

CHAPTER 3

ORGANIC AGRICULTURE DEVELOPMENT IN SERBIA AND SURROUNDING COUNTRIES

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Food is one of the key resources today. The global population is growing, as is the demand for food. Producing more food requires more energy, which means more pollution to obtain that energy, and in addition to energy, higher yields also require stimulation with chemical treatments, which also increases pollution. The problem has been recognized and one of the solutions has been recognized in organic agricultural production - organic farming mitigates climate change.

Serbia and its surrounding countries are not among the most developed countries in the world, but looking at Europe, they can be an important factor in the supply of agricultural products. In accordance with contemporary tendencies, the potential for ecologically acceptable, earth-friendly agricultural production exists. This paper investigates this development through a comparative analysis of Serbia with neighboring countries as well as with the most developed European countries in the field of organic agriculture.

Keywords: *Natural Resources, Sustainability, Biodiversity, Organic Land, Organic Share, Serbia, EU.*

INTRODUCTION

Dealing with food challenges is becoming more and more complex, and economies that devote themselves to the potential of this market have significant benefits for the entire economy by setting clear objectives for

sustainable productivity growth. Industries have had to adapt their business strategies to account for major geo-economic and technological shifts. The increase of the area of arable land under organic production, as well as the increase in number of organic producers testify in favor of the fact that the organic production is outlook and long-term profitable activity, with multifunctional advantages (Pavlović et al., 2024). Recent surveys indicate that technology is now the primary driver of change and disruption for businesses across sectors and leaders will need to be equipped with a new leadership toolkit to adapt to and fully capitalize on these deep and structural changes. In addition to preserving the environment and improving the health of the population through environmentally friendly methods of agricultural production, modern technologies are what agriculture should rely on and improve its practices.

Bioeconomy and ecology are indivisible, but investors are not always interested in the humane aspects of the economy, i.e. organic agriculture (Pavlović&Jovanović, 2024). The agro-industrial complex is a major source of pollution of soil, water, air and the entire biosphere in general, and therefore significant changes have been taking place in agriculture over the last 20 years, both in the methods of its organization and in the directions of development (Khoruzhy et al., 2024). The European Union and other European countries (e.g., candidate countries for membership, which include the countries in this analysis), is committed to sustainable food production through several adopted policies: European Green Deal, Sustainable Development Goals, The Green Agenda for the Western Balkans, EU Biodiversity Strategy 2030 and a significant strategy for organic production Farm-to-Fork Strategy. This Strategy refers to a fair, healthy and environmentally-friendly food system with a current target share of 25% organic farmland area, reduce by 50% the use and risk of chemical pesticides and the use of more hazardous pesticides, Reduce nutrient loss by at least 50% while ensuring no loss in soil fertility and reduce fertiliser use by at least 20%, Reduce by 50% the use of antimicrobials such as antibiotics for farmed animals and aquaculture by 2030 (EC, 2021).

By investing significant additional efforts in the development of organic production and by following European regulations and guidelines, as well as examples of good practices from developed countries - which can serve as a solid foundation for many other Balkan countries -it is possible to achieve the necessary goals for the production and processing of organic food in accordance with the European Green Deal (Jovanović & Pavlović, 2024).

To achieve sustainable productivity growth, synergy is needed between all stakeholders in the field of governance for strategy development, strengthening institutional structures, stakeholder engagement, monitoring and evaluation, then policy reorientation or support for reforms, financial incentives, educational programs, sustainable certification. Farmers should adopt sustainable practices, invest in technology and knowledge, while other stakeholders should develop sustainable technologies and inputs, offer products with sustainable certification.

Organic agriculture represents a system of sustainable agriculture, largely based on local resources, which maintains ecological balance and minimizes the negative impact of agriculture on the environment. Also, it implies production in accordance with the law and standards defined conditions with control of the entire production cycle by an authorized organization for certification.

Beyond fostering eco-friendly agricultural practices and contributing to sustainable rural development, organic farming directly impacts soil physicochemical properties, which are key to mitigate GHG emissions. For example, organic farming practices such as composting, crop rotation, and reduced reliance on synthetic fertilizers improve soil structure, enhance organic matter content, and reduce the denitrification process responsible for nitrous oxide (N₂O) emissions. By leveraging local resources and promoting biodiversity, organic farming minimizes environmental impacts while building resilience to climate change (Bocean, 2025).

The development of organic agriculture: provides assistance in the preservation of the human environment and in this sense leaves an enviable legacy for future generations, it contributes to more proper nutrition of the population and the preservation of human health, it contributes to the development of rural communities and the reduction of negative demographic trends. In current conditions of man-made transformation of nature, the principle adequacy of the materials and technologies used to productivity and resources of the biosphere is of cardinal importance (Ermakov&Jovanović, 2023).

Organic food is associated with organic plant production, which directly affects the preservation of a healthy environment (Beslać et al., 2023).

MATERIALS AND METHODS

Europe is a region that has had a very constant growth of organic land over the years, had over 19 percent of the world's organic agricultural land (Willer et al, 2024) and this research investigates organic sector of this region, focuses on less-developed countries and examines the status of

development of those countries, comparing them with the most developed European organic agricultures. In this paper, a descriptive, analytical and comparative analysis method was used through the report The World of Organic Agriculture - Statistics and Emerging Trends 2024 Research Institute of Organic Agriculture FiBL, Frick, and IFOAM (Willer et al, 2024) and official national statistics and data. The comparative analysis was carried out through the research of organic agriculture in Serbia and the surrounding countries, and with EU top 5 countries by organic land.

RESEARCH AND DISCUSSION

A survey of organic production indicators was conducted in the observed countries Serbia and surrounding countries and with average of EU top 5 countries by organic land indicator. The indicators of organic agriculture analyzed: Organic agricultural land (area in ha, share of organic production in %, changes in shares and areas); Land conversion status (fully converted, in conversion); Number of producers, processors, importers and exporters.

Table 1 - Organic land

Country	Organic area (ha)	Organic share (%)	Organic share change 2013-2022 (%)	Organic land change 2021-2022 (ha)
Serbia	25035	0.7	204.3	+1508
Bosnia and Herzegovina	2495	0.1	754.9	0
Croatia	129374	8.6	218.3	+7450
North Macedonia	8724	0.7	177.3	+930
Montenegro	3966	1.5	29.3	-438
Albania	733	0.1	42.4	-361
Bulgaria	110441	2.2	96.2	+24131
Romania	578718	4.3	101.2	0
Hungary	293597	5.9	124.1	0
Selected countries average	128120	2.7	194.2	+11770
Top 5 EU countries average	2135391	13.5	107	+150189

Source: Author's systematization and calculation based on Willer et al, 2024

Organic land

Among the selected countries, Romania, Hungary and Croatia have the largest organic area which makes them the most competitive among the researched countries. Bulgaria also has more than 100,000 ha (110,441 ha). In the category of 1,000 to 100,000 ha are Serbia, North Macedonia and Montenegro, while Albania has only 733 ha of organic area (Figure 1).

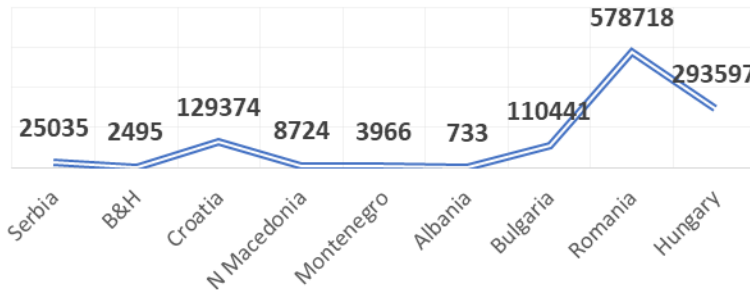


Figure 1 - Organic area (ha) by selected country

Source: Author's figure

Organic share

Average organic share of total Europe is 3.7%, while within EU countries this share is almost triple, i.e. 10.4%. Among the selected countries, the average is 2.67%, which is (expectedly) below the EU average, given that 5 of 9 selected countries are not member states, but also below the overall European average. Croatia has the highest organic share at 8.6%, but still below the EU average.

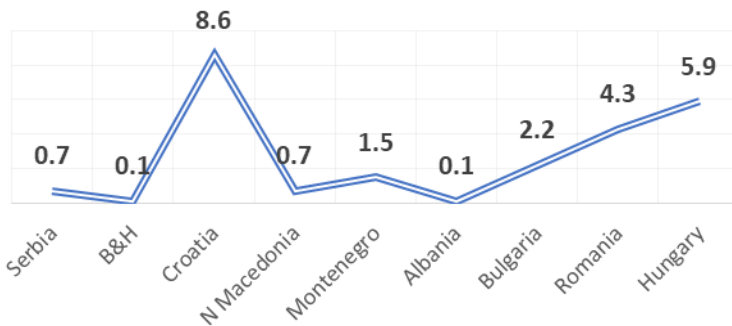


Figure 2 - Organic share (%) by selected country

Source: Author's figure

Organic share higher than overall Europe average have Croatia, Hungary and Romania. The other observed countries have lower shares, while Serbia is among them. Serbia, North Macedonia, Bosnia and Herzegovina and Albania have an organic share lower than 1% (Figure 2).

Organic share change

Shown in Figure 3 comparative data from 2013 and 2022 indicate an improvement in the organic sector in all observed countries, which indicates a commitment to the development of organic production in these countries. Organic share change is the lowest in Montenegro and Albania, while the highest is in Bosnia and Herzegovina, Serbia and Croatia. Romania, Hungary and Bulgaria have a similar change score (about 100) and are in the middle of the scale among the observed countries. At the European level, next to Malta (851.4), Bosnia and Herzegovina has one of the most outstanding results in organic share change 2013-2022.

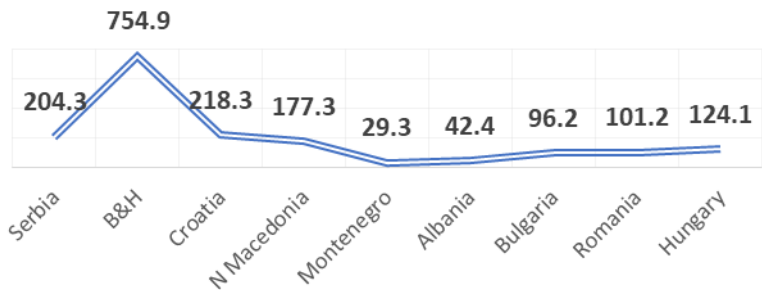


Figure 3 - Organic share change 2013-2022 (%) in selected countries
Source: Author's figure

Organic land change

An overview of organic land change 2021-2022 shows that there are no changes in 3 selected countries, two countries have a decrease in organic land, while an increase in organic land is observed in Serbia, Croatia, North Macedonia and Bulgaria. Compared to European numbers, the decline in organic land is the opposite of these trends. In both cases (the whole of Europe and the EU), organic land is on the rise.

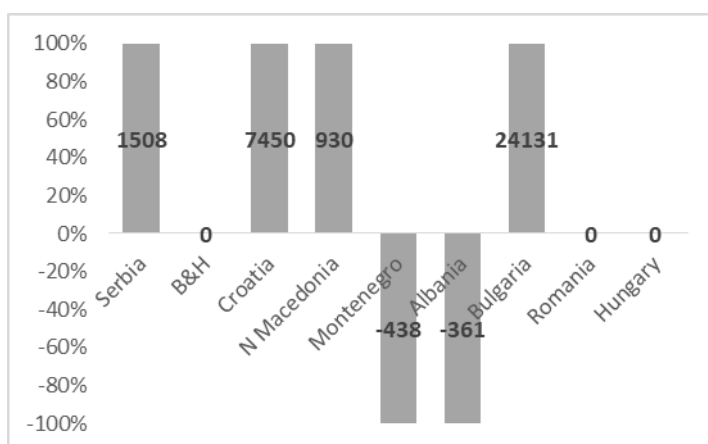


Figure 4 - Organic land change 2021-2022 (ha) in selected countries
Source: Author's figure

Organic land indicator comparative analysis with EU Top 5 average

Compared to the most developed European organic agri-forces, the best result in terms of organic land area is found in Romania, but it is still almost four times lower. According to the organic share indicator, Croatia is closest to the EU top 5 average with a share of 8.6, while Croatia's organic share compared to the EU average is lower by about 20%.

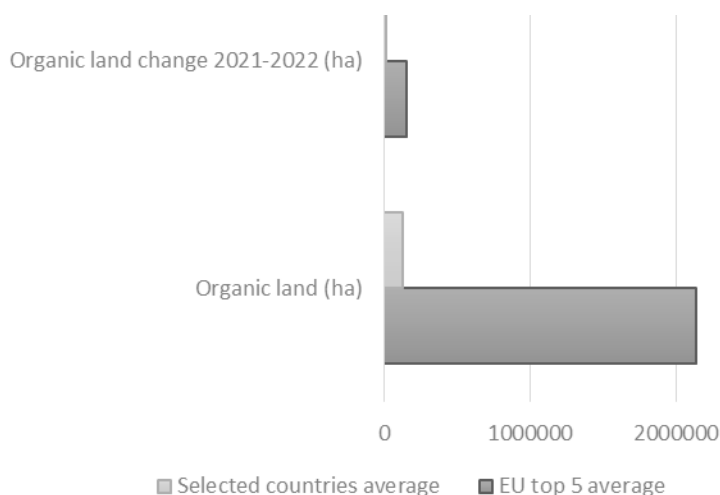


Figure 5 - Selected countries average and EU top 5 average by organic land indicators (ha)
Source: Author's figure

Organic share change 2013-2022 is higher than EU top 5 in 5 of 9 selected countries (included Serbia) and indicates the development of the organic sector in the observed countries. Researching organic land changes 2021-2022 observed countries do not show significant results compared to the EU top 5 average.

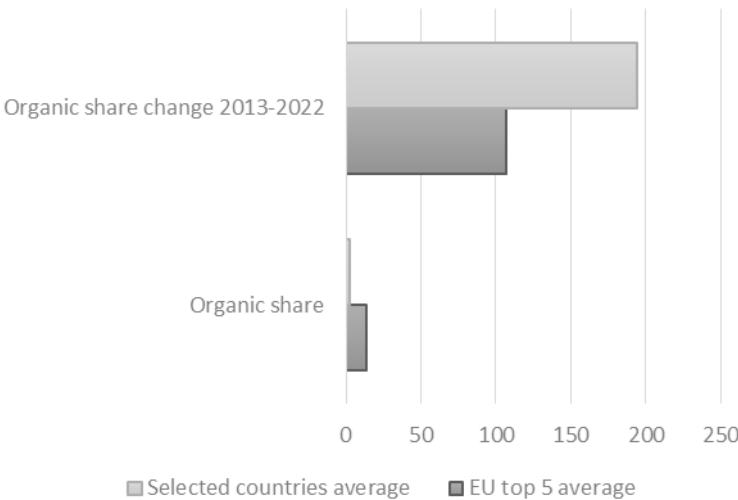


Figure 6 - Selected countries average and EU top 5 average by organic share indicators

Source: Author's figure

Status of land conversion

The successful process of land conversion for organic production depends on several factors and several challenges need to be taken into account. (Figure 5). An organic farming system requires farmers not to utilize any synthetic chemicals including fertilizers or pesticides, which potentially results in a decrease in the crop's yield while its sale price remains the same until it is certified organic at the end of the conversion period; thus, during this period, the farm's revenue (that is, the product of the crop's yield and its price) is very likely to decrease (Jahantab et al., 2023) this period lasts three years and, in addition to the initial location and climate challenges and cause economic issues. Thus, the possibility of conversion is not only determined by intentions and economic factors, but also by locality conditions and climate.



Figure 7 - Conversion pre-steps

Source: Author's figure

Table 2 - Status of land conversion

Country	Fully converted (ha)	In conversion (ha)	Share of fully converted (%)
Serbia	16503	8533	65.20
Bosnia and Herzegovina	2082	413	83.44
Croatia	92959	36415	71.85
North Macedonia	6594	2130	77.35
Montenegro	3781	185	95.43
Albania	570	163	77.76
Bulgaria	60460	49981	54.70
Romania	344541	234177	59.50
Hungary	262906	30691	89.57
Selected countries average	87822	40299	68.55
Top 5 EU countries average	1335300	380195	77.84

Source: Author's research based on Willer et al, 2024

Share of fully converted indicates land that can produce under organic certification, while share of in conversion indicates land that is awaiting that certification and is not currently organic productive, but beyond that, this parameter can also indicate the further development of organic production.

Opserving situation in Serbia and surrounding countries, the highest percentage of fully converted is found in Montenegro, but since these are small areas, it can be concluded that Montenegro is stagnating in its already weak development of the organic sector. The average in the observed countries is 68.55%; Bulgaria and Romania are below this average, while the other countries have a higher share of fully converted land but on significantly smaller areas.

Average of fully converted land is lower in selected countries than in the EU top 5. In the selected countries, an average of 31.45 % percent of land remains in conversion, while the average at the EU top 5 level is 21.16 % and this may indicate a more rapid development of these countries and a catch-up in this sector, and thus an interest in organic production. In addition, this is an economic burden on the economies of the selected countries, given that there is no organic productivity on the land during the conversion process.

Producers, processors, exporters and importers

The participants in the productivity process of the organic sector are spelled out through numbers producers, processors, exporters and importers in selected countries and group of countries averages.

Table 3 - Producers, processors, exporters and importers

Country	Producers	Processors	Importers	Exporters
Serbia	513	154	66	88
Bosnia and Herzegovina	90	51	-	20
Croatia	6132	380	11	-
North Macedonia	890	18	5	1
Montenegro	427	26	2	0
Albania	129	8	0	12
Bulgaria	4260	386	101	86
Romania	11562	209	34	25
Hungary	5129	489	61	0
Selected countries average	3237	191	31	26
Top 5 EU countries average	58482	14479	748	589

Source: Author's research based on Willer et al, 2024

All researched indicators in the EU top 5 average are higher than the indicators within the observed countries individually, as well as the average of the selected countries of Serbia and the surrounding area.

Producers

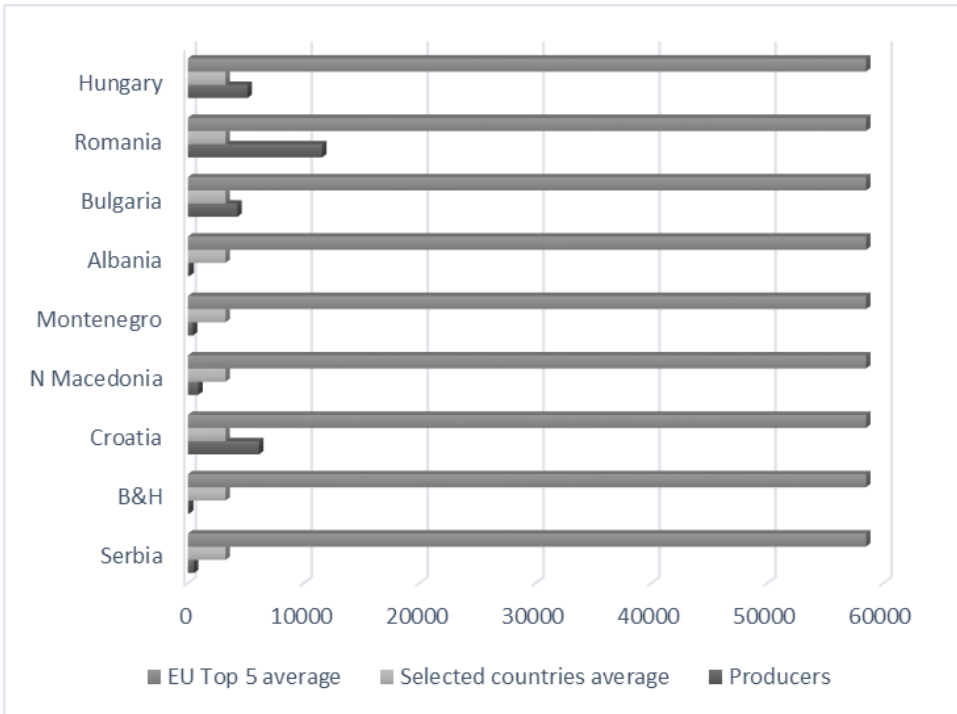


Figure 8 - Comparative overview of number of producers in selected countries to the average and the EU top 5 average

Source: Author's figure

The number of producers indicates the acceptance of organic practices in the observed country or group of countries (Figure 8). The average of the observed countries is 3237 producers.

Processors

Processors of organic products bring a competitive role to market in the organic sector and higher revenues from the sale of a processed product compared to an unprocessed organic product. Number of processors indicates greater financial benefits of the organic sector. The numbers indicate that in the selected countries there are an average of 17 manufacturers per processor, while in the EU top 5 there are an average of 4 and means more favourable financial results from organic sector.

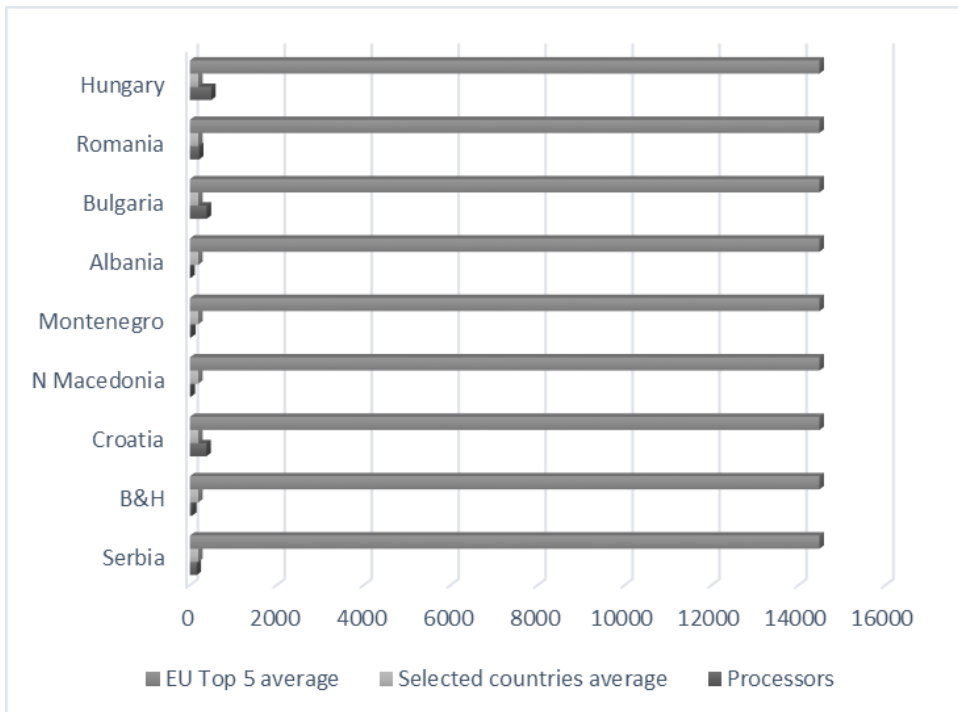


Figure 9 - Comparative overview of number of processors in selected countries to the average and the EU top 5 average

Source: Author's figure

Importers and exporters

A higher number of importers may indicate a combination of a lack of local organic products mixed with a developed market demand, while a low number of importers may also indicate a low level of awareness of organic production and weak demand.

In the top 5 EU countries average (the most significant European producers, developed market for organic products) have a ratio of importers to exporters of 55% to 45%, on average, the ratio among the selected countries does not differ significantly (54-46) but arranged individually, different results are found. Hungary and Croatia does not export beyond the EU market, Albania has no importers due to the underdevelopment of the local market, Montenegro has producers and importers but no exporters, so everything produced remains on the small local market (the number of producers in Montenegro is high due to the size of the farms, mostly very small-scale producers).

Organic sector in Serbia

The tables show the percentage ratio of Serbia's results on organic agriculture indicators to the average values in selected countries and the EU top 5 countries average (Table 4, 5 and 6). The tables through research of indicators show progress of organic sector of Serbia arranged by percentage in comparison.

Table 4 - Ratio results of Serbia in organic land and organic share indicators

Serbia	Organic area (ha)	Organic share (%)	Organic share change 2013-2022 (%)	Organic land change 2021-2022 (ha)
Ratio to Selected countries average (%)	19.54	25.92	105.20	12.81
Ratio to Top 5 EU countries average (%)	1.17	5.18	190.93	1

Source: Author's research

Table 5 - Ratio results of Serbia in Status of land conversion

Serbia	Fully converted (ha)	In conversion (ha)	Share of fully converted (%)
Ratio to Selected countries average (%)	18.79	21.17	95.88
Ratio to Top 5 EU countries average (%)	1.23	2.24	84.6

Source: Author's research

Table 6 - Ratio results of Serbia in number of Producers, processors, exporters and importers

Serbia	Producers	Processors	Importers	Exporters
Ratio to Selected countries average (%)	15.84	80.62	212.9	338.46
Ratio to Top 5 EU countries average (%)	0.87	1.06	8.82	14.94

Source: Author's research

CONCLUSION

Transition to organic farming can be challenging and depending on location and climate and those factors must be taken into account when converting land for organic farming can be challenging and depending on location and climate. The transition process can also be economically challenging for farmers, however organic agriculture supports the production of local autochthonous varieties and with a good strategy can be economically profitable in the long term in addition to the natural features of sustainability.

Serbia, with 34.80% of land in conversion, has the intention to orient its agriculture towards organic production. Compared to the averages in the most important European countries in the organic sector, Serbia does not show significant results, but efforts can be recognized through organic share changes 2013-2022 and in data compared to surrounding countries.

Serbia has potential for the development of organic agriculture, a tradition of agricultural activities, and implements complete legislation in the field of organic production. Efforts need to be made in education and professional training, additional incentives, awareness-raising, and following good European practice.

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