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## THE SIGNIFICANCE OF ORGANIC FARMING IN THE EUROPEAN UNION FROM THE PERSPECTIVE OF SUSTAINABLE DEVELOPMENT

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**ABSTRACT:** This study aimed to evaluate the status of organic farming in the member states of the European Union, drawing on its potential and selected elements of the organic agri-food products market. To this end, we used several partial indicators and a synthetic measure, which allowed us to create a ranking of the member states depending on the development level of organic farming. The survey showed a 50% increase in the utilised agricultural area allocated for organic farming in the EU from 2015 to 2021 and a 69% increase from 2012 to 2021. So far, the only member state to meet the target set by the Green Deal, that is, 25% of organic UAA, has been Austria. Considering the synthetic index, Portugal is a leader in organic farming development. In addition, differences exist between EU member states in consumers' expenditure on organic products.

**KEYWORDS:** organic farming, sustainable development, European Union member states, linear ordering

## Introduction

The terms and conditions of agricultural production are strongly differentiated both within the European Union (EU) as a whole and in respective member states (Nowak et al., 2016). Furthermore, agriculture is a sector of the economy featuring special links with the natural environment. On the one hand, its efficiency depends on the environmental resources, but on the other hand, agricultural production is often at the expense of the environment, which is detrimental to environmental sustainability (Czyżewski & Czyżewski, 2016; Gołaś et al., 2020; Zakrzewska & Nowak, 2022). For a long time, the development of agriculture has relied on the maximisation of economic benefits, leading to environmental and social imbalance (Soni et al., 2022). Agricultural policy supporting the growth in agricultural production volume has stimulated this model of agriculture in highly developed countries. Agricultural practices became more and more intensive, which concurrently gave rise to environmental degradation (Średnicka-Tober et al., 2016; Łuczka et al., 2021). Therefore, a lot of attention is devoted to sustainable development as a response to risks posed by human activity, including agricultural production. The Report of the World Commission on Environment and Development: Our Common Future (1987) defines sustainable development as stable “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

Sustainable development is a concept that extends to all human activities. However, the sector that is assigned a special role here is agriculture. Sustainable agriculture is a global, dynamic process within these three areas, occurring at five levels: field, farmstead, local community, national, and international (Hayati et al., 2010; Kelly et al., 2018). Organic farming oriented at safe food production, simultaneously respecting the natural environment, fits the idea of sustainable development to the fullest (Ahlem & Hammas, 2017; Biernat-Jarka & Trębska, 2018). Organic farming is defined 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, 2018). Łuczka et al. (2021) underline that organic farming is a comprehensive system applying specific processes to ensure a sustainable function of the ecosystems, food safety, animal welfare and social justice. All these aspects have an identical weight and contribute to achieving multiple sustainable development goals. The development of organic production in agriculture is particularly significant in view of several obvious benefits to the environment, economy and society (Vovk, 2015; Cherevko, 2018). Organic production methods have a dual role in society. On the one hand, they supply goods to a specific market driven by the demand for organic products.

On the other hand, they provide access to public goods, boosting environmental protection, animal welfare and rural development (Łuczka et al., 2021; Otouzburov et al., 2019). Organic farming is deemed an important element of sustainable development, as it promotes environmental sustainability and social responsibility involving practices that minimise the adverse impact of agriculture on the environment and human health (Brzezina et al., 2017; Pânzaru et al., 2023). Thus, the benefits of organic farming are equally important to consumers (highly nutritive food products) and to the environment and climate (due to the low-cost agricultural production system – involving the industrial means of agricultural production – and the low economic pressure on the environment) (Wrzaszcz, 2022).

One hundred ninety-one countries practice organic farming, and at least 3.7 million farmers run organic farms. In 2019, the world sales of organic food and drinks exceeded 106 billion euros (Trávníček et al., 2023) as reported by the European Commission (2021); although an average European spends ca. EUR 84 on organic products, the annual consumption of organic products per capita differs significantly from country to country – ranging from EUR 344 to EUR 1. In 2020, the EU’s mean expenditure on organic food was EUR 101.8. However, this level remains low in Central and Eastern Europe (Trávníček et al., 2022).

The European Union deems green agriculture beneficial for sustainable development. Under the Farm to Fork strategy and the EU’s biodiversity strategy for 2030, the European Commission has set a target of “at least 25% of the EU’s agricultural land under organic farming and a significant increase in organic aquaculture by 2030” (European Commission, 2020). These two strategies are the key documents setting the path towards transforming European agriculture (Wrzaszcz, 2023). The Green

Deal resolution of the European Parliament of 15 January 2020 underlines that agriculture can help the EU reduce greenhouse gas emissions thanks to practices such as organic farming (European Parliament, 2020). Under CAP, from 2014-2022, sustainable farmers could use several support instruments. CAP's strategic plans still provide various interventions from 2023 to 2027 supporting green agriculture in the EU. In addition, in March 2021, the European Commission launched an organic action plan for the EU. The plan consists of 23 measures, making three axes. Axis 1: stimulating demand and ensuring consumer trust. Axis 2: stimulate conversion and reinforce the entire value chain. In contrast, axis 3 contains organics, leading by example to improve the contribution of organic farming to environmental sustainability (European Commission, 2021). The progressive greening of the common agricultural policy results from numerous premises, which, on the one hand, are the environmental costs incurred by society as a result of irresponsible management of environmental resources, and the other are environmental benefits, including ecosystem services, which are necessary for human existence (Wrzaszcz, 2022). This is how the EU fulfils its obligation to incorporate sustainable development goals (SDGs) in the Common Agricultural Policy (CAP). The pandemic of COVID-19 has exposed the imbalance and inefficiency of the present agri-food system. This gave rise to a higher-than-ever need for redesigning and reorienting it towards sustainable development (Calabro & Vieri, 2023).

The implementation of the organic agriculture model in the European Union should be continually monitored in particular member states (Scown & Nicholas, 2020). Meanwhile, such monitoring is rare and often refers to selected features only, most often utilised in agricultural areas under organic farming (Calabro & Vieri, 2023). This paper attempts to fill the gap by including aspects such as resources, production and international exchange. The spatial significance of the studies on the status of organic farming also stems from the Euro-Pean Green Deal (EGD), which implies the growth in the significance of this model of agriculture. Therefore, this study evaluates the status of organic farming in the member states of the European Union, drawing on its potential and selected elements of the organic agri-food products market. This assessment was performed in the context of sustainable development assumptions. We attempted to answer the following questions: What is the relationship between the organic farming model and sustainable development and its goals? Does the status of organic farming differ in the member states of the European Union? What is the ranking of EU member states according to organic farming development?

## Materials and Methods

The economic transformation in Europe has set up new challenges for the EU's agriculture. They required a modified approach to production, the market, the competitiveness, and the sales of products. The challenges also involved a necessity to assume that the organic farming model followed the sustainable development path. Therefore, a need exists to monitor the progress of organic farming development, particularly in view of the goals set out in the strategic documents of the European Union. To fulfil the adopted study objective, we analysed the selected aspects of this agricultural management system in the EU member states.

The methodology used in this paper is based on the following four steps:

1. Establishing the significance of organic farming in implementing the concept of sustainable development.
2. Selecting the variables to describe the potential of organic farming in the European Union.
3. Comparing the 27 member states of the European Union in terms of organic farming significance considering production and international exchange.
4. A synthetic index will be used to assess the level of development of organic agriculture in EU countries.

We developed the indicators based on the Eurostat (2023), data from the European Commission's Agri-food data portal (2023) and data from FiBL Statistiscs – the Research Institute of Organic Agriculture FiBL (2023). To design a synthetic measure of organic farming development, we analysed the basic descriptive statistics, including mean value (M), standard deviation (SD), median (Me), minimum (Min.), maximum (Max.), skewness (Sk.), and the coefficient of variation (ACV), and performed linear ordering using the standardised sums method. This method involves the use of a linear order-

ing function, which is an arithmetic mean of standardised values of features for each object (member state), and then transforming it into a synthetic index within the range from 0 to 1. The higher the value of the index is, the higher a specific object ranks in the hierarchy. The analysis included seven indicators: % of organic UAA [x1], % of all EU organic farms [x2], changes in the area of organic agricultural land (total fully converted and under conversion to organic farming) in 2012-2021 (%) [x3], live organic bovine animals (% of all bovine animals) [x4], live organic sheep – % of all sheep [x5], live organic goats – % of all goats [x6], organic cereals (excluding rice) for the production of grain (including seed) (tonne) – % of total production [x7]. The selection of variables was, on the one hand, dictated by substantive aspects and, on the other hand, the availability of numerical data for all the analysed member states. We conducted statistical analyses using Microsoft Excel 2021.

## Results and discussion

### Organic farming potential

The potential for organic farming is determined by agricultural land under organic production. Organic production is of an extensive nature and, compared with conventional farming, requires more UAA and labour input to achieve the same economic targets (Nachtman, 2021). In 2021, the global UAA under organic farming covered 76.4 million ha (including areas under conversion into organic farming), corresponding to an increase of 1.3% in relation to the preceding year. In 2020, organic farming in the European Union covered an area of 14.8 million ha, representing 19.7% of global organic crops and 9.1% of the EU's utilised agricultural area. In 2020, 61.6% of the EU's agricultural land, where sustainable farming was practised, received special payments under green support programmes (European Commission, 2023b). In 2021, the surface area of agricultural land under organic farming grew to 15.1 million ha. However,  $\frac{3}{4}$  of organic crops and farms are still located in the old EU. According to Eurostat (2023), in 2021, France, Spain, Italy, and Germany were the countries that utilised the biggest agricultural area under organic farming. Together, these countries accounted for 62.6% of all such UAA in the European Union. Furthermore, from 2015 to 2021, France was a country (next to Portugal, Romania, Malta, and Hungary) with the highest annual UAA under organic farming (Table 1). In Portugal, between 2015 and 2021, the surface of utilised agricultural area under organic farming increased three times and reached the highest growth rate in the EU (European Commission, 2023b). In the analysed years, the UAA under organic farming also doubled in Romania, Hungary, and Malta. In addition, the analyses of USDA (2023) imply that approx. 45 per cent of utilised agricultural area under organic farming in the EU is used as permanent grassland, mostly in France, Spain and Germany. The other 40 per cent of UAA under organic farming is cropland. The major groups of crops include green fodder and cereals, which are mainly concentrated in Italy, Spain, and France. Permanent crops cover more than ten per cent of UAA, two-thirds of which are in Spain, Italy, and France.

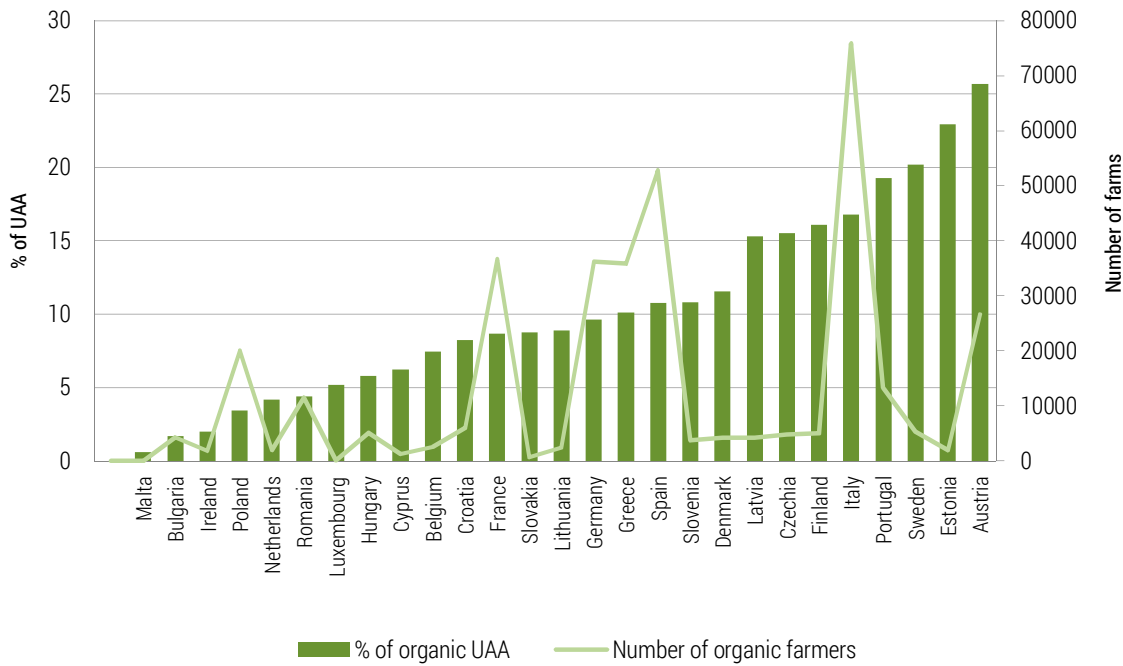
According to Eurostat, in 2021, the EU's average area covered by organic crops was 9.9%. From 2015 to 2021, the UAA under organic farming increased in nearly all member states, and the average growth in the EU was 38.6%. Countries with the highest share of UAA under organic farming in the total UAA were Austria (25.7%), Estonia (23%), and Sweden (20.2%). In turn, as many as six EU member states (the Netherlands, Poland, Ireland, Bulgaria, Romania, and Malta) had less than 5% of UAA under such management (Figure 1). The number of organic farms ranged from 75,900 in Italy to 25 in Malta. Estonia makes an interesting case: despite a very high share of UAA under organic farming, the number of organic farms was low (2043). This means that Estonian organic farms have a relatively large average surface area. In addition, Austria is the only country that at the moment meets the limit set by the Green Deal – increasing the percentage of UAA under organic farming to 25%. Such a high threshold is also criticised. Ziętara and Mirkowska (2021) believe that this can decrease the level of agricultural production, which could compromise the food security of specific member states of the EU. They suggest that implementing integrated farming and precision farming on a wider scale will have a wider range than organic farming and contribute to achieving environmental goals and climate protection to a greater extent, maintaining the existing production level. Barreiro Hurlle et al. (2021) and Lampkin (2023) present a similar scenario, anticipating that the accomplishment of the 25% target would increase the UAA under organic farming in the EU from 15 to 40 Mha. The

volume of organic plant production would increase from 24 to more than 80 Mt, but this means a decrease in the overall plant production of the EU by 5-10%, depending on the scenario and assumptions regarding the future increase in its efficiency. The high share of pastures and meadows in the total UAA (ca. 45%) shows that the production volume of organic farming in the EU does not match the overall utilised agricultural area (Calabro & Vieri, 2023). An overall increase in organic farming would necessitate a much wider area to be covered by organic farming due to lower yield than in the case of conventional farming and a higher risk of production losses in the absence of pesticides (Barbieri et al., 2021; Benbrook et al., 2021).

**Table 1.** The utilised agricultural area under organic farming in the EU member states in 2015 and 2021, in descending order from 2021

Member State	UAA under organic farming (ha) in 2015	UAA under organic farming (ha) in 2021	Dynamics (2015=100)	Share of UAA under organic farming in the overall UAA of the European Union (%) in 2021	Average annual growth rate of UAA under organic farming (% per year) 2015 to 2021
France	1 322 911	2 775 671	209.8	18.9	13.1
Spain	1 968 570	2 635 442	133.9	17.9	5
Italy	1 492 571	2 186 159	146.5	14.9	6.6
Germany	1 060 291	1 601 316	151.0	10.9	7.1
Portugal	241 375	768 800	318.5	5.2	21.3
Sweden	518 983	606 669	116.9	4.1	2.6
Romania	245 924	578 718	235.3	3.9	15.3
Poland	580 731	549 443	94.6	3.7	-0.9
Czechia	478 033	548 792	114.8	3.7	2.3
Finland	225 235	365 379	162.2	2.5	8.4
Denmark	166 788	303 093	181.7	2.1	10.5
Latvia	231 608	302 177	130.5	2.1	4.5
Hungary	129 735	293 597	226.3	2	14.6
Lithuania	213 579	261 782	122.6	1.8	3.4
Estonia	155 806	226 605	145.4	1.5	6.4
Slovakia	181 882	162 565	89.4	1.1	-1.9
Croatia	75 883	121 924	160.7	0.8	8.2
Belgium	68 818	102 413	148.8	0.7	6.9
Ireland	73 037	86 868	118.9	0.6	2.9
Bulgaria	118 552	86 310	72.8	0.6	-5.2
Netherlands	49 273	76 375	155.0	0.5	7.6
Slovenia	42 188	51 826	122.8	0.4	3.5
Cyprus	4 699	7 738	164.7	0.1	8.7
Luxembourg	4 216	6 893	163.5	0.05	8.5
Malta	30	66	220.0	0	14

Source: authors' own elaboration based on Agri-food data portal (2023).



**Figure 1.** Share of UAA under organic farming and number of organic farming producers in EU member states in 2021

Source: authors' work based on Eurostat (2023).

The interest in the development of organic farming started in highly developed countries due to social awareness of the adverse side effects of excessively intensive farming, including high expenditure on industrial means of production (fertilisers and plant protection products) (Komorowska, 2014). The Common Agricultural Policy (CAP) recognises and supports the role of organic farming. Therefore, it provides special support to farmers who are changing to and/or willing to maintain organic farming. In 2020, the organic production market grew much faster than the organic production area, hence rapidly continuing a recent trend (Trávníček et al., 2022). Analysing the scale of organic production by country, we paid attention to the share of such production in the overall volume of selected products. The analysis covered vegetables, grains, cattle, dairy cows, sheep and goats, and pigs (Table 2).

**Table 2.** Share of organic production in total production by top ten countries with the highest share in 2021 [%]

Share of organic production in total production (%)	Top ten countries with the highest shares in 2021
fresh vegetables	Sweden (17.7), Germany (11.2), Netherlands (5.4), Belgium (3.7), Latvia (3.5), Spain (3.5), Bulgaria (2.3), Hungary (2.0), Ireland (1.8), Finland (1.8)
grain (including seed)	Sweden (6.2), Estonia (5.5), Finland (4.4), Lithuania (3.5), Latvia (3.0), Belgium (2.7), Luxembourg (2.0), Croatia (1.7), France (1.6), Netherlands (1.5)
bovine	Greece (31.5), Latvia (26.0), Sweden (23.7), Austria (22.5), Czechia (20.5), Estonia (17.8), Denmark (15.6), Portugal (15.3), Slovakia (13.7), Finland (10.2)
dairy cows	Greece (23.1), Austria (22.2), Sweden (19.1), Denmark (14.6), Latvia (12.5), Germany (6.3), Lithuania (6.0), France (5.7), Slovakia (4.8), Belgium (4.6)
sheep and goats	Latvia (35.9), Austria (34.1), Greece (21.3), Germany (15.2), Lithuania (13.5), France (11.7), Croatia (11.1), Portugal (9.8), Italy (8.7), Netherlands (5.6)
pigs	France (3.8), Denmark (3.7), Austria (3.0), Sweden (2.7), Slovenia (1.4), Luxembourg (1.0), Netherlands (0.9), Germany (0.8), Greece (0.7), Italy (0.7)

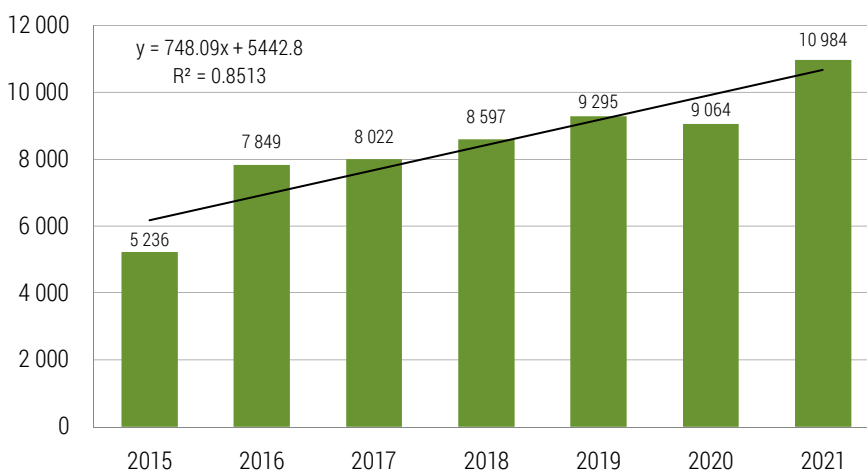
Source: authors' work based on Eurostat (2023).



The share of organic fresh vegetable production in the EU's overall fresh vegetable production in 2021 was the highest in Sweden, Germany, and the Netherlands. Sweden and Estonia noted the highest share (above 5%) of organic cereals in grain production in 2021. Other Baltic states, such as Finland, Lithuania and Latvia, achieved more than 4%. The lowest share of less than 1% was that of Poland, Hungary, Ireland, and Bulgaria. The livestock statistics of organic farms in the EU are incomplete, but data published by EUROSTAT implies a considerable scale of organic breeding of cattle, dairy cows, sheep and goats, and pigs in the EU member states. Studies by other authors, such as Komorowska (2014), corroborate this view. Out of ten countries with the highest share in 2021, Greece, Latvia, and Sweden showed the highest share of organic livestock in all livestock (bovine species). For dairy cows, the share of livestock in all livestock was the highest in Greece, Austria and Sweden. Among new member states, Latvia, Lithuania, and Slovakia were in the top ten. The percentage of organic livestock for sheep and goats in the top ten countries ranged from nearly 36% to 5.6%. It was the highest in Latvia and Austria (more than 34%). For pigs, the percentage of organic production was the highest in France, Denmark and Austria (above 3%) and the lowest among the presented countries – Greece and Italy. It could be deemed that animal breeding constraints are the right direction, at least due to the reduction of greenhouse gas emissions from animal production. However, it simultaneously contributes to eliminating natural fertilisers that are basic to organic farming, that is, deteriorating soil fertility (Nachtman, 2021). Organic farms should rely on the balance between animal and plant production (Wrzaszcz, 2017). This will make them fit the concept of sustainable development to the fullest.

### Selected elements of the organic products market

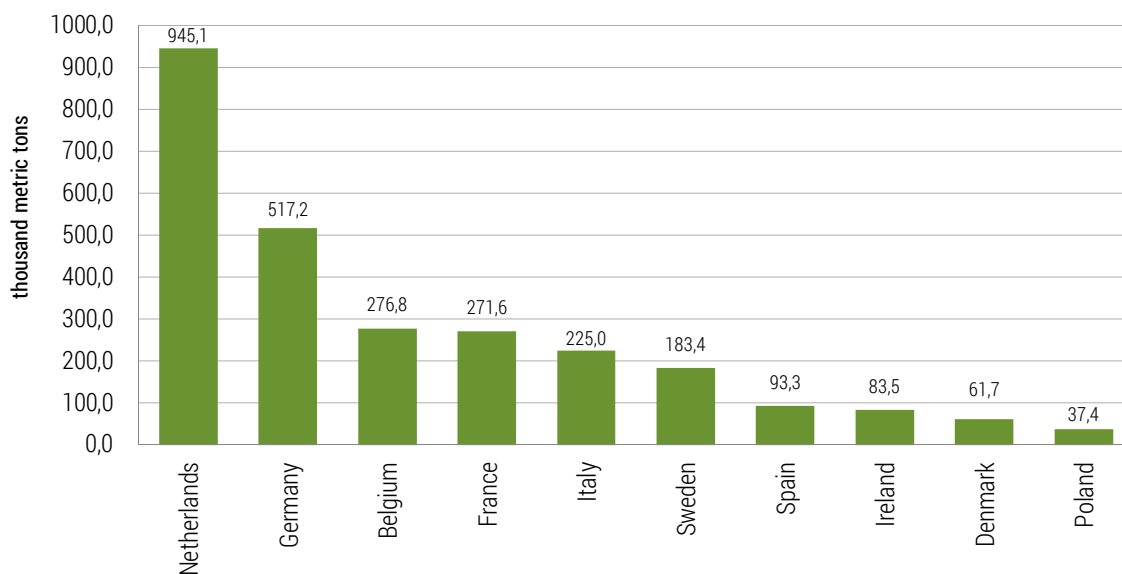
Various factors can determine the development of organic farming, including market conditions affecting the prices of organic products, the demand for organic products in the specific market resulting from social awareness, and the possibility and amount of funding allocated to organic farming. The Common Agricultural Policy (CAP) is one of the oldest sector-specific policies of the European Union. Over the years, the Common Agricultural Policy has changed due to the emergence of new challenges, mainly due to increased focus on research and innovation, climate change and environmental protection (Wrzaszcz, 2023). These challenges also included the development of organic farming, which EU funds have supported. Data presented in Figure 2 indicate that in 2021, nearly 11 million ha of UAA under organic farming in the EU were covered by financial support under CAP. Compared with 2015, this area was more than doubled, and its mean annual growth rate from 2015 to 2021 was close to 750,000 ha. This growth trend was linear in the period under review, except for 2020, which was most likely associated with the constraints of the pandemic.



**Figure 2.** Organic area receiving specific CAP support in the EU (1000 ha)

Source: authors' work based on Agri-food data portal (2023).

In the market-based approach, the organic production of food is a response to the changing market demand structure (Kowalska & Bieniek, 2022). In 2021, the organic products market in Europe grew to EUR 54.5 billion and in the European Union to EUR 46.7 billion. This means it grew much slower than before and differently than in the past – slower than the organic agricultural land (Willer et al., 2023). According to USDA (2023), in 2021, countries with the highest annual sales of organic food and beverage per capita (in total USD 100 or more) were Denmark (EUR 384), Luxembourg (EUR 313), Austria (EUR 268), Sweden (EUR 266), Germany (EUR 191), France (EUR 187) and Belgium (EUR 122). At the same time, several member states, mainly in Eastern Europe, recorded sales lower than USD 10 per capita. Eyinade et al. (2021) have found that consumers in developed countries paid more attention to product quality and the production process's social, economic and environmental balance. The pandemic of COVID-19 had a severe influence on the purchasing habits of most people and boosted the growth of the organic food market in many countries. One of the factors that contributed to the growth of the organic products market in European countries at that time was an increase in health awareness during the pandemic of COVID-19 (Kowalska & Bieniek, 2022; Prosser et al., 2022). After two successful years, Europe's organic products market growth was reversed in 2022 with the Ukraine war outbreak (Busacca et al., 2023). However, generally, the EU's demand for organic products has recently increased, which boosted organic production. The utilised agricultural area under organic farming in the EU has more than doubled in the last decade. This upward trend is expected to not continue due to Europe's high inflation rate (USDA, 2023). The EU has been the main importer of organic agri-food products, particularly those that were not converted at all or slightly converted.



**Figure 3.** Leading importers of organic agri-food products in the EU in 2021 (in thousands of metric tonnes)

Source: authors' work based on the European Commission's data (2023b).

In 2020, the EU imported 2.79 million tonnes of organic agri-food products in total. The largest importers (according to import volumes measured in metric tonnes) were the Netherlands, followed by Germany, Belgium and France (Figure 3). In 2021, EU imports increased to 2.87 million t (+2.8%). Among the main countries of origin in 2021, the import from India grew fastest (+18.1%, mainly expeller cakes), followed by Mexico (+10.8%, mainly juices and sugar products). In contrast, imports from China decreased (34.4%, expeller) as they did from Ukraine (-12.9%, wheat) (Table 3).

The European Commission's data (2023b) imply that the strong growth rate in production and consumption indicates that the EU's organic market has not matured yet, and further growth can be expected. Organic farming is now responding to emerging consumer trends such as veganism, transforming these challenges into opportunities. It is deemed the most sustainable production system, so



the implementing strategies of the European Green Deal contain provisions on allocating at least 25% of agricultural land in the EU to organic farming by 2030. The EU's agricultural policy is thus even more integrated with the sustainable development concept and the environmental protection goals and is oriented toward values such as biodiversity, food quality, and animal welfare.

**Table 3.** Top exporters of agri-food products to the EU from 2020 to 2021 (in thousands of tonnes)

Ranking in 2021	Country of import	Import (thousand t)				Change 2021/2020 (%)	Share of overall imports (% 2021)
		2018	2019	2020	2021		
1	Ecuador	276.9	304.3	324.1	345.2	6.5	12.0
2	Dominican Republic	271.8	324.4	252.3	265.1	5.1	9.2
3	India	125.5	176.6	174.3	205.9	18.1	7.2
4	Peru	204.9	214.2	200.9	203.6	1.4	7.1
5	Ukraine	265.8	337.9	217.2	189.2	-12.9	6.6
6	Turkey	262.7	210.8	155.7	154.9	-0.5	5.4
7	China	404.6	433.7	227.7	149.3	-34.4	5.2
8	United Kingdom	-	-	-	108.0	-	3.8
9	Columbia	63.1	87.3	106.8	105.2	-1.5	3.7
10	Mexico	69.5	74.9	66.1	73.3	10.8	2.6

Source: authors' work based on the European Commission's data (2021, 2023b).

Many papers refer to the opportunities and barriers to organic farming development. Kociszewski (2022) underlines that the expected increase in demand offers a significant opportunity for developing organic production. Tzouramani et al. (2014) and Siepman and Nicholas (2018) see such an opportunity in societies' growing environmental awareness and changing consumption patterns. Kowalska and Bieniek (2022) have formulated a similar opinion and mentioned the need for working out new incentives in individual EU member states, including green public procurement, innovative and effective media campaigns and strategies promoting green consumption patterns. In addition, organic farming, supported by public funds, may be an alternative to conventional farming in Natura 2000 protected areas (Pawlewicz et al., 2022). This network of areas has been established to protect biodiversity without excluding human activity, provided that such activity is not a threat to protected species and habitats (Müller et al., 2018).

In turn, major barriers to the development of organic farming include poor links between farmers and the distribution system and low rates of return (Kociszewski, 2022). Cultural and ideological factors, being either stimulants or destimulants for the decisions on the opportunity for organic farming, are also significant (Kołoszko-Chomentowska & Stalgiene, 2019). Research conducted by Best (2010) has corroborated the view that farmers clearly showing environment-friendly attitudes are more susceptible to undertaking green measures and organic farming. Other surveys imply that social support is significant to the development of organic production (Brock & Bradford, 2013). Wrzaszcz (2017) noticed that the war pending in Ukraine necessitates international discourse on the options for implementing the goals the European Green Deal set. A question arises as to whether the care for the environment and the climate and hence the promotion of organic farming in Europe, will not become secondary in the face of the problem of ensuring global food security (Coe et al., 2022). Hassen and Bilali (2022), however, believes that this situation does not discharge countries from the obligation to take care of environmental issues, including reinforcing the organic production system. Kowalska and Bieniek (2022) formulated a similar view.

## Synthetic measure of organic farming development

To assess the features of selected diagnostic variables, as the first step of the analysis, we calculated their basic descriptive statistics. The results are presented in Table 4.

**Table 4.** Basic descriptive statistics of the analysed diagnostic variables

Variable	M	SD	Me	Min.	Max.	Sk.	ACV
X1	10.40	6.64	8.91	0.61	25.69	0.65	63.81%
X2	3.70	5.28	1.32	0.01	20.06	1.96	142.46%
X3	80.04	70.38	66.83	-16.18	282.81	1.80	87.93%
X4	9.77	8.95	7.26	0.00	31.53	0.91	91.55%
X5	14.06	12.21	11.67	0.00	38.21	0.69	86.88%
X6	13.41	12.97	9.33	0.00	52.56	1.27	96.69%
X7	2.69	2.49	1.54	0.27	8.46	1.14	92.25%

Note: see Materials and Methods for an explanation of symbols representing descriptive statistics.

The analysis showed that all the diagnostic variables featured a high coefficient of variation (ACV > 45.00%), which implied that the particular feature had high discriminatory strength and that skewness of these variables did not exceed the absolute value of 2, which was a sign of insignificantly asymmetric distribution (Field, 2018). Therefore, including all the selected diagnostic variables in further analysis was justified.

Next, we performed linear ordering using the standardised sums method. Table 5 presents a ranking of individual EU member states according to organic farming development potential based on the above-mentioned method.

**Table 5.** Synthetic measures based on standardised sums for the organic farming development level of individual EU member states, including their ranking position

Ranking	Member state	Wi
1	Portugal	1.0000
2	Croatia	0.9712
3	France	0.6574
4	Finland	0.5367
5	Estonia	0.4950
6	Latvia	0.4668
7	Austria	0.4621
8	Belgium	0.4260
9	Italy	0.4131
10	Hungary	0.3996
11	Bulgaria	0.3781
12	Lithuania	0.3777
13	Germany	0.3761
14	Slovenia	0.3646
15	Czechia	0.3465
16	Romania	0.3181
17	Sweden	0.3174
18	Cyprus	0.3149
19	Greece	0.2964
20	Denmark	0.2953
21	Luxembourg	0.2611
22	Malta	0.2230
23	Netherlands	0.2226
24	Spain	0.2129
25	Ireland	0.2070
26	Slovakia	0.1291
27	Poland	0.0000

The analysis showed the highest level of organic farming development in Portugal, Croatia and France and the lowest in Poland, Slovakia and Ireland. According to Pe'er et al. (2019) and Salavisa et al. (2021), the dynamic development of organic farming in Portugal should be attributed to the following factors: 1) EU regulations, strategies and plans governing the organic sector in Portugal; 2) institutionalisation, which has developed the market and attracted new farmers, investors and retailers; 3) standardisation, which has led to market development and investor and retailer interest; 4) farmer certification; external (government) subsidy support programs; 5) incremental market improvements; 6) market innovations; 7) a shift away from conventional agriculture (i.e. the sector's reconfiguration). Le Gall et al. (2022) argued that the level of organic farming development in France was fixed from 2010, but it improved since 2014. As regards crops, from 2014 to 2018, the growing area of oil and protein plants, in particular sunflower, soy and legumes, increased. In turn, barriers to the development of organic farming in countries such as Poland include the farmers' fear of the economic risk due to lower yield, institutional barriers (unstable legal regulations on organic farming) and communications from regulatory institutions (Łuczka & Kalinowski, 2020).

## Conclusions

This paper offers a contribution to the discussion on the status of organic farming in the EU and its significance from the perspective of the premises of sustainable development. At present, hazards are evident for conventional farming that has long been based on maximising economic benefits, leading to disturbances in the ecosystem and deepening social inequality. Highly developed countries have tended to replace this model of agriculture that generates excessive production and degrades the environment, believing that organic farming is an essential element of sustainable development, giving rise to environmental balance. Another important aspect is an increase in social responsibility for the adverse impact of agriculture on the environment and human health. The European Union also deems green agriculture beneficial for sustainable development. To this end, it is important to monitor the advancement and options for supporting organic farming development in specific member states of the European Union.

The potential for organic farming is determined by agricultural land under organic production. Since 2012, over a decade, the share of UAA under organic farming in the EU member states increased nearly by 70%, and in 2021, the average share of organic crops in the EU was 9.9%. The Common Agricultural Policy (CAP) reinforces the role of organic farming. Therefore, special support is provided to farmers who are changing to and/or willing to maintain organic farming. In the market-based approach, the organic production of food is a response to the changing market demand structure. In 2021, an upward trend in the organic products market in Europe declined in contrast to the upward trend in the utilised agricultural area under organic farming. The highest annual organic food and beverage sales per capita mainly refer to northern countries. The lowest sales, below USD 10 per capita, can be observed in less developed countries. Generally, the demand for organic products in the EU increased, but this trend was disturbed by the war continuing in Ukraine and the resulting disturbances in global markets. The EU remains the main importer of organic agri-food products, but the unquestionable leader in import and consumption is still the EU-15, a more developed member state. The synthetic index made it possible to create a ranking of EU member states according to the development level of organic farming. The highest index value was recorded in Portugal, while Poland and Slovakia featured the lowest aggregate measure. Analysing the development of organic farming and the organic market in the EU member states, a need can be identified for an innovative approach to promoting organic products, particularly in countries admitted to the EU in and after 2004. Scientifically proven knowledge of organic products and the significance of organic farming to sustainable development should be disseminated among consumers. Implementing institutional solutions to revive the organic products market associated with green public procurement would also be essential.

This study is subject to limitations. They mostly include data not incorporating post-pandemic periods, covering the time of the armed conflict in Ukraine in the analysis, and addressing their impact on the situation in the organic products market. In addition, further research should take into

account identifying a wider range of factors that determine the propensity of agricultural producers to undertake organic production and of consumers to increase their demand for organic products.

## The contribution of the authors

Conceptualization, A.N. and A.K.; literature review, A.N. and A.K.; methodology, A.N. and A.K.; formal analysis, A.N. and A.K.; writing, A.N. and A.K.; conclusions and discussion, A.N. and A.K.

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## ZNACZENIE ROLNICTWA EKOLOGICZNEGO W UNII EUROPEJSKIEJ Z PERSPEKTYWY ROZWOJU ZRÓWNOWAŻONEGO

**STRESZCZENIE:** Celem opracowania była ocena stanu rolnictwa ekologicznego w krajach Unii Europejskiej z uwzględnieniem jego potencjału oraz wybranych elementów rynku ekologicznych produktów rolno-spożywczych. Wykorzystano w tym celu szereg wskaźników cząstkowych oraz miarę syntetyczną, która pozwoliła na stworzenie rankingu krajów członkowskich w zależności od poziomu rozwoju rolnictwa ekologicznego. Badania wykazały 50% wzrost powierzchni użytków rolnych (UAA) w przeznaczonych pod ekologiczną produkcję rolniczą w UE w latach 2015-2021 oraz 69% w latach 2012-2021. Cel wyznaczony przez strategię Zielony Ład na poziomie 25% ekologicznych użytków rolnych spełnia dotychczas tylko Austria. Biorąc pod uwagę indeks syntetyczny liderem w poziomie rozwoju rolnictwa ekologicznego jest Portugalia. Istnieją ponadto różnice pomiędzy krajami unijnymi w wydatkach konsumentów na produkty ekologiczne.

**SŁOWA KLUCZOWE:** rolnictwo ekologiczne, rozwój zrównoważony, kraje członkowskie Unii Europejskiej, porządkowanie liniowe