

THE ORGANIC FOOD MARKET IN SELECTED EU COUNTRIES 2012-2021

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Purpose: Organic farming is a farming concept whose development is justified by pro-environmental measures. In recent years, there has been a steadily increasing market demand for goods supplied by organic farms. An important objective of organic farming, which is emphasised in EU regulations, is to respond to consumer demands, which is related both to changes in the structure of consumption and to environmentally friendly consumer attitudes. As a result, there is an increasing demand for organic food. The aim of the article is to present the differentiation of EU countries in terms of the development of organic agriculture, based on selected indicators presenting the supply and demand side of the organic food market.

Methodology: The assessment of development of the organic food market in EU countries was carried out on the basis of annual data from 2012 to 2021. Dynamic measures and development trend models were used to characterise the time series. In a second step, the EU countries were classified by development of the organic market using a synthetic variable.

Findings: Demand for organic food is increasing, both in economically more developed countries and in developing countries. Nevertheless, sales of organic food in overall food sales are still low, as they do not on average exceed 3,7%, while there are countries like Denmark where they even reach 13%. In addition to the presentation of the diversity of EU countries in terms of the level of the organic food market, the dynamics of change in the selected indicators in 2021 in comparison with 2012 are also shown. The most dynamic changes in the food market in terms of the number of producers and the area of crops are observed in the new Member States, i.e. Croatia, Bulgaria and Latvia.

Originality: The article presents the organic food market leaders in terms of organic food producers, area occupied and volume of sales worth. It then identifies the countries with the most dynamic changes taking place in this market in 2021 in comparison with 2012.

Keywords: organic area, organic market, organic producers, organic retail sales.

Category of the paper: research paper.

1. Introduction

The organic food market is playing an increasingly important role in the food sector. The difference between organic and non-organic (conventional) food has to do with how food is produced. For example, organic foods like vegetables, fruit, eggs, milk and meat are produced without: pesticides, herbicides and fertilisers. Organic food production is perceived as being beneficial not only for the environment, but also for humans - such foods have more nutritive value and better pro-health properties than conventionally grown foods. Organic food is defined as foodstuff with the lowest possible level of contamination, produced on farms using ecological methods of plant cultivation and animal husbandry (Mróz, 2013). These products are frequently referred to as health food or natural products. The term organic food describes products certified under certain legal provisions.

The global organic food market is expected to grow from \$227,19 billion in 2021 to \$259,06 billion in 2022 at a compound annual growth rate (CAGR) of 14,0%. The Russia-Ukraine war disrupted the chances of global economic recovery from the COVID-19 pandemic, at least in the short term. The war between these two countries has led to economic sanctions on multiple countries, a surge in commodity prices, and supply chain disruptions, causing inflation across goods and services effecting many markets across the globe. The organic food market is expected to grow to \$437,36 billion in 2026 at a CAGR of 14,0%. (Organic Food Global Market Report 2023, 2023).

One of the primary factors driving market expansion is growing awareness about the health benefits associated with the consumption of organic products. Sales of organic food and beverages are projected to rise as a result of the change in the purchasing behavior of the consumer. Additionally, the rising popularity of non-GMO products amongst consumers is driving the growth of the market (Organic Food..., 2023). The organic food and beverage market in Europe is rated second only after North America in terms of size. According to the most recent data provided by the Research Institute for Agricultural Ecology (FiBL), European consumers spent around €54,5 billion on organic food in 2021 (Willer, Kilcher, 2023). Analysts predict that demand for organic food and beverages in Europe could grow at a rate of around 7% per year (Dovleac, 2016).

The European market for organic products is highly diversified and characterised by high sales volumes. The most dynamically developing markets for organic food are at present the German market and the markets of the Scandinavian countries, where the share of organic food in total food sales has exceeded 5%. In these countries, the trade in organic food is growing dynamically and, at the same time, new forms and ways of communication of the benefits of organic food to consumers are being sought in order to build a competitive advantage. It should be emphasised that in addition to the Western European and Scandinavian countries, where organic food sales and consumption are highest, the countries of Central Europe are also becoming increasingly important.

However, despite the observed trends in the development of the organic food market, the share of organic products in overall food sales in Europe is still low, the reasons for which can be found both on the supply side and the demand side for organic food (Żakowska-Biemans, 2011). The most important factors influencing the development of the organic market are the concern for human health and environmental sustainability in the context of food safety, the agricultural practices used, pesticide-free cultivation and attention to animal welfare (Cavaliere, Peri, Banterle, 2016). The increasing number of certified organic producers and a wider range of organic product categories are influencing the provision of higher food safety and quality (Hamzaoui-Essoussi, Zahaf, 2012).

The main barrier against buying such products is related to the problem of lack of trust in producers, as consumers are unable to verify whether a product is indeed produced according to the organic system or not (Krystallis, Chryssohoidis, 2005). Baecke points out that the main constraints to the development of the sector are the lack of information combined with the high price of products and the high production costs (Baecke, Rogiers, De Cock, Van Huylenbroeck, 2002).

Organic food is offered both in direct sales channels, including directly from the producer, at markets and occasional fairs, as well as in shops specialising in organic food and in large supermarkets (on separate stands or shelves) (Żakowska-Biemans, 2008). The most varied assortment of organic food is offered by specialised shops, which are one of the preferred places for many consumers to buy organic food. Sales of organic food in large supermarkets are slower to grow due to a little varied assortment and a failure to adapt the organic food offer to consumer expectations. Johns predicted that organic food sales would move from niche shops, such as small specialist health food shops, to large supermarkets (Jones, Clarke-Hill, Shears, Hillier, 2001). A growing number of distribution channels are shifting towards the use of supermarkets and grocery networks, which offer and expand their range of organic foods at more competitive prices. Borgerson emphasises that retailers have the advantage of being very close to organic consumers which makes it easier for them to tailor their offerings to the preferences of the end consumers (Borgerson, 2007). The level of competition in this market will intensify due to an increase in the number of retailers introducing their own brands of organic products.

A large number of own brands are emerging on the market, which will further intensify the level of competition between retailers, which will certainly have an impact on organic food prices.

The development of the organic food market is also influenced by EU policy. Łuczka emphasises that in the case of the organic food market, EU policy needs to be refocused through:

- Promotion of food quality and safety including stimulation of organic farming.
- Focusing on the long term, reaching a "win-win" situation (i.e. both sides win, e.g. agriculture and environment, producer and consumer).
- Coordinate agricultural policy towards increasing its coherence with other sectoral policies (Łuczka, 2016).

The implemented legal conditions for the functioning of the organic food market should be fundamentally influenced by the principles of organic production, which were extensively discussed by Zegar (2012) and Zyznarska (1997).

Among the most significant occurring in organic production, they mention the following:

- treating agricultural production processes in relation to the natural environment so as to preserve the sustainability of the agro-ecosystem,
- closing the substance cycle within the farm, which requires a balance of crop and animal production, i.e. feed and fertiliser self-sufficiency,
- reducing all polluting species, using local raw materials and production resources,
- cultivation and nutrition of soil organisms through soil aeration and the application of organic fertilisers,
- using organic materials such as manure, organic waste, rock powder,
- use of a variety of agro-technical measures,
- selection of plant and animal species and varieties for specific site conditions,
- protection of natural enemies of pests, use of biotechnical pest control,
- pursuing soil protection and energy saving techniques,
- aiming to protect the health, longevity and productivity of animals,
- adaptation of animal density to the area of Utilised Agricultural Area (UAA),
- maintaining and creating a varied and attractive countryside with high leisure values,
- ensuring workplaces are adapted to human needs,
- farm organisation connected with a small market and low expenditure on the purchase of production resources,
- prohibiting the use of mineral chemical fertilisers and plant protection products, hormones, growth substances.

From an environmental point of view, organic food production is a very demanding system, which manifests itself by the complete elimination of the use of resources of industrial origin; these include pesticides and artificial fertilisers. It implies the maintenance of a closed nutrient cycle. This system eliminates the possibility of supplying the farm with fodder of conventional origin from the market.

Despite the higher price of organic food recently, it has been observed that the demand for organic food products in Europe is rising rapidly. Much of this growing organic market share and demand can be attributed to the populace's growing preference for a healthy lifestyle and the rising awareness about the health benefits of organic food products. This paradigm shift in the consumer's preferences will spur the demand for organic food products and beverages during the forecast period (Technavio, 2016). The growth in demand for organic food is influenced by an increase in the area under.

2. Materials and Methods

The assessment of the development of the organic food market in EU countries was based on annual data from 2012 to 2021 ($t = 1, 2, \dots, 10$). Not covered in the analysis are: Luxembourg, Malta, Cyprus, Portugal, Slovakia due to the lack of complete data. The selection of indicators was preceded by a literature review (i.a.: Gulbicka, 2007; Komorowska, 2014; Brągiel, Ślusarczyk, 2017), data availability and statistical analysis (Table 1). All indicators in the studied group of objects meet the basic criterion for the selection of variables to describe a complex phenomenon, they are not quasi-constant variables (Kukuła, 2000).

In the first stage, the analysis of the dynamics of changes in selected indicators of the organic food market in EU countries over a decade was carried out. Dynamic measures and development trend models were used to describe the time series. Correlation analysis was carried out using Pearson's correlation coefficient.

Table1.
Organic food market indicators

Variable	Full name
X_1	Organic producers [thousand]
X_2	Organic area (farmland) [million ha]
X_3	Organic area share of total farmland [%]
X_4	Organic retail sales [million €]
X_5	Organic retail sales share [%]
X_6	Organic per capita consumption [€/person]

Source: Own study based on [Research Institute of Organic Agriculture FiBL. Available online: <https://www.fibl.org> (accessed on 1 February 2023); Eurostat. Available online: <https://ec.europa.eu/eurostat> (accessed on 15 January 2023)].

In a second stage, the EU countries were ranked by the development of the market for organic products using a synthetic variable, which has the character of a latent variable because its realisations are not directly observed. In the literature we can find many proposed methods for the construction of the synthetic variable and discussions on the criteria for their selection (i.a.: Panek, 2009; Walesiak, 2014; Nermed, 2017). Thus, the realisations of the synthetic variable using the proposal of the authors Kukuła, Luty (2015) were determined according to the formula:

$$DI_i = \frac{1}{m} \sum_{j=1}^m \frac{w_{ij} - \min_i \{w_{ij}\}}{\max_i \{w_{ij}\} - \min_i \{w_{ij}\}} \quad (1)$$

where: DI_i - development indicator of object i , and:

$$w_{ij} = \frac{x_{ij, t=10}}{x_{ij, t=1}} \quad (2)$$

where: $x_{ij, t}$ - actual value of the characteristic X_j for object i per time unit t .

3. Results

From 2012 to 2021, variables X_1 - X_4 showed an increasing trend. Of which the fastest growth can be observed in the case of variable X_4 (retail sales of organic products), where the value grew year by year with 11% (Fig. 1). Slightly smaller changes in the analysed period took place in the case of the area under organic cultivation and the share of organic cultivation in the total agricultural land, it was a year-to-year increase of 6%.

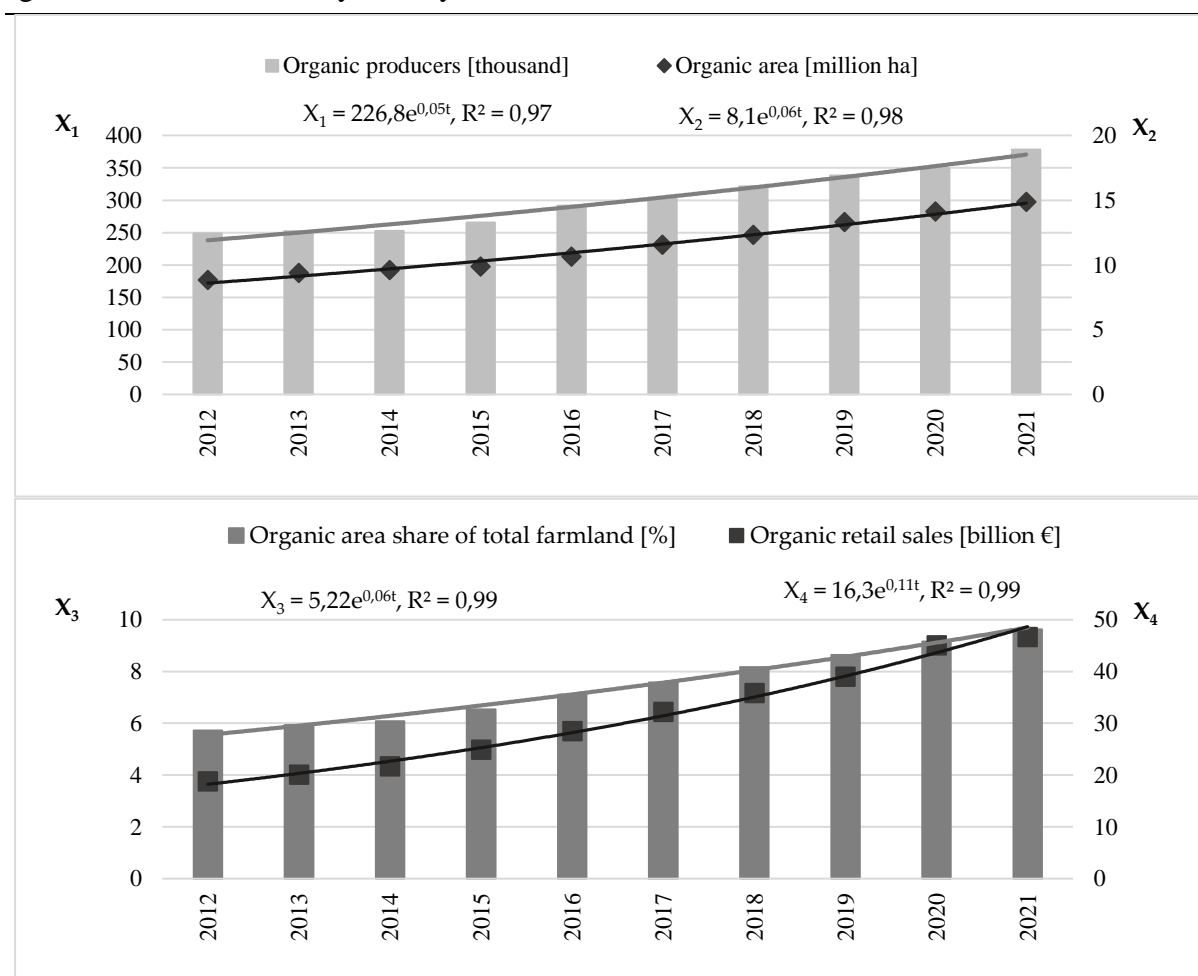


Figure 1. Values of selected indicators of the organic food market in the EU from 2012 to 2021 ($t = 1, 2, \dots, 10$) with trend lines given.

Source: Own study based on designations as in Table 1.

The legal conditions for organic production and labelling of organic products introduced in the EU (Council Regulation (EC) No. 834/200, 2007) resulted in a systematic increase in the number of organic food producers in most Member States. Countries such as Italy, France, Spain, Germany and Greece were the leaders in this market during the analysed period. Poland was also in the lead in 2012, with more than 25,000 producers, but by 2021, the number of enterprises operating in this sector dropped significantly, by as much as 28%. An equally unfavourable trend was seen in Romania, where there was a 25% decrease in the number of producers in 2021 compared to 2012. In the remaining countries, the number of producers

increased, with Croatia up by almost 300% and Hungary by 229%. Favourable developments also occurred in France (up 139%) and Bulgaria (up 116%).

As the idea of healthy food is becoming more and more popular in the countries of the European Union, organic producers have increased the area under organic cultivation during the analysed period, as shown by the increase in the basic characteristics describing this phenomenon (Fig. 2). A particularly significant change took place in France, where organic area increased by 1,78 million ha in 2021 compared to 2012 (Fig. 2). Countries with large areas under organic cultivation also include Spain and Italy, where there was an increase of more than 1 million hectares of organic area compared to 2012. Organic crops also occupied a significant area in Germany and Austria. Countries that joined the EU after 2004 are increasing the area under organic production, with leaders including Croatia, which increased its area under organic production by more than 280% in 2021 compared to 2012, and Bulgaria, Hungary and Romania, where the growth exceeded 100%. In the group of analysed countries, the opposite trend can only be observed in Poland, where the area under organic farming decreased by 23%.

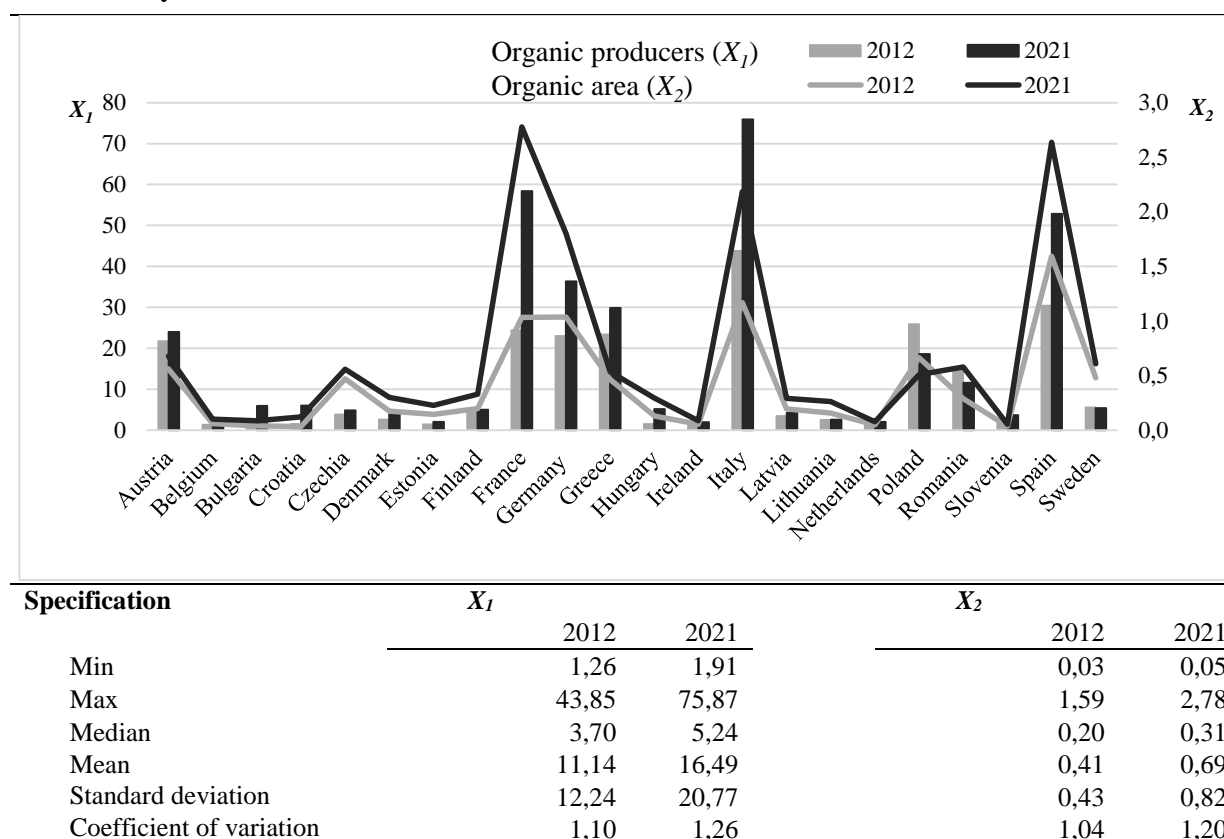
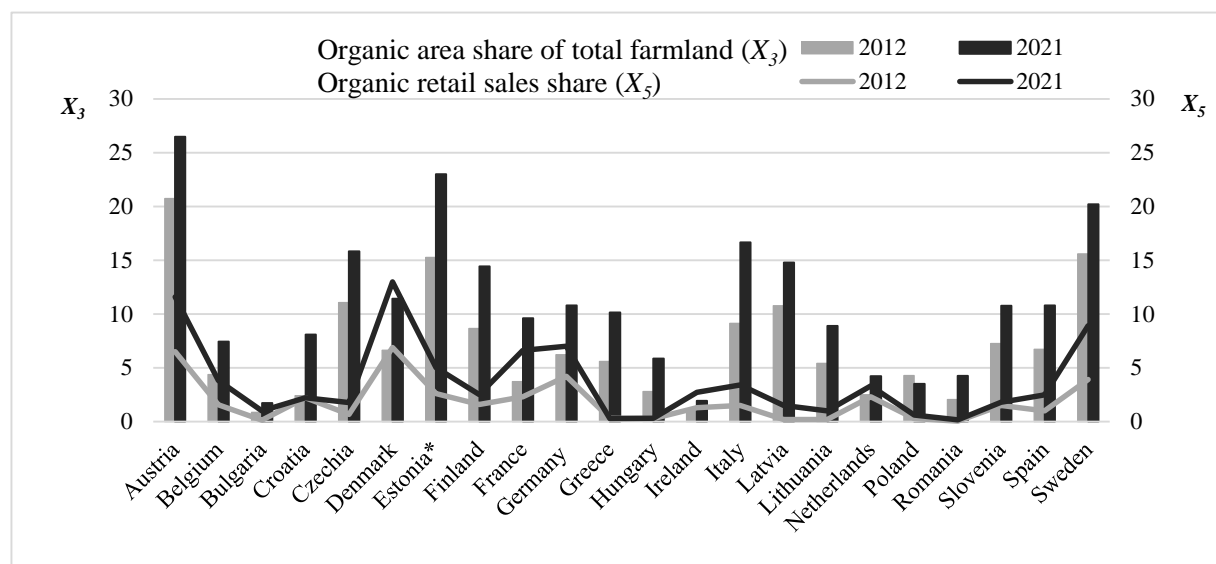


Figure 2. Organic producers [thousand] and organic area [million ha] in selected EU countries and quantitative characteristics in 2012 and 2021.

Source: Own study based on designations as in Table 1.

As the area occupied by organic farms increases, their share of the total cultivated area increases. On average in the EU countries, organic farm area occupied 10,95% of the total area in 2021 (Fig. 3). The largest share of the area of farms producing healthy food in 2021 was in

Austria at 26,48% and also in Estonia (22,99%) and Sweden (20,19%). Estonia recorded the largest increase in the share of organic area in total crops in 2021 compared to 2012 and this was an increase of 7,74 p.p. In Italy, the increase in the share of cultivated area was 7,54 p.p.. Significant changes also took place in Austria (share increase of 5,73 p.p.), France (share increase of 5,90 p.p.) and Finland (share increase of 5,79 p.p.).



Specification	X_3		X_5	
	2012	2021	2012	2021
Min	0,87	1,71	0,04	0,15
Max	20,75	26,48	6,90	13,00
Median	5,90	10,46	1,50	2,49
Mean	6,96	10,95	1,88	3,68
Standard deviation	5,03	6,47	1,90	3,54
Coefficient of variation	0,72	0,59	1,01	0,96

*for Estonia X_5 lack of data for 2012, the data for 2017 was adopted.

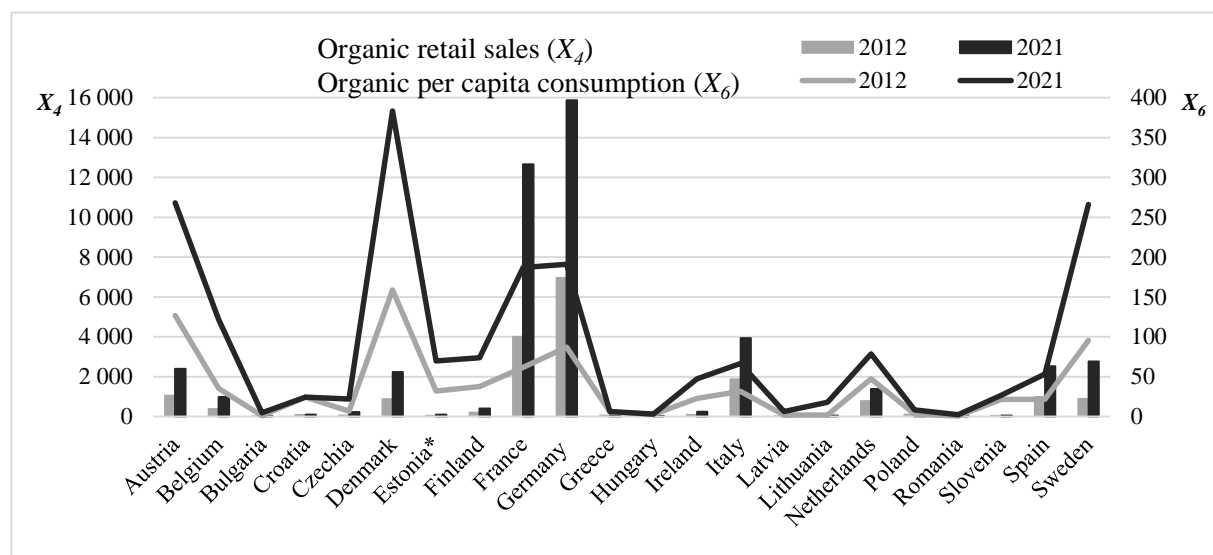
Figure 3. Organic area share of total farmland [%] and organic retail sales share [%] in selected EU countries and quantitative characteristics in 2012 and 2021.

Source: Own study based on designations as in Table 1.

The increase in cultivated area is a response to the growing demand for healthy food reported by consumers. The growing interest in healthy food is also confirmed by the increasing share of healthy food sales in total food purchases, in 2021 compared to 2012 in 20 of the 22 countries analysed. The share of organic food sales in EU countries increased on average from 1,68% to 3,68% in 2021 compared to 2012. In Denmark, which is the leader in terms of the share of healthy food sales in the food market this increase was at 6,1pp. (from 6,9% in 2012 to 13% in 2021) (Fig.3). Healthy food is also popular in Sweden with a share of 8,9%, Germany with a market share of 7% and France (6,63%).

In terms of sales value, consumers in the EU countries analysed have significantly increased their consumption of healthy food in 2021 compared to 2012. Germany is the clear market leader in organic food. The value of products sold on the German market increased from € 6970 million in 2012 to € 15870 million in 2021, an increase of 128% (Fig. 4). The average value for

this variable in EU countries increased by 148%. The largest markets in terms of sales value in 2021 were France, Italy, Sweden and Spain. In contrast, during the period under review, the most dynamic healthy food markets were Latvia with an increase in sales of 1175%, Lithuania (up 742%) Bulgaria (up 371%), Romania (up 246%) and the Czech Republic (up 223%).



Specification	X_4		X_6	
	2012	2021	2012	2021
Min	4,00	30,00	0,58	2,06
Max	6970,00	15870,00	158,94	383,55
Median	112,00	274,56	23,50	50,37
Mean	850,92	2111,22	37,56	87,63
Standard deviation	1609,21	4031,90	42,49	103,47
Coefficient of variation	1,89	1,91	1,13	1,18

*For Estonia X_4 , X_6 lack of data for 2012, the data for 2017 was adopted.

Figure 4. Organic retail sales [million €] and organic per capita consumption [€/person] in selected EU countries and quantitative characteristics in 2012 and 2021.

Source: Own study based on designations as in Table 1.

Considering healthy food consumption per capita, all countries except Croatia increased in value. Consumption of healthy food in 2021 in comparison to 2012 increased the most in Denmark, Sweden and Austria by €225/person, €171/person and €141/person respectively.

A statistically significant correlation was identified in the data between the number producers (X_1) and area under organic cultivation (X_2) and the sales value of organic products (X_3) (Tab. 2).

Table 2.
Correlation coefficients between organic food market variables

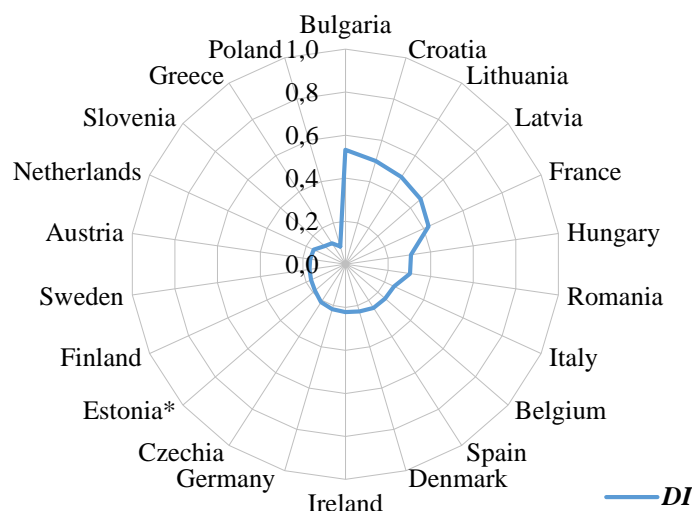
Specification	2012					2021				
	X_1	X_2	X_3	X_4	X_5	X_1	X_2	X_3	X_4	X_5
X_2	0,88***					0,92***				
X_3	0,12	0,18				0,16	0,16			
X_4	0,44*	0,57**	-0,05			0,57**	0,70***	0,04		
X_5	0,03	0,09	0,50*	0,35		0,11	0,19	0,55**	0,40	
X_6	-0,09	0,03	0,13	0,44*	0,72***	0,05	0,16	0,25	0,46*	0,84***

Statistically significant respectively: *: p value < 0,05; **: p value < 0,01; ***: p value < 0,001.

Source: Own study based on designations as in Table 1.

A statistically significant relationship was also found between the area occupied by organic crops (X_2) and the amount obtained from the sale of organic products (X_4). The increased interest in purchasing healthy food reported by consumers (X_6) increases the share of the healthy food market in total food sales (X_5), which is confirmed by the high value of the correlation coefficient between these variables.

Considering the aggregate indicator of organic food market development, the leading positions in the ranking were taken by the countries that joined the EU after 2004, Bulgaria, Croatia, Lithuania and Latvia. Poland was ranked lowest (Fig. 5).



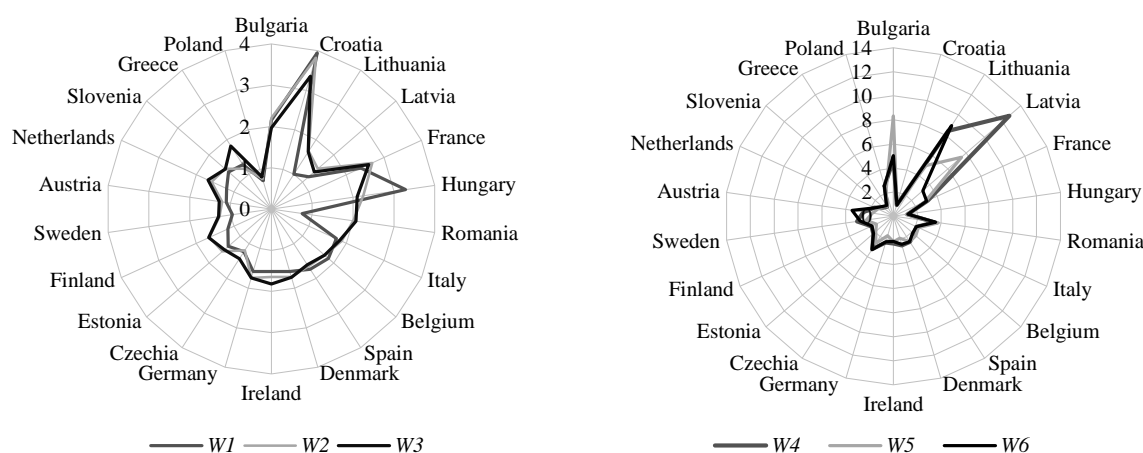
*for Estonia W_4 , W_5 , W_6 lack of data for 2012, the data for 2017 was adopted.

Figure 5. Ranking of EU countries on organic food market development indicator.

Source: Own study.

The largest increase in the W_1 - W_3 indicators for the EU countries was observed in Croatia where the indicators describing the supply side of the market changed most dynamically. Croatia is described by the maximum values of the indicators (Fig. 6), which corresponds to a 294% increase in the number of organic producers, a 282% increase in the area under organic

cultivation and a 236% increase in the share of organic cultivation in the total crop. Significant changes took place in the Hungarian market where the number of organic producers increased by 230%.



Specification	W_1	W_2	W_3	W_4	W_5	W_6
Min	0,72	0,77	0,82	0,95	0,97	0,99
Max	3,94	3,82	3,36	12,75	8,33	8,94
Median	1,38	1,66	1,70	2,39	2,16	2,31
Coefficient of variation	0,48	0,35	0,28	0,84	0,71	0,61
Correlation coefficients						
W_2	0,85***					
W_3	0,82***	0,96***				
W_4	-0,27	-0,13	-0,22			
W_5	-0,14	0,01	-0,09	0,81***		
W_6	-0,31	-0,10	-0,17	0,64**	0,65***	

W_j defined according to the formula (2); for Estonia indicators W_4 , W_5 , W_6 determined in relation to the year 2017; Statistically significant respectively: *: p value < 0,05; **: p value < 0,01; ***: p value < 0,001.

Figure 6. Values of organic food market development indicators and their quantitative characteristics and correlation coefficients.

Source: Own study.

The lowest values for indicators W_1 - W_3 were adopted for Poland with a decrease, the number of producers by 28%, the area of organic crops by 23% and the share of organic crops in the total area of crops decreased by 18%. Important from the point of view of the development of the organic food market is the information that, apart from Poland and, in the case of indicator W_1 , Romania, the other countries recorded an increase in the indicators describing the supply side of the market.

Considering the demand side, the highest increase in the value of sales in 2021 compared to 2012 was in Latvia, with an increase of 1175%. This was followed by Lithuania and Bulgaria with increases of 742% and 371% respectively. A slight decrease in the value of organic goods sold was recorded in Croatia (by 5%) and Greece (by 4%).

The increase in the market share of healthy food in total sales was highest in Bulgaria, with a change of 733%, and in Latvia, with a change of 650%. For this indicator, only Greece saw a decrease in market share in 2021 compared to 2012.

4. Conclusion

Measures taken in EU countries to promote organic farming have been effective in increasing organic food production. As a result, there is an increase in the number of organic farms and organic areas, and the EU maintains its leading position in the global market for this type of production. The organic food market in Europe has been one of the most rapidly growing sectors of the food market since the 1990s. Increased organic awareness and the trend towards higher needs are also stimulating an increase in demand for healthy food. Such food is produced on organic farms, where no artificial fertilisers are used. The simultaneous increase in demand and supply creates favourable conditions for the development of a distribution system for organic products.

Demand for organic food is growing, both in countries with higher levels of economic development and in developing countries. Still, sales of organic food as a part of total food sales remain low. The highest share of organic food is found in Western European countries, including Denmark (13%), Austria (11,6%) and Sweden (8,9%), at the same time Denmark and Sweden had the highest per capita expenditure on organic food.

In addition to Western European and Scandinavian countries, where organic food sales and consumption are highest, Central European countries are also becoming more and more important. Considering the dynamics of market changes, the most significant changes took place in Croatia, which allowed it to take a leading position in terms of the dynamics of development of the supply side of the healthy food market, represented in the analyses by the number of organic producers and the area under organic cultivation. Considering the demand side of the market, the highest increase in organic retail sales (W_4) was recorded in Latvia, organic retail sales share (W_5) in Bulgaria and organic per capita consumption (W_6) in Lithuania.

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