

PAPER • OPEN ACCESS

## Organic agriculture – importance and development

To cite this article: Slavica Veskovic Moracanin *et al* 2021 *IOP Conf. Ser.: Earth Environ. Sci.* **854** 012102

View the [article online](#) for updates and enhancements.

You may also like

- [Results of the first national indoor radon survey performed in Serbia](#)

Maja Eremi Savković, Vladimir Udovii, Dimitrije Maletić et al.

- [The most important parasites in Serbia involving the foodborne route of transmission](#)

J M Petrović, J Z Prodanov-Radulović and S D Vasilev

- [Pork safety – challenges and opportunities](#)

Nedjeljko Karabasil, Tamara Bosković, Dragan Vasilev et al.



The Electrochemical Society  
Advancing solid state & electrochemical science & technology

**241st ECS Meeting**

Vancouver, BC, Canada. May 29 – June 2, 2022

ECS Plenary Lecture featuring  
**Prof. Jeff Dahn,**  
Dalhousie University

Register now!



# Organic agriculture – importance and development

**Slavica Veskovic Moracanin<sup>1</sup>, Dragutin Djukic<sup>2</sup>, Milinko Saponjić<sup>3</sup> and Zoran Ostojic<sup>4</sup>**

<sup>1</sup> Institute for Meat Hygiene and Technology, Kaćanskog 13, Belgrade, Serbia

<sup>2</sup> University of Kragujevac, Faculty of Agronomy Cacak, Cara Dusana 34, Cacak, Republic of Serbia

<sup>3</sup> Departments of Economy and Local Economic Development of Nova Varos, Karadjordjeva 32, Nova Varos, Republic of Serbia

<sup>4</sup> Union University, Kosancicev venac 2, Belgrade, Republic of Serbia

E-mail: [slavica.veskovic@inmes.rs](mailto:slavica.veskovic@inmes.rs)

**Abstract.** Agriculture, as the most important strategic industry, is tasked with providing sufficient quantities of quality and safe food. Intensive and often excessive, uncontrolled, and unskilled use of the means for protection and nutrition of plants, as well as means for the prevention or treatment of animals, are carried out to increase yields in conventional production. This approach in food production has contributed to the increasingly common endangerment of the health of plants, animals and humans, as well as significant environmental endangerment. Unlike conventional production, organic food production is now increasingly attracting interest from modern consumers. However, organic agriculture involves not only producing without artificial fertilizers and other agrochemicals, but without antibiotics and hormones too. It is more of a holistic production system that functions as a sustainable unit, and unites interconnected and conditioned actors: plants, animals, microorganisms, insects, organic and mineral soil matter, and humans. In Serbia, organic agriculture has been developing for the last thirty years. However, the intensive development of organic agriculture has only happened in the last decade, with plant organic production being more developed than animal organic production.

## 1. What is organic agriculture and organic food?

An estimated 1.8 billion people worldwide are involved in agriculture, with the majority of the population using conventional principles of production. Conventional, predominant food production is based on the requirement to meet the growing needs for large amounts of food, which is conditioned primarily by population increase and society's unstoppable imperative to increase available capital [1]. The quality of these foods has long been questioned, primarily due to the extensive and often uncontrolled or unregulated use of agrochemicals, antibiotics, and hormones. In 2019, the agrochemical market worldwide was worth approximately US\$234.2 billion. This is expected to increase to more than US\$300 billion in 2025 [2].

Organic food production developed as a spontaneous and natural solution to this existing problem. Organic production as part of ecological, sustainable development includes food production (primary agriculture, processing to distribution), but also some other products of plant and animal origin (fabric, leather). According to the National Organic Standards Board, it is "an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological



Content from this work may be used under the terms of the [Creative Commons Attribution 3.0 licence](#). Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

activity; it is based on minimal use of off-farm inputs and on management practices that restore, maintain, and enhance ecological harmony” [3].

Based on these characteristics and combining the best elements of tradition, innovation and science, the overall health of land, ecosystems and humans is achieved. In addition to the above and the most comprehensive definition of organic production, there is a large terminological patchwork in the world and in our country, which often confuses the public. Namely, only in Serbian and related languages, there is talk of “organic production/agriculture”, “ecological production/agriculture”, “biological production/agriculture”, “alternative production/agriculture”, “sustainable production/agriculture”, “biodynamic production”, etc. On the other hand, in English literature, one can meet terms such as “organic agriculture”, “organic production”, “organic farming” (U.S), whereby the author’s tendency is to highlight the difference between this agricultural practice and “sustainable agriculture”. In addition to the above, terms “biological agriculture” (Germany, Denmark, Western European countries) “produzione biologico”, “agricoltura biologica” (Italy), “production/agriculture biologique” (France) are in use [4]. However, regardless of the term used, organic agriculture indicates activities aimed at introducing an ecological dimension into agricultural production, i.e., management of agriculture with respect to the principles of environmental preservation [5, 6].

Describing organic food, some authors tie it to principles of “biological” or “natural production” [7], others associate it with “green concepts” and “environmental friendliness” [8], while some authors identify it with the absence of the use of agrochemicals and veterinary medicines in food production [9]. In any case, organic food is “a result of the organic philosophy practices and principles” [10].

Organic agriculture is based on the application of the principles of agroecology, which includes a prohibition on the use of artificial mineral fertilizers and pesticides, as well as genetically modified organisms [8]. Similarly, related to animal production, organic production regulations prohibit the use of hormones, growth promoters etc., while the use of antibiotics is severely restricted (they are allowed only in special cases). It also prohibits the use of many other synthetic compounds that, as food additives, are used in the conventional food chain (e.g., preservatives, colouring agents) [11, 12]. In organic animal production, all actions are directed towards the health and well-being of domestic animals.

However, organic agriculture is not only producing without artificial fertilizers, other agrochemicals, antibiotics and hormones. It is more of a holistic production system that functions as a sustainable unit, and unites interconnected and conditioned actors: plants, animals, microorganisms, insects, organic and mineral soil matter and humans [13]. In other words, the role of organic agriculture is to sustain and improve the health of the ecosystem as a whole, as well as all present organisms, from the smallest ones found in the soil, through plants and animals, to humans. On this basis, the International Federation of Movements for Organic Agriculture [12] has defined the basic principles of organic agriculture development, the primary goal of which is to produce high quality healthy food, with preventive environmental action and well-being: the principle of health, the principle of ecology, the principle of fairness and the principle of nurturing and aging.

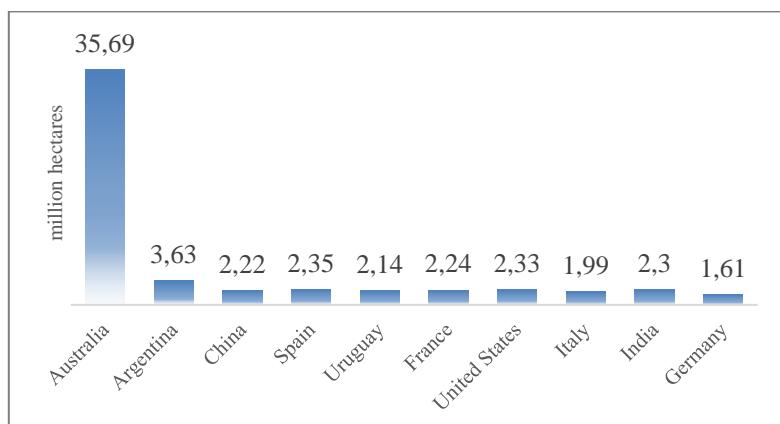
Definitely, organic food is now increasingly attracting interest from modern consumers, and we can see it as food that is grown with the utmost consideration for the environment and animals, and which is safe and of suitable quality [11, 14].

## 2. Organic production in the world

According to the Food and Agriculture Organization (FAO), organic agriculture is gaining popularity among farmers and consumers around the world [15]. In the last 20 years, the area under organic cultivation has nearly doubled, from 15 million hectares in 2000 to an estimated 71.5 million hectares in 2018. Figures from 2019 show that India was the world’s leading producer of organic food (1.4 million organic food producers, which is higher than the number of all organic food producers in the other nine leading countries in the world combined) [16]. The biggest consumers of organic food by population are Denmark and Switzerland (where people spend about €344 and €338 per capita annually, respectively, on organic food). Of the ten leading countries with the highest organic food consumption per capita, the top eight are in Europe. In ninth and 10th place are the United States and Canada,

respectively. On the other hand, although India has the largest number of organic food producers, Australia has by far the largest share of organic agricultural land (approximately half of the world's total organic agricultural land). Behind Australia are Argentina and China with 5.08% and 4.39%, respectively, of world organic agricultural land (Table 1).

**Table 1.** Organic agricultural land area worldwide in 2019, by leading country (in million hectares) [16]



### 3. Organic production in the Republic of Serbia

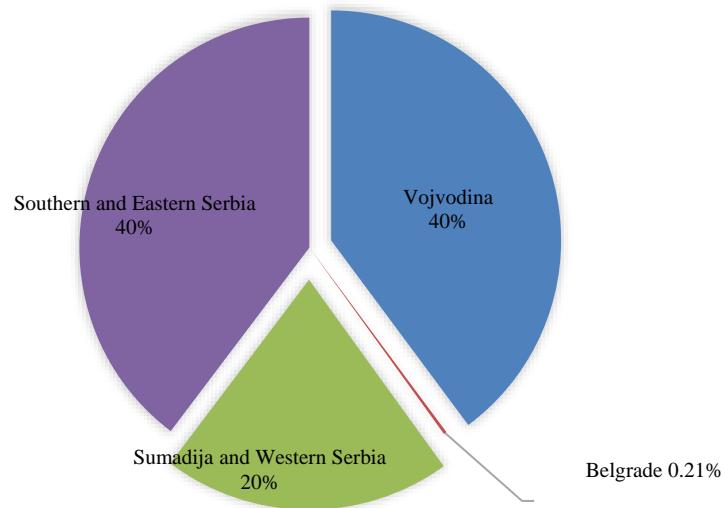
The first organized organic food production in Serbia and its exports to the EU market are tied to the period three decades ago. That is when the Den Juro Organic company from Brus started developing organic fruit production in southern Serbia (around Blace). Today, after 30 years of development, exports of organic products from Serbia (2020) reached €37 million [17]. This is further encouraged by the fact that over 80% of the land in Serbia is uncontaminated, which provides significant preconditions for the development of this type of production [18]. Also, in parallel with the development and institutional organization of the organic sector, public (consumer) awareness is developing, as well as new markets in the country and the world.

During the past ten years, agricultural production in Serbia showed a growing trend (annual growth was approximately 10%). Out of the total agricultural area (5,734,000 ha, of which 4,867,000 ha is arable), about 0.60% is under organic production, in contrast to European countries where it is about 6%. In 2018 and 2019, we saw a significant increase in areas under meadows and pastures due to the development of livestock production, which is developing more intensively in regions with hills and mountains.

During 2019, organic plant production took place on an area of 13,725 ha (arable land – 9,880 ha, meadows, and pastures – 3,845 ha), while an additional 7,539 ha is in the conversion period. In addition to great interest from modern consumers, the government directly supports the development of organic food production by implementing subsidies.

In Serbia, fruit, cereals, industrial and fodder plants are mostly grown according to the principles of organic production. In fact, organic arable production (industrial plants, cereals, fodder, medicinal and aromatic plants) is the most prevalent (it accounts for 57% of organic production), followed by fruit production (33.5%), while vegetable production is very underrepresented (1.15%). Other crops make up 8.35% of organic production according to production area [17, 19].

Organic plant production by regions in Serbia is shown in Figure 1.



**Figure 1.** Organic plant production in Serbia by regions

Organic livestock production in Serbia is still poorly developed. This can be explained by the fact that this type of production is significantly more demanding than organic plant production. Namely, the Law on Organic Production defined special construction, technical and sanitary conditions for the facilities in which these animals are bred; their procurement procedures from other farms are strictly controlled, while the manner of nutrition and treatment is tailored to the principles of ecology and safety. At the same time, special conditions are prescribed for facilities in which organic products of animal origin are produced, stored, and transported [18]. Most of all, poultry, bee societies, sheep and pigs are bred this way [17, 19].

The basis for the development of organic production was accompanied by the development of domestic legislation in this area (Law on Organic Production, Official Gazette of RS, No. 30/10, Rulebook on Control and Certification in Organic Production and Methods of Organic Production, Official Gazette of RS, No. 95/20, Rulebook on Documentation submitted to an authorized control organization for issuing of certificate, as well as on the conditions and manner of sale of organic products, Official Gazette of RS, No. 88/16), harmonized with the legal achievements of the European Union, Codex Alimentarius (FAO/WHO), ISO documents, Council Regulation (EC) No. 834/2007, Commission Regulation (EC) No. 889/2008.

#### 4. Conclusions

The growing education level of modern consumers, accompanied by their expressed awareness of the need for healthy food and healthy lifestyles, has contributed to increased interest and demand for organic products. This legislated form of food production is particularly pronounced in highly developed countries, where we have significantly higher demand relative to supply, which provides great opportunities for the development of this agriculture sector. Organic agricultural production combines the best models from nature with a high respect for environmental principles and the preservation of natural resources, as an imperative to implement natural procedures and substances, while limiting or completely eliminating synthetic chemical substances.

Today in Serbia, organic agriculture is increasingly popular and has a tendency to grow. Thanks to its potential, which is primarily reflected in small properties, and on land that is not contaminated with harmful substances, this type of agriculture can contribute significantly to the development of rural areas, and thus, in general, to agriculture in the country.

### Acknowledgement

The results of the research shown in this work were funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia, and under the Agreement on realization and financing of scientific research work OF NIO in 2021 no. 451-03-9/2021-14/200050 from 05.02.2021.

### References

- [1] Baras J K, Turubatović L, Tadić R and Matekalo-Sverak V 2004 *Meat Technol* **45** (3–4) 89–94
- [2] <https://www.statista.com/statistics/311943/agrochemical-market-value-worldwide>
- [3] NOSB, National Organic Standards Board, <https://www.ams.usda.gov/rules-regulations/organic/nosb>
- [4] Čikić J and Petrović Ž 2010 *Organska proizvodnja i poljoprivredna gazdinstva Srbije – ruralnosociološka analiza* (Poljoprivredni fakultet, Novi Sad Press). p152
- [5] Tabaković M, Simić M, Dragičević V and Brankov M 2017 *Selekcija i semenarstvo* **23** (2) 45–53
- [6] Vesović-Moračanin S *et al* 2015 *Meat Technol.* **56** (1) 16–25
- [7] Magkos F, Arvaniti F and Zampelas A 2003 *A 2003 Int J Food Sci Nutr* **54** 357–71
- [8] Snyder C and Spaner D 2010 *Sustainability* **2** 1016–34
- [9] Gomiero T 2013 *Agriculture* **3** 464–83
- [10] Bourn D and Prescott J 2002 *Food Sci Nutr* **42** 1–34
- [11] EC (European Commission) 2017 [ec.europa.eu/agriculture/sites/agriculture/files/rural-area-economics/briefs/pdf/014\\_en.pdf](http://ec.europa.eu/agriculture/sites/agriculture/files/rural-area-economics/briefs/pdf/014_en.pdf)
- [12] IFOAM (International Movement of Organic Agriculture Movements) 2017 [www.ifoam.bio/en/organiclandmarks/principles-organic-agriculture](http://www.ifoam.bio/en/organiclandmarks/principles-organic-agriculture)
- [13] Mirecki N, Wehinger T and Repič P 2011 [www.fao.org/3/an444sr/an444sr00.pdf](http://www.fao.org/3/an444sr/an444sr00.pdf)
- [14] Carlson A and Jaenicke E 2016 [www.ers.usda.gov/webdocs/publications/err209/59472\\_err209.pdf](http://www.ers.usda.gov/webdocs/publications/err209/59472_err209.pdf)
- [15] FAO (Food and Agriculture Organization) 2019 [www.fao.org/3/ca6746en/ca6746en.pdf](http://www.fao.org/3/ca6746en/ca6746en.pdf)
- [16] FIBL may 2021 [www.statista.com/aboutus/our-research-commitment/756/nils-gerrit-wunsch](https://www.statista.com/aboutus/our-research-commitment/756/nils-gerrit-wunsch)
- [17] Serbia Organica 2021 <https://serbiaorganica.info/wp-content/uploads/2021/01/ORGANSKA-PROIZVODNJA-U-SRBIJI-2020-online-1.pdf>
- [18] Čavlin M 2019 *Vojnoekonomski pregled* **7** 344–56
- [19] Ministry of Agriculture, Forestry and Water Management <http://www.minpolj.gov.rs/organska/?script=lat>