

ORGANIC LIVESTOCK BREEDING AS A FUNCTION OF ENVIRONMENTAL PROTECTION AND SUSTAINABLE DEVELOPMENT

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ABSTRACT

Conventional livestock production is still the dominant form of livestock production in the Republic of Serbia. However, there are also great opportunities for the development of organic livestock production. In order for a farm to pass the certification and receive the organic farm label, it is necessary for the farm to fulfil a number of conditions. First of all, it is necessary to harmonize all ecological and production conditions, as well as standards for animals raised in organic livestock systems in accordance with the legal regulations on organic production.

The aim of this paper is to present the possible forms of development of organic livestock production in accordance with the principles of environmental protection and sustainable development. For the development of organic animal husbandry, it is necessary to have the interest of consumers who will understand the importance and quality of organic products and appreciate their added value. The process of transforming a conventional farm to organic livestock production requires a certain period of time - the conversion period.

The social and ecological importance of organic livestock production compared to conventional farming is the production of sufficient quantities of high-quality food while minimizing all forms of pollution.

Keywords: organic livestock production, environmental protection, sustainable development.

INTRODUCTION

Organic production is a sustainable agricultural system based on a high regard for ecological principles through the rational use of natural resources, the use of renewable energy sources, the preservation of natural diversity, and environmental protection. It aims to establish a closed system of plant and animal production.

Methods of organic production are based on the application of natural processes and substances with the limitation or complete elimination of the use of synthetic agents (Urošević et al., 2020).

From the very beginning of the development of organic farming systems, the preservation of biodiversity has been considered as important as maintaining soil fertility (Hass, 2012).

The basic principles of organic agriculture are based on the principles of sustainable agricultural development, which involve the management and preservation of natural resources and the direction of technological development towards meeting the needs of present and future generations. Such an approach can be successfully linked to the concept of multifunctional agriculture and sustainable development system, where the preservation of biodiversity and agrobiodiversity holds significant importance (Roljević et al., 2009; Đurić et al., 2019).

The Republic of Serbia and The Republic of Srpska (Bosnia and Herzegovina), like many other countries in the world, fulfill all the requirements for the organized development of high quality, safe, certified food that meets the consumers' needs and corresponds to export increase, making ecological and economic profit without jeopardizing the environment. As for the current state of legislation in the Republic of Serbia, our normative framework is completely harmonized with the EU directives. Enacted and implemented laws and regulations strictly follow the principle of "ecological welfare", facilitating the export of final organic products to the EU and third country

markets. This is the reason why organic production is described as a controlled way of production from field to table - it prevents a potential deterioration of ecosystem and human health. For the countries in the region, this is a very important type of production since they have always been agricultural countries with significant natural resources and a long production tradition (Milojević et al., 2022).

ORGANIC LIVESTOCK PRODUCTION

In recent years, agricultural productivity has been affected dramatically by climate-related events such as drought. On the other hand, agricultural intensification is expected to satisfy the need for increased global food production. It is important to better understand the impact of multiple anthropogenic and global climate change stressors on agroecosystems since the cumulative effects and interaction between such disturbances can substantially decrease crop production (Azarbad, 2022).

Organic livestock production is based on the utilization of pasture areas and organic production of roughage and concentrated feed. The system of animal husbandry is free-range, which contributes to better health conditions and enables the expression of natural animal behavior. Transitioning to organic livestock production systems can significantly contribute to reducing environmental pollution and preserving ecological balance (Stojanović et al., 2004).

In organic livestock production, animal welfare is of high priority. It is necessary to provide animals with conditions for their growth and development in accordance with their natural genetic potential. This involves honouring the physiological and ethological needs of animals and creating conditions for the expression of natural functions and behaviors (Hovi, 2004; Drobnjak et al., 2013).

This production method is not extensive but rather intensive within the biological potential of the habitat (Rakonjac, 2017).

The social and environmental significance of organic livestock production compared to conventional production is the ability to produce sufficient quantities of high-quality food while minimizing all forms of pollution.

A sustainable food system is at the heart of the European Green Deal. Within the 'Farm to Fork Strategy' of the Green Deal, the European Commission has set a goal for at least 25% of agricultural land in the EU to be under organic farming and for organic aquaculture to be significantly increased by 2030 (Agricultural and rural development, 2023).

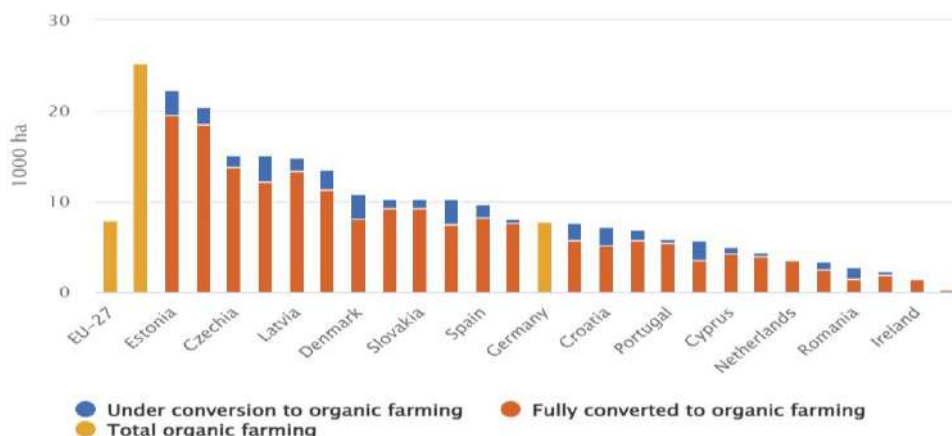


Figure 1. Share of organic area in total utilised agricultural area by country - 2019 (Eurostat online data, 2019).

The rules of organic livestock production in the European Union

Livestock breeders must meet specific requirements if they want to market their products as organic. These rules include respecting animal welfare and feeding animals according to their nutritional needs, and they are designed to protect animal health and the environment. In this way, it contributes to building public trust as the rules ensure that animals from organic farming are kept separate from animals in conventional farming.

The rules related to adherence to organic principles are as follows:

- Animals that are not organically raised must not be introduced onto the premises except for breeding purposes, and even then, they must comply with special rules.
- Farmers must provide their animals with 100% organic feed in order to market their products as organic.
- Food should primarily be sourced from the farm where the animals are kept or from farms in the same region.
- Cloning of animals and/or embryo transfer is strictly prohibited.
- Growth promoters and synthetic amino acids are prohibited.
- Mammals must be fed natural, preferably maternal, milk.
- Natural methods of reproduction must be used, although artificial insemination is allowed.
- Non-organic feed of plant origin, feed of animal and mineral origin, animal feed additives, certain products used in animal nutrition, and processing aids can be used only if they are explicitly approved for use in organic production.

The rules pertaining to animal welfare are as follows:

- Breeders must possess necessary basic knowledge and skills regarding animal health and welfare.
- Special attention should be given to housing conditions, breeding practices, adherence to prescribed stocking densities, and minimum surface areas for indoor and outdoor spaces.
- The number of livestock must be limited to minimize overgrazing, erosion, or pollution caused by animals or the spread of their manure.
- Animals should have access to open space or pasture whenever possible.
- Tethering or isolation of livestock is prohibited, except for individual animals for limited periods and only for reasons of welfare, safety, or veterinary purposes.
- Hormones or similar substances are not allowed, except as a form of veterinary therapeutic treatment for individual animals.
- When animals are sick, allopathic veterinary medicinal products, including antibiotics, can be used where necessary and under strict conditions. This is allowed only when the use of phytotherapeutic, homeopathic, and other products is inappropriate.
- The use of immunological veterinary drugs is permitted.

Statistical data on the number of organically raised animals in the European Union is incomplete and currently does not reflect the true state of the sector. However, based on the currently available information, the organic animal farming sector is rapidly developing in European countries (Trávníček et al., 2021). Table 1 provides an overview of European organic livestock in 2019, and it is observed that the majority of organic livestock farming is based on beef, lamb, and milk production. In Europe, there are approximately 5.1 million cattle, over 5.4 million sheep, and nearly 1.6 million pigs. From Table 1, it can be seen that over 62.3 million poultry are raised. Between 2010 and 2019, the highest increase was seen in poultry (110%). The number of cattle and dairy cows significantly increased in the same period (+81%), as well as the number of sheep (+55%) and pigs (+110%).

Table 1. Europe and the European Union: Organic livestock 2019 (Trávníček et al., 2021).

	Europe				European Union	
	Animals [head]	Organic share of total [%]	Change 2018-2019 [%]	Change 2010-2019 [%]	Animals [head]	Organic share of total [%]
Bovine animals	5.079.962	4.0%	4.1%	80.9%	4.852.303	6.0%
Sheep	5.413.420	3.5%	-9.7%	55.3%	5.214.634	5.3%
Pigs*	1.586.702	0.9%	13.7%	109.6%	1.544.573	1.1%
Poultry**	62.317.071	2.5%	8%	110%	59.666.753	4.2%

* Please note there is no consistent reporting in the official statistics, no clear distinction is made between the number of animals slaughtered, the places or average numbers of stock. Therefore, the data should be treated with caution.¹

According to the Agricultural Market Information Company AMI, the average stock of fattening pigs was 621'000 in Europe, and 584'000 in the European Union.

** Also for poultry, there is no consistent reporting. According to the Agricultural Market Information Company (AMI), broilers' average stock was 15.1 million Europe and 14.6 million in the European Union. The average stock of laying hens was 27.3 million in Europe and 25.4 million in the European Union.

The state of organic livestock production in Serbia

Conventional livestock production continues to be the dominant form of livestock production in the Republic of Serbia, and it is certain that it will remain dominant for a long time. According to data from the Statistical Office of the Republic of Serbia, comparing the status as of December 1, 2022, to the status as of December 1, 2021, there is a decrease in the total number of cattle (by 6.9%), pigs (by 7.0%), goats (by 1.7%), and poultry (by 3.5%), while there is an increase in the total number of sheep (by 1.5%) (RZS, 2023).

According to the data from the National Association for the Development of Organic Production *Serbia Organica* (2020), a smaller number of producers are engaged in organic livestock production compared to the number of producers involved in organic crop production. This can be explained by the fact that organic livestock production is more demanding in terms of meeting additional requirements for animal housing facilities, sourcing animals from other farms, and animal feeding and treatment. Intensive livestock production is closely related to intensive crop production, which relies on the use of significant amounts of chemicals and pesticides. It can be highly aggressive to the environment, especially if all prescribed technological procedures are not fully implemented. Within an organic farm, the circulation of mineral substances and nutrients comes to the fore, while maintaining soil fertility and satisfactory yield and production. By adhering to the basic standards prescribed for organic production, it is possible to achieve reduced environmental pollution and lower loss of nutrients at the farm level, which can directly impact production profitability (Bogdanović, 2015).

Furthermore, in order to market livestock products, it is necessary to meet the prescribed technological conditions for processing, as well as to provide conditions for storage and transportation in accordance with organic production regulations. However, livestock production in Serbia is experiencing a growth trend. In 2019, there was a significant increase in poultry (165%), bee colony (225%), sheep (18.7%), and pigs (10.7%), while the number of goats decreased (64%) compared to 2018 (Table 2).

A new development in organic livestock production in Serbia is the emergence of group production, which was previously characteristic only of organic crop production.

Table 2. Organic livestock production in Serbia 2012-2019 (Serbia Organica, 2020).

Type of animal	Year							
	2012	2013	2014	2015	2016	2017	2018	2019
Sheep	2.837	4.031	3.153	4.848	4.378	4.665	5.138	6.099
Pigs	206	175	76	232	283	87	284	315
Cattle	1.428	2.176	2.726	2.746	2.895	3.094	3.594	3.556
Goats	211	946	1.154	1.686	1.406	2.048	1.486	536
Poultry	2.034	1.390	1.140	1.380	3.158	4.415	6.735	17.880
Donkeys	7	21	17	20	2	47	-	-
Horses	66	210	173	218	165	177	114	88
Bee colony	961	1.940	894	2.504	2.878	2.307	3.061	9.969

Research indicates that in the field of organic livestock production, there is faster development in those production branches where animal nutrition is based on grazing and roughage, particularly in the case of ruminants. The development of organic pig farming and organic poultry farming is significantly slower, considering that these domestic animal species require large quantities of protein feed in their diet (Rakonjac, 2016).

The state recognizes the importance of organic livestock production, and for subsidies in 2020, there was a planned increase of 40% compared to the amount of subsidies in conventional livestock production. Funds were allocated from the agricultural budget to co-finance the costs of control and certification of organic production, as well as the acquisition of machinery and equipment suitable for organic production (Đurić et al., 2021).

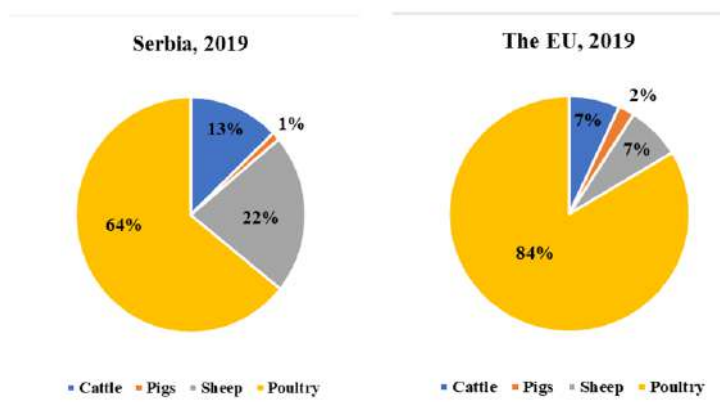
The transition from conventional to organic livestock production is demanding and involves a conversion period. Similar to conventional livestock production, there are differences in the quality of products resulting from the applied farming techniques or breed selection in organic livestock production as well (Bogdanović, 2015).

To obtain certified organic products, animals must be kept in accordance with the regulations, which specify the conversion period for transitioning from conventional to organic farming. The conversion period for different livestock species is prescribed as follows: for cattle and horses intended for meat production, a minimum period of 12 months is required; for small ruminants and pigs intended for meat production, a minimum of 6 months is required; for animals used for milk production, a minimum of 6 months is required; for fattening poultry, a period of 10 weeks is required; for poultry used for egg production, a period of 6 weeks is required (Bogdanović et al., 2004; Petrovic et al., 2016).

Comparison of organic livestock production in the EU and in Serbia

Comparison of organic livestock production in the EU and Serbia based on available data from 2019 can be made for four categories: cattle, pigs, sheep, and poultry (Graph 1).

From the graph, it can be observed that both in the EU and Serbia, poultry farming has the highest percentage, with 84% in the EU and 64% in Serbia. The least represented category is pig farming, with 2% in the EU and 1% in Serbia. In the EU, the percentage of sheep and cattle farming is equal at 7%, while in Serbia, sheep farming is higher at 22% compared to cattle farming at 13%.



Graph 1. Organic livestock production in the EU and Serbia in 2019.

CONCLUSIONS

Organic livestock production, both in Europe and in Serbia, has a solid foundation and potential for further development. The connection between sustainable development and organic livestock farming is evident across all three dimensions - economic, social, and environmental. Although it requires significant initial investments, organic livestock production is becoming increasingly profitable.

However, organic livestock production cannot solve all the existing problems in animal husbandry, as it is still primarily targeted towards a selective and relatively small consumer group. Consumer interest and promotion of organic products are crucial factors.

The demand for certified organic products is growing among environmentally conscious consumers who understand the importance and quality of organic products and appreciate their added value. Farmers face numerous challenges, particularly during the conversion period from conventional to organic production. These challenges can be overcome through subsidies and support from relevant state institutions responsible for this field.

The social and environmental significance of organic livestock farming, compared to conventional production, lies in the production of sufficient quantities of highly quality food while minimizing all forms of pollution.

LITERATURE

- Agriculture and rural development. (2023). *Action plan for organic production in the EU*. Retrieved May 20, 2023 from https://agriculture.ec.europa.eu/farming/organic-farming/organic-action-plan_en.
- Azarbad, H. (2022). Conventional vs. Organic Agriculture—Which One Promotes Better Yields and Microbial Resilience in Rapidly Changing Climates?, *Sec. Terrestrial Microbiology*, 13. <https://doi.org/10.3389/fmicb.2022.903500>
- Bogdanović, V., Đedović, R., Perišić, P. i Petrović, M. (2004). Principi definisanja odgajivačkih ciljeva u stočarstvu. *Biotehnologija u stočarstvu*, 20(5-6), 61-68.
- Bogdanović, V. (2015). *Organska stočarska proizvodnja*. Poljoprivredni fakultet, Beograd Institut za zootehniku
- Drobnjak, D., Urošević, M., & Matarugić, D. (2013). Conservation of genetic resources of autochthonous breeds of domestic animals in Serbia. *Agrozanjanje-Agro-knowledge Journal*, 14(1/4), 143-151.
- Đurić, K., Cvijanović, D., Prodanović, R., Čavlin, M., Kuzman, B., & Lukač Bulatović, M. (2019), Serbian Agriculture Policy: Economic Analysis Using the PSE Approach. *Sustainability*, 11(2), 309.

- Đurić, K., Ivanišević, D., Jahić, M., & Prodanović, R. (2021). Mere agrarne politike u funkciji održivog ruralnog razvoja Republike Srbije Agricultural policy measures in function of sustainable rural development of the Republic of Serbia. *Ecologica*, 28(102), 264-270.
- Eurostat online data. (2019). Report. Retrieved May 28, 2023 from https://ec.europa.eu/eurostat/databrowser/view/ORG_CROPAR/default/table?lang=en
- Haas, G. 2012. Stanje i okvir agrobiodiverziteta useva u EU - zaključak i perspektive za Srbiju. U *Zborniku radova Organska proizvodnja i biodiverzitet. i otvoreni dani biodiverziteta*. Izdavač: Institut Tamiš Pančevo.Pančevo, str.9-25.
- Hovi, M., Sundrum, A., & Padel, S. (2004). Organic livestock farming: potential and limitations of husbandry practice to secure animal health and welfare and food quality. SAFO Sustaining Animal Health and Food Safety in Organic Farming. A European Commission funded Concerted Action Project. Retrieved May 28, 2023 from <https://orgprints.org/id/eprint/3148/1/hovi-et-al-2004-2nd-SAFO-proceedings.pdf>
- Milojević, M., Milošević, A., Ayaşan, T., Zarić, S. & İnan, S. (2022). Organic and Ecological Production of Chicken Meat and Eggs: A Review of The Regulatory Harmonization Between the EU and Republic of Serbia. *Osmaniye Korkut Ata Üniversitesi Fen Bilimleri Enstitüsü Dergisi*, 5(3), 1872-1889. DOI: 10.47495/okufbed.1066144
- Petrovic, M., Bogosavljevic-Boskovic, S., Rakonjac, S., Bokan, N., & Doskovic, V. (2016). Kontrola i sertifikacija organske proizvodnje i period konverzije konvencionalne u organsku farmu. U *Zbornik radova Vol. 21.(24) XXI Savetovanje o biotehnologiji*, (pp. 519-524), Čačak 11-12.03.2016.
- Rakonjac, S. (2017). Organska stočarska proizvodnja. Retrieved May 25, 2023 from <http://arhiva.nara.ac.rs/handle/123456789/2066>
- Roljević, S., Hamović, V., & Sarić, R. (2009). Organska poljoprivreda u funkciji održivog razvoja. *Ekonomске teme*, 47(3), 99-109.
- Serbia Organica. Organska proizvodnja u Srbiji 2020. Retrieved May 28, 2023 from <https://serbiaorganica.info/wp-content/uploads/2021/01/ORGANSKA-PROIZVODNJA-U-SRBIJI-2020-online-1.pdf>
- Stojanović, B., Adamović, O., Grubić, G. (2004). Unapređenje strategije ishrane domaćih životinja u cilju smanjenja negativnih uticaja na životnu sredinu. U *Zborniku radova III Međunarodna Eko-konferencija*, Novi Sad. Tematski Zbornik, str. 99-104.
- Trávníček, J., Willer, H., & Schaack, D. (2021). Organic Farming and Market Development in Europe and the European Union. In *The World of Organic Agriculture. Statistics and Emerging Trends 2021* (pp. 229-226). Research Institute of Organic Agriculture FiBL and IFOAM-Organics International.
- Urošević, M., Drobnjak, D., Nilda, E., & Stojić, P. (2020). Basic principles of organic goat farming. *Veterinarska stanica*, 51(1), 87-91. <https://doi.org/10.46419/vs.51.1.9>