

Development potentials and SWOT analysis of organic animal husbandry in the Republic of Croatia and its comparison with the EU

Potencijali razvoja i SWOT analiza ekološkog stočarstva u RH i usporedba s EU

Zvonko ANTUNOVIĆ, Željka KLIR ŠALAVARDIĆ (✉), Danijela SAMAC, Krunoslav ZMAIĆ, Josip NOVOSELEC

Faculty of Agrobiotechnical Sciences Osijek, Josip Juraj Strossmayer University of Osijek, V. Preloga 1, 31000 Osijek, Croatia

✉ Corresponding author: zkilir@fazos.hr

Received: April 12, 2024; accepted: August 14, 2024

ABSTRACT

Organic animal husbandry is constantly increasing in the Republic of Croatia, as well as in most EU countries. The aim of this paper is to present the situation and create a SWOT analysis of organic animal husbandry production in the Republic of Croatia during the last decade, research its development potential, and to make a comparison with the situation in other EU countries. During the last decade, numerous activities/measures were undertaken which led to an increase in the area of used agricultural land under organic production, and now they occupy 8.57% of the total used agricultural area of the Republic of Croatia. The potentials for the development of organic animal husbandry production in Croatia are shown in the SWOT analysis and they are very good; not only because of the wealth of natural resources, various incentive measures, the preservation of numerous protected and GMO-free landscapes suitable for the aforementioned production, the abundance of neglected land areas that quickly could be put into use, regulated legislation; but also because of the emphasis on tourist destinations and friendly farming. In the EU countries, the need for better education of organic farmers as well as consumers of organic animal products is also emphasised, as well as raising the quality of coexistence with animals and the environment while preserving biodiversity, better distribution of incentives for this sector with opportunities for the development of numerous protected and rural areas.

Keywords: organic farming, Croatia, European Union, state, SWOT analysis

SAŽETAK

Ekološka stočarska proizvodnja je u Republici Hrvatskoj ali i u većini zemalja EU u stalnom porastu. Cilj ovoga rada je prikazati stanje i napraviti SWOT analizu ekološke stočarske proizvodnje u RH tijekom posljednjeg desetljeća te potencijale njenoga razvoja i napraviti usporedbu sa stanjem u drugim zemljama EU. Tijekom posljednjeg desetljeća poduzete su brojne aktivnosti/mjere koje su dovele do povećanja površina korištenog poljoprivrednog zemljišta pod ekološkom proizvodnjom i sada one zauzimaju 8,57% udjela u ukupnim korištenim poljoprivrednim površinama RH. Potencijali za razvoj ekološke stočarske proizvodnje u Hrvatskoj prikazani su u SWOT analizi i oni su vrlo dobri ne samo zbog bogatstva prirodnim resursima, različitih poticajnih mjera, očuvanosti brojnih zaštićenih i GMO-slobodnih krajolika pogodnih za navedenu proizvodnju, obilja zapuštenih zemljišnih površina koje bi se brzo mogle staviti u funkciju, uređenoj zakonskoj regulativi, nego i zbog naglašenosti turističke destinacije i friendly uzgoja. U zemljama EU također se naglašava potreba za kvalitetnijom edukacijom ekoloških farmera ali i konzumenata ekoloških animalnih proizvoda te podizanje kvalitete suživota sa životinjama i okolišem uz očuvanje bioraznolikosti, kvalitetnija raspodjela poticaja za ovaj sektor uz mogućnosti razvoja brojnih zaštićenih područja i ruralnih prostora.

Ključne riječi: ekološka proizvodnja, Hrvatska, Europska Unija, stanje, SWOT analiza

INTRODUCTION

In the world, there is an increasing demand for organic agricultural products, including organic animal products (Peng, 2019). The situation is similar in the Republic of Croatia. According to the research of Manuelian et al. (2020), there is a growing interest in organic animal husbandry and it has become a trendy topic not only in the real life of farmers but also in the research area. Organic animal husbandry contributes to the preservation of the environment and cultural heritage, which ultimately leads to the revitalization of rural areas from an economic, social and organic point of view. Organic animal husbandry can be a useful strategy to overcome numerous challenges in the agricultural sector (sustainability, food quality and safety, authenticity, traceability of products) with the necessary harmonization with the aspirations of consumers who pay more and more attention to animal welfare, health, environmental protection, etc. (Antunović et al., 2020). However, this is not an easy task at all, considering the compliance with Regulation (EU) 2018/848 of the European Parliament on organic production and labelling of organic products (European Parliament and the Council of the European Union, 2018). Regarding animal health and welfare, the principle of organic animal husbandry implies the maintenance of physical, mental, social and ecological well-being as well as the prevention of diseases (Presto Åkerfeldt et al., 2021). Organic animal production encourages the use of natural resources of a specific breeding area, grazing, open barns and canopies, which ensures better adaptation of animals to environmental conditions (Antunović, 2011). This paper aims to analyse the situation and present the potential of the development of organic animal production in the Republic of Croatia in the last decade through the preparation of a SWOT analysis of organic animal husbandry production in the Republic of Croatia. In addition, the state and potential development of organic animal husbandry in the Republic of Croatia will be compared with other EU countries.

MATERIAL AND METHODS

An analysis of the state and potential of organic animal husbandry in the Republic of Croatia was made based on data from the Croatian Bureau of Statistics (2024), the Ministry of Agriculture (2024) from the year 2013 to 2022, and by analysing and synthesizing the available literature. A comparison was also made of the state and potential of the development of organic animal husbandry in the Republic of Croatia and EU countries, together with the observed problems and recommendations for the development of this sector. Finally, based on the analysis of the state of organic animal husbandry in the Republic of Croatia, a SWOT analysis of the mentioned sector was made, where difficulties, opportunities, strengths and weaknesses were presented. The results are presented through tables and graphs, while numerous statistical reviews of the results and the situation in the EU were used (Eurostat, 2024; EC, 2023; European Commission, 2024; National Action Plan for the Development of Organic Agriculture 2023-2030, 2024).

RESULTS AND DISCUSSION

The state of organic animal production in the Republic of Croatia over the past decade and comparison with the EU

It is not acceptable to analyze the state of organic animal production without determining the organic agricultural areas and the basic feed used in animal diets. This is because animal feeding is significant and contributes to the production costs of each animal. In the Republic of Croatia, there are numerous advantages are being utilized and should be further activated to promote the growth of organic agriculture and the development of organic animal husbandry. Firstly, the region is abundant in natural resources, with numerous preserved areas suitable for organic production, and there is also a substantial market demand for such products. Furthermore, favorable climatic conditions, the potential to produce affordable and high-quality food, large quantities of bedding, lower financial investments, and the ownership of certified organic land are excellent

prerequisites for the growth of organic animal farming in the Republic of Croatia (Antunović, 2011). In the last decade, there has been an increase in the area of agricultural land and organic production in the Republic of Croatia. As shown in Table 1, it is apparent that over the last decade in the Republic of Croatia, the utilized agricultural land has increased by nearly 9%, and the area under organic production has grown by 306%. In 2021, organic production occupied 9.9% (15.9 million ha) of EU agricultural land.

Thus, there was a significant rapid increase in organic agricultural areas. For example, in 2012, there was an increase of 6.6 million ha, which accounts for a 68% increase in used areas. In support of this is the fact that one of the main goals of the European Commission's farm-to-table strategy is to increase organic arable land, which account for 25% of the total EU agricultural land by 2030 (Eurostat/Statistics-Explained, 2024). For example, compared to the EU, the largest organic used agricultural areas are in France (2.8 million ha), slightly less in Spain (2.6 million ha), Italy (2.2 million ha) and Germany (1.6 million ha).

Together, these four countries account for almost 3/5 of the total organic agricultural land in the EU. When comparing the percentage of organic agricultural areas in the total land areas during 2021 and 2022, it should be noted that Austria (26%), Estonia (23%), and Sweden (20%) have the largest share. Additionally, Portugal, Italy, Finland, the Czech Republic, Latvia, Denmark, Slovenia, and Greece had a share above 10%. The smallest share was held by six EU countries (below 5%), like Bulgaria (1.7%) and Malta (0.6%). A significant increase in organic agricultural areas in the EU compared to total agricultural areas in the period from 2012 to 2021 was also

determined in almost all countries and at the most and fourfold in Portugal and the Republic of Croatia. In France the increase was 169%, while in Hungary and Romania it was more than double (Eurostat/Statistics-Explained, 2024).

Table 2 presents data on the areas and production of organic arable crops, which serve as the foundation of livestock diet. Data with changes in areas and production are presented for corn (dry grain), barley, oats, soybeans and green forage from arable land and gardens for 2013 and 2022. The largest increase in 2022 compared to 2013 was in organic areas under soybeans (+376.75%), resulting in the highest change in soybean production (+591.60%). The amount of permanent grassland has also increased significantly, by 338.34%. In 2013, permanent grassland made up 35.12% of organically used agricultural land in the Republic of Croatia. By 2022, this percentage had increased significantly to 48.38%. In the EU, the average share of permanent grassland is 42%, followed by green fodder (17%) and cereals (16%) in total organic agricultural areas. The largest areas of organic permanent grassland, which are mainly used for livestock grazing, as well as meat and milk production, were in France and Spain.

Antunović et al. (2019) noted that there has been a noticeable rise in the number of livestock on organic farms in Europe and the Republic of Croatia in recent years. This suggests a growing interest in organic animal husbandry not only among farmers, but also among processors and consumers of organic animal products. However, there is still a lot of effort and work required, as well as broader coordinated action among various departments in the agriculture sector, to invest in the development of organic animal husbandry in the Republic of Croatia.

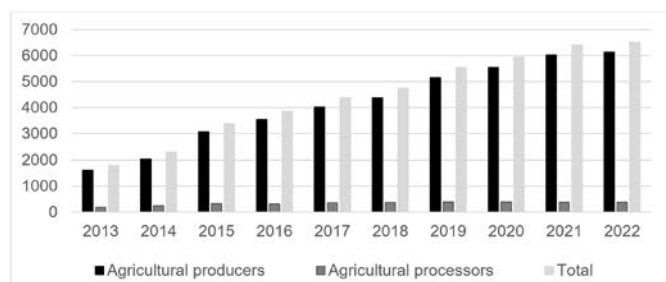
Table 1. Areas of used agricultural land and areas under organic production during the last decade in the Republic of Croatia (Croatian Bureau of Statistics, 2024)

Year	Used agricultural land, ha	Areas under organic production, ha	The share of land areas under organic production in total used agricultural area, %
2012	1 330 973	31 904	2.40
2022	1 445 070	129 374	8.95
Difference, % (2012-2022)	+ 8.57	+ 305.51	+ 272.92

Table 2. Area (ha) and quantity (t) of arable crops in the Republic of Croatia with significant changes (2013-2022) (Croatian Bureau of Statistics, 2024)

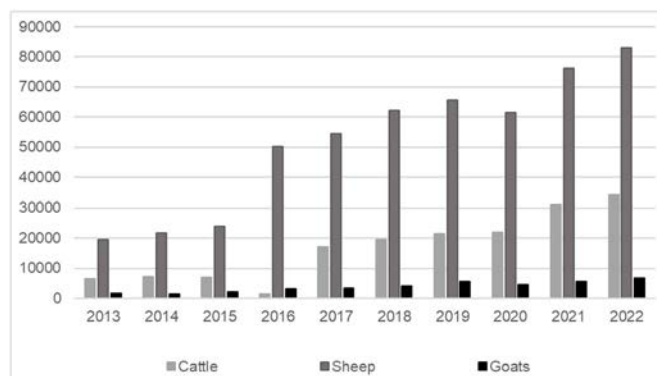
Feedstuff	Area, ha			Production, t		
	2013	2 022	Change, %	2013	2 022	Change, %
Corn, dry gain	1 781	3 247	+ 82.31	11 921	14 585	+ 22.35
Barley	980	1 642	+ 67.55	2 480	5 471	+ 120.60
Oat	968	1210	+ 25.00	1 777	2 838	+ 59.71
Soybean	744	3 547	+ 376.75	988	6 833	+591.60
Green fodder	9 281	17 757	+ 91.33	25 471	64 717	+ 154.08
Permanent grassland	14 279	62 590	+ 338.34			

The abovementioned was confirmed by the significant trend of increasing the number of agricultural producers in organic agriculture in the last decade in the Republic of Croatia by 305% from 1 608 to 6 512, as well as the number of processors by 110% from 181 to 380 processors of organic agricultural products (Figure 1).

**Figure 1.** The number of agricultural producers and processors in organic production and their total number in the Republic of Croatia during the last decade (Croatian Bureau of Statistics, 2024)

In the EU countries, the largest number of organic producers was recorded in Italy (75 874), France (58 413) and Spain (52 861), while the Republic of Croatia is at the back together with Bulgaria (5 942; Statista, 2024).

In the Republic of Croatia, in the last decade, there has been an increase in the number of ruminants (cattle, sheep and goats) and ungulates, while the number of non-ruminants (pigs, poultry) and bee colonies in organic production has decreased (Figure 2 and 3).

**Figure 2.** The number of organically reared ruminants (cattle, sheep and goats) in the Republic of Croatia during the last decade (Croatian Bureau of Statistics, 2024)

In the organic farming of cattle, their number increased by 425% from 6540 to 34331 heads, while the number of sheep increased by 327% from 19411 to 82941, and the number of goats by 281% from 1 769 to 6 742 heads. The number of ungulates increased the most by 493% from 874 to 5181 heads, and the number of poultry in 2021 by 419% from 2 036 to 10 578. However, unfortunately, the number of organically raised pigs decreased by 65% from 1 122 to 390 heads and bee colonies by 57% from 2 678 to 1 162, and the number of organically raised poultry in 2022 was not recorded. The reasons for the above-mentioned may be in the increased demand for organic animal products on the market, but also in the significantly different situation in the sectors of different types of domestic animals and numerous problems in

their breeding and conventional systems, particularly those involving non-ruminants. The aforementioned was evident in the pig and beekeeping sectors, which was reflected in their organic farming (Figure 3).

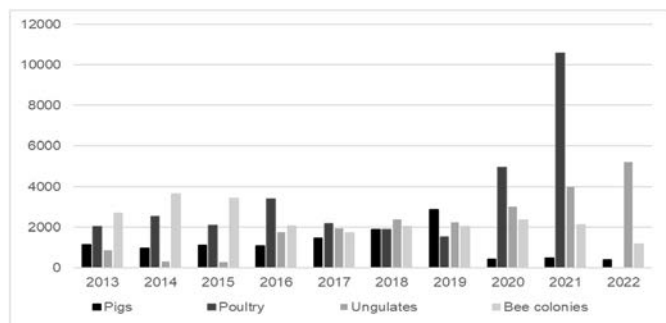


Figure 3. The number of organically reared pigs, poultry, ungulates and bee colonies in the Republic of Croatia during the last decade (Croatian Bureau of Statistics, 2024)

By analyzing the number of livestock in organic farming in EU countries compared to the total number, despite the significant increase in organic production, the percentage ranged from 1 to 5%, depending on the type of animal. In the EU countries, the largest share of organically reared livestock in the total number of animals was determined (Table 3), primarily in Austria (22.5% cattle, 29.5% sheep, 56.5% goats and 3% pigs), Sweden (24% cattle, 30.5% sheep and 2.7% pigs), Denmark (15.6% cattle and 3.7% pigs) and Latvia (26% cattle, 37.7% sheep, 22.0% goats and 0.5% pigs). For example, it should be emphasized that more than half of the cattle in organic farming in the EU are in Germany, France, Austria and Italy. It should also be pointed out that in the period from 2014 to 2020, the number of cattle in organic farming in the EU increased the fastest in Bulgaria, Croatia and Greece, while, for example, the number of cattle in organic farming decreased only in Romania and Poland (Eurostat, 2024).

When compared to the total number of ruminants raised in the Republic of Croatia in 2022, there is still a small number reared in organic farming (Table 3), around 8% of beef, 12% of sheep, 6.5% of goats, while organic pig farming is extremely small < 0.5%.

The absence of enough high-quality breeding material from organic farms and the scarcity of organic feed, particularly concentrated feed high in proteins, should be emphasized as development-restricting elements in organic animal husbandry that must be minimized. Analyzing the production of organic animal products in the last decade in the Republic of Croatia, and as can be seen from figures 4, 5 and 6, an increase in almost all products was determined.

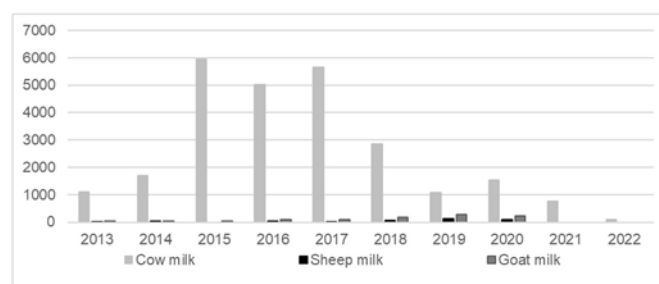


Figure 4. Production of organic milk (cow, sheep and goat milk) in the Republic of Croatia during the last decade (Croatian Bureau of Statistics, 2024)

Thus, the production of organic beef and veal increased to 2 392.3 t, organic pork from 3 to 11.5 t, lamb meat from 6 to 666 t, and goat meat to 26.7 t. There was also a significant increase in the production of organic eggs and a decrease in the production of organic milk and cheese, while some data for some organic products are still not available in the calculations of the National Bureau of Statistics.

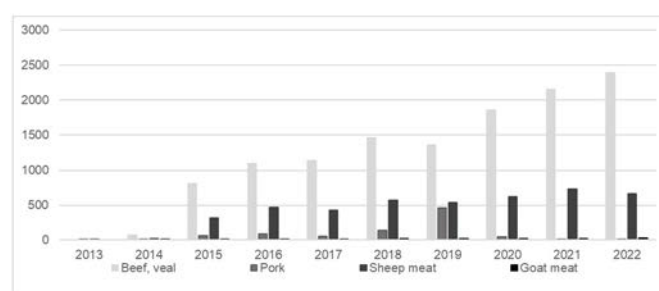


Figure 5. Production of organic meat (beef, lamb, goat meat) in the Republic of Croatia during the last decade (Croatian Bureau of Statistics, 2024)

Table 3. The share (%) of organically raised livestock in the first fifteen EU countries in relation to the total number of animals raised in 2022 (Eurostat, 2024)

Country EU	Animal species, %				
	Live bovine	Dairy cows	Pigs	Sheep	Goat
Greece	31.5	23.1	0.7	22.5	18.4
Latvia	26.0	12.5	0.5	37.7	22.0
Sweden	23.7	19.1	2.7	30.5	-
Austria	22.5	22.2	3.0	29.5	52.6
Czech Republic	20.5	2.0	0.1	-	-
Estonia	17.8	2.2	0.2	-	-
Denmark	15.6	14.6	3.7	-	-
Portugal	15.3	2.3	0.2	10.6	4.8
Slovakia	13.7	4.8	0.2	-	-
Finland	10.2	4.2	0.4	-	-
Lithuania	9.4	6.0	-	14.4	4.8
Germany	8.1	6.3	0.8	13.5	31.3
Slovenia	8.0	-	1.4	-	-
Croatia	7.3	0.3	-	11.7	6.4
Italy	6.5	4.4	0.7	8.6	9.4

- No expressed values

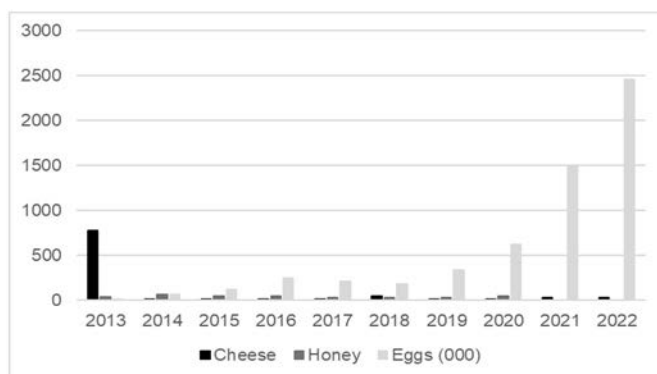


Figure 6. Production of organic cheese, honey and eggs in the Republic of Croatia during the last decade (Croatian Bureau of Statistics, 2024)

Also, in the last decade in the Republic of Croatia, a significant increase in the production of organic sheep and goat milk has been established from 6 and no registered quantities to 730 and 18 t by 2020, while data for the last two years are not available. The stated situation in the

production of organic animal products in the Republic of Croatia in the last decade largely follows the trends in the number of livestock farms.

By analyzing the share of organic milk in total milk production, despite a significant increase, these are still small amounts, while at the EU level, it's on average 3.7% in 2020. However, for example, compared to the total production of milk, a significant share of organic milk was recorded in Sweden (20%), Austria (17%) and Denmark (13%). 3/4 of organic milk is produced in EU countries (Germany, France, Denmark, Austria and Italy). An increase in milk production was recorded in the two leading EU countries in organic milk production (Germany by 74%, and France by 115%). A more significant increase in the production of organic milk was in Bulgaria, Greece and Spain, while a decrease in production was recorded in Estonia, Hungary and Poland. Analyzing the use of

organic milk in the EU, it was determined that half of the produced organic milk is used for fresh consumption, and around 26% for cheese making.

Potentials for the development of organic animal husbandry and possible guidelines in the Republic of Croatia and the EU

The potential for the development of organic animal husbandry in Croatia is very good, not only due to the wealth of natural resources, and the preservation of numerous protected and GMO-free landscapes suitable for the aforementioned production, but also because of the abundance of neglected land that could be used relatively quickly. It should be emphasized that legal regulations, various incentive measures, tourist destinations and friendly farming contribute to the aforementioned development. Escribano (2016) pointed out that reducing the depopulation of rural areas and its preservation is highly emphasized through the implementation of organic animal husbandry, but also that organic marketing strategies can significantly improve the profitability of production, i.e. increased economic output of farmers and the overall sustainability of the food sector. As pointed out by Antunović et al. (2020) in the common market of the European Union, the advantages of the Republic of Croatia, among other things, are reflected in the possibility of developing organic agriculture as well as organic animal husbandry. Besides, it is reflected through the prism of a stronger connection with tourism, as well as the protection of autochthonous plant and animal genetic resources and the preservation of biodiversity. The sale of organic products is increasing through the tourist offer in EU countries, and through eco-agritourism and successful hotels, while in the Republic of Croatia, this practice is not fully utilized. The association of smallholder farmers who produce organic animal products should also be imperative due to the possibility of entering the shelves of larger market chains, which may ensure a continuous supply, as well as an improvement in the quality of their products. In a study conducted in the northwestern part of the Republic of Croatia on 77 organic farms (Bokan et

al., 2019), they investigated the potential for cooperation and association among organic farmers. The results showed that organic farmers generally have no formal agricultural education and that they acquire most of their specialized knowledge through informal training. The authors emphasize good cooperation between organic farmers, which is usually based on the exchange of production experiences. It also highlights the low level of trust in key agricultural services and institutions as well as in people in general. Of the many obstacles that organic farmers face with, the possibility of overcoming them by coordinating the institutional logistic support is emphasized. This would increase the prospects for their association and business networking, and thus enable even more successful development of organic agriculture. In the study by Crnčan et al. (2022) on the state and prospects of the development of organic production in the Republic of Croatia, it is emphasized that organic production in the Republic of Croatia, among other things, can contribute to the creation of innovative organic products of added value that which also contribute to the creation of competitive advantage of organic producers. In order to significantly increase interest in organic livestock production in the Republic of Croatia, efforts should be made to improve the fertility of such soils, consolidate fragmented land areas, and organize land registrations (Antunović et al., 2019). These authors also emphasize the need for better marketing and market organization, as well as more significant investments for education of farmers and consumers of organic animal products. It should be emphasized that in the Republic of Croatia, there are good educational programs, from secondary school to higher education, which educate participants about the state and the latest scientific achievements in organic agriculture, including their implementation in the organic economic sector. As part of the intensification of improving the marketing sector in the field of organic livestock farming and the development of various marketing strategies in the Republic of Croatia, it is necessary to invest additional efforts in the further development of online platforms through which the purchase and promotion of organic animal products will

be carried out (National Action Plan for the Development of Organic Agriculture 2023 - 2030, 2024). This will increase interest in organic animal products. The further development of short supply chains for organic animal products is imposed as a task in view of the good indicators obtained by their establishment and operation during the COVID-19 pandemic, through the prism of distribution of food to consumers. At the EU level, the importance of organic farming is widely recognized. However, there are significant differences between European countries in terms of their development (Pânzaru et al., 2023). For example, in Slovakia, a significant increase in organic areas was recorded from 1991 to 2017 (almost 9%), which led to a significant increase in the number of animals on organic farms, as well as producers and processors of organic products (Némethová and Hudáková, 2019). The aforementioned authors revealed that the deficiency of organic production is disorganized market for organic products and the reduced consumption of such products. They also pointed out the weak supply of organic products, the uncompetitiveness of such supply and the high price of organic products, as well as the obligation of the country to encourage this production. In the mentioned research, it is emphasized that in Slovakia, organic agriculture may become an important economic branch not only when it comes to increasing employment in rural areas, but also in the development of agritourism and the production of traditional organic products, especially in the maintenance of the natural landscape. The analysis was carried out in Poland in a study by Jezierska-Thöle et al. (2017). The mentioned authors emphasize a significant increase in organic agricultural areas, the number of organic reared livestock and an increase in the number of organic processors of the obtained products, but also significantly greater opportunities for the development of organic agriculture. The research of Łuczka and Kalinowski, (2020) on the opinion of farmers on the obstacles to the development of organic agriculture in Poland, indicates that many farmers (almost 80%) fear lower productivity of organic production, and also presents the institutional obstacles in combination with legislation, its non-

implementation in practice and decision-making risks. These authors pointed out that farmers have a greater focus on economic than non-economic factors. Most of them reported the need for financial support, and almost 1/5 of the respondents emphasize the desire to stop engaging in organic production in the future (especially farms for livestock grazing). The aforementioned authors pointed out that a stable and coherent support policy is needed as a condition for the further development of organic agriculture. Research by Zuba-Ciszewska et al. (2023) reported that in Poland there is a limited number of certified organic dairy farms which sell milk as an organic product. Due to great instability and spatial differences in the arrangement of producers and buyers (processors) and low production, the supply of organic cow's milk does not meet the demand of dairies. The authors emphasize the importance of cooperation between producers and processors, continuity in the supply of sufficient quantities of organic cow's milk, as well as professional and technical support for producers as key components for the development of farms and the organic milk sector, which is comparable to Austria. In a study on the development of organic livestock farming in southeastern Bulgaria, Stoyanov (2017) pointed out that Bulgaria is in first place in the EU in terms of the percentage of agricultural land in conversion in 2015, which is a necessary prerequisite for the development of organic agriculture and thus organic livestock farming. Therefore, the great potential in the development of organic animal husbandry is emphasized. However, in Bulgaria, there is a slightly smaller number of organically reared livestock, in contrast to the EU average which is changing. In support of this are the facts regarding the increase in organic agricultural areas, the increase in demand for organic products, which is comparable to the increase in organic agriculture in highly developed EU countries. Likewise, an increasing trend in the number of animals in organic farms was recorded in southeastern Bulgaria, which stands out as one of the leading regions in the organic livestock sector. The author pointed out that, although organic animal husbandry in terms of production is not comparable to conventional animal husbandry, due

to its lower productivity, it has significant development potential based on added value and the constant increase in demand for organic animal products throughout the world. Research in Bulgaria by Mitev (2019), reported that the synergy of private and market actions greatly influenced the rapid development of organic agriculture in the last decade. Although the organic farming system in Bulgaria is still in the early stages of development, its potential is unquestionable. The author emphasizes numerous prerequisites for the development of organic agriculture: the desire and awareness of consumers to eat healthily; support for organic producers within the framework of the Rural Development Program, proper institutional support of the ministry, a good partnership of business and non-governmental organizations; organically preserved areas; adoption of knowledge about the well-being of the environment and rural areas. The author concludes that organic farming is a priority in the future, which will contribute to new knowledge in which agriculture should not be in the last row, but should be a leader in the development of the economy. Recent research by Ferasso et al. (2021), conducted in Spain, pointed out that the project Europe 2030 identified the need to create a growth model based on a dynamic balance of economic, social and environmental dimensions. The abovementioned leads to the redirection of the funds allocated to the Common Agricultural Policy 2023-2027 towards organic agriculture, including organic animal husbandry. In recent decades, funds for projects related to agriculture have been included in two packages of the European Agricultural Fund for Rural Development. In this study, the authors highlight a regional evaluation of the effects on production and employment in organic agriculture in Spain. The results reported significant differences at the regional level in Spain, which through the new European support package for the development of agriculture can stimulate the development and conversion of production systems through organic farming at the level of the whole of Spain. Research on the main characteristics of organic agriculture in Romania and their changes in the period from 2010 to 2020 as well as the impact of agricultural policy on the

development strategy of Romanian agriculture was conducted by Fortea et al. (2022). The authors pointed out that the dynamics of agricultural entities are directly dependent on branches of commercial interest related to the demand for products, but also changes in development strategies financed by centralized EU sustainable development programs. The strategy of limiting land fragmentation is also included as a successful element of sustainable development. The impact of the research is significant, emphasized by the delimitation of clusters with high and medium productivity. The abovementioned indicates the economic attractiveness of organic agriculture but also identifies statistical tools for evaluating changes in different clusters over time. The proposed model is useful for economic entities and decision-makers in the field of agricultural strategy, which will help in choosing the future direction of the development of the agriculture sector. The situation is similar in Slovenia, where a significant increase in organic agriculture areas, and organic farms was reported (Perpar and Udovč, 2020). The authors pointed out that this increase is still small because reduction of financial incentives, and the demand for organic products is high, while only around 20% of the demand can be accomplished by domestic production. Therefore, it is necessary to apply a system of direct support to organic producers, adapt support to investment in organic farms, modernize farms, strengthen the integration of farmers and a joint appearance on the market, carry out more research and transfer knowledge and innovations in this sector. It is necessary to invest more effort in the promotion of organic production, protection of the environment, farmer's lifestyle and healthy food. Areas in Slovenia that have natural limitations, especially farms with pastures, are recommended for the transition to organic agriculture. Research in Hungary (Király et al., 2022) reported that organic agriculture is one of the sustainable solutions to overcome climate change and mitigate the impact on the environment. However, the authors stated that Hungarian farmers are not motivated by climate change to change and switch to organic farming, which is surprising. Furthermore, the authors reported that the short-term

picture of organic agriculture in Europe will change significantly with regard to the Green Deal adopted by the European Commission, as well as the Farm to Fork Strategy. They set clear goals regarding the share of organic production in EU agriculture with the goal of 25% of agricultural land in the EU being under organic farming by 2030. In the study by Cammarat et al. (2021) carried out in the central part of the island of Sicily (Italy), organic animal farms were studied with the aim of determining their level of sustainability. The negative aspects of animal farming are being more emphasized regarding greenhouse gas emissions, soil erosion and groundwater pollution. The authors also took into account the territorial distribution of farms and made a performance assessment in four directions: environment, integrity, economic resilience and social well-being using the tools in "Sustainability Assessment of Food and Agriculture System". Ultimately, the authors stated that the overall results presented a satisfactory level of sustainability with great prospects for improvement, in line with the EU commitments made in the Green Deal and the Millennium Development Goals. The mandatory encouragement of organic animal farms is highlighted, as well as their monitoring with technical assistance strategies and appropriate organic protocols.

SWOT analysis of organic animal farming in the Republic of Croatia

Organic animal husbandry should be an interesting strategy for rural development to overcome the decreasing profitability of farms. In the EU, rural areas occupy 90% of the total area, where >23% of the EU population lives, while another 35% of the population lives in transitional areas. The agricultural sector is the main driver of sustainable rural development in these areas (Manos et al., 2013).

However, it is difficult to combine and arrange compliance with the current legislation as well as the goals and principles of organic animal husbandry, while increasing overall sustainability. Regional and climatic conditions of the area should be considered. Therefore, it is necessary to make a SWOT analysis of the organic livestock sector, which will include an assessment of the future effects and difficulties of organic farms depending on the areas of cultivation. The above will help in designing specific and successful options which are in accordance with the current legal regulations in organic livestock farming with the application of short local food supply chains that will lead to the sustainability of the organic agriculture system (Escribano, 2016).

In our study, a SWOT analysis of organic livestock production in the Republic of Croatia is presented in Table 4, which was created as a result of an analysis of the state and potential of the development of organic livestock production in the Republic of Croatia during the last decade. In the available literature, there are no SWOT analyses on organic livestock farming in the Republic of Croatia. By reviewing the literature, we found a review paper by Gugić et al. (2017) who created and presented a SWOT analysis through the state and perspectives of the development of organic agriculture in the Republic of Croatia from year 2005 to 2015. The SWOT analysis helps in presentation of competitive sectors, potential effects and ultimate risks, as well as possible opportunities and threats to the sector, which certainly contributes to the creation of comprehensive development strategies. A high-quality SWOT analysis of organic animal husbandry in the Republic of Croatia will help in upgrading the development strategies which have already been adopted, or those which will be adopted in the future, aimed to sustainability of this agricultural sector.

Table 4. SWOT analysis of organic animal farming during the last decade in the Republic of Croatia

Strength	Weaknesses
High school and higher education programs on organic agriculture	Lack of organic reproductive material
Short supply chains of organic animal products	Lack of organic concentrated feeds
Good quality educational programs	Insufficient amounts of organic manure
Friendly farming	Higher price of production costs compared to conventional production
Established legal regulations	Fragmentation of land surfaces
Numerous incentive measures	Depopulation of rural areas
Increase in agricultural areas and number of livestock species in organic farming	Insufficient knowledge and education of farmers and consumers
Increased interest in transitioning to organic production	Insufficient monitoring and control of organic livestock production
Emphasis on the quality of organic animal products	Insufficiently developed market of organic animal products
Environment and biodiversity preservation	Insufficient professional support for organic farmers and weak collaboration with state institutions
Wealth of natural resources (water, forests, land)	Insufficient production and processing capacities and their weak connection
Suitability of climatic conditions for organic animal production	Lack of interest among young people in starting their own organic farms

Continued. Table 4.

Opportunities	Threats
Increasing market demand for organic animal products and the creation of eco-brands in order to continuously and comprehensively enter the European market	Weaker purchasing power of the population
Further development and establishment of new chains of short supply of organic animal products with the aim of ensuring continuous financial resources for farmers	High prices of organic animal products
Bringing abandoned and mined land areas to their intended purpose in the function of organic animal production	More expensive production and lower availability of organic animal products in markets
A country without GMO crops as a constant for the promotion and development of organic animal production	Aging of the rural population (farmers)
Development of rural tourism and agrotourism in order to raise the standards for organic farmers	Irregularity of land registers and complexity of their implementation
Reduction of depopulation and preservation of the rural agro-ecosystem as the basis of landscape preservation and development of organic animal production	Weaker familiarity with legal regulations and the complexity of their implementation
Association of smaller farmers with the aim of joint market activity	Increased import of cheaper organic animal products
Better use of funds from EU funds aimed for development of organic animal production	Use of environmental labels without the permission of supervisory authorities
Favorable climatic conditions and better possible utilization of renewable energy sources for the development of organic animal production	Insufficient preparation for the use of EU funds
Increase in export quantities of organic animal products due to raising the standards of organic producers and processors of animal products	Labor shortage and population migration from rural areas, especially young and educated people
Improving the education of farmers and consumers of organic animal products by introducing a larger number of lifelong learning programs about the importance and significance of organic animal production and spreading awareness of the downsides of conventional animal production	Climate changes
Numerous incentive measures as motivation for the expansion of organic farming	Excessive urbanization of rural areas
Protection of animal genetic resources, especially old breeds/strains of livestock that have an important place in organic animal production	Antagonism between conventional and organic animal farming
	Changes of humans' habits in meat consumption
	Diseases like African swine fever, Avian influenza, lumpy skin disease, brucellosis

CONCLUSION

In the last decade, organic animal husbandry has been increasing in the Republic of Croatia and most of the EU countries. An increase in the number of most species and products of livestock in organic farming was determined, except decreased number of poultries, pigs and bee colonies and a decrease in the organic milk and cheese yield produced in the Republic of Croatia. The situation is similar in EU countries. However, a lot of investment is still needed in the development of this sector. The potential for the development of organic animal husbandry in the Republic of Croatia, as well as in the EU countries, is very good, but it is necessary to invest even more efforts in increasing organic agricultural areas, livestock farming and the production of larger quantities of organic animal products, as well as increasing the incentives for this production. In addition, it is necessary to reinforce the education of farmers and consumers regarding the value of organic animal products, by intensifying even stronger marketing promotions about the importance of organic animal husbandry, while emphasizing the preservation of the environment, the maintenance of natural biodiversity and possible stronger development of rural areas. All of the above will contribute to increasing interest in organic livestock production. The current SWOT analysis could be the basis for creating a more comprehensive SWOT analysis of organic agriculture or individual organic agriculture branches in Croatia and the European Union. With the synergy of all the opportunities listed in the current SWOT analysis, it is possible to expect an increase in this production and a greater financial effect, but also a change in the attitude of the citizens, which can contribute to increased needs for organic animal production.

REFERENCES

- Åkerfeldt, M.P., Gunnarsson, S., Bernes, G., Blanco-Penedo I. (2021) Health and welfare in organic livestock production systems - a systematic mapping of current knowledge. *Organic Agriculture* 11, 105–132. DOI: <https://doi.org/10.1007/s13165-020-00334-y>
- Antunović, Z. (2011) Ekološki uzgoj ovaca i koza. In: *Organic livestock farming*. Osijek: Poljoprivredni fakultet u Osijeku, pp. 92-122.
- Antunović, Z., Senčić, Đ., Novoselec, J., Klir, Ž. (2019) Organic livestock in the Republic of Croatia and Europe. *Krmiva*, 61 (2), 75-80.
- Antunović, Z., Senčić, Đ., Klir, Ž., Zmaić, K., Samac, D., Novoselec, J. (2020) Organic livestock farming in Republic of Croatia- state and perspective development. *Agriculture & Forestry*, 66 (3), 7-13.
- Bokan, N., Štambuk, M., Žutinić, Đ. (2019) Wishes versus capacities: Organic farmers and potential for cooperation. *Agriculturae Conspectus Scientificus*, 84 (4), 407-415.
- Cammarata, M., Timpanaro, G., Scuderi, A. (2021) Assessing Sustainability of organic livestock farming in Sicily: a case study using the FAO SAFA framework. *Agriculture*, 11, 274. DOI: <https://doi.org/10.3390/agriculture11030274>
- Crnčan, A., Sudarić, T., Kristić, J., Rukavina, M. (2022) Stanje i perspektiva razvoja ekološke poljoprivredne proizvodnje u Republici Hrvatskoj. *Agroeconomia Croatica*, 12 (2), 25-31.
- Croatian Bureau of Statistics (2024) Available at: www.dzs.hr [Accessed 10 April 2024].
- EC (2023) Organic farming in the EU - A decade of organic growth, January 2023. European Commission, DG Agriculture and Rural Development, Brussels.
- Escribano, A.J. (2016) Organic livestock farming - challenges, perspectives, and strategies to increase its contribution to the agrifood system's sustainability - a review. In: *Organic farming - a promising way of food production*. IntechOpen, p. 374.
- European Commission (2024) Development of organic production in the EU: 2021-2027 action plan. Available at: https://agriculture.ec.europa.eu/farming/organic-farming/organic-action-plan_en [Accessed 10 April 2024].
- Eurostat (2024) Available at: <https://ec.europa.eu/eurostat/data/database> [Accessed 10 April 2024].
- Eurostat/Statistics-Explained (2024) Available at: <https://ec.europa.eu/eurostat/statisticsexplained/> [Accessed 10 April 2024].
- Ferasso, M., Blanco, M., Bares, L. (2021) Territorial analysis of the European Rural Development Funds (ERDF) as a driving factor of ecological agricultural Production. *Agriculture*, 11, 964. DOI: <https://doi.org/10.3390/agriculture111100964>
- Fortea, C., Antohi, V.M., Zlati, M.L., Ionescu, R.V., Lazarescu, I., Petrea, S.M., Cristea, D.S. (2022) The dynamics of the implementation of organic farming in Romania. *Agriculture*, 12, 774. DOI: <https://doi.org/10.3390/agriculture12060774>
- Gugić, J., Grgić, I., Dorbić, B., Šuste, M., Džepina, M., Zrakić, M. (2017) Pregled stanja i perspektiva razvoja ekološke poljoprivrede u Republici Hrvatskoj. *Glasnik zaštite bilja*, 3, 20-30.
- Jezierska-Thöle, A., Gwiazdzinska-Goraj, M., Wisniewski, Ł. (2017) Current status and prospects for organic agriculture in Poland. *Quaestiones Geographicae*, 36, 23–36.
- Király, G., Rizzo, G., Tóth, J. (2022) Transition to organic farming: a case from Hungary. *Agronomy*, 12, 2435. DOI: <https://doi.org/10.3390/agronomy12102435>
- Lobley, M., Butler, A., Reed, M. (2009) The contribution of organic farming to rural development: an exploration of the socio-economic linkages of organic and non-organic farms in England. *Land Use Policy*, 26, 723-735. DOI: <https://doi.org/10.1016/j.landusepol.2008.09.007>
- Łuczka, W., Kalinowski, S. (2020) Barriers to the development of organic farming: a Polish case study. *Agriculture*, 10, 536. DOI: <https://doi.org/10.3390/agriculture10110536>
- Manos, B., Bournaris, T., Chatzinikolaou, P., Berbel, J., Nikolov, D. (2013) Effects of CAP policy on farm household behavior and social sustainability. *Land Use Policy*, 31, 166-181. DOI: <https://doi.org/10.1016/j.landusepol.2011.12.012>
- Manuelian, C.L., Penasa, M., da Costa, L., Burbli, S., Righi, F., De Marchi, M. (2020) Organic livestock production: a bibliometric review. *Animals*, 10, 618. DOI: <https://doi.org/10.3390/ani10040618>

- Ministry of Agriculture Croatia (2024) Available at: www.mp.hr [Accessed 10 April 2024].
- Mitev, G. (2019) Organic farming- the future of the agricultural economy of Bulgaria. *Trakia Journal of Sciences*, 17(1), 572-576. DOI: <https://doi.org/10.15547/tjs.2019.s.01.091>
- National Action Plan for the Development of Organic Agriculture RH 2023.-2030. (2024) Available at: https://poljoprivreda.gov.hr/UserDocsImages/dokumenti/pristup_info/zakoni_propisi/zakoni_poljoprivreda/ekoloska/NAP%202023-2030_compressed.pdf [Accessed 10 April 2024].
- Némethová, J., Hudáková, M. (2019) Dynamics of livestock production development in the Slovak Republic between the years 2004 and 2017 and potential impact of the changes on the agricultural sector and landscape. *Applied Ecology and Environmental Research*, 17 (4), 7649-7666. DOI: http://dx.doi.org/10.15666/aeer/1704_76497666
- Pânzaru, R.L., Firoiu, D., Ionescu, G.H., Ciobanu, A., Medelete, D.M., Pîrvu, R. (2023) Organic agriculture in the context of 2030 Agenda implementation in European Union countries. *Sustainability*, 15, 10582. DOI: <https://doi.org/10.3390/su151310582>
- Peng M. (2019) The growing market of organic foods: Impact on the US and global economy. In: Debabrata Biswas, Shirley A. Micallef, eds. *Safety and practice for organic food*, Academic Press, pp. 3-22.
- Perpar, A., Udovč, A. (2020) Organic farming: A good production decision for Slovenian small size farms and farms in the areas with restrictions/ limitations or natural obstacles for agriculture. In: *Multifunctionality and impacts of organic and conventional agriculture*. IntechOpen. DOI: <https://doi.org/10.5772/intechopen.89716>
- Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labelling of organic products and repealing Council Regulation (EC) No 834/2007. *Official Journal of the European Union L 150*, 1-92.
- Sahm, H., Sanders, J., Nieberg, H., Behrens, G., Kuhnert, H., Strohm, R., Hamm, U. (2013) Reversion from organic to conventional agriculture: a review. *Renewable Agriculture and Food Systems*, 28, 263-275. DOI: <https://doi.org/10.1017/S1742170512000117>
- Statista (2024) Available at: <https://www.statista.com/statistics/641880/organic-producer-numbers-european-union-eu/> [Accessed 10 April 2024].
- Stoyanov, K. (2017) Organic livestock farming and preconditions for its development in South-East Bulgaria. *Trakia Journal of Sciences*, 15 (1), 120-124. DOI: <https://doi.org/10.15547/tjs.2017.s.01.022>
- Zuba-Ciszewska, M., Kowalska, A., Brodziak, A., Manning, L. (2023) Organic milk production sector in Poland: driving the potential to meet future market, societal and environmental challenges. *Sustainability*, 15, 9903. DOI: <https://doi.org/10.3390/su15139903>