Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development
Vol. 25, Issue 1, 2025
PRINT ISSN 2284-7995, E-ISSN 2285-3952

THE EVOLUTION OF ORGANIC FARMING IN ROMANIA (2012-2023): TRENDS, CHALLENGES AND OPPORTUNITIES

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Abstract

This study analyses the evolution of certified organic operators and the agricultural area dedicated to organic farming in Romania during the period 2012-2023. The methodology used included the collection and processing of official statistical data, the application of quantitative analysis methods and the calculation of relevant statistical indicators. The evolution of organic farming was examined through the lens of economic, political, and climatic factors, while also considering the impact of the Common Agricultural Policy (CAP) regulations and the financial support provided to farmers for land conversion. The analysis of organic agriculture in Romania from 2012 to 2023 reveals a notable increase in organically farmed areas, despite variations in the number of certified operators. The total area dedicated to organic farming grew by 140.7%, indicating a rising interest among farmers, bolstered by European subsidies, national policies, and a growing consumer demand for organic products.However, challenges such as certification costs, administrative burdens, and market volatility remain obstacles to further growth.The statistical analysis shows that certain categories of organic crops, such as legumes, industrial crops, and green harvested plants, experienced remarkable growth, driven by economic incentives and sustainability benefits. Meanwhile, other crops, like tuber plants, have shown fluctuating trends due to economic and climatic factors. Permanent crops, including orchards, vineyards, and pastures, have steadily increased, demonstrating long-term stability in organic farming.The SWOT analysis reveals that organic farming in Romania has strong potential for future development, benefiting from favorable policies and an expanding market. However, the sector requires continued support through investments in research, innovation, and infrastructure, as well as stronger incentives for small and medium-sized farmers to transition to organic practices.

Key words: *organic farming, certified operators, cultivated areas, CAP,financial support, organic products*

INTRODUCTION

Organic agriculture plays a crucial role in promoting sustainable development, a concept that refers to meeting the needs of the present without compromising the ability of future generations to meet their own needs [3]. Organic agriculture directly contributes to sustainability goals by implementing practices that protect the environment, promote biodiversity, conserve natural resources, and support the rural economy. This aligns with global demands to reduce the negative impact of agriculture on the planet, along with other areas that aim to encourage a sustainable and responsible lifestyle.

Organic farming is defined as the use of methods that comply with established regulations to protect the environment, human health and animals. These methods include the use of local resources, the reduction of greenhouse gas emissions, the protection of biodiversity and the avoidance of synthetic chemicals [10]. Organic farming is directly linked to sustainable development because it encourages the efficient management of natural resources and the protection of biodiversity, providing solutions to the challenges of climate change and environmental degradation.

A key feature of organic farming is its focus on environmental protection. Practices like crop rotation, the use of organic fertilizers, and natural pest control contribute to reducing pollution in soil, air, and water. Furthermore, organic farming enhances carbon sequestration in the soil, which aids in lowering greenhouse gas emissions [20]. According to a study conducted by the FAO in 2017, organic farming can significantly

contribute to combating climate change by absorbing carbon and reducing emissions from agriculture [10].

Although organic farming brings many environmental and health benefits, there are also challenges, such as higher production costs, limited access to technology and information for organic farmers, and stringent certification requirements [15]. In addition, its widespread integration requires continued support from authorities to address these challenges.

In 2017, about 70 million ha represented the surface cultivated in organic system, of which Oceania covered 36 million ha, followed by Europe with 15 million ha [23].

Organic products are in increasing demand on the European market, as they are perceived as healthier by consumers [15]. Farmers who adopt these practices thus have access to larger markets and better prices for their products.

However, the outlook is optimistic, as more and more consumers are willing to pay a higher price for organic products, and policies such as the European Commission's "Farm to Fork Strategy" (2020) emphasize the development of organic and sustainable agriculture in Europe [7, 9, 6].

In the EU, organic farming is better and better developed and in Romania is just at its beginning, accounting for just 3% of he cultivated area. A part of cereals, vegetables, wine, honey, dairy products are carried out in organic farming system, representing a chance for Romania's export on the EU market [19].

In Romania, there is a weak literature on organic farming. Several published articles discuss the cultivated area under organic farming, the number of operators, organic products, and labeling [1, 4]. Financial support plays a crucial role for farmers transitioning to or focused on organic farming.[11].

In this context, this study examines the trends in certified organic operators and the agricultural land allocated to organic farming in Romania between 2012 and 2023.

MATERIALSAND METHODS

The data for this study were sourced from official records, including annual organic farming reports from the Ministry of Agriculture and Rural Development (MADR) and databases on agricultural structure and cultivated areas from the National Institute of Statistics, Eurostat data on organic agricultural area at European level, as well as the European Union Regulations on organic farming to identify the influence of regulations on the dynamics of organic operators and cultivated areas.To interpret the collected data, the following statistical methods were used:

• The evolution of the number of certified operators and organic agricultural areas was analyzed through time series, using annual growth rates and variation ratios.

• *The growth index* (%) was calculated using the formula:

$$I_t = \frac{X_t}{X_{t-1}} \times 100 \quad \text{.....(1)}$$

where:

I_t= growth index for year t,

X_t = indicator value in year t,

X_{t-1} = indicator value in the previous year.

• *The coefficient of variation* was used to evaluate the fluctuations in the number of certified operators and cultivated areas, according to the formula:

$$CV=\sigma/\mu \quad \text{.....(2)}$$

where:

σ = standard deviation,

μ= arithmetic mean of the data series.

A CV below 0.2 indicates low variability, and a CV above 0.5 indicates high variability.

• *The compound annual growth rate* (CAGR) was used to analyze the growth trend of organically cultivated areas.

CAGR is an important tool in long-term data analysis, as it allows comparing increases (or decreases) from different periods, taking into account market or data volatility. Thus, it is useful for:

1. Evaluating investment performance – in cases where we want to understand how a

certain investment or economic sector has evolved (e.g. organic farming).
2. Long-term growth estimates – based on past trends, the future development of a sector or market can be forecasted.
3. Comparisons between sectors – such as comparing organic and conventional agricultural sectors, or between different regions.

$$CAGR = \left(\frac{V_f}{V_i}\right)^{\frac{1}{n}} - 1 \quad \text{.....(3)}$$

where:
V_f= the final value of the indicator,
V_i = theinitialvalue of the indicator,
n = thenumber of yearsunderreview.

•*SWOT analysis* is a method used to evaluate the Strengths, Weaknesses, Opportunities and Threats of a sector, organization or strategy. In the study on the evolution of organic agriculture in Romania, SWOT analysis was used to identify the internal and external factors influencing the development of this sector.

RESULTS AND DISCUSSIONS

Certified organic operators are natural or legal persons who undertake to apply specific rules for the production, processing or marketing of agricultural and food products, respecting the regulations of European and national legislation on organic farming. These operators
may be farmers, processors or traders who apply agricultural techniques that protect the environment, conserve biodiversity and natural resources, and use sustainable production methods that prohibit or limit the use of synthetic chemicals and artificial fertilizers [5].
The number of certified operators in organic farming decreased by 9.54% in 2023 compared to 2012 (Table 1).
There is a significant decrease until 2017 (Fig. 1), this decrease may be the result of a complex of economic, political and social factors, including high certification costs, lack of consistent support from the authorities, low demand for organic products and administrative difficulties. However, the number of operators started to increase again starting from 2018 (Fig. 1), which could suggest a return of interest in organic farming. This fluctuation can be attributed to various factors, such as shifts in national and international organic farming regulations, economic incentives, and market demands [20].

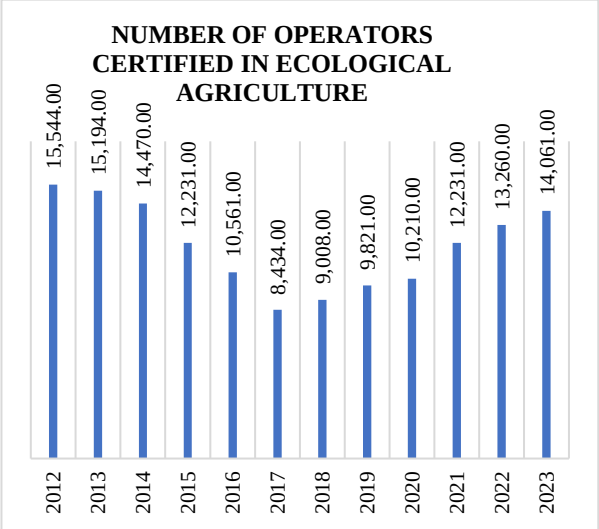

Fig. 1. The trend in the number of organically certified operators in Romania from 2012 to 2023.
Source: Reports on organic farming of the Ministry of Agriculture and Rural Development [12, 13].

The coefficient of variation is 0.195, indicating moderate variability in the number of operators over the period. This suggests that while fluctuations occurred, the changes were not extreme (Table 1). The agricultural area dedicated to organic farming has increased significantly, from 288,261 ha in 2012 to 693,998 ha in 2023 (Fig. 2), which represents an increase of 140.7% in 2023 compared to 2012 (Table 1). One of the main reasons why the organically cultivated area has increased in Romania is the financial support provided by the European Union through the Common Agricultural Policy (CAP). Subsidies for organic farming have served as a significant incentive for Romanian farmers to transition from conventional to organic land. Through the CAP, Romania has received substantial funding that has supported both the conversion of farms to organic farming and the ongoing maintenance of these practices [9].

Table 1.Statistical parameters of ecological agriculture in Romania

	Standard deviation	Mean	Coefficient of variation	Annual growth rate (%)	2023/2012 (%)
Number of operators certified in ecological agriculture	2,352.45	12,085.42	0.195	-0.9074	90.46
Total area in ecological agriculture(ha), of which:	157,138.28	393,060.13	0.400	8.314928	240.75
-Whole grain (ha)	29,255.12	117,133.80	0.250	4.591039	163.85
-Dry legumes and proteins for the production of grains (ha)	2,470.50	4,939.21	0.500	10.9533	313.72
-Tuberculiferous and totally rooted plants (ha)	252.68	625.63	0.404	-0.84937	91.04
-Industrial crops (ha)	25,262.93	76,697.50	0.329	8.529277	246.05
-Green harvested plants(ha)	28,257.08	37,512.61	0.753	21.16078	826.01
-Other crops on arable land(ha)	128.53	155.21	0.828	26.69983	1350.63
-Permanent crops: orchards, vines, shrubs, nuts (ha)	5,620.64	15,887.72	0.354	9.909551	282.74
-Permanent crops: pastures and meadows(ha)	74,851.16	139,280.71	0.537	9.400026	268.65

Sources: own calculation based on data provided by the Ministry of Agriculture and Rural Development [13].

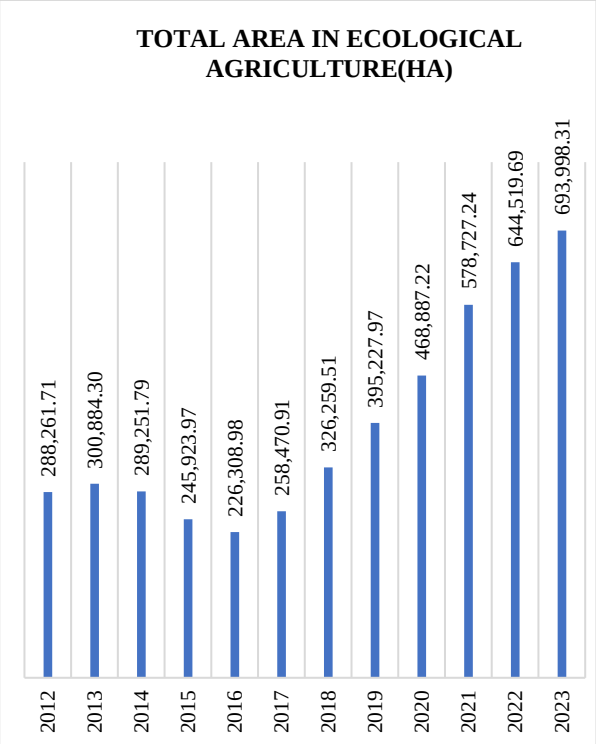

Fig 2. The trend in the total area of organic agriculture in Romania from 2012 to 2023.
Source: Databases on agricultural structure and cultivated area from the National Institute of Statistics [15].

The Romanian government has also encouraged the integration of organic farming into its national policies, providing additional financial support for its implementation. According to studies, Romania has a great potential in the market for organic products in the European Union, and more and more consumers prefer these products due to their health and environmental benefits [21]. Farmers have begun to realize the long-term benefits of organic farming, such as improved soil quality, reduced costs of chemical inputs, and increased biodiversity. Also, in some cases, organic farming can be more resilient to climate change, being less dependent on chemicals for pest and disease control [14]. Farmers who have adopted these practices have observed improvements in the quality and diversity of their harvest, which has contributed to greater economic stability. The Romanian government has introduced policies to support farmers who choose to practice organic farming. These policies have included tax incentives, tax exemptions for organic operators, and support for research and development in the field of organic farming. Thus, farmers were motivated to adopt organic practices, benefiting from favorable economic and legislative conditions [18].The coefficient of variation of 0.400 indicates a moderate variability of the area from one year to another.

The area cultivated with organic cereals increased from 105,149 ha in 2012 to 172,283 ha in 2023 (Fig. 3). Cereals remain an important part of organic agriculture. The increase in the area by 63.8% in 2023 compared to 2012 (Table 1) may reflect the constant demand for organic cereals. The

coefficient of variation with the value of 0.250 shows a smaller variation compared to other crops.

Analyzing the area cultivated with legumes, an increase of 211.7% is observed in 2023 compared to 2012 (Table 1). These crops had a remarkable expansion until 2018, but fluctuations were observed thereafter. The increase in the area under legumes can be attributed to several factors, such as: The significant subsidies provided by the European Union for legume crops, particularly through the Common Agricultural Policy (CAP). Legumes receive direct financial support through payment schemes for protein crops, which are considered beneficial for agriculture due to their ability to fix nitrogen in the soil, thus reducing the need for chemical fertilizers [8].

Legumes are an important component of organic farming and crop rotation systems due to their ability to enrich the soil with nitrogen, which reduces the dependence on chemical fertilizers. In this sense, legumes are an attractive option for farmers adopting organic practices or who want to improve soil quality. Legumes also help to diversify production and reduce the risks associated with monocultures [16].

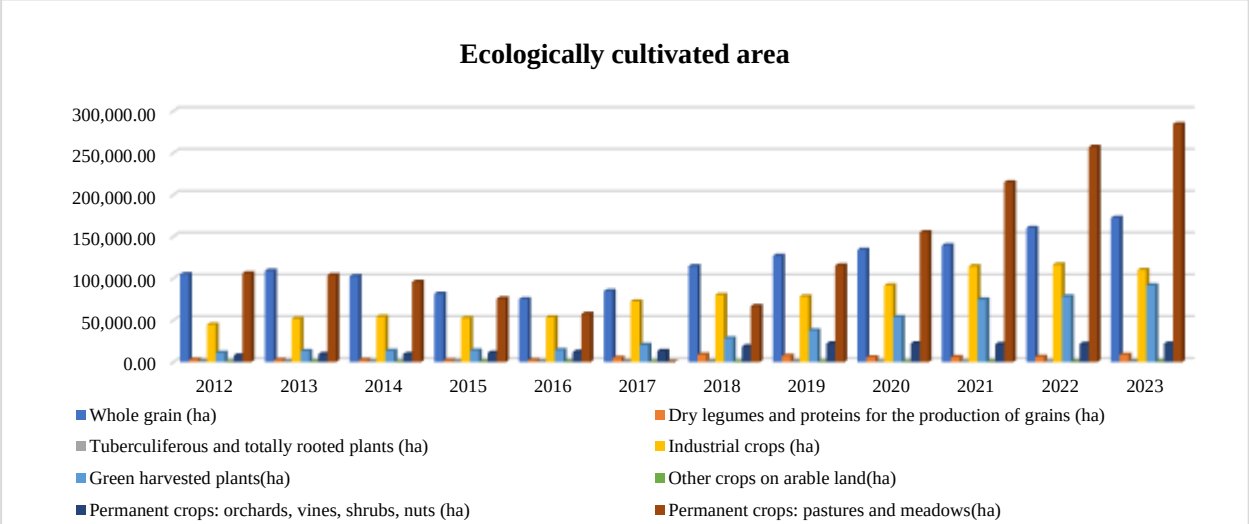

Fig. 3 .Ecologically cultivated area in Romania in the period 2012-2023
Sources: Databases on agricultural structure and cultivated areas of the National Institute of Statistics [15].

Demand for legumes has also increased due to the growing awareness of consumers about their nutritional benefits. Legumes are a key source of vegetable protein and are becoming more popular as the demand for plant-based foods and vegan or vegetarian diets rises. These crops are especially popular in international markets, particularly within the European Union, where there is a constant demand for vegetable protein products, and Romania has begun to take advantage of these economic opportunities [21].

The fluctuations in the area under legumes were caused by a combination of climatic, economic and political factors, including extreme weather conditions, changes in demand on international markets, changes in subsidy policies, production cost issues and lack of adequate investment in agricultural infrastructure. These variables led farmers to adjust the area under legumes according to economic and environmental circumstances.

The area under tuber crops fluctuated significantly during the period under review. These crops include species such as potatoes, carrots, sugar beets, parsnips, radishes and other root or tuber vegetables, which are important for both human consumption and the food industry.

The causes leading to these fluctuations are multiple and influenced by a series of economic, climatological and political factors. Climate change and extreme weather conditions have had a significant impact on the production of tuber and root crops, such as potatoes, carrots, beets and parsnips. Severe

droughts as well as floods in some regions have negatively affected yields and led farmers to reduce the area cultivated with these organic crops. The higher production costs for organic crops, compared to conventional ones, can represent a barrier for farmers wishing to grow tuber and root crops organically.

Although farmers benefit from subsidies for organic farming, these crops require more manual labor and natural inputs, such as organic fertilizers, which can lead to increased production costs. In times of economic crisis or financial instability, farmers may be more reluctant to invest in such crops, which can lead to fluctuations in the cultivated area [17]. The area dedicated to industrial crops increased significantly by 2023, reaching 110,200 ha (Fig. 3).

The increase in the area cultivated with organic industrial plants in Romania has been influenced by a number of economic, political and market factors. Industrial plants, such as sunflower, rapeseed, soybean and hemp, play an important role in organic farming due to their lower requirements for chemical inputs, being more adaptable to environmental conditions and having a lower ecological impact compared to other crops. The CAP includes direct payments and payments for ecological practices and environmental protection, thus stimulating sustainable agriculture and favoring the cultivation of organic industrial plants [6].

Another important reason for the increase in the area cultivated with organic industrial plants is the increasing demand for biofuels and renewable energy. Organic vegetable oils are used for the production of biodiesel, and this demand has been continuously expanding in the period 2012-2023, due to policies to reduce carbon emissions and the need to transition to cleaner energy sources. Industrial crops like rapeseed and sunflower are key sources of oil for biofuels, and their organic cultivation has become a priority within the framework of the European energy strategy [6]. Romania has received European funds for research and innovation in agriculture, including funding for the development of more resilient and productive varieties of organic industrial crops. This research has contributed to improving the yield of organic industrial plants, thus reducing the risks associated with production and making their cultivation more attractive for farmers. In addition, the promotion of more efficient organic crop management practices has been supported through training and education programs for farmers [12].

The coefficient of variation of 0.329 (Table 1) suggests moderate volatility in the area allocated to them.

There was a significant increase in the area dedicated to green harvested plants, from 11,082 ha in 2012 to 91,545 ha in 2023, which represents an increase of 726% (Table 1). The area cultivated with green harvested plants in Romania represents an important category of agricultural crops, which includes species such as hay and forage grasses, which are harvested before reaching full maturity (usually for use as animal feed). These crops are essential for the production of organic fodder and may include pasture grasses, alfalfa, clover or other perennial and annual species that are harvested for use either fresh or preserved as hay or silage. The increase is a sign that there is a growing demand for such crops, which can be used for feed, biomass production or other ecological purposes. The coefficient of variation of 0.753 (Table 1) indicates a large variation in area from year to year, which may signal rapid changes in market or production requirements. In 2012, the area with other arable land crops was small, and subsequently large fluctuations in these indicators occurred. This may reflect a variety of crops that are not large consumers of land and are strongly influenced by market conditions and market requirements for more diverse crops.

The area dedicated to permanent crops: orchards, vines, shrubs, nuts has steadily increased from 7,781 ha in 2012 to 22,001 ha in 2023 (Fig. 3), which represents an increase of 182.7%. This increase shows a trend of development and diversification of organic agriculture in Romania, including for permanent crops, which require a longer production cycle and sustainable management. The increase can be explained

by the demand for organic products (e.g. nuts, fruits) and by the stability that these crops offer compared to more perishable ones. The coefficient of variation of 0.354 indicates moderate volatility.

Calculating the annual growth rate (CAGR) for the period 2012-2023, an average increase of 9.91% per year is observed for the area cultivated with permanent crops. This suggests that organic farming for these crops has solid development potential, and farmers are increasingly encouraged to switch to these practices due to the economic, environmental benefits, and the demand for organic products.

Data on the area cultivated with permanent grassland and hay crops in Romania between 2012 and 2023 indicate a significant increase, with a constant expansion during the analyzed period. In 2012, the area was 105,836 ha, and in 2023 it reached 284,331.59 ha. Thus, the area dedicated to grassland and hay has increased considerably, which suggests a sustainable growth trend of this type of organic farming. This expansion is accompanied by a gradual increase starting with 2017 and continuing until 2023, which reflects a long-term adaptation and transition to organic farming.

The calculation of the annual growth rate (CAGR) for the period 2012-2023 shows an expansion of 9,400 ha per year, which represents an average growth of approximately 9.4% annually. This growth rate indicates that organic grasslands are an attractive and sustainable option for farmers, due to their economic and ecological benefits, but also to the growing demand for organic products [20]. This growth also suggests a positive direction in terms of soil conservation and biodiversity support.

Although there is a general upward trend, the data also shows a high annual variability, with a coefficient of variation of 0.537. This suggests that there are significant fluctuations in farmers' decisions related to cultivated areas, influenced by economic, political or climatological factors. For example, in 2015-2016, the cultivated area decreased significantly, reaching 57,611 ha, but in the period 2020-2023 it experienced a spectacular increase, signifying a possible return of interest in these crops. The standard deviation of 74,851.16 ha reflects the significant differences between annual values, indicating a considerable variability in the extension of meadows and hay in agriculture. This is an important significance in the analysis of the data, as it shows that, despite the general upward trend, there are years in which the cultivated area fluctuated significantly, depending on market conditions and farmers' decisions.

A SWOT analysis of organically cultivated areas in Romania can provide an overview of the advantages and challenges of this sector. Data on various types of organic crops for the period 2012-2023, such as cereals, legumes, industrial crops, green plants and permanent crops (orchards, vineyards, grasslands), are essential in assessing the trends and prospects of this sector.

Strengths:

• During the period 2012-2023, the total area cultivated organically increased significantly, from 288,261 ha in 2012 to 693,998 ha in 2023, which shows an increased interest in organic practices and an alignment with global market requirements [20].

• The area dedicated to various crops, such as cereals (whole grains), dry legumes, industrial crops, green plants, permanent crops and grasslands suggests a diversification of organic production, which can ensure the stability and sustainability of the agricultural sector.

• Organic farming has a positive impact on the environment, contributing to the conservation of biodiversity, improving soil quality and more efficient water management, which makes it increasingly attractive as environmental concerns grow [20].

• Organic farming policies and subsidies offered by the European Union directly support the expansion of organic areas, encouraging farmers to adopt sustainable practices [2].

Weaknesses:

• There is significant variability between crop years, with notable decreases in certain periods (e.g. 2015-2016 for organic grassland). This indicates an instability of the sector, which may be influenced by economic,

political or climatological factors (the coefficient of variation of the total organically cultivated area is 0.537).

• The transition from conventional to organic farming involves higher costs and an adaptation period that may discourage small or medium-sized farmers. It may also reduce production in the short term, leading to lower profitability in the first years [20].

• Although organic farming is developing, small farmers may face difficulties in gaining access to the resources and technology needed to implement organic standards [2].

Opportunities:

• There is a growing demand for organic products in the European Union and on the global market, which may represent a significant opportunity for Romania to become a major player in the organic market [20].

• The steady increase in the areas dedicated to permanent crops, such as orchards, vineyards and nuts, suggests an opportunity to capitalize on land in the long term. Permanent crops are attractive for organic farming due to their ecological and economic benefits (e.g. soil and water conservation) [22].

• Technological innovations in agriculture, such as the use of technologies for more precise monitoring of crops and soils, can improve the efficiency and sustainability of organic farming practices [22].

Threats:

• Climate change may have a significant impact on organic farming, especially on crops sensitive to extreme weather conditions. Droughts, heavy rains or extreme temperatures can negatively affect the production of organic crops [22].

• Fluctuating global market prices can put pressure on the incomes of organic farmers, who may become more vulnerable to economic instability. This could discourage investment in organic agriculture, especially during periods of economic crisis.

• The domestic market for organic products in Romania may be affected by imports of cheaper organic products, making local producers less competitive [20].

CONCLUSIONS

The analysis of the growth of organic agriculture in Romania from 2012 to 2023 reveals a notable expansion of organically cultivated land, despite variations in the number of certified operators. The total area dedicated to organic farming grew by 140.7%, reflecting growing interest among farmers, supported by European subsidies, national policies, and increasing consumer demand for organic products. This growth aligns with global trends promoting sustainability, biodiversity conservation, and soil health improvement. However, challenges such as certification costs, administrative burdens, and market volatility remain obstacles to further growth and widespread adoption of organic practices.

The statistical analysis indicates that certain categories of organic crops, such as legumes, industrial crops, and green harvested plants, have experienced remarkable growth, driven by economic incentives, sustainability benefits, and increased consumer awareness. The rise in demand for healthier food options and eco-friendly farming methods has encouraged more farmers to transition to organic agriculture. Meanwhile, other crops, like tuber plants, have shown fluctuating trends due to economic constraints, climatic factors, and lower financial incentives. The expansion of permanent crops, including orchards, vineyards, and pastures, suggests a long-term commitment to organic farming, driven by the high value of organic fruits, wine, and livestock products in both domestic and international markets.

The SWOT analysis highlights that organic farming in Romania has strong potential for future development, benefiting from favorable policies, an expanding market, and Romania's relatively low production costs compared to other European Union (EU) countries. The sector is also supported by EU financial aid programs that encourage conversion to organic farming and help farmers manage risks associated with certification and market fluctuations. However, the industry faces several weaknesses and threats, including limited processing and storage infrastructure, gaps in the supply chain, and a lack of consumer education regarding the benefits of

organic products. Moreover, the complexity of certification procedures and inconsistent policy support may deter small and medium-sized farmers from transitioning into the organic sector.Tosupportand accelerate thegrowth of organic agriculture in Romania, it isessentialtoinvest in research, innovation, andinfrastructuredevelopment.

Policy adjustments should aim at reducing bureaucratic obstacles, increasing subsidies for organic farmers, and improving access to training and technical support. Strengthening local and international distribution networks and promoting organic products through targeted marketing campaigns will also help improve competitiveness in the European organic market.

Future research should explore strategies to improve farmers' access to organic certification, identify cost-effective technological advancements, and analyze consumer behavior trends to better align production with market demand. Additionally, further investigation into the economic viability of organic farming and its long-term sustainability will be essential to ensure the sector's resilience and continued growth.

By overcoming these challenges and capitalizing on its strengths, Romania has the potential to emerge as a major player in the European organic agriculture sector, supporting environmental sustainability and fulfilling the growing demand for high-quality organic products.

REFERENCES

[1]Angelescu, A.I., Dona, I., Resit (alim), I.D., 2021, Aspects regarding the evolution of the number of operators in organic agriculture in Romania and in Prahova county. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 21(2), 55-62.

[2]Björklund, A., Andersson, S., Karlsson, M., 2016, Economic considerations in sustainable agriculture. Agricultural Economics Review, 14(1), 98-112.

[3]Brundtland, G. H., 1987, Our Common Future: The World Commission on Environment and Development. Oxford University Press.

[4]Burcea, M., Oltenacu, N., Sandulescu, E.B., 2021, comparative study on the dynamics of surfaces cultivated in conventional and organic system, in crops of wheat, corn, barley and sunflower. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 21(4), 89-94.

[5]European Commission, 2007,Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91, https://eur-lex.europa.eu/eli/reg/2007/834/oj/eng, Accessed on February 4, 2025.

[6]European Commission, 2021, CAP and support for organic production of industrial plants https://ec.europa.eu, Accessed on February 4, 2025.

[7]European Commission, Farm to Fork Strategy, https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy_en, Accessed on December 5, 2024.

[8]European Parliament resolution of 17 April 2018 on a European strategy for the promotion of protein crops – encouraging the production of protein and leguminous plants in the European agriculture sector (2017/2116(INI)), https://www.europarl.europa.eu/doceo/document/TA-8-2018-0095_EN.html, Accessed on February 4, 2025.

[9]European Parliament, 2018, Regulation (EU) no. 848/2018 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, https://eur-lex.europa.eu/eli/reg/2018/848/oj/eng, Accessed on January 23, 2025.

[10]FAO, 2019, The State of the World's Biodiversity for Food and Agriculture. Rome, 572 pp. J. Bélanger & D. Pilling (Editors). https://openknowledge.fao.org/server/api/core/bitstreams/50b79369-9249-4486-ac07-9098d07df60a/content, Accessed on February 4, 2025.

[11]Lungu, V., Uliu, D.V., Vladu, M., 2022, studies on the influence of the level of financial support on the trend of area cultivated in organic farming system . Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 22(4), 367-372.

[12]Ministry of Agriculture and Rural Development, MADR, 2020, Support for the ecological cultures: Reports and Statistics. www.madr.ro, Accessed on Jan 17 2025

[13]Ministry of Agriculture and Rural Development, MADR, 2025, Ecological agriculture,https://www.madr.ro/agricultura-ecologica/dinami ca-operatorilor-si-a-suprafetelor-in-agricultura-ecologi ca.html,Accessed on Jan 17 2025.

[14]MADR, Government Decision no. 864/2014 regarding the scheme of specific aids of minimis compensations for the vegetal holdings registered in the ecological agricultural system, https://www.madr.ro/agricultura-ecologica/tag/agricultura%20ecologica.html, Accessed on December 5, 2024.

[15]National Institute of Statistics, www. insse.ro, Accessed on December 5, 2024.

[16]Păun, I. S., 2018, Ecological systems of agricultural production. (In Romanian). Ceres Publishing House.

[17]Păun, I. S., 2020, Ecological agriculture and the impact of climate change on the ecological crops.(In Romanian). Ceres Publishing House.
[18]Payments and Intervention Agency for agriculture, APIA, Support Measure 11- Organic agriculture from the National Rural Development Program (NRDP) 2014-2020. https://apia.org.ro/directia-masuri-de-sprijin-i-iasc/masuri-delegate-din-pndr/masuri-de-mediu-si-clima-finantate-prin-pndr-2014-2020/masura-11-agricultura-ecologica/, Accessed on February 1 2025.
[19]Popescu A., Pop C. 2013, Considerations regarding the development of organic agriculture in the world, the EU-27 and Romania. Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development", Vol. 13(2), 323-330.
[20]Reganold, J. P., Wachter, J. M., 2016, The role of organic agriculture in modern agriculture: Perspectives and realities. Environmental Science & Technology, 50 (13), 7438-7445. https://doi.org/10. 1021/acs.est.6b01344, Accessed on February 4, 2025
[21]Roșca, I. E., 2020, Ecological agriculture in Romania, In Romanian. University of Bucharest Publishing House.
[22]Seufert, V., Ramankutty, N., Foley, J. A., 2012, Comparing the yields of organic and conventional agriculture. Nature, 485(7397), 229-232. https://doi.org/10.1038/nature11069 Accessed on February 4, 2025.
[23]Willer, H., Lernoud, J., 2019, The World of Organic Agriculture: Statistics and Emerging Trends 2019. IFOAM Organics International.