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Organic farming and market development in the European Union in times of global economic turbulences

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ABSTRACT

Objective: This article aims to examine the latest trends in the development of the organic farming and market for organic agricultural products in the European Union in the context of global economic uncertainty and turbulences caused by the COVID-19 pandemic and current geopolitical tensions.

Research Design & Methods: We used quantitative research methods (*e.g.*, descriptive statistics, hierarchical cluster analysis, Pearson's correlation coefficient calculations) to analyse trends in organic farming and market development in the EU between 2015 and 2023. We based the study on statistical data provided by the Research Institute of Organic Agriculture (FiBL) and Eurostat.

Findings: The economic turmoil of recent years caused by the COVID-19 pandemic and Russian invasion of Ukraine has affected the organic products market, and in particular the demand for organic products, but in different ways in each of these crises.

Implications & Recommendations: Knowledge of development trends in the organic market is important for entrepreneurs in the agri-food sector, as it reveals market opportunities associated with participation in more sustainable agri-food systems. It highlights the need for EU policymakers to continue to support and promote the development of sustainable agriculture.

Contribution & Value Added: The study contributes to a broader understanding of the latest development trends in organic farming and the organic products market. It also reveals the opportunities and limitations associated with this form of agriculture, which represents a more environmentally-friendly alternative to conventional farming.

Article type:	research article
Keywords:	organic farming; European Union; global turbulences; organic production; organic market development
JEL codes:	Q13, Q15, Q18, F14, O13

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INTRODUCTION

Climate change, biodiversity loss, and environmental degradation have led the European Union to make green transition its main objective (Arora, 2018; Dziekański, Popławski, & Straka, 2025; Sztorc & Savenkovs, 2025). By implementing a new economic growth strategy known as the Green Deal, the EU is seeking to play a leading role in the global ecological transition. Simultaneously, it recognises that this strategy will increase the EU's competitiveness and lead to a gradual but significant transformation of European economies (European Commission, 2018).

Scholars often see agroecology as the heart of the European Green Deal (De Schutter, 2023). It is a way to promote low consumption of inputs, little or no use of pesticides, and little or no use of nitrogen fertilisers. This means a transformation of agricultural production models and, through the

'Farm to Fork' strategy contained in the Green Deal, it affects the conditions for agriculture and agricultural markets in the EU (Boix-Fayos & de Vente, 2023). One of the key ways to achieve the objectives of the 'Farm to Fork' strategy is to support organic farming and develop the market for organic products. According to research, organic farming constitutes an environmentally friendly practice and an alternative to conventional farming, which should be further developed so that by 2030, 25% of the total agricultural area is under organic farming (European Commission, 2020). However, the pandemic and the war in Ukraine, as well as the recent geopolitical tensions, pose a challenge to the organic sector and undermine the possibility of achieving the strategic objectives of the 'Farm to Fork' strategy. We have noticed a lack of detailed research demonstrating the recent development of the organic market, which we believe constitutes a research gap. Especially since most research in recent years has focused on integrated agroecological systems, and these go beyond organic farming practices and organic certification (Mouratiadou *et al*., 2024; Bezner Kerr, 2023).

The following research questions guided our analysis:

RQ1: What are the main trends in the development of organic farming and the market for organic agricultural products in the European Union?

RQ2: What is the awareness of EU citizens regarding ecological, environmental and health issues and their attitude towards organic products?

RQ3: How resilient has the organic market been to the shocks caused by the pandemic and the war in Ukraine?

Based on the above research questions, we aimed to examine the latest trends and prospects for the development of organic farming and the market for organic agricultural products in the European Union in the context of global economic uncertainty and turmoil caused by the COVID-19 pandemic and current geopolitical tensions. The article begins by presenting the essence and main principles of organic farming, examining its links with environmental policy and agroecology, and identifying its main benefits and development constraints. We then analyse the main trends in the development of this form of agricultural activity in European Union countries in recent years. We also investigate the situation on the organic product market, including consumption trends and consumer attitudes towards these products. Finally, we conclude on the state and prospects of organic production and the market for these products, considering changes in the global environment and EU policy priorities for the agri-food sector.

Knowledge of development trends in the organic market is important for entrepreneurs in the agri-food sector, because it reveals possible market opportunities associated with participation in more sustainable agri-food systems. It also highlights the need for EU policymakers to continue to support and promote the development of sustainable agriculture.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The agri-food sector constitutes a strategic sector for the European Union and plays a key role in ensuring food security at the regional and global levels. Both EU policymakers and consumers perceive food as one of the sectors of greatest importance for the provision of basic services to citizens (European Commission, 2025). In addition, the EU had a competitive advantage in the global market for many agri-food products, which corresponded to their high share in global exports and generated a high positive trade balance (Pawlak, 2017). The EU's trade surplus in agri-food products with third countries (outside the EU-27) reached 63.6 billion EUR in 2024 (DG-AGRI EC, 2025). However, the EU remains dependent on imports of many agri-food product groups (European Union, 2025).

Simultaneously, unsustainable and industrial agriculture is the largest driver of biodiversity and habitat loss, and it contributes to climate change, contaminating soils and water bodies (Common, 1995; IFOAM, 2025). The proximity and intensity of the interaction between agriculture and the environment makes the sector's activities particularly vital for the transition towards sustainability. Redefining world agricultural systems is of interest to environmental policy, not only in its sectoral dimension, but also as an element of a broader, horizon dimension, shaping the conditions and scope of use of environmental resources on a large scale in the entire economy and society.

The implementation of environmental policy requires, among other things, specifying goals and effectively selecting tools. The choice of its goals and adequate tools, which include both legal regulations and economic measures, is determined by many factors, including the current state of knowledge about the environment, environmental protection priorities in the context of other economic and social policy goals, and the availability of financial resources for environmental protection. This leads to heterogeneity of states' ecological policies and the measures they implement (Lamy & Pons, 2023).

By implementing Green Deal initiative, the European Union has become a pioneer in attempting to find a better balance between economic growth and the environment (Kwilinski *et al*., 2024). In December 2019, Ursula von der Leyen affirmed that the Green Deal aimed to 'reconcile the economy with our planet, to reconcile the way we produce and the way we consume with our planet and to make it work for our people' (Charveriat, 2023). In May 2020, the European Union introduced the 'Farm to Fork' strategy, which is an element of the Green Deal. The strategy approaches agriculture from a sustainable food systems perspective (Fayos & de Vente, 2023). It launches a much more integrated, coordinated, and cross-sectoral policy for a more sustainable food system. The 'Farm to Fork' strategy is expected to be a key driver for structural changes that, among others, will reduce Europe's dependence on imported animal feed and nitrogen fertilisers produced from fossil fuels, it also promotes quality systems, including organic products and products with geographical indications.

Organic production constitutes one of the key notions of this strategy. Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 defines it as: 'an overall system of farm management and food production that combines best environmental and climate action practices, a high level of biodiversity, the preservation of natural resources and the application of high animal welfare standards and high production standards in line with the demand of a growing number of consumers for products produced using natural substances and processes' (Regulation (EU), 2018/848).

As stated by the International Federation of Organic Agriculture Movements (IFOAM), organic farming is an agricultural production approach designed to maintain and support the well-being of soils, ecosystems, and human populations. Rather than relying on inputs that may cause harmful side effects, it draws on ecological principles, biological diversity, and natural cycles tailored to local environmental conditions. By its very nature, organic agriculture integrates traditional practices, modern innovation, and scientific knowledge to protect the environment we all share, foster equitable relationships, and enhance the overall quality of life for everyone involved. It is based on 4 core principles (IFOAM, 2016), which represent the basic aims which organic farming and food systems must strive to achieve:

1. Principle of Health — Organic farming must preserve and improve the well-being of soil, plants, animals, people, and the entire planet, treating them as interconnected and inseparable elements of a single system.
2. Principle of Ecology — Organic farming must be grounded in living ecological systems and natural cycles, cooperating with them, drawing inspiration from them, and actively contributing to their preservation.
3. Principle of Fairness — Organic farming must foster relationships built on equity, ensuring just access to shared environmental resources and equal life opportunities for all.
4. Principle of Care — Organic farming must be conducted with caution and a sense of responsibility, with the goal of safeguarding the health, welfare, and environment of both present and future generations.

The first two principles relate to the use of agroecological methods, such as recycling nutrients and organic matter to improve soil health and increase functional diversity to minimise the occurrence of pests and diseases in crop production, as well as the proper management of livestock health and welfare. The latter two refer to the ethical and ecologically just use of natural resources and the prudent use of new technologies (Halberg & Muller, 2013).

We consider organic farming to be a particularly relevant research topic when considering the harmful impacts of conventional agriculture on the local and global environment, as we can see it as part of the solution to environmental challenges, contributing through sustainable practices and rewards to the achievement of several Sustainable Development Goals, especially SDG 13 'Climate Action,' which

concerns taking urgent action to combat climate change and its impacts; SDG 14 'Life below Water,' which refers to the need to conserve and sustainably use the oceans, seas, and marine resources for sustainable development; SDG 15 'Life on Land,' which emphasises the role of protecting, restoring, and promoting sustainable use of terrestrial ecosystems as well as SDG 3 'Good Health and Well-being,' which focuses on ensuring healthy lives and promoting well-being for all at all ages. Benefits of organic farming include among others improved soil structure and fertility due to the use of organic fertilizers and crop rotations (Jiang *et al.*, 2022), enhanced biodiversity through reduced chemical inputs and habitat preservation (Gomiero *et al.*, 2011), lower greenhouse gas emissions and increased carbon sequestration in organic systems (Scialabba & Müller-Lindenlauf, 2010), and reduced exposure to pesticides and antibiotics, leading to potentially healthier food products (Mie *et al.*, 2017).

The growing organic sector also creates jobs and attracts younger farmers, preventing them from leaving the countryside, offering a combination of business opportunities with environmental progress and social responsibility. This is of particular importance in the context of structural changes in the agri-food sector in the European Union, resulting from significant discrepancies in the scale of agricultural activity and the ageing of the farming population.

The term 'organic farming' has a similar but not identical meaning to 'agroecology.' The common goals make organic farming and agroecological farming similar, although agroecological practices are not necessarily applied in organic farming. De Shutter (2023) emphasises that agroecology extends beyond a series of designated practices such as organic farming, as it is a general approach aimed at reducing the use of inputs, reducing the costs of production and the farmer's dependence on the use of these costly inputs. Agroecology encompasses not just farming but also food systems, policies, and social movements. It emphasises farmer empowerment and local economies. If we consider ecological and social transformation, agroecology offers a more comprehensive and grassroots-based approach.

Despite its narrower scope, organic farming, as a certified production system that adheres to strict guidelines for avoiding synthetic fertilisers, pesticides, GMOs, and artificial additives in food production (Miśniakiewicz *et al.,* 2021), also serves to reduce the use of external inputs. It encourages crop rotation, composting, and natural pest control. When considering both consumer-driven sustainability and regulated standards, organic farming — with its focus on farm-level practices and market certification — offers a more structured and market-oriented system than agroecology.

Organic products have a high and growing market value (Pawlewicz *et al.,* 2020), as there is an increasing number of environmentally conscious consumers who value high-quality healthy food and are willing to pay a higher price for certified organic products. Organic production is the cornerstone of EU quality policy and one of the EU's agricultural product quality schemes, alongside geographical indications and traditional specialities guaranteed. It plays a dual social role. On the one hand, it provides a concrete market response to consumer demand for healthy products, thereby supporting competitiveness, and on the other hand, it supplies publicly available goods that contribute to environmental protection. The EC declares its continued support for organic farming, while noting that other, more integrated approaches could be further promoted (EC, 2025).

However, organic farming currently faces many challenges and constraints to further development as an alternative to conventional farming systems. These limitations stem from both sectoral factors related to the specific nature of these farming practices and structural trends in agriculture, as well as global conditions. Sectoral barriers include lower yields on organic farms compared to conventional farms (Schrama *et al.,* 2018), which extreme weather events may further reduce. Another limitation is the lengthy and costly process of converting conventional farms to organic farms (Verburg *et al.*, 2022), which can translate into bureaucratic burdens. Organic products are also typically higher-priced, which may limit their availability to some consumers (Bryła, 2016). The ban on GMOs in organic production reduces the availability of food on the market, which raises public concerns (Meemken & Qaim, 2018). One of the main factors in the development of organic farms in the European Union was the high level of subsidies for this production system, which, however, in some situations (changes in the requirements for receiving subsidies, reduction of support rates) may cause a regression in the development of organic farms (Pawlewicz *et al.,* 2022).

From a global perspective, the organic farming sector, like the economy as a whole, has been struggling with the effects of the pandemic and has been under pressure from serious geopolitical tensions (Song & Zhou, 2020; Ibn-Mohammed *et al.,* 2021; Sahota, 2022; Naseer *et al.,* 2023). Our research will focus mainly on the impact of these global factors on the development of organic production and the market for these products.

Motivated by the results of the literature review, and seeking to examine the latest trends and prospects for the development of organic farming and the market for organic agricultural products in the European Union in the context of global economic uncertainty and turmoil caused by the COVID-19 pandemic, the war in Ukraine and current geopolitical tensions, we put forward the following hypotheses:

H1: The development of organic farming slowed down during the period of global turbulence caused by the COVID-19 pandemic and the war in Ukraine.

H2: The growth rate of the organic product market declined during the years of global turbulence caused by the COVID-19 pandemic and Russia's invasion of Ukraine.

RESEARCH METHODOLOGY

We used data provided by the Research Institute of Organic Agriculture (FiBL) and Eurostat to analyse trends in organic farming and market development in the EU between 2015 and 2022. The statistical analysis of the data covered the size of organic farmland, the structure of organic production in terms of volume, per capita consumption and retail sales of organic products, as well as the number of entities engaged in organic farming. We used quantitative research methods such as descriptive statistics, hierarchical cluster analysis, and Pearson's correlation coefficient calculations.

We applied cluster analysis and descriptive statistics to determine in detail the current level of organic farming development in EU countries. The variables used were the total organic farmland in the EU MCs; the share of organic crop area in the total agricultural area in the EU member country (OCAMC) and the share of the organic farmland of the member country in the total organic agricultural land of the EU (OCAEU). We ran Ward's linkage, a hierarchical clustering method, to identify the clusters.

Attempting to assess EU organic farming development, we applied the indicator of the annual average growth rate of organic farming area during the COVID-19 pandemic (2020-2021), the war in Ukraine (2022-2023), and global turbulence (2020-2023). Analysing the changes of organic product market during the global turbulence period, we used the growth rate of organic retail sales and compared it to the retail sale of food, beverages and tobacco in the same years as above.

We divided organic products into classes according to the classification applied in the Annual crop statistics (ACS). The seven groups of various crop products included in our analysis were: cereals for the production of grain; dry pulses and protein crops for the production of grain; root crops; industrial crops; plants harvested green from arable land; fresh vegetables; permanent crops for human consumption (European Commission & Eurostat, 2017).

Research on consumer attitudes towards organic products used the results of a Eurobarometer survey published in the 2023 EU Ecolabel Report. We conducted a correlation analysis using Pearson's correlation coefficient to examine the relationships between variables representing different attitudes and perceptions of organic products by consumers.

RESULTS AND DISCUSSION

Examining the potential of organic farming as an alternative to conventional farming systems, we began our analysis by identifying development trends in organic farming in the EU as a whole and changes taking place in EU Member States.

The area under organic farming and the share of organic farming area in the utilised agricultural area give some indication as to the importance of this type of farming in the European Union. The agricultural area of organic crops in the EU increased by almost 6 million hectares between 2015 and 2022 to almost 17 million hectares, but still had a modest share of the total acreage of cultivated crops.

Although the share of organic crops in total agricultural acreage increased by approximately 4 percentage points, it reached 10.5% in 2022, which is far from the goal to achieve 25% of total farmland under organic farming by 2030. In 2023, 17.7 million hectares of farmland in the EU were organic, with 10.9% of the EU's farmland certified organic. Data shows a particularly significant increase in the share of organic crops in the agricultural crop area between 2019 and 2020. However, this was the consequence of maintaining the area of organic agricultural crops at a similar level while reducing the acreage of total cultivated crops in the European Union (Figure 1). Although still far from achieving the Green Deal goal, it is worth noting that organic farmland in the EU is gradually developing, recording growth year on year, despite the turbulence caused by crisis phenomena and geopolitical tensions.

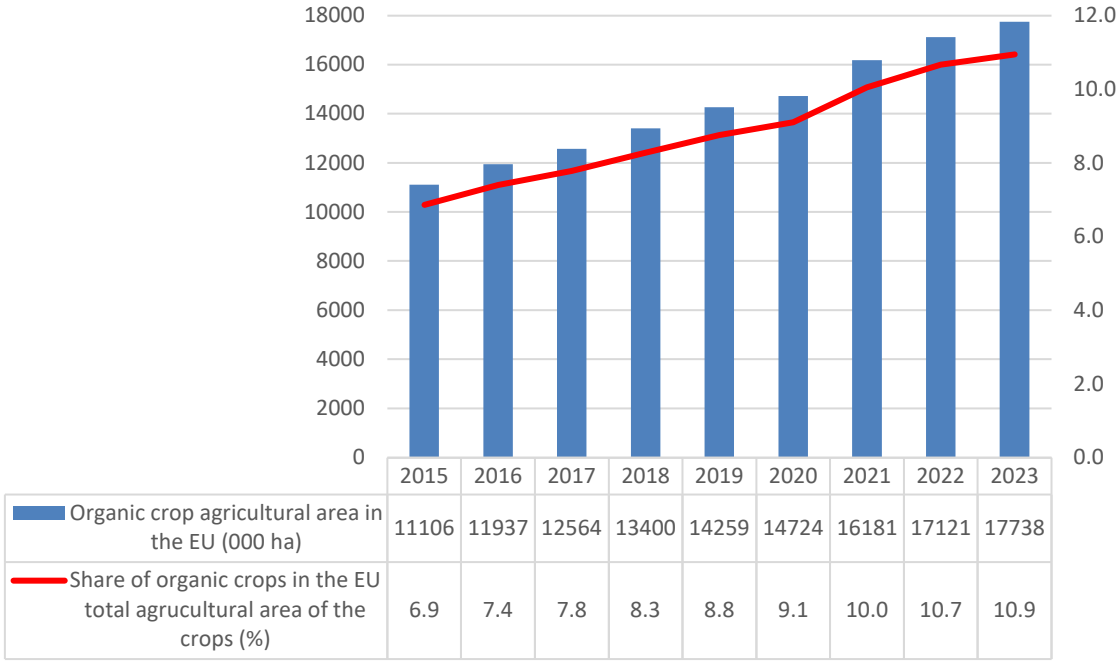

Figure 1. Organic crop agricultural area in the EU (thousand ha) and share of organic crops in the EU total agricultural area of the crops (%) in 2015-2023
Source: own elaboration based on Eurostat & FiBL.

Table 1. Annual average growth rate the EU area under organic farming vs. the crops utilised agricultural area in the analysed periods in 2015-2023 (%)

Description	2015-2019	2019-2023	2019-2020	2020-2021	2021-2022	2022-2023
Agricultural area of the crops	0.17	-0.31	-0.72	-0.41	-0.33	0.20
Area under organic farming	6.45	5.61	3.27	9.89	5.81	3.61

Source: own study based on Eurostat & FiBL.

Throughout the study period, the rate of change in the area used for organic farming was significantly higher than for conventional farming. During the period of global turbulence, the growth rate of organic areas decreased slightly compared to the previous years (about 1 p.p.), but still remained high (5.61%). The annual average growth rate of agricultural land used for organic farming was higher during the COVID-19 pandemic than in the period following Russia's invasion of Ukraine (Table 1).

In the analysis, we used descriptive statistics to examine the changes that occur in the size of the lands allocated to organic crops by the EU member states.

The results of the descriptive statistics confirmed significant progress in expanding the organic agricultural area between 2015 and 2023, while at the same time the gap between the country with the smallest cultivated area and the country with the largest area increased during the period under review. In 2015, the smallest cultivated area in the EU member states was 30 ha and the largest was 1968.6 thousand ha. In 2023, it was 66 ha and 2986.4 thousand ha, respectively. The average cultivated area increased from 393.0 thousand ha to 657.0 thousand ha. In 2015, the area under organic

cultivation in half of the EU Member States was higher than 213.6 thousand ha, whereas in 2022 it was already 312.8 thousand ha. But it decreased by 9 thousand ha in 2023 (Table 2). Using the median and the lower and upper quartiles, we divided all EU Member States into four groups, taking the size of the acreage of cultivated organic crops as the only variable. To indicate changes over time of analysis, we compared the respective groups of countries in 2015, 2022, and 2023.

Table 2. Descriptive statistics for organic agricultural crop area in EU member states in 2015-2023 (thousand ha)

Measures/Year	Mean	Lower Quartile (Q1)	Median (Q2)	Upper Quartile (Q3)	Minimum	Maximum
2015	393.0	73.0	213.6	519.0	0.030	1968.6
2016	424.0	78.5	221.7	536.6	0.024	2018.8
2017	446.9	83.5	234.1	496.3	0.041	2082.2
2018	479.3	89.0	239.7	519.9	0.047	2246.5
2019	511.1	93.1	291.2	535.2	0.055	2354.9
2020	545.3	99.1	300.0	540.4	0.067	2517.5
2021	600.2	86.9	302.2	718.4	0.066	2775.7
2022	627.3	103.4	312.8	745.7	0.066	2875.5
2023	657.0	119.9	303.4	701.2	0.066	2986.4

Source: own study based on Eurostat.

Table 3. The EU member states' groups according to the organic crop area (OA) in 2015, 2022 and 2023: Distribution of countries based on median and lower and upper quartiles*

Description	Group members in 2015	Group members in 2022	Group members in 2023
Countries with the lowest OA up to the size of Q1	Belgium, Cyprus, Ireland, Luxembourg, Malta, the Netherlands, Slovenia,	Belgium, Cyprus, Ireland, Luxembourg, Malta Netherlands, Slovenia,	Belgium, **Croatia**, Cyprus, Luxembourg, Malta, Netherlands, Slovenia
Countries with the medium-low size OA between Q1 and Q2 sizes	Bulgaria, Croatia, Denmark, Estonia, Hungary, Lithuania, Slovakia,	Bulgaria, Croatia, Denmark, Estonia, **Latvia,** Lithuania, Slovakia,	Bulgaria, Denmark, Estonia, **Ireland,** Latvia, Lithuania, Slovakia
Countries with the medium-high size OA between Q2 and Q3 sizes	Czechia, Finland, Greece, Latvia, Portugal, Romania, Sweden	**Austria,** Czechia, Finland, **Hungary, Poland**, Romania, Sweden	Austria, Czechia, Finland, Hungary, Poland, Romania, Sweden
Countries with the high size OA above Q3 size	Austria, France, Germany, Italy, Poland, Spain	France, Germany, **Greece,** Italy, **Portugal**, Spain	France, Germany, Greece, Spain, Italy, Portugal

* Countries that have changed their group affiliation (up or down) between 2015 and 2022, and 2022 and 2023 are marked in bold.

Source: own study.

The development of organic agricultural land during the study period did not result in major changes in the membership composition of the distinct groups. France, Spain, Italy, and Germany formed the core of the group with the highest organic acreage in both 2015 and 2022, with Greece and Portugal joining them in the latter year. In contrast, the segment of countries with the smallest organic acreage included Belgium, Ireland, the Netherlands, Slovenia, Luxembourg, Cyprus, and Malta. Overall, the twenty-one EU member states did not change group. Three countries (Latvia, Austria, and Poland) saw a relative deterioration in the position of organic farming in 2022 compared to 2015, resulting in a move to a lower segment. For the other three countries (Greece, Portugal, and Hungary), there was an improvement, and they moved up a segment in 2022. We recorded two significant changes in the country breakdown between 2022 and 2023: Croatia's position deteriorated relatively in terms of organic acreage, while Ireland moved up to the EU member states with the medium-low sized OA. (Table 3) The changes that occurred in OA indicate uneven growth and significant diversity among EU countries (Table 2 and 3).

We also applied a cluster analysis to detect a detailed and up to date level of development of organic farming in the EU countries. The used variables were the share of organic crop area in the total agricultural area in the EU member country (OCAMC) and the share of the organic farmland

of the member country in the total organic agricultural land of the EU (OCAEU). We run Ward's linkage, a hierarchical clustering method, to identify the clusters. Running Ward's linkage clustering method, we get 4 clusters.

Table 4. Summary of clusters according to the organic share in the total agricultural land in the EU member country (OCAMC) and the share of the organic farmland of the member country in the total agricultural land of the EU (OCAEU)

MS	OCAMC		OCAEU		MS	OCAMC		OCAEU	
	2015					2023			
	Mean	Range	Mean	Range		Mean	Range	Mean	Range
Cluster 1: {DE, ES, FR, IT}	7.73	7.24	13.77	8.56	Cluster 1: {DE, ES, FR, IT}	12.96	9.09	14.23	6.19
Cluster 2: {CZ, EE, LA, AT, SW}	15.82	8.01	3.65	3.74	Cluster 2: {EE, AT, PT}	24.08	4.51	3.36	3.58
Cluster 3: {DK, GR, LT, PL, PT, SI, SK, FI}	7.49	5.87	2.43	5.08	Cluster 3: {CZ, DK, GR, LA, SI, SK, FI, SW}	14.56	7.08	2.32	4.91
Cluster 4: {BE, BG, IE, HR, CY, LU, HU, MT, NL, RO}	2.82	4.91	0.73	2.32	Cluster 4: {BE, BG, IE, HR, CY, LT, LU, HU, MT, NL, PL, RO}	5.66	8.03	1.20	3.91

Note: AT – Austria, BE – Belgium, BG – Bulgaria, HR – Croatia, CY Cyprus, CZ – Czechia, DK – Denmark, EE – Estonia, FI – Finland, FR – France, DE – Germany, GR – Greece, HU – Hungary, IE Ireland, IT – Italy, LT – Lithuania, LU – Luxembourg, LV – Latvia, MT – Malta, NL – the Netherlands, PL – Poland, PT – Portugal, RO – Romania, SK – Slovakia, SI – Slovenia, ES – Spain, SE – Sweden.
Source: own study.

The analysis results provided a breakdown of EU countries into four groups in terms of the share of lands used for organic farming in the total agricultural area at the national and EU levels. Germany, France, Spain, and Italy formed the group of countries that play the most significant role in organic agriculture in the EU. Germany's share of organic farmland in the total agricultural area of the country increased from 6.3% in 2015 to 9.8% in 2022, but despite this, Germany recorded the lowest results among the countries in this group. The share of organic farmland in the total organic farmland area in the EU was around 10%. The share of land assigned to organic agriculture for each of the four countries was the largest compared to the whole European Union. However, in the case of Spain and Italy, there was a slight decrease in it in 2015 compared to 2022. All objects classified in this group recorded an increase in the share of organic agricultural acreage in the total national acreage, most significantly in the case of Italy (from 11.8% to 18.1%) and France (from 4.5% to 10.1%). Czechia, Estonia, Latvia, Austria, and Sweden were recognised as a separate cluster in 2015. This group represented a relatively high share of the agricultural area under organic farming in the total national acreage and a relatively low share of this area in the total EU organic acreage. We classified small EU countries with the highest share of organic farming in a country's agricultural acreage into this cluster. Austria was the country with the highest percentage of land converted to organic farming and used 20.3% of total arable land for organic crops, while the other countries in this group reached between 12.3% and 17.4% in 2015. The share of croplands under organic agriculture exceeded 25% of total arable land in Austria in 2019. The agricultural organic crop area increased significantly in Finland, Slovakia, Portugal, Greece, and all mentioned countries joined this cluster in 2022. Eight EU countries belonged to a segment that brought together countries with relatively low shares of agricultural organic crop area in the country and in the EU in 2015. The organic crop areas were significantly developed by Slovakia, Finland and Portugal. Moreover, in 2022 this group of countries joined a cluster that included Sweden, Austria, Latvia, Estonia, and Czechia. The largest cluster encompassed ten worst-performing EU countries in organic agriculture.

Only Croatia managed to move into another group of EU countries characterised by better performance in 2022. Meanwhile, Poland joined this group mainly due to the deterioration of the share of the country's organic farmland in the total agricultural land of the EU (Table 4).

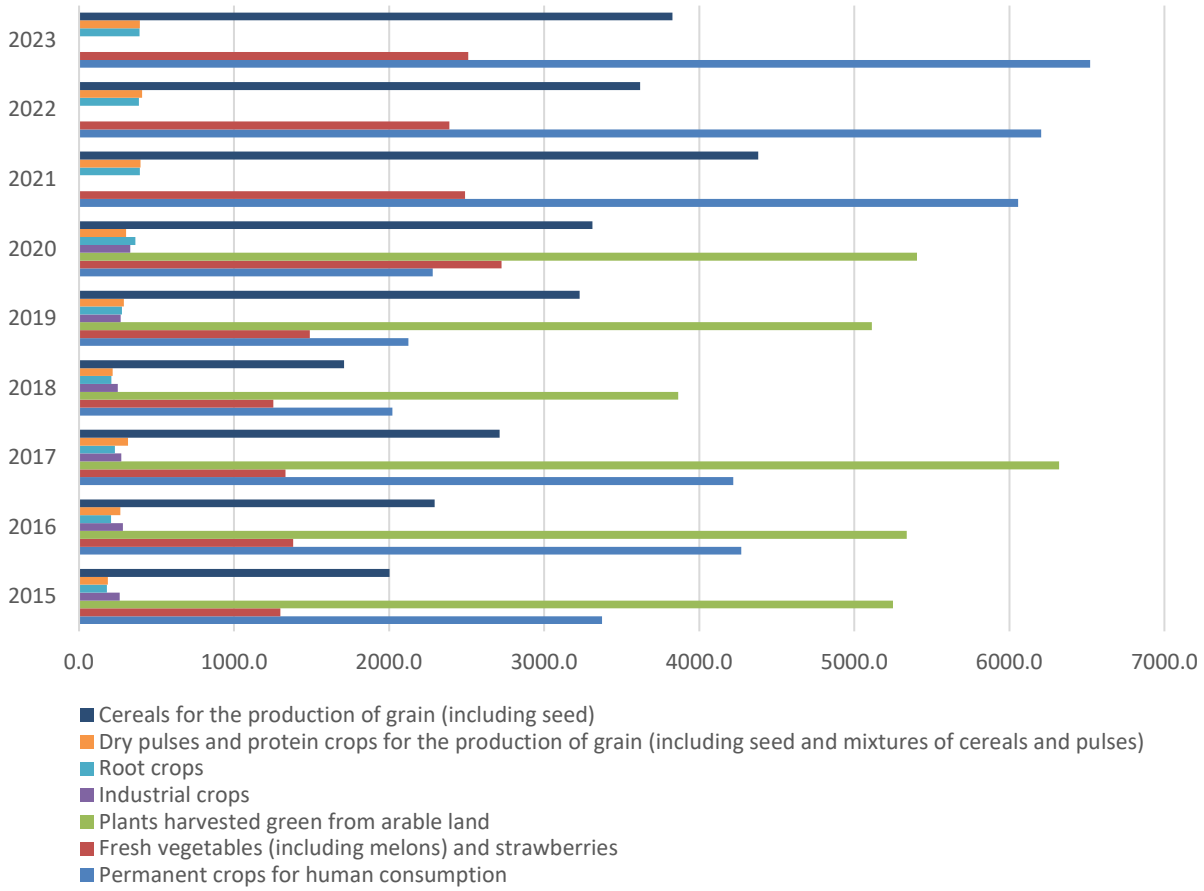

Figure 2. Organic production of the European Union by seven main product categories in 2015-2023 (thousand tonnes)
Source: Eurostat.

Between 2015 and 2023, there were significant changes in the volume of organic production. For industrial crops and green crops harvested from arable land, we conducted the analysis only up to 2020 due to the lack of more recent data. We observed the largest changes in the case of permanent crops for human consumption. This class includes fruits, berries and nuts, citrus fruits, grapes, olives and other permanent crops intended for human consumption. The volume of this product group increased from around 3 372 in 2015 to 4 219 thousand tonnes in 2017, and then fell to 2 021 thousand tonnes in 2018. During the COVID-19 pandemic, this group recorded an increase from 2 124 in 2019 to 2 280 thousand tonnes in 2020. In 2021, there was a significant increase to 6 056, and the volume of permanent crops intended for human consumption increased by another 200 000 tonnes when the Russian invasion of Ukraine began in 2022. The following year saw an increase of 300 000 tonnes. During the period under review, we observed a similar upward trend for dry legumes and protein crops intended for grain production. The production of fresh vegetables increased from 1 299 000 tonnes in 2015 to 1 381 000 tonnes in 2016. The increase in production continued in 2019-2020. During this period, the production of the group under review increased from 1 488 000 to 2 726 000 tonnes. In 2021, a decrease of approximately 230 thousand tonnes was recorded, and in 2022, a decrease of 102 thousand tonnes. However, in 2022-2023, the upward trend returned. The production volume of root crops changed in the same direction as that of fresh vegetables. The volume of cereal production increased from 2 003 000 tonnes in 2015 to 2 713 000 tonnes in 2017, while in 2018 there was a decrease

of approximately 1 000 000 tonnes. Starting in 2019, the trend changed, and the volume of the examined group of organic products increased from 3 230 thousand tonnes in 2019, through 3 310 thousand tonnes in 2020, to 4380 thousand tonnes. In 2022, there was a decrease in the volume of cereals by 761 thousand tonnes, while in 2023, there was an increase of 208 thousand tonnes (Figure 2).

The period of global turbulence (the COVID-19 pandemic and Russia's invasion of Ukraine) did not disrupt the high production rate of certain types of organic crops, *e.g.*, in the case of permanent crops and fresh vegetables. However, the production of three other studied crop groups (*e.g.*, root crops, dry pulses and protein crops for production of grain, cereals for production of grain) were more sensitive to global turmoil (Table 5).

Table 5. Annual average growth rate in production of selected categories of organic products in 2016-2023 (%)

Organic product category	2015-2019	2019-2023	2019-2020	2020-2021	2021-2022	2022-2023
Permanent crops for human consumption	-10.91	32.36	7.34	165.57	2.46	5.08
Fresh vegetables (including melons) and strawberries	3.47	13.95	83.16	-8.64	-4.11	5.07
Root crops	11.32	8.87	30.77	8.35	-2.00	-1.15
Dry pulses and protein crops for the production of grain (including seed and mixtures of cereals and pulses)	11.71	7.90	4.88	30.99	2.49	-3.72
Cereals for the production of grain (including seed)	12.68	4.33	2.51	32.31	-17.38	5.73

Source: own study based on Eurostat.

Moving on to the analysis of the demand for organic products, we examined per capita consumption of organic products. The analysis covered selected countries classified into different clusters distinguished according to the share of organic crops area in total farmland.

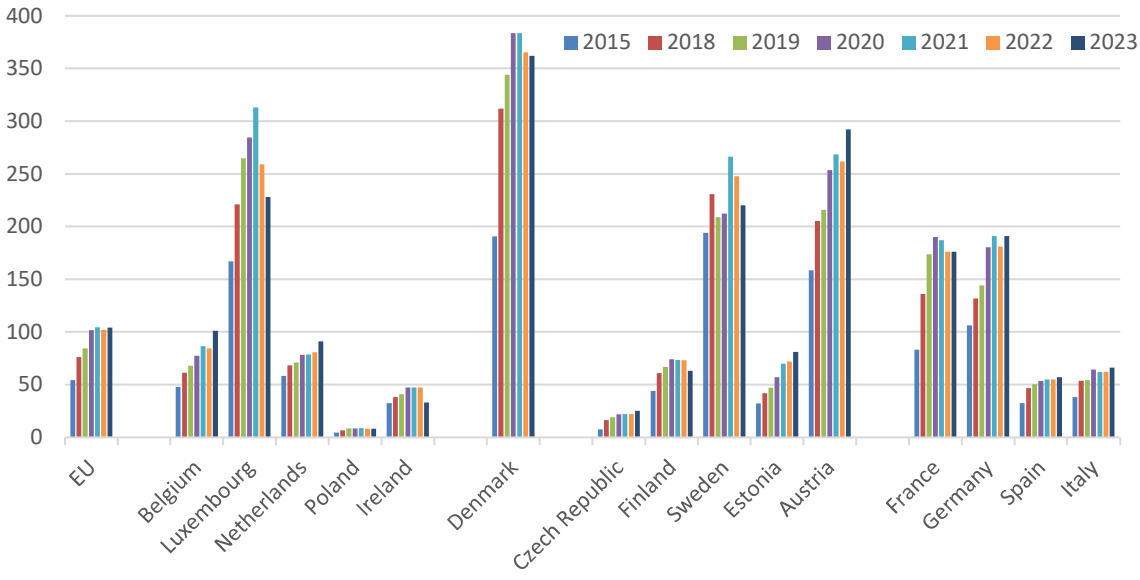

Figure 3. Organic consumption per capita in EU selected countries in 2015-2023 (EUR)
Source: own elaboration.

The per capita consumption of organic products increased during the study period in the countries analysed, except for 2022, when it decreased in several countries (France, Germany, Denmark, Finland, Sweden, Austria, Belgium, Luxembourg, Poland). The highest consumption of organic products throughout the years was recorded in Denmark and the lowest – in Poland. The following year, the downward trend in per capita consumption continued in Denmark, Sweden, Finland, Luxembourg, and Ireland. France and Poland maintained their per capita consumption levels in 2022 and 2023. Average per capita consumption in the EU fell in 2022 compared to 2021, but returned to 2021 levels in 2023. Germany ranked only 5th in terms of per capita consumption (behind Denmark,

Austria, Luxembourg, and Sweden), despite the largest organic market in the EU (Figure 3, 4), and the second largest in the world, after the US.

The data in Figure 4 shows that the largest organic markets in Europe saw growth in 2023, with Austria showing the highest growth and France showing the lowest. Among EU countries outside the main organic markets, the largest growth was recorded in Estonia (+13.0%), the Netherlands (+12.5%), and Belgium (+9.0%). Overall, retail sales of organic products increased by 2.9% in 2023, but have been highly volatile in previous years (Figure 5).

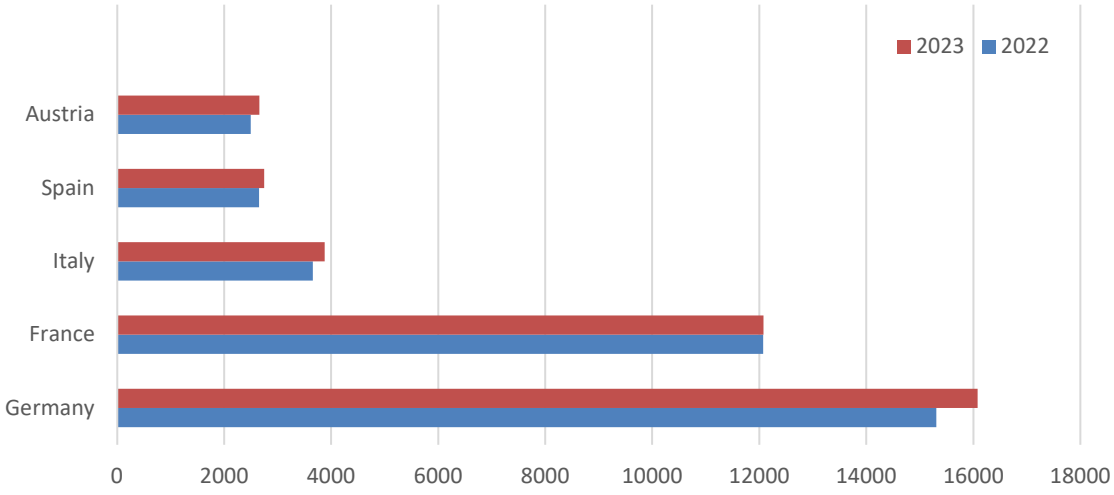

Figure 4. Top organic markets in the European Union in 2022-2023 (million EUR)
Source: own elaboration based on (Trávníček *et al*., Schlatter & Willer, 2025).

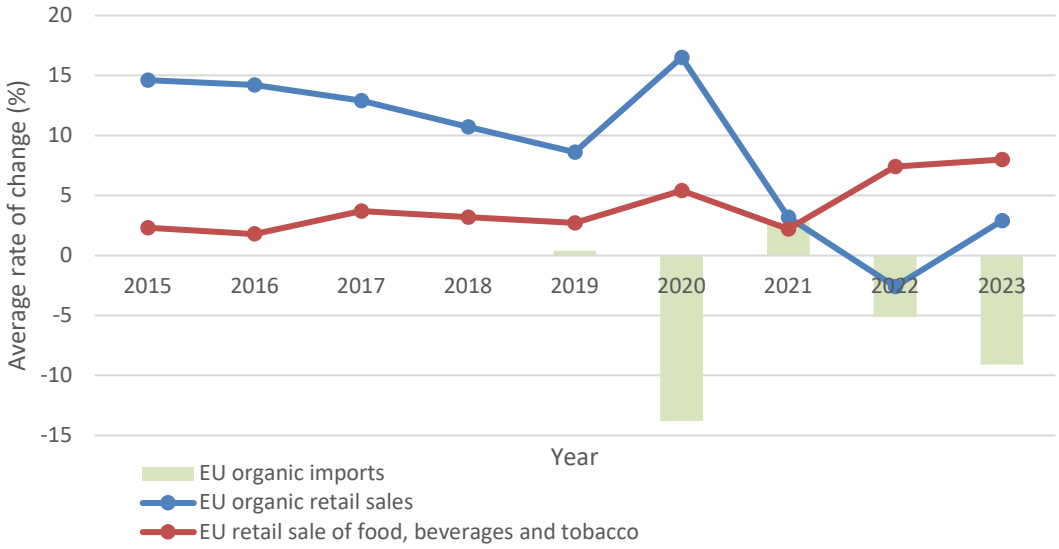

Figure 5. EU average rate of change of organic retail sales compared with total retail food, beverages and tobacco sales in 2015-2023 (y-to-y change, %)
Source: own elaboration based based on FiBL and Eurostat.

Retail sales of organic products in the EU accelerated rapidly in 2020, growing even faster than total retail sales of food, beverages and tobacco products. Despite a noticeable slowdown in organic sales growth in 2021, which fell to the levels recorded for overall food retail sales, organic sales did not decline during and after the pandemic. These results were a bit surprising, but we can explain them by the fact that consumers were staying home to eat, had more time to cook meals, and this resulted in them purchasing organic products more often and in larger quantities. At the same time, in 2020, we

observed a significant decline in organic product imports, probably related to disruptions in international supply chains during the pandemic (Figure 5).

The results of the analysis conducted for the years of the war in Ukraine showed the opposite market reaction. In 2022, there was a negative growth rate for organic products, while the total retail sales of food, beverages, and tobacco products increased. During the first two years after Russia invades Ukraine, there was a negative growth rate in imports of organic products, which amounted to approximately 5% in 2022 and deepened by another 4 percentage points in 2023. We may attribute this to rising living costs and high inflation, which have increased consumers' price sensitivity, causing them to pay closer attention to product prices when shopping. It is difficult to assess unequivocally whether the resilience of the organic market to external shocks was lower than that of other agri-food markets, especially since demand for organic products rebounded in 2023, with retail sales in the sector analysed growing by 2.9%. Moreover, the largest organic product markets in Europe have again recorded growth. However, the fact is that disruptions in supply chains caused a collapse in imports of organic products to the European Union during the pandemic. The decline in import volumes continued after Russia's invasion of Ukraine (Figure 5).

Table 6. Annual average growth rate of the EU organic retail sales in 2015-2023 (%)

Category	2015-2019	2019-2023	2019-2020	2020-2021	2021-2022	2022-2023
Organic retail sales	11.58	4.77	16.5	3.2	-2.6	2.9
Retail sale of food, beverages and tobacco	3.10	5.75	5.4	2.2	7.4	8.0
Organic import	n/a	-6.5	-13.8	2.8	-5.1	-9.1

Source: own study based on FiBL & Eurostat.

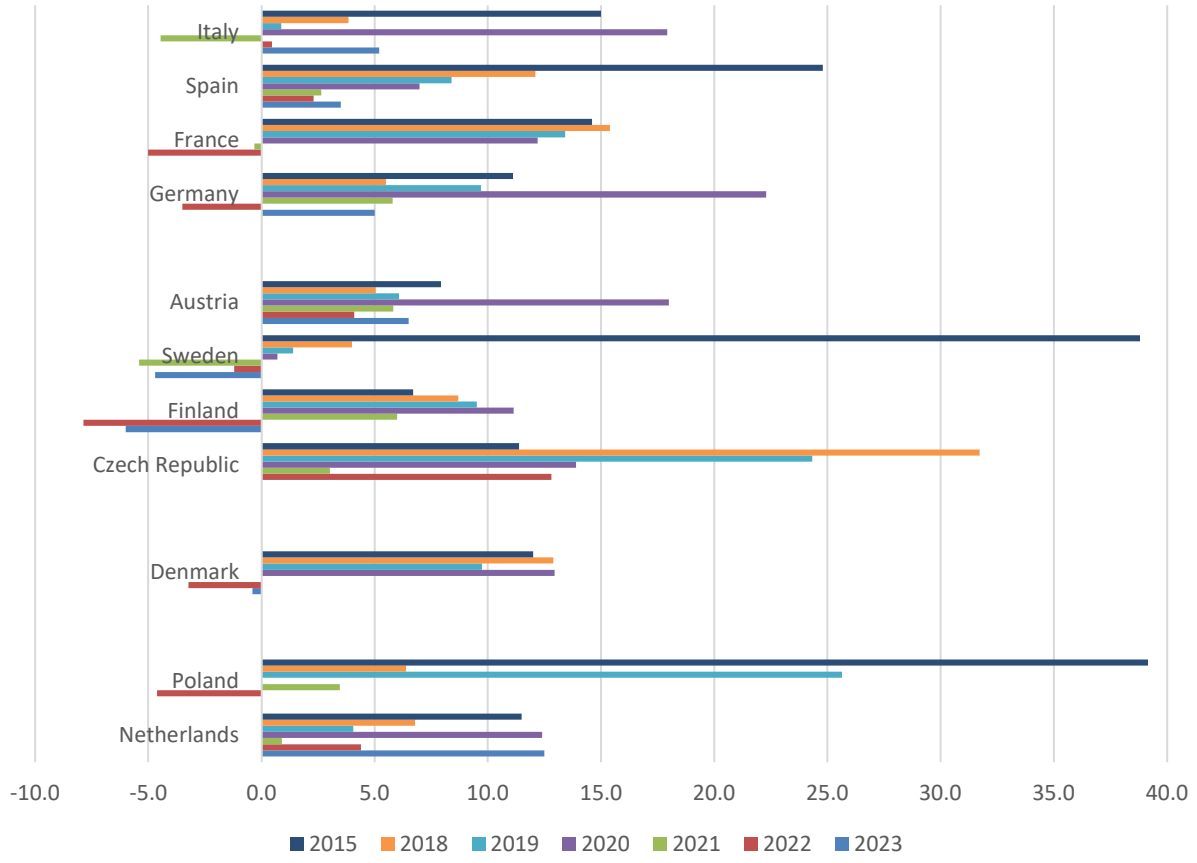

Figure 6. The organic retail sales rate of change for the selected member states in 2015-2023 (y-to-y change, %)
Source: own elaboration based on FiBL survey and on national data sources from certifiers and Eurostat.

The annual average growth rate of the EU organic retail sales fell significantly in 2019-2023 compared to 2015-2019. However, we observed the opposite trend for total retail sales of food, beverages, and tobacco, where the annual average rate of change increased during the years of global turmoil. Imports of organic goods were the most sensitive to global turbulences. The average rate of change in imports was negative throughout the studied period (Table 6).

The reactions of studied EU member states to the COVID-19 pandemic shock and the war in Ukraine were similar to the shifts observed across the EU. In none of the 11 EU analysed countries did the COVID-19 pandemic trigger a decline in organic food sales in 2020. In contrast, the Russia's invasion of Ukraine contributed to decline in organic sales in 6 out of the 11 EU countries studied (France, Germany, Sweden, Finland, Denmark, and Poland). For 2022, the data shows the largest increase in organic food sales in the Czech Republic. In some other countries (the Netherlands, Austria, Spain and Italy), there was a slight increase in organic food sales. In 2021, organic food sales declined in France and Sweden and continued to decline in 2022. The decline in retail sales of organic products continued in 3 of the 11 countries analysed (Denmark, Finland, and Sweden) in 2023. Sales of organic products remained at the same level as in the previous year in France, the Czech Republic, and Poland (Figure 6).

As with retail sales, EU member countries responded differently to organic imports during the COVID-19 pandemic and after Russia's invasion of Ukraine. We selected the same countries in Table 4 as those considered in Figure 6.

Table 7. The share of the country in organic import and rate of change for selected EU countries in 2018-2024 (y-to-y change, %)

Countries	The share of the country in organic imports							Rate of change (y-to-y change)					
	2018	2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024
Austria	1.3	1.0	1.1	1.2	1.9	2.3	1.6	-21.0	8.4	14.9	44.6	9.3	-26.5
Czechia	1.1	0.7	0.9	1.0	1.2	0.7	0.9	-32.3	25.4	20.2	12.6	-51.0	40.5
Denmark	4.7	4.2	2.9	2.1	2.4	2.8	3.2	-5.3	-32.0	-24.8	3.8	9.2	20.2
Finland	0.6	0.7	0.7	0.6	0.5	0.5	0.4	26.2	-2.6	-12.9	-8.1	-20.6	-2.0
France	7.9	8.4	9.8	9.5	10.2	9.2	7.4	12.6	14.1	-1.1	2.1	-17.6	-14.3
Germany	15.8	15.2	17.6	18.0	16.5	16.8	16.2	1.2	13.6	5.2	-13.1	-7.2	2.2
Italy	6.9	6.3	8.5	7.8	6.5	10.0	10.0	-2.9	30.9	-4.7	-21.0	39.7	6.1
Netherlands	35.2	36.4	30.7	32.9	36.3	32.1	35.4	8.9	-17.4	10.2	4.6	-19.6	17.3
Poland	0.7	1.0	1.3	1.3	1.2	1.1	1.2	51.5	23.2	3.6	-12.0	-16.6	11.0
Spain	2.9	3.5	4.0	3.2	3.2	3.6	3.0	27.1	12.0	-16.8	-5.9	1.4	-11.8
Sweden	6.2	6.7	6.4	6.4	5.6	5.6	4.6	13.6	-5.8	2.5	-16.4	-9.3	-13.3

Source: own study base on EC Agricultural and rural development, 2025.

All selected 11 EU Member States, including representatives of different groups in terms of market importance, accounted for over 80% of the EU's organic imports. The COVID-19 pandemic and Russia's invasion of Ukraine impacted imports of organic products. The analysis showed that Russia's invasion of Ukraine contributed more to the decline in imports than the COVID-19 pandemic (Table 7).

The EU remains dependent on imports in many agri-food commodity groups, mainly fruit and nuts, oilseeds and protein crops, and cereals. Categories of imported organic commodities showed varying levels of resilience to the COVID-19 pandemic and Russia's invasion of Ukraine. During the COVID-19 pandemic, negative growth was recorded in five out of nine categories. The most vulnerable group turned out to be arable crops and plant-based products, including cereals, oilseeds and protein, and sugar and isoglucose group. Russia's invasion of Ukraine contributed to changes in all categories of imported organic commodities (Table 8).

As already mentioned, organic farming can be an attractive alternative to conventional farming, especially among agricultural entrepreneurs looking for new market opportunities. The results of the analysis of the number of operators seem to confirm the growing interest in this form of farming. The number of producers in organic farming has increased over the analysed period from approximately 265.7 thousand in 2015 to 434.6 thousand in 2023. As the organic market grew, the number of pro-

cessors, exporters, and importers also increased. The number of the companies exporting organic commodities grew two and a half times (from 1957 in 2015 to 4898 in 2023). More importers supplied the EU market with the organic commodities. The number of entrepreneurs dealing with imports was higher than the number of exporters, but it increased at a slower rate (from 3512 in 2015 to 6727 in 2023). The organic processors constituted a large group of enterprises operating on the EU market. Their number rose from 52178 in 2015 to 89379 in 2023 (Table 9).

Table 8. Share of organic agri-food import volumes and rate of growth (y-to-y change) by class and key-product categories in 2018-2024 (%)

Class and category	Share of organic agri-food imports							Rate of growth (y-to-y change)					
	2018	2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024
Fruit, vegetables and olive oil	39.0	41.1	44.5	46.6	46.3	47,8	47.9	10.8	6.3	6.8	-5.7	-5.8	6.4
Fruit and nuts	29.7	31.7	35.4	37.0	37.1	38.9	39.2	12.1	9.5	6.6	-4.8	-4.6	7.3
Preparations of fruit, nuts and vegetables	5.2	4.9	4.8	5.2	5.2	5.0	5.0	-0.7	-5.5	11.2	-3.9	-13.7	7.6
Arable crops and plant based poducts	50.1	47.7	42.5	38.0	39.3	38.2	39.0	0.0	-12.5	-8.8	-1.8	-11.4	8.3
Oilseeds and protein crops	19.7	20.0	17.9	16.1	18.0	17.0	16.8	6.5	-12.2	-8.4	6.6	-14.2	4.9
Cereals	17.9	13.8	10.5	8.9	9.2	10.2	10.5	-19.1	-25.4	-13.6	-1.5	0.6	9.5
Sugar and isoglucose	7.4	8.8	8.2	7.4	7.1	6.2	6.3	25.4	-8.3	-8.5	-8.8	-20.8	7.8
Coffee, tea, cocoa and spices	8.4	8.6	9.7	10.1	10.2	10.1	8.8	6.7	11.5	5.8	-3.6	-10.3	-7.3
Coffee, tea, cocoa and spices	8.4	8.6	9.7	10.1	10.2	10.1	8.8	6.7	11.5	5.8	-3.6	-10.3	-7.3
Wine, beverages and food preparations	1.9	2.0	2.5	3.1	2.9	2.5	2.6	10.1	22.8	24.7	-10.8	-22.6	12.9
Mixed food preparations and ingredients	1.2	1.4	1.8	2.3	2.2	1.9	2.1	16,8	32,9	28.2	-9.1	-22.0	17.7
Wine and wine based products	0.6	0.6	0.6	0.6	0.6	0.4	0.4	-4.5	4.8	1.4	-13.2	-29.0	4.2
Non-edible	0.6	0.7	0.7	2.1	1.3	1.4	1.7	15.2	1.9	216.1	-44.0	1.2	28.4
Non-edible for technical use	0.5	0.5	0.6	0.7	0.7	0.6	0.7	11.7	19.8	17.3	-3.1	-21.4	12.9

Source: own study based on EC Agricultural and rural development, 2025.

Table 9. The number of organic operators and the average rate of change (y-to-y change) in 2015-2023

Years	The number of organic operators				The average rate of change (y-to-y change)			
	Organic exporters	Organic importers	Organic processors	Organic producers	Organic exporters	Organic importers	Organic processors	Organic producers
2015	1957	3510	52178	265677				
2016	2059	3941	57202	291721	5.2	12.3	9.6	9.8
2017	2676	4504	63384	302131	30.0	14.3	10.8	3.6
2018	3152	5016	69368	321772	17.8	11.4	9.4	6.5
2019	3130	5559	74866	338212	-0.7	10.8	7.9	5.1
2020	3614	5878	77893	349509	15.5	5.7	4.0	3.3
2021	4126	6642	84452	384968	14.2	13.0	8.4	10.1
2022	4296	6505	87436	426688	4.1	-2.1	3.5	10.8
2023	4898	6727	89379	434577	14.0	3.4	2.2	1.8

Source: own study based on FiBL.

Interestingly, the number of producers, exporters, and processors did not decrease either during the pandemic or after Russia attacked Ukraine. However, in 2022, there was a noticeable decrease in the number of importers, probably due to the general decline in import activity related to disruptions in global supply chains. This might have been a temporary decline, as an increase in their number was already recorded in 2023. Global turbulence could have caused a slowdown in business activity in two groups of organic operators: organic importers and organic processors. On the other hand, there was a slight increase in organic producers. Organic operators proved to be more resilient to market turmoil caused by the COVID-19 pandemic than Russia's invasion of Ukraine (Table 9).

The growing interest in organic farming is a response to new trends in consumer behaviour in today's marketplace that are creating new business opportunities. Notably, there is a growing demand for organic products from eco-conscious consumers who are concerned about the environment and from the consumers desiring healthy and natural food. And many consumers in the European Union seem to make purchasing decisions based on environmental impact. According to Eurobarometer

study (2023), the majority of respondents across surveyed EU countries state that a product's environmental impact plays a 'very' or 'rather important' role in their buying choices, although the size of these majorities differs considerably from country to country with the largest shares recorded in Portugal, Italy, and Romania. Approximately 80% of respondents believe that choosing products with a reduced environmental footprint has a measurable positive effect on the environment; of these, 33% 'strongly agree' and 48% 'somewhat agree' with this view. A somewhat lower proportion, yet still representing a majority, indicated that they had actually purchased products specifically due to their reduced environmental impact, with 18% 'strongly agreeing' and 42% 'somewhat agreeing'. In 23 EU Member States, at least half of all respondents confirmed that they 'strongly' or 'somewhat agree' that they have made such environmentally motivated purchases. The countries with the highest levels of agreement on this point were Romania, at 78%, and Italy, at 74%.

Table 10. The value of the Pearson's correlation coefficient between the responsible choices of the purchased products in EI countries

Variables	Importance of environmental impact of the product on buying it	Buying products with a lower environmental impact makes a difference for the environment	Lower environmental impact makes consumers' decision on buying the products	Awareness of the EU Ecolabel	EU Ecolabel provides lower environmental impact	Frequency of buying products with ecolabels
Importance of environmental impact of the product on buying it	1.000	0.621*	0.821*	-0.069	0.672*	0.486*
Buying products with a lower environmental impact makes a difference for the environment	0.621*	1.000	0.794*	-0.308	0.611*	0.423*
Lower environmental impact makes consumers' decision on buying the products	0.821*	0.794*	1.000	-0.228	0.617*	0.613*
Awareness of the EU Ecolabel	-0.069	-0.308	-0.228	1.000	-0.197	0.036
EU Ecolabel provides lower environmental impact	0.672*	0.611*	0.617*	-0.197	1.000	0.303
Frequency of buying products with ecolabels	0.486*	0.423*	0.613*	0.036	0.303	1.000

Source: own study based on Eurobarometer.

The question arises whether this relatively high environmental awareness of EU consumers translates into a high awareness of the EU Ecolabel and their trust that products with the EU Ecolabel truly have a lower environmental impact than similar products on the market.

We conducted the correlation analysis using of the Pearson's correlation coefficient to examine the relationships between variables representing various consumers' attitudes and perceptions about organic products. We discovered that the importance of the environmental impact of the product in purchasing decisions is strongly positively correlated, among others, with a strong belief that buying products with a lower environmental impact makes a difference for the environment and with the declaration of purchasing products specifically because of their lower environmental impact, while it is not correlated with awareness of the EU Ecolabel (Table 10). This results from low general awareness of the EU Ecolabel. The findings indicate that, across the European Union, 48% of survey participants (had not previously encountered the EU Ecolabel logo, and 38% reported recognising it. Furthermore, 14% of respondents were uncertain as to whether they had come across the logo before. Among all surveyed countries, France stood out as the only one where a majority of participants (61%) confirmed having seen the EU Ecolabel logo.

At the same time, awareness of the Eco Label was not correlated with trust in the Eco Label and declared frequent purchases of EU Eco labelled products (Table 10). This may indicate some problems in ensuring the credibility of the eco-label as a reliable quality signal. In addition to promotional activities related to the eco-label, building greater credibility requires improving the control process conducted by independent certification bodies. Certifiers must be vigilant and succeed in revealing departures from standards and opportunistic behaviour to build up the reputation of quality assurance labels. Consumers will then be more willing to pay a premium price for products with organic quality labels, which will encourage the growth of the organic market.

CONCLUSIONS

Organic farming contributes to sustainable development, reducing the detrimental effects of agriculture on local and global environments and boosting ecological transformation towards more sustainable food systems. It combines the best sustainable practices with the market response to the demand of a growing number of consumers for natural and healthy products. The development of organic farming is high on the list of priorities of the European Union's environmental policy, as expressed, among others, in the 'Farm to Fork' strategy included in the Green Deal.

In the years 2015-2023, the organic farming sector in the EU has expanded steadily, in terms not only of the area used for organic farming but also of the overall number of organic operators registered in the European Union, which shows that it can be an attractive alternative to conventional farming. However, despite the noticeable development of organic farming in recent years, the EU's target to achieve 25% of total farmland under organic farming by 2030 seems far from being achieved. Further expansion of organic production will require appropriate EU policy, including promotional activities and appropriate financial support.

The analysis results show that the to the economic turbulence of recent years, caused by the COVID-19 pandemic and the Russian invasion of Ukraine affected the organic farming and demand for organic products, but in a different way in each of these crises, which was a rather unexpected result of the analysis. During the pandemic, organic food sales in the EU have accelerated rapidly, even faster than the total food sales, indicating the growing interest of consumers in purchasing healthy food of assured quality. The reaction to the war in Ukraine was opposite. The retail sales of organic products declined, especially in Germany, which is the largest market for organic products in the European Union. The decline in the growth rate of the organic products market was significantly greater than that of the overall agri-food market. The research provided certain evidence supporting both hypotheses, as the overall average growth rate of organic farmland and the organic market during the period of turmoil after 2019 was lower than in the previous period. However, they indicate a varied response of the organic market depending on the type of crisis (dynamic growth during the pandemic and a subsequent slowdown during the war in Ukraine) and the category of organic crops.

An opportunity for its further development is the growing ecological awareness of consumers in the European Union, most of which declare that the environmental impact of a product plays a significant role in their purchasing decisions. However, it is necessary to intensify promotional activities in this area that will increase awareness and recognition of the EU Ecolabel and those that will build trust in it by improving the control process carried out by independent certification bodies.

There are some limitations to our study that require consideration. We based the quantitative research on the FIBL and Eurostat data, which were not complete, as some countries did not report all information or do so with a delay. In addition, the effects of geopolitical tensions, especially Russian invasion of Ukraine, have not yet fully manifested themselves, and more time and continued research are needed to fully assess their impact on the development of organic farming and the organic products market.

Despite the limitations, this study contributes to expanding knowledge about changes in organic farming and the organic product market, which is especially important for producers, as it reveals possible market opportunities related to participation in more sustainable agri-food systems. It also highlights the need for further support and promotion of the development of sustainable agriculture by EU policymakers.

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