only European countries and Liechtenstein (26.4%), Austria (12.9%) and Switzerland (10.27 %). The largest area

of organic production system in Europe, in Italy, Germany and the UK, and these countries are the most important sector of organic production. About 6 % of arable land in organic production system in most European countries. More pronounced tendency of development of organic agriculture in the countries of Central and Eastern Europe such as the Czech Republic, Slovakia and Poland.

Some countries regard the primacy of certain products. For example , the largest producer of organic citrus fruits is Italy, Mexiko is largest producer of organic coffee and the largest producer of cocoa is Dominican Republic. Italy, Spain and France are the leaders in the production of organic grapes, while the largest producers of organic olive are Spain and Tunisia. Climate, historical heritage and the state support the organic sector to create the conditions of a country are the leaders of a specific organic production. [7].

In the period since 2007. - 2011th , the trade of organic products has grown from 23 to 40 billion dollars. And if there is an increased selling prices of organic products are still high at an average of 15% to 30 % compared to the products obtained by conventional production methods. Demand for organic food in the period since 2001. - 2011th in the U.S. has increased by 15-20 % .

Germany is one of the countries with a long tradition and high reputation in organic production, and is one of the leading producers of organic food, as well as one of the largest markets in the world with an annual turnover of around 3.9 billion euros. Consequently, the company offers over 1,800 organic products designated 35,000, Bio, organic certification, which is the official state symbol in Germany since 2001.

The country with the highest share of organic products in the market, compared to other products, Switzerland is 4.5%, which in addition has the highest consumption of organic products per capita (100 Euro per individual) [7].

The EU Member States, despite significant local production and further demonstrate the need for imports of organic products. Serbia can take advantage of the chance and invest significant amounts of organic products in the international market. Area under organic production in Serbia in the 2012th increased by nearly 30 % compared to the 2011., and an increase in organic livestock production complete. Taking into account all these unused natural opportunities that Serbia has , at the same time and the huge increase in demand for these products in most of the world markets, which can not meet their needs from their own production , there is a possibility that the trend of increasing size to continue in the coming years.

Organic agricultural production in our country is still in the development stage. Due to the potential offered by the natural resources of our country, the establishment of this type of production is a step forward not only in terms of rural development, environmental protection and improvement of human health, but also from the standpoint of economic prosperity[8] .

In July 2009th was done in the draft National Action Plan for the development of organic agriculture which defines the activities for the development of organic agriculture in the Republic of Serbia for the period since 2010. - 2015. [9]. The law's aims of : obtaining products with documented procedures production, sustainable socio- economic rural development, consumer protection, placing the label that clearly indicates the ways and methods for production of organic products, the protection of natural resources from pollution, long-term maintain and increase soil fertility , biodiversity conservation.

The new law introduces some innovations, especially when it comes to certification. He confides separate certification organizations, and the Ministry of Agriculture authorizes to do the job, keep a register of organic production, certification bodies inspect and proposes measures for the development of organic agriculture. With us, in accordance with the Law on Organic Production, a certified organic product is marked "organic product" code by the authorized organizations

and national character. Appearance on national character provides the Minister.

In Serbia, currently organic production is an area of about 829,000 ha, whether it be on products that have been certified or who are in the process of obtaining certification for organic production, arable land used for organic production occupies an area of 11,000 ha. There are around 150 certified producers and about 160 in the conversion process. Currently in Serbia, this type of farming deals with about 3,000 farms , which indicates that the job of a population of 9,000 people. The 2011th, The total area under organic production amounted to 6294.61 ha.

According to the above Table 1 the structure of land by type of crop production in the 2012th year is the most common fruit production with 46.36 %, followed by crop production with 41.31 %. Meadows and pastures occupy 7:57 % until vegetables are grown on 4.77 % of organic surfaces[10].

Perennial species are grown to about 46.7 %, and one- on about 46 % of the total area under organic production , the remaining 7.3% are meadows and pašnjaci.Od perennial species dominate apples , plums , and berries, particularly raspberries. Of the annual species are the main cereals, soybeans and vegetables . Despite the fact that the berries are the main export species , manufacturers are opting for other species such as apples and plums. Apple surface with organic status amounted to 1177.55 hectares, while the conversion is 6.02 ha, which means that a total of 1183.57 ha. Surfaces with organic status of plum amounts 1188.56 ha area in conversion amount 39.48 ha for a total of 1228.04 ha. Also, there is a significant increase in the areas under the one species.

The main objective of organic farms is the sustainability. It is important that a balanced relationship between crop and livestock production provide enough food to feed domestic animals or livestock to provide manure.

Table. 1 Structure of the categories of crop production in 2012.

	Organic vegetable production in 2012th			
	Areas in conversion (ha)	Areas with organic status (ha)	Tota, (ha)	% of total arable area
Crop production	1734,39	2.850,43	4584. 82	41,31
Fruit production	1091,19	4054	5145. 19	46.36
Vegetable production	233	296,5	529.5	4.77
Pastures and meadows	818,97	20,83	839.8	7.57
Total	3877,55	7222,26	11099 .31	100

Source: Organic Farming in Serbia 2013th National Association for organic production, Serbia Organica,

In average, 1 ha of crop production should be suspended 1-2 heads of cattle (depending on the type and intensity of production).

Organic methods of animal husbandry conditions and provide a way of keeping animals, the type and quality of facilities, free movement of animals and the cultivation of the optimum density. Animals are fed organic food and provides the list of allowed nutrients.The Animal Health greatest attention is paid to prevention, which includes all measures of hygiene[2].

On average about 90 % of feed domestic animals are not used for their operations and products, but they returned in the form of liquid and solid excreta - organic fertilizers , without which no sustainable land. In organic farming, farm animals must be provided with suitable conditions for breeding, including their welfare and their health in accordance with the type and rasom[9].

According to test results, the Research Institute of Organic Agriculture, from Switzerland, in Germany, in the most organic livestock are bred sheep (8%), beef cattle breeds (3.2%) , and dairy cattle breeds (2.3) while only 1 % of poultry and pigs grown in an organic system. From organic animal products the highest consumption of organic milk, which is more widespread in supermarkets in most countries of the

European Union. For now, the biggest production of organic milk in Denmark and is 15%[11].

In Serbia, according to Table 2 The structure of organic livestock production is as follows: organic status occupies most flocks which include sheep, goats and pigs (983 animals), while the number of sheep in conversion is still 3404 heads. Followed by poultry (chickens, geese, ducks, turkeys, guinea fowls), bee hives and the least number of animals in the herd which include cattle, buffaloes, horses and donkeys, which has in the conversion in 2164 and 230 head of cattle in the organic status.

Table. 2 The structure of organic livestock production (2012).

	Organic livestock production 2012th the conversion period	
	Conversion period- Number of livestock, poultry birds, beehives hives	Organic status Number of livestock poultry birds, beehives hives
Herds (cattle, buffaloes, horses, donkeys)	2164	230
Flocks (sheep, goats, pigs)	3404	983
Poultry (chickens, geese, ducks, turkeys, guinea fowls)	4276	3600
Beehives	2610	4394

Source: Organic Farming in Serbia 2013th National Association for organic production, Serbia Organica, Belgrade

In Serbia, according to the test more than 4,000 farmers involved in organic production. The total value of organic production in Serbia can not be precisely determined due to the lack of clear empirical data.

The interest in organic farming, which is also reflected in the market for organic products in the last ten years has increased three times.

Despite the current difficulties, organic farming is moving towards alignment with the needs of market development and conservation of the environment and to reduce the quantity at the expense of food, while favoring agricultural techniques that optimal use of natural resources (recycled biomass and energy) and minimize waste matter[1].

CONCLUSIONS

The main advantage of organic farming is the production of high-value and safe food, which will be a source of human and animal health. It is well known that many diseases of modern mankind descended from malnutrition and the use of contaminated and unsafe food. Another great advantage is the preservation and protection of the environment, which we have provided clean soil, water and air for our children.

When it comes to agriculture disadvantages of this type of food production are insufficiently developed technology (lack of machinery, plant protection, seed and other materials) and hence less productivity of these systems is of growing plants. It takes a lot of effort and research to promote organic farming and all the complex mechanisms found in nature in order to achieve a balance between human needs for food and other materials from nature.

Organic farming is currently one of the most promising sectors in the world economy. The increase of organic production would bring Serbia: optimal use of agricultural resources, a higher rate of economic growth, increase exports, increase local agricultural production, improving the standard of living in rural areas, rural development and the preservation and increase of the rural population.

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