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Economic indicators of effectiveness and efficiency with a focus on the development of organic production in the Western Balkans

Ekonomski indikatori efektivnosti i efikasnosti sa fokusom na razvoj organske proizvodnje na Zapadnom Balkanu

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Abstract: Organic agriculture represents a farming system that, beyond its environmental dimension, carries substantial economic relevance. Although the development of organic production in the Western Balkan countries has progressed more slowly than in most European Union member states, it nevertheless demonstrates encouraging economic performance and growing strategic relevance. When guided by principles of efficiency and supported by a dedicated institutional framework, this sector yields dual benefits: promoting environmental sustainability while simultaneously facilitating integration into expanding and profitable markets. More than merely the avoidance of synthetic inputs, organic agriculture entails the harmonization of farming practices with natural ecosystems and the respectful treatment of living organisms. By rejecting synthetic fertilizers and pesticides, genetically modified organisms, growth hormones, antibiotics, and artificial additives, this approach proactively addresses ecological and social externalities. Instead, it embraces a holistic paradigm that fosters biodiversity, reinforces natural cycles, and revitalizes soil fertility. For Serbia and the other countries analyzed in this study: Albania, Bosnia and Herzegovina, Montenegro, and North Macedonia, organic agriculture emerges like a pathway toward sustainable economic transformation. This paper explores key economic indicators related to the effectiveness and efficiency of organic sector development in the Western Balkans.

Keywords: Organic agriculture, Western Balkans, Economic performance, Effectiveness, Sustainable development, Agro-ecosystem, Serbia, Comparative analysis.

Sažetak: Organska poljoprivreda predstavlja poljoprivredni sistem koji, pored svoje ekološke dimenzije, nosi značajan ekonomski značaj. Iako je razvoj organske proizvodnje u zemljama Zapadnog Balkana napredovao sporije nego u većini zemalja članica Evropske unije, on ipak pokazuje ohrabrujuće ekonomske performanse i rastući strateški značaj. Kada se vodi principima efikasnosti i podržava ga poseban institucionalni okvir, ovaj sektor donosi dvostruke koristi: promociju ekološke održivosti, a istovremeno olakšava integraciju u rastuća i profitabilna tržišta. Više od pukog izbegavanja sintetičkih inputa, organska poljoprivreda podrazumeva harmonizaciju poljoprivrednih praksi s prirodnim ekosistemima i poštovanje prema živim organizmima. Odbacivanjem sintetičkih đubriva i pesticida, genetski modifikovanih organizama, hormona rasta, antibiotika i veštačkih aditiva, ovaj pristup proaktivno rešava ekološke i društvene eksternalije. Umesto toga, on prihvata holističku paradigmu koja podstiče biodiverzitet, jača prirodne cikluse i revitalizuje plodnost zemljišta. Za Srbiju i druge zemlje analizirane u ovoj studiji: Albaniju, Bosnu i Hercegovinu, Crnu Goru i Severnu Makedoniju, organska poljoprivreda se pojavljuje kao put ka održivoj ekonomskoj transformaciji. Ovaj rad istražuje ključne ekonomske indikatore vezane za efikasnost i efikasnost razvoja organskog sektora na Zapadnom Balkanu..

Ključne reči: Organska poljoprivreda, Zapadni Balkan, ekonomski učinak, efikasnost, održivi razvoj, agroekosistem, Srbija, komparativna analiza.

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INTRODUCTION

The growing demand for sustainable agricultural practices has brought organic farming to the forefront of environmental and rural development strategies. As global concerns about soil degradation, water scarcity, and chemical overuse in agriculture intensify, organic production systems have emerged as a viable alternative that aligns with ecological and socio-economic priorities. In contrast to conventional agriculture, organic farming promotes the conservation of essential natural resources, particularly soil and water. Additionally, it plays a direct role in fostering various complementary activities within rural economies.

In the Western Balkan region, sustainability has historically not been a core focus of agricultural policy. This has led to a range of environmental and infrastructural constraints for the development of organic production. As noted by Pavlović et al. (2024), "Croatia and Serbia have numerous deposits of lignite, which is used for electricity production and household heating. Combustion of lignite leads to significant pollution of the environment with heavy metals and other phytotoxic elements. That is why significant areas of land in Croatia and Serbia are not suitable for organic production." This observation underscores how legacy energy practices can limit the ecological viability of certain territories for organic agriculture. The production of fruit dominates in Serbia, followed by the production of cereals with constant growth in the production of industrial plants, oilseeds and animal feed Fodder production, it has also seen growth in recent years (Jovanović & Pavlović, 2023).

The ecological dimension of organic agriculture can serve as part of the solution to challenges addressed by the European Green Deal and the Green Agenda for the Western Balkans. In addition to its contribution to environmental sustainability and the preservation of public health, its economic significance is substantial. Given that Western Balkan countries possess longstanding experience in conventional agricultural practices, hold the status of developing economies, and are geographically situated in Europe with aspirations toward EU accession, the economic potential associated with the development of the organic sector appears promising.

1. METHODOLOGY

This study employs a descriptive, analytical, and comparative research approach. The primary data sources include The World of Organic Agriculture (Statistics and Emerging Trends) reports for 2021, 2022, and 2024, published by the Research Institute of Organic Agriculture (FiBL), Frick, and IFOAM (Willer et al., 2021, 2022, 2024), alongside official national statistics. The comparative analysis focuses on the state of organic agriculture in selected Western Balkan countries: Albania, Bosnia and Herzegovina, Montenegro, and North Macedonia and Croatia, like EU member state from the same region.

To assess the market performance of the organic agriculture sector across these countries, a Market Efficiency Index (MEI) is introduced. The MEI is defined as the ratio of total organic food exports (in metric tons) to the total certified organic agricultural area (in hectares). This index serves as a proxy indicator for evaluating the degree of market integration, export productivity, and the economic output per unit area of organic land.

2. RESEARCH AND DISCUSSION

A survey of organic production effectiveness and efficiency was conducted in the observed countries of Western Balkans (Albania, Bosnia and Herzegovina, Montenegro, North Macedonia and Serbia) and Croatia (EU member). The indicators analyzed: Organic share; Organic area; and Export data (EU and USA). Based on the analyzed indicators assessing the market performance of the organic agriculture sector across selected countries, a Market Efficiency Index (MEI) is calculated to provide a comparative measure.

Overview of Organic Share in the Western Balkan Countries and Croatia

The organic share serves as a key indicator of the development and integration of organic farming within national agricultural systems. Among the Western Balkan countries, this share remains relatively low compared to EU averages, yet it shows gradual progress. As shown in Table 1, organic share is in progress (2019-2022) in selected countries.

Table 1 – Organic share change (2019-2022) in selected countries, with trend

Country	Organic share % (2019)	Organic share % (2022)	Trend
Albania	0.1	0.1	No variation
Bosnia and Herzegovina	0.1	0.1	No variation
Montenegro	1.8	1.5	- 0.3
North Macedonia	0.3	0.7	+0.4
Serbia	0.6	0.7	+0.1
Croatia	7.2	8.6	+1.4

Source: Author 's research based on Willer et al., 2021 & 2024

Albania and Bosnia and Herzegovina maintained a consistently low organic share of 0.1%, with no recorded growth during this period. Montenegro saw a slight decline from 1.8% to 1.5%. North Macedonia more than doubled its organic share, growing from 0.3% to 0.7%, showing promising momentum. Serbia experienced modest growth, increasing from 0.6% to 0.7%. Croatia stands out with both the highest organic share overall and notable growth: from 7.2% in 2019 to 8.6% in 2022. This suggests a more mature and better-supported organic considering EU membership.

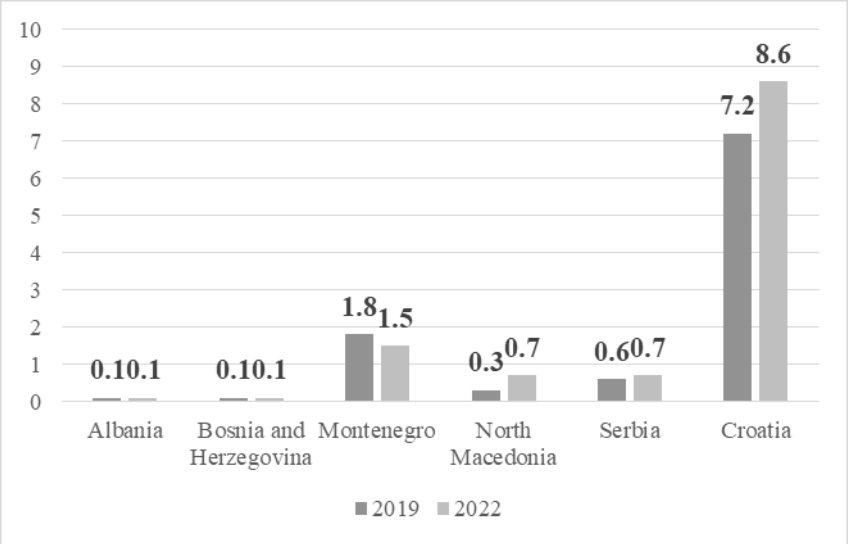

Figure 1 – Organic share change (2019-2022) in selected countries
Source: Author 's figure

Organic area in selected countries

The comparative analysis of organic agricultural land across selected countries between 2020 and 2022 reveals marked variations in growth dynamics, reflecting distinct national trajectories in the development of the organic sector (Table 2).

Table 2 – Areas under organic production in selected countries 2020 and 2022 in ha, with trend and growth rate

Country	Area under organic production (2020) in ha	Area under organic production (2022) in ha	Trend in ha	Growth rate in %
Albania	887	674	-213	-24.02
Bosnia and Herzegovina	1692	2495	+803	+47.45
Montenegro	4823	3966	-857	-17.76
North Macedonia	3727	8724	+4997	+133.99
Serbia	19317	25035	+5718	+29.60
Croatia	108610	129374	+20764	+19.14

Source: Author 's research based on Willer et al., 2022&2024 database

Croatia recorded the most substantial absolute increase, with an expansion of 20,764 hectares under organic production, underscoring the country's consolidated regulatory framework and relatively advanced institutional support for organic farming.

Serbia and North Macedonia also exhibited significant positive developments, with respective increases of 5,718 and 4,997 hectares.

Bosnia and Herzegovina demonstrated moderate growth, adding 803 hectares to its organic agricultural area during the observed period. In contrast, Albania and Montenegro experienced reductions of 213 and 857 hectares, respectively. Taken together, these findings point to a general regional tendency toward the expansion of organic farming.

Although the total areas under organic production (still remain below the levels seen in EU countries, and are even several times smaller), the value of organic product exports has generally shown a steady increase.

The calculated growth rates reveal considerable variation across countries. North Macedonia experienced the most dynamic expansion, with a 133.99% increase in organic agricultural area, followed by Bosnia and Herzegovina (+47.45%) and Serbia (+29.60%). Croatia saw a steady growth of 19.14%, despite already having the largest organic area in absolute terms. In contrast, Montenegro (-17.76%) and Albania (-24.02%) recorded contractions.

Organic exports in selected countries

Table 3 – Exports to EU and USA

Country	Exports to EU and USA (2020) in MT	Exports to EU (2022) in MT	Exports to USA (2022) in MT
Albania	1834	1440.3	1.4
Bosnia and Herzegovina	1582	10489.8	-
Montenegro	56	24.1	-
North Macedonia	361	447.1	-
Serbia	15847	14323.6	62.2
Croatia	28 (USA)	EU country	20.8

Source: Author ‘s research based on Willer et al., 2022 & 2024 database

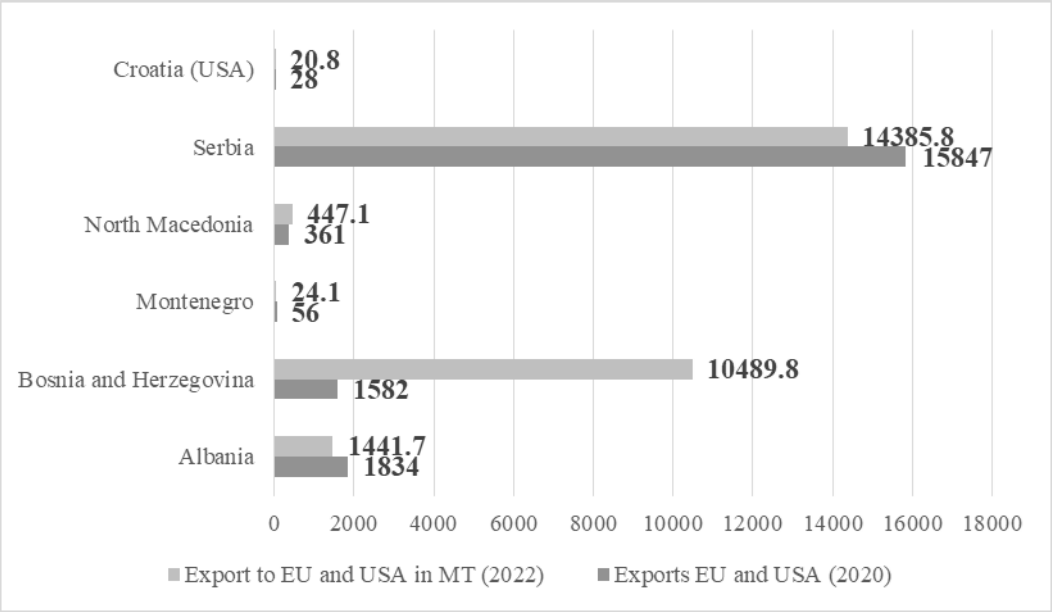

Figure 2 – Exports to EU and USA
Source: Author ‘s figure

The export of organic agricultural products from the Western Balkans to the European Union and the United States represents a growing segment of economic potential for the region. In particular, the European market has demonstrated a consistent and significant demand for such products, positioning itself as the primary destination for exporters from countries like Serbia, Bosnia and Herzegovina, and North Macedonia. Empirical data supports this trend: in 2022, Serbia exported approximately 14,323 metric tons (MT) of organic products to the EU, compared to a modest 62.2 MT to the United States. Bosnia and Herzegovina experienced a remarkable increase in exports to the EU, rising from 1,582 MT in 2020 to over 10,000 MT in 2022. In contrast, countries such as Montenegro and Albania exhibited notably smaller volumes, indicating structural limitations or underdeveloped supply chains in organic production.

This uneven distribution suggests a high degree of heterogeneity in the capacity of Western Balkan states to engage with international organic markets. Serbia has emerged as a regional leader, owing to its more developed production infrastructure, diversified export portfolio, and institutional support for organic farming. Meanwhile, the limited engagement with the U.S. market across the region may reflect logistical challenges, regulatory differences,

or strategic prioritization of the geographically closer and more accessible EU market.

Importantly, the positive trajectory in export volumes - particularly toward the EU - illustrates the increasing competitiveness of the region's organic sector, even in the face of global disruptions such as the COVID-19 pandemic. This growth can be interpreted not merely as a commercial success but as an indicator of the sector's adaptive capacity and alignment with international quality standards. Nevertheless, the proportion of land dedicated to organic farming in most Western Balkan countries remains marginal. Tripković, Arsić, and Dobričanin (2023) emphasize that the continued expansion of organic agriculture holds the potential to strengthen the sustainability of small and medium-sized enterprises, provided that they harness emerging opportunities and maintain a focus on healthy food production principles. This underscores both the potential for expansion and the necessity of targeted policy interventions, including technical assistance, farmer education, and improved certification processes.

In sum, the organic export sector holds significant promise as a driver of rural development and economic diversification in the Western Balkans. While current performance varies across countries, the overall trend points to an upward trajectory that, if strategically cultivated, could bolster not only export revenues but also the environmental sustainability and international integration of the region's agri-food systems.

Market Efficiency Index of the Organic Sector in selected countries

A Market Efficiency Index (MEI) was calculated by dividing the total quantity of organic exports, measured in metric tons, by the total certified organic agricultural area in hectares. This ratio provides a standardized indicator of export productivity per unit of organic land area. This metric serves as a proxy indicator for assessing the intensity of market integration, export productivity, and the economic output per unit area of organic land.

Table 4 – Market Efficiency Index of the Organic Sector in selected countries (2022)

Country	Organic area (ha, 2022)	Exports to EU+USA (MT, 2022)	MEI (MT/ha)
Albania	674	1441.7	2.14
Bosnia and Herzegovina	2495	10489.98	4.20
Montenegro	3966	24.1	0.006
North Macedonia	8724	447.1	0.05
Serbia	25035	14385.8	0.57
Croatia	129374	N/a (partial data)	-

Source: Author 's calculation

The MEI reveals significant divergence in market integration among the countries studied. Bosnia and Herzegovina exhibits the highest index value (4.20 MT/ha), suggesting a strong export orientation and efficient conversion of organic land into marketable output. Conversely, Montenegro and North Macedonia display very low MEI values, indicating weak export performance relative to their organic area. In the case of North Macedonia, although the number of organic producers is relatively high, holdings are highly fragmented - typically not exceeding 2 hectares - which further limits export capacity (Jovanović & Pavlović, 2024). Moreover, the accessibility of official certification systems remains a key barrier. As Janković et al. (2023) note, 'For small-scale farmers, the cost of accessing official certification systems is often burdensome. As a result, the procedures required to obtain formal certification can represent a significant obstacle. Serbia presents a moderate level of efficiency, while data limitations prevent conclusive analysis for Croatia.

When addressing the importance of organic agriculture - particularly from an economic standpoint - it is relevant to consider Demeter certification, which reflects a more rigorous and advanced standard of organic production rooted in the biodynamic farming system. As a holistic agricultural approach, biodynamic farming builds upon the principles of organic agriculture while incorporating ecological, ethical, and spiritual dimensions of land management. Globally, 7,087 farms are certified under the Demeter standard. Within the Western Balkans and the countries examined in this study, Serbia stands out with two Demeter-certified farms, followed by Bosnia and Herzegovina with one. Currently, no certified farms operate under this standard in Albania, Montenegro, or North Macedonia. The presence of biodynamic practices in Serbia demonstrates that the foundational conditions for implementing more advanced organic systems are already in place, providing a promising platform for future sectoral development.

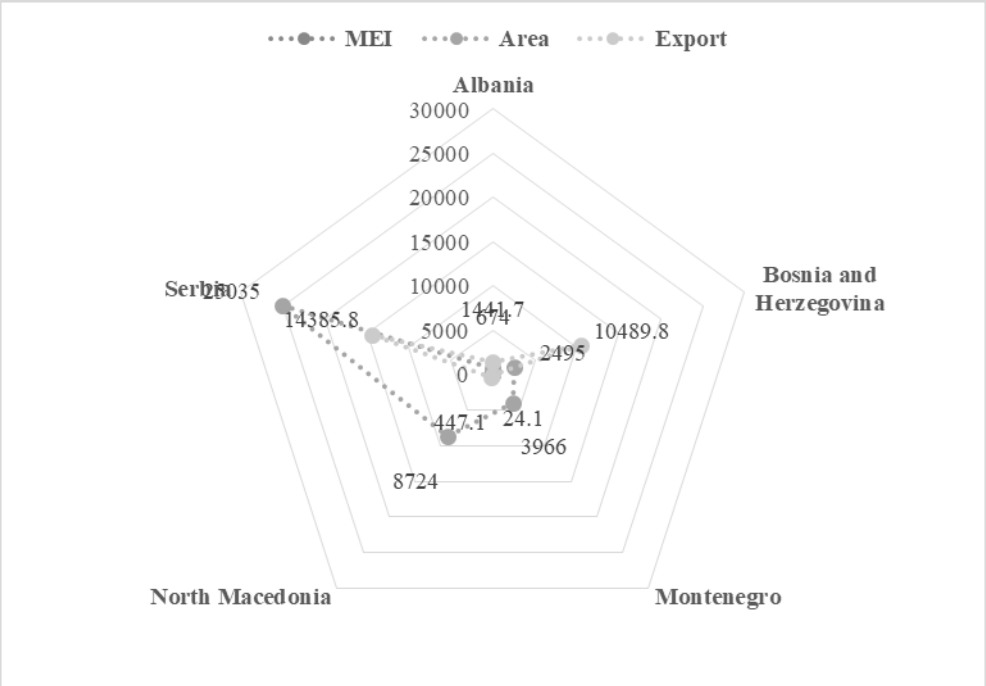

Figure 3 – Market Efficiency Index in selected countries (2022)
Source: Author 's figure

CONCLUSION

The analysis of organic agriculture in the Western Balkans and Croatia underscores the sector's uneven yet progressively evolving character across the region. Despite persistent environmental and infrastructural limitations in relation to the soil contamination and limited policy emphasis on sustainability - several countries demonstrate clear signs of growth in organic land area, export performance, and market integration.

The introduction of the Market Efficiency Index (MEI) offers a valuable metric for assessing the relationship between certified organic area and export output, enabling more nuanced comparisons between countries. Serbia emerges as a regional leader, exhibiting a strong export capacity and early adoption of advanced standards such as Demeter certification. This not only reflects its institutional and infrastructural readiness, but also highlights the latent potential of the entire region to transition toward more sustainable agricultural models.

Although the share of land under organic management remains modest in most countries, rising export volumes - particularly to the European Union - illustrate the sector's growing alignment with international markets. However, to fully harness this potential, targeted policy interventions are needed to support certification systems, farmer education, technical capacity building, and value chain development.

In this context, organic agriculture should not be viewed merely as a niche production system, but as a strategic pillar for rural development, environmental protection, and European integration. The foundation for more advanced organic systems - such as biodynamic farming - is already present in parts of the region, providing a promising basis for further expansion and innovation.

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