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Development and Effects of Organic Farms in Poland, Taking into Account Their Location in Areas Facing Natural or Other Specific Constraints

Marek Zieliński [1,*], Wioletta Wrzaszcz [2], Jolanta Sobierajewska [1] and Marcin Adamski [1]

[1] Department of Economics of Agricultural and Horticultural Holdings, Institute of Agricultural and Food Economics, National Research Institute, 00-002 Warsaw, Poland; jolanta.sobierajewska@ierigz.waw.pl (J.S.); marcin.adamski@ierigz.waw.pl (M.A.)
[2] Department of Agricultural Economy, Agricultural Policy and Rural Development, Institute of Agricultural and Food Economics, National Research Institute, 00-002 Warsaw, Poland; wioletta.wrzaszcz@ierigz.waw.pl
* Correspondence: marek.zielinski@ierigz.waw.pl

Abstract: Organic farms should, by definition, place particular emphasis on the protection of agricultural soils, landscape care and activities aimed at producing high-quality agricultural products. However, when joining this production system, the farms face many challenges in order to make these contributions to society at the expected level. The main aim of the study is to determine the scale of disproportions in production effects achieved by farms between organic and conventional production systems, taking into account the quality of natural management conditions. An equally important goal is to determine the factors in Polish agriculture that determine whether to conduct this production system. The paper aims to indicate the direction of development of organic farming in the EU, including Poland, based on the Eurostat data for 2012–2020. It was noted that the current development of the organic farming sector in EU member states has been at different rates. In Poland, its development strength largely depends on the presence of ANCs. Nearly ¾ of organic utilized agriculture area (UAA) is located in communes with a large share of them. Organic farms achieve lower production effects in comparison to conventional farms, and their disproportions also depend on the quality of natural farming conditions. In Poland, the personal competences of farmers are also an important determinant in joining organic farming.

Keywords: areas facing natural or other specific constraints (ANCs); EU CAP; Farm Accountancy Data Network (FADN); organic farms; production effects; yield gaps

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1. Introduction

Globally, negative changes in the natural environment are currently intensifying, often caused by agriculture [1,2]. The process results not only from the intensification of production in areas with favorable natural conditions for production, but also from the simultaneous abandonment of land that is particularly difficult to cultivate [3–7]. Thus, agriculture largely contributes to increased degradation of the natural environment [8,9]. This state of affairs results in the opinion that in order for agriculture to have a positive impact on its condition, it requires the presence of permanent and stable institutional rules of conduct consistent with social interest. First of all, we are discussing principles regarding the need to provide society with environmental goods resulting from the proper protection of ecosystems. Agriculture on its own cannot sufficiently ensure many values valued by society, including those related to the good condition of nature.

In the European Union (EU), in supporting agriculture in its efforts to protect the natural environment, an important role is played by the set of standards, regulations and incentives included in the European Green Deal (EGD) strategy of 2019, in its thematic strategies for 2020–2022, and also in the EU Common Agricultural Policy (CAP), revised

every few years, which increasingly emphasizes the role of institutional activities aimed at meeting society's needs in terms of the consumption of high-quality agricultural goods and the stable and sustainable acquisition of a wide range of environmental goods [10–12]. One of the most important of them is the organic farming measure [13]. This measure has been a permanent part of European agricultural policy for many years, serving to promote in agriculture the agricultural production system that is most consistent with the social interest in order to effectively overcome the progressive degradation of the natural environment [14]. Financial support is provided to farmers who voluntarily decide to stop using conventional practices in agricultural production, including the use of chemical plant protection products and artificial fertilizers. As a result, this situation improves the quality of food offered by organic farms, ensures public health and brings a number of non-market benefits to the natural environment [15]. Moreover, participation of farms in this measure is often a real chance to improve their economic situation, due to the possibility of obtaining additional payments, selling certified organic products and developing agritourism. However, farms joining the organic farming system face many challenges. First of all, they must cope with a lower supply of nutrients in the soil and a limited ability to effectively combat weeds, pests and diseases, which, as a result, are often associated with lower yields of crops, as compared to conventional agriculture [16–18]. Despite these weaknesses, the organic farming system is able to meet one of the basic objectives of the EU CAP, which concerns the need to achieve a balance in agriculture between ensuring satisfactory agricultural income and providing environmental goods to society [19,20]. However, in agriculture, an acceptable level of income is usually an important condition for effective protection of the natural environment [21,22]. This situation is particularly important in areas facing natural or other specific constraints (ANCs), where farms have limited opportunities to obtain satisfactory economic effects from conventional production. The implementation of institutional environmental measures in these areas, including organic farming under the EU CAP, is one of the important opportunities. This circumstance occurs in agriculture in Poland, where the presence of ANCs is an important determinant of greater participation in this measure. These areas play an important role in Poland [23]. Their current share in the total area of utilized agricultural area is 58.7% [24].

This study is intended to fill the research gap regarding determining the potential and production effects of organic farms, as compared to conventional farms in areas with different saturation of ANCs in Poland. The main aim of the study is to determine the scale of disproportions in production effects achieved by farms between organic and conventional production system. An equally important goal is to determine the factors in Polish agriculture that determine whether to conduct this production system. The additional aim of this research is also to indicate the direction of development of organic farming in the EU, including Poland, based on the Eurostat data for 2012–2020. In the international literature, there is still a shortage of the type of analyses conducted in relation to the newly designated ANCs in the EU, including Poland, under the CAP 2014–2020 and applicable in the CAP 2023–2027.

2. Materials and Methods

In order to fill the research gap indicated in the introduction, first of all, a review of the international literature was carried out regarding the results of research on the scale of potential disproportions in the obtained production effects in the organic farming, as compared to conventional agriculture, as one of the important determinants of the development strength of this production system in EU, including in Poland. Next, the current direction of development of organic agriculture in the EU, including Poland, was determined based on Eurostat data. In turn, data from the Agency for Restructuring and Modernization of Agriculture, which in Poland serves as a public institution implementing payments under the EU CAP, were used to determine the national status of organic farming supported under the EU CAP 2014–2020, including taking into account various natural conditions for management in communes. In order to assess the potential production

effects of organic farms against the background of conventional farms operating in various management conditions, data from farms continuously keeping accounts for the Polish Farm Accountancy Data Network (FADN) in 2019–2021 were used. The Polish FADN is part of the European system for collecting accounting data from farms and one of the basic tools of the European Commission, supporting it in programming and assessing the implementation of EU CAP measures. The analysis covered 207 organic (after conversion) farms and 641 conventional farms operating in the same communes with at least a 75% share of ANCs in the total utilized agricultural area (UAA), referred to as communes with a high share of ANCs. On the other hand, the same analysis covered 65 organic (after conversion) farms and 264 conventional farms from the same communes where the share of ANCs was smaller or such areas did not exist (Figure 1). Finally, the direction and strength of the influence of factors underlying farms' decisions to participate in organic farming were identified. For this purpose, a logistic regression model was used, based on data from farms participating in the production system, as compared to farms that did not participate in it and continuously kept accounting for the Polish FADN in 2019–2021. The adopted model was intended to determine the factors influencing farmers' decisions to switch to organic production methods. Therefore, the dependent variable was information about whether organic methods were used on the farm or not (1 or 0), where 1 was considered to be organic farms and 0 was considered to be conventional farms. In the literature, logistic regression models are widely used to identify factors that determine farmers' willingness to participate in voluntary environmental measures under the EU CAP [25–28].

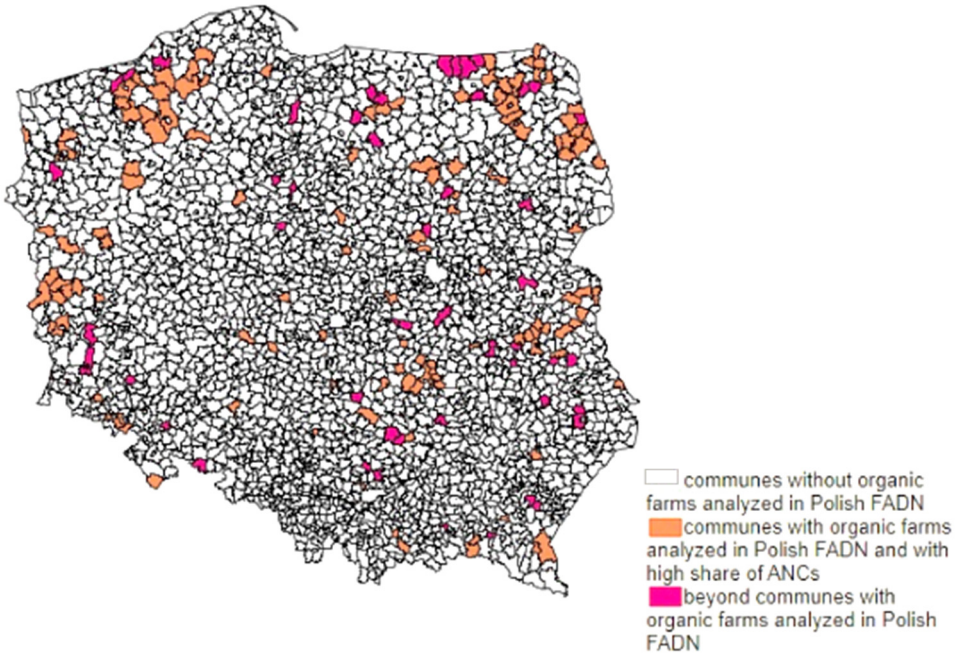

Figure 1. Distribution of communes with farms included in the analysis based on Polish FADN data for 2019–2021.

3. Theoretical Backgrounds

3.1. Yields Gaps between Organic and Conventional Farming: Literature Review

The organic farming system is a comprehensive agricultural system that uses a number of processes to ensure sustainable functioning of ecosystems, food safety, animal welfare and social justice [29]. Organic farming, therefore, has a positive impact on protecting the natural environment, preserving biodiversity and offering high-quality food [30]. However, one of the basic weaknesses of this production system, as compared to conventional agriculture, is about the often lower production effects, which is related to the production only using natural means of production, which limits the possibilities of increasing productivity [31,32]. It is also the main criticism, because in common opinion, global food production

should constantly increase to feed the constantly growing population of people who, at the same time, report an increasing demand for a high-calorie diet [33,34]. On the other hand, the fact is that in reality, global food production still keeps pace with the growing demand of the world's population, but equitable access to it remains the problem; for many people, it is limited or impossible as a result of prevailing local social, political or economic factors [35].

Feledyn-Szewczyk et al. [36] indicated that the yields of cereal crops in organic farming, as compared to conventional agriculture are, on average, 25 to 50% lower. However, Alvarez [37] obtained research results indicating an average difference in crop yields of 25% to the detriment of organic farming, with a larger difference in the case of cereals (30%), and a much smaller difference in the case of legumes (10%). Ponti et al. [38] obtained a similar strength of differences between cereals and legumes in the compared agricultural production systems.

Boschiero et al. [13] received an average 22% decrease in crop yields in the organic system, as compared to the conventional one. In turn, Seufert et al. [39] and Seufert and Ramankutty [40] presented results according to which average yields of crops in this production system turned out to be lower by between 5 and 34%. A different range of disproportions in crop yields to the detriment of organic farming was the result of research by Kirchmann and Ryan [41], which ranged from 20% to 45%. An even greater range in the difference occurred in the analyses of Ziętara and Mirkowska [42] and Hagner et al. [43], where it ranged from 28 to 60% and 12 to 45%, respectively. In turn, a much smaller difference occurred in the study by Sacco et al. [44], who obtained yields of organic plants that were 12 to 29% lower than those of analogous plants grown in a conventional system. All the mentioned research results have in common the belief of their authors that in economic reality, the scale of disproportions in crop yields in the organic and conventional systems depends to a large extent on the knowledge, skills and commitment of farmers in the proper selection of agricultural practices. For the success of crops in organic farming, it is, first of all, desirable to use long crop rotation cycles; they are the basic method of stabilizing yields in the production system, including through limiting the occurrence of weeds and outbreaks of diseases and pests, large-scale cultivation of intercrops, appropriate amounts and quality of natural fertilizers, varietal progress and proper selection of crop plants, which allows better use of the natural potential of a given habitat and effectively counteracts increasing occurrence of pests, as well as plant protection using biological agents [45–48]. When these practices are used in organic farming, the documented scale of disproportions in crop yields is often much smaller. This is confirmed by the results of research by Ponisio et al. [49], who, using correct agrotechnics, achieved differences in yields ranging on average from 3 to 13%, to the detriment of organic farming. The existence and strength of differences in crop yields in the organic and conventional systems may also depend on natural farming conditions. The issue becomes particularly important for agriculture in Poland, which is characterized by a large share of areas with difficult or particularly difficult conditions for farming within the ANCs' delimitation. In Poland, organic farming is very important in these areas. Therefore, the question arises about potential differences in production effects in organic and conventional farming in communes with a large share of ANCs, as compared to other communes. An attempt was made to answer this question in the final section of this study.

3.2. The Direction of Organic Farming Development in the EU, including Poland

The EGD highlighted the importance of organic farming in achieving the EU environmental goals. According to the introduced European strategies, in 2030, the share of agricultural area covered by organic farming should reach 25% [50,51]. Such an ambitious goal of increasing the area of agricultural land in the organic system results from the role of those farms in shaping the natural environment, climate and society [52].

Based on Eurostat data, mainly for 2012 and 2020, the basic determinants of the development of organic farming in the EU (EU-27) are presented. One of the most important

is the area of organic UAA, which increased by more than half in the adopted analysis period, from 9.5 million ha to 14.7 million ha. The area includes the area that was converted and which is in the process of being converted to organic farming. Currently, the area constitutes 9% of UAA intended for agricultural purposes in the EU and, when compared to the adopted strategic goal of 25%, it highlights the distance that European agriculture has to overcome in the coming years. From the perspective of the current development experience of European agriculture, the strategic goal regarding the development of organic farming is appropriate, and the direction of changes is consistent with the expected [53].

EU agriculture is diverse, also in the field of organic farming [52,54,55]. The differentiation is evidenced by both the absolute and relative difference in the area of organic UAA, as well as the pace of change in this respect in individual EU Member States (Figures 2 and 3).

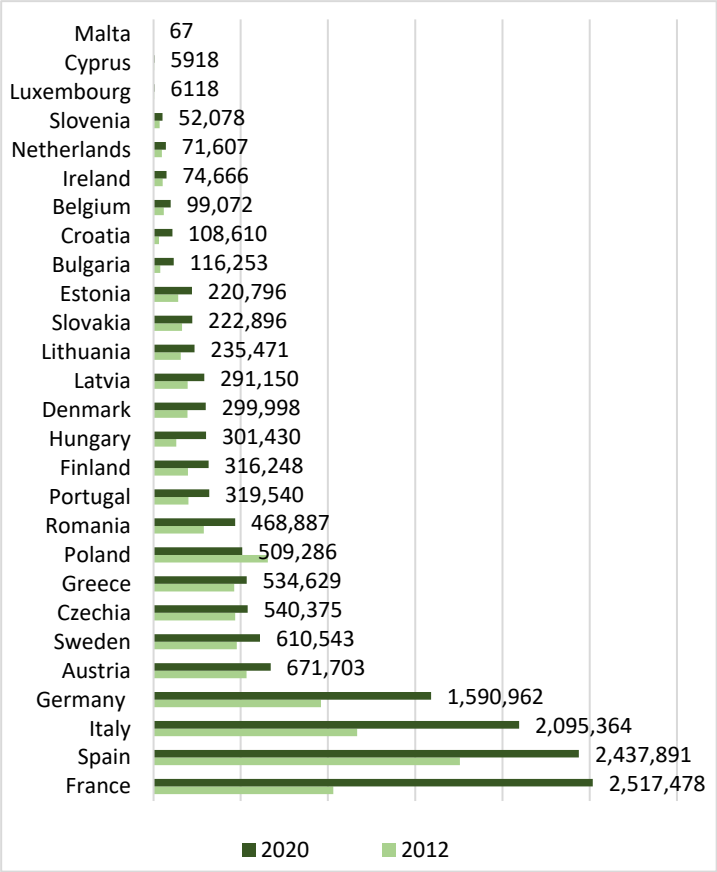

Figure 2. Utilized agricultural organic farming area in EU-27 (in ha).

The presented statistics indicate that almost 60% of the total area of UAA cultivated in accordance with organic principles is concentrated in four European countries (approximately 8.5 million ha, 2020). The leaders in this respect include France, Spain, Italy and Germany, which determines their importance in the European organic market, and also in the context of achieving the environmental EGD goal for 2030 at the EU level.

Individual EU countries changed the area of UAA intended for organic management at different rates. In the period under consideration, only in Poland, the area of organic UAA decreased by more than one-fifth. The illustrated results indicate (Figure 3) that, on the one hand, countries with a large area of organic UAA continue to significantly increase it (example of France, Italy and Germany), and on the other hand, other countries with a small area covered by this production system are dynamically developing this segment of the agricultural sector. Croatia, Bulgaria and Hungary are examples of the latter group (the rate of change exceeded 80% taking into account the period 2012–2020).

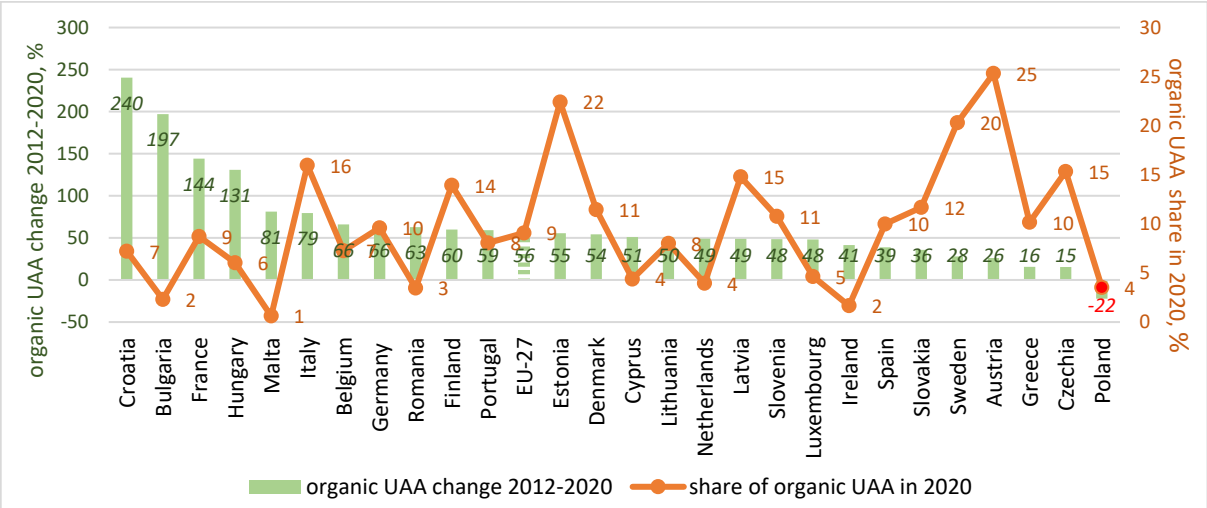

Figure 3. The change in organic utilized agricultural area in EU between 2012 and 2020 (%) and percentage of organic UAA in 2020 (%). UAA—utilized agricultural area.

Taking into account the current share of organic area in UAA in individual countries (2020), the most favorable results are recorded in Austria, Estonia and Sweden (over 20% of land), followed by Italy, the Czech Republic and Latvia (approximately 15%). The agriculture of these countries has been distinguished by high results in this respect for years, which results from both production conditions and the wealth and awareness of the local community.

The key information indicating the development of organic farming is the number of farmers—organic producers. In 2012–2020, the number of farmers engaged in organic farming increased by over 30%, from 248 thousand up to 334 thousand. Taking the over-50% increase in the area of organic crops at the same time as a reference point, it can be assumed that a significant part of producers successively increased their area of organic crops. The comparison proves the increased production potential of organic farms, thus improving their market and economic position.

Italy, Spain, France and Germany are the countries with the largest population of organic farmers, whose number has been gradually increasing (by approximately 50–60%, depending on the country). The four countries account for more than half of all organic farmers in the EU. On the other hand, the number of organic farmers decreased in three European countries, namely in Romania (by almost 40%), in Poland (by over a quarter), and in Lithuania (by over 10%). Of them, only in Poland is there a reduction in both the area and the number of organic farmers (Figure 4).

To sum up, the presented numerical statistics illustrate the scale and pace of changes in the development of organic agriculture in the EU as a community and in the dominant majority of member states in 2012–2020. Differences in this respect between countries are justified due to the different production potential of agriculture, and its different economic, environmental, climatic and social conditions. Taking into account the need for further development of the market segment—which was also highlighted in the EGD strategy for the coming years—institutional support, including educational and advisory support for farmers and society more broadly, has multilateral justification. The illustrated statistics confirm the development of organic farming in the EU, but its course differs significantly from the expectations presented in the official EC documents.

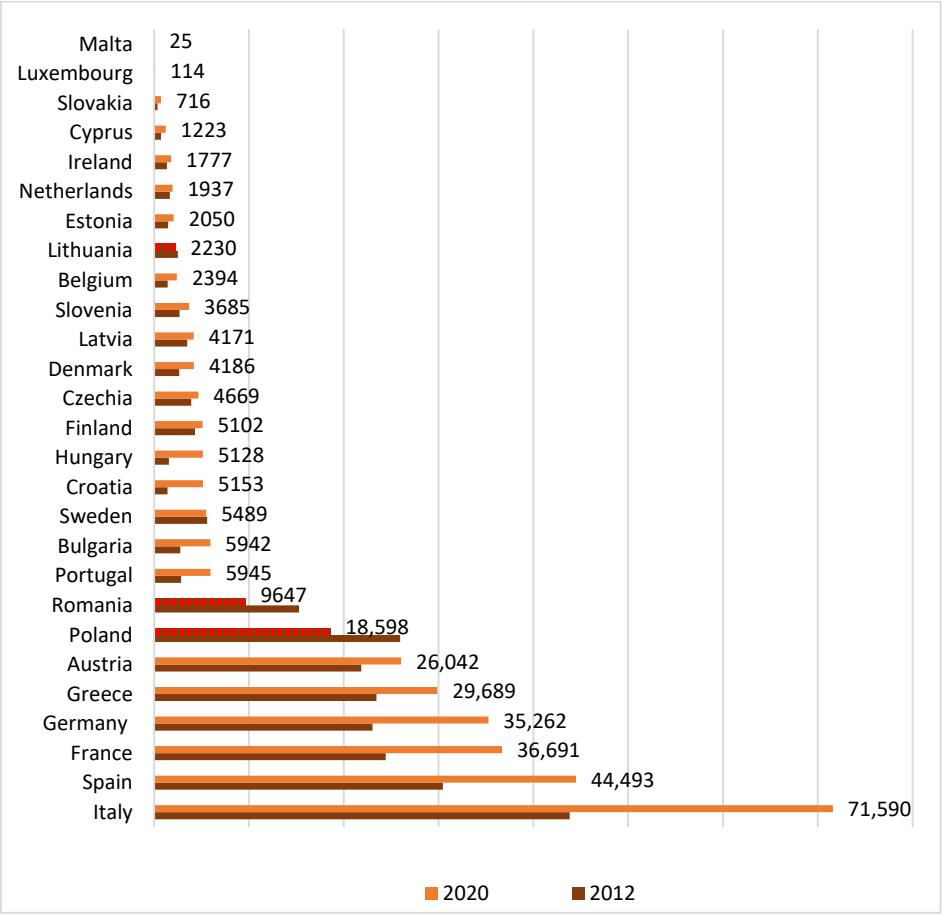

Figure 4. Number of agricultural organic producers in 2012 and 2020.

3.3. Natural Farming Conditions in Poland and the Development of Organic Farming Supported by the EU CAP

In the EU, including Poland, an important factor differentiating the possibility, direction and scale of agricultural production is the natural management conditions, which are characterized by spatial variability and a large share of ANCs (Figure 5). In the EU, the area of ANCs currently accounts for 57.9% of the total area of UAA. In Poland, the share of ANCs is close to the EU average, 58.7% [56]. From the point of view of the predisposition to provide society with high-quality agricultural products and a wide range of environmental goods, in Poland, the significantly greater presence of High Nature Value farmlands (HNVfs) in the total area of UAA is the advantage of communes with a high share of ANCs, as compared to communes that are the reference point [57,58].

In Poland in 2022, communes with high ANCs' saturation accounted for 49.6% of the total number of farms and 47.3% of the total area of UAA covered by the CAP 2014–2020. It should also be noted that these communes accounted for 42.7% of the total area of arable land and 70.8% of the total area of permanent grassland (Table 1). In these communes, characterizing worse management conditions has consequences in the structure of land use. It is evidenced by, among others, a much larger area of permanent grasslands than in other communes, which in the areas serve not only as an important source of fodder for grazing animals, but also serve to better protect the rich biodiversity and diversified landscape. Permanent grasslands in these areas are also an important element of HNVfs in Poland.

In areas with a high share of ANCs, the coexistence of diversified plant production with structural plants on arable land and animal production on permanent grasslands is one of the basic conditions for conducting profitable agricultural production. It then ensures optimal soil protection by maintaining and increasing their fertility, including through the use of natural fertilizers, as well as ensuring the good condition of the landscape, including

by grazing animals. In this context, organic farming under the EU CAP has a lot to offer. This opinion is confirmed by the fact that in 2014–2022, 71.6% to 74.8% of the total area of UAA with organic farming supported under the CAP 2014–2020 was located in communes with a high share of ANCs. In addition, its share in the total area of UAA ranged from 3.9 to 5.6%, while in the remaining communes, it ranged from 1.6 to 2.1% (Figures 6–8).

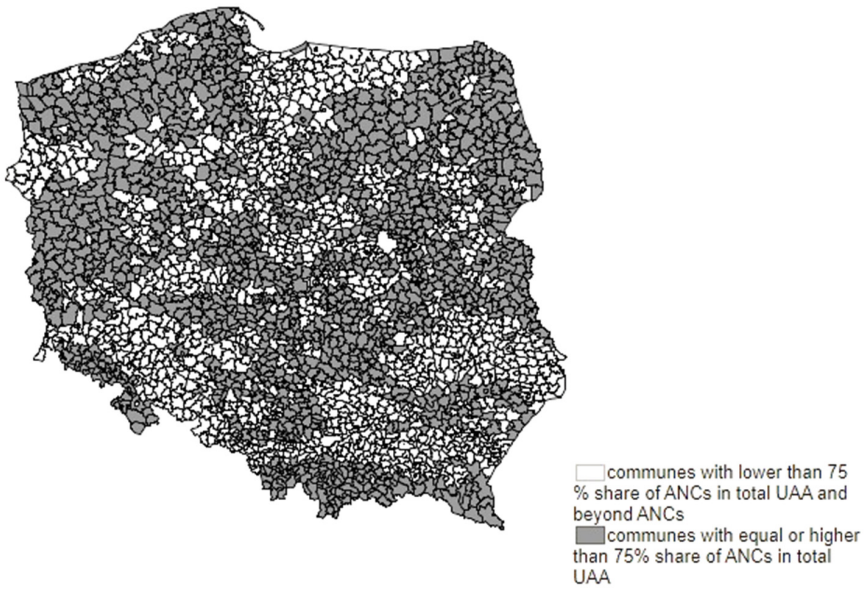

Figure 5. Distribution of ANCs by communes in Poland.

Table 1. Organizational features of agriculture in communes with different saturation of ANCs in 2022 in Poland.

Variable	Communes	
	With a High Share of ANCs	Remaining
Number of farms (thousands)	620.6	631.4
UAA (thousand ha), including:	6705.4	7459.0
arable lands (thousand ha)	4807.8	6440.2
permanent grasslands (thousand ha)	1790.3	737.6

Source: own study on the basis of ARMA for 2022.

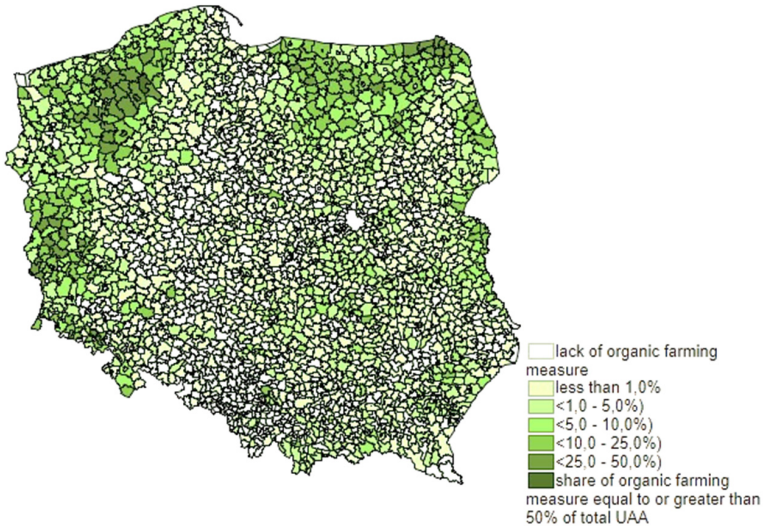

Figure 6. Distribution of area supported under the organic farming measure under the EU CAP by communes in Poland in 2022.

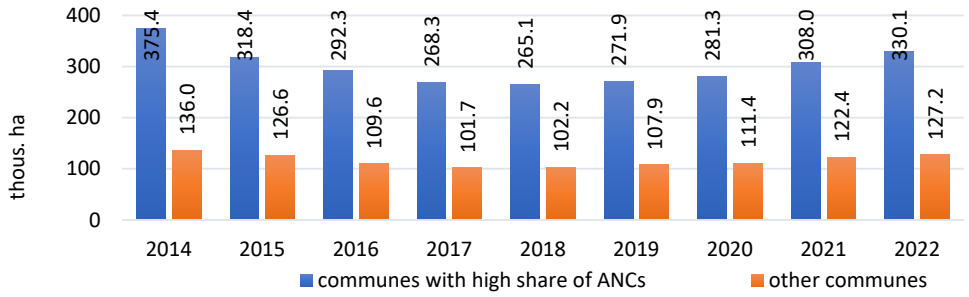

Figure 7. UAA supported under the organic farming measure in the CAP 2014–2020 by communes with different ANCs saturation in Poland in 2014–2022 (thousand ha).

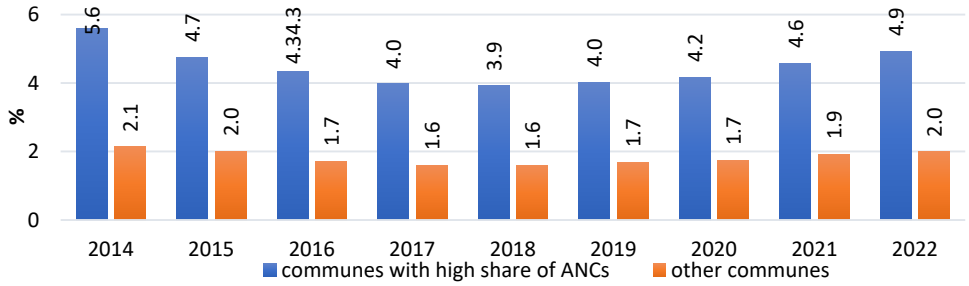

Figure 8. Share of UAA supported under the organic farming measure in the CAP 2014–2020 in total UAA by communes with different ANCs saturation in Poland in 2014–2022 (%).

4. Results

4.1. Production Potential and Effects of Organic Farms Based on Polish FADN Data

Based on the analysis of Polish FADN data from 2019 to 2021, organic farms located in communes with a high share of ANCs had a 40% smaller economic size, as compared to conventional farms from the same communes. They are also characterized by a smaller area of UAA, on average by 16% and 28% in communes with a high share of ANCs and others, respectively (Table 2). The capital equipment of organic farms is also at a lower level (on average by 25–27%), as compared to other farms in similar communes.

Table 2. Production potential of organic and conventional farms in communes with different ANCs saturation in the light of Polish FADN data for 2019–2021.

Variable	Organic Farms		Conventional Farms	
	With a High Share of ANCs	Remaining	With a High Share of ANCs	Remaining
Number of farms	207	65	641	264
Economic size (thousand euros of standard output)	29.3	40.6	49.3	54.0
UAA (ha), including	29.7	28.1	35.4	39.0
rented area (%)	25.9	32.0	30.5	30.0
Total labor input (AWU)	1.63	1.91	1.68	1.74
including own labor input (%)	88.3	77.0	94.0	91.4
Total value of assets (thousand euros)	204.8	241.9	280.6	321.3

Source: own study on the basis of Polish FADN from 2019 to 2021.

Different organic production technology, as compared to conventional production, leads to different relationships between production factors. First of all, on organic farms there is a lower ratio of capital to labor input, which indirectly indicates the use of more labor-intensive production techniques. Organic farms, regardless of their location, are also characterized by a higher labor force, which also results from the replacement of capital with labor inputs (Table 3).

Table 3. Relationships between production factors of organic and conventional farms in communes with different ANCs saturation in the light of Polish FADN data for 2019–2021.

Variable	Organic Farms		Conventional Farms	
	With a High Share of ANCs	Remaining	With a High Share of ANCs	Remaining
Capital to labor ratio (euro '000/AWU)	125.7	125.7	167.0	184.6
Relation of labor inputs to UAA (AWU/100 ha)	5.5	6.8	4.7	4.5

Source: own study on the basis of Polish FADN from 2019 to 2021.

On organic farms, crop yields were usually much lower, as compared to conventional farms. In the case of communes with a high share of ANC areas, the differences ranged from 15 to 69%, and in the case of other communes, from 4 to 52.7%. The same situation occurred in the case of milk productivity of cows kept in the organic farming, which in communes with a high share of ANCs and others was lower by 29.0 and 19.4%, respectively, than in the conventional system. It means that poorer farming conditions, to some extent, increase the difference between most comparable production outcomes to the detriment of organic farming (Table 4).

Table 4. Yields of crops (t/ha) and milk yield of cows (kg/cow) of organic and conventional farms in communes with different ANCs saturation in the light of Polish FADN data for 2019–2021.

Description	Organic Farms from Communes		Conventional Farms from Communes	
	With a High Share of ANCs	Remaining	With a High Share of ANCs	Remaining
Wheat	3.7	3.8	5.0	6.2
Rye	2.0	2.9	3.8	4.2
Barley	2.6	4.4	4.2	5.1
Oat	2.3	3.5	3.4	3.9
Triticale	3.0	4.8	4.4	5.0
Edible legumes	0.7	1.2	2.2	2.2
Rapeseed and turnip rape	1.1	2.6	2.9	3.1
Onion	13.6	12.2	16.0	25.8
Strawberries	4.0	5.0	5.8	7.2
Apples	5.1	17.7	16.4	33.9
Milk yield	3617	4164	5094	5167

Source: own study on the basis of Polish FADN from 2019 to 2021.

The scale of disproportions in the production effects achieved to the detriment of organic farms indicates that in Poland, the system requires the presence of satisfactory and stable financial support from agricultural policy in order to continue and develop in conditions of growing competitive pressure. The state of affairs is particularly expected in ANCs, where its permanent presence contributes to the provision of many environmental goods to society related to the improvement of soil condition and the preservation of a diversified and valuable landscape, which are increasingly more valuable.

4.2. Factors Co-Determining the Entry of Farmers into Organic Farming in Poland in the Light of the Polish FADN Data

Table 5 presents the results of the estimated parameters, the results of the Wald test, the likelihood ratio (LR) and Nagelkerke's pseudo-R2 for the analyzed logit model. Of the eight explanatory variables included in the model, six turned out to be statistically significant, and in the case of two of them, the dependence of an increase by one unit had a positive impact on the probability of the farm undertaking production in an organic system. The other four factors that negatively influence this probability also turned out to be statistically significant.

Table 5. Estimated parameters, Wald and Likelihood Ratio (LR) test, odds ratios and Nagelkerke's pseudo-R2 measure for the logistic regression model.

Description	β	Standard Error (SE)	Wald	Confidence Intervals (95%)		ρ	exp(β)	Confidence Intervals (95%)		ρ	Likelihood Ratio Test (LR Test)		
				Upper	Lower			Upper	Lower		Logarithm of Maximum Likelihood (lnL)	Chi-Square	ρ
Free expression	−0.87882	0.713329	1.51780	−2.27691	0.519284	0.217952	-	-	-	-	−636.020	-	-
Possession of rented land	−1.21345	0.317027	14.65039	−1.83481	−0.592086	0.000129	0.297171	0.159644	0.553172	0.000129	−627.021	17.99831	0.000022
Farmer's age	0.02873	0.011231	6.54372	0.00672	0.050740	0.010526	1.029145	1.006740	1.052050	0.010526	−624.271	5.50022	0.019014
The fact that the farmer has higher education	0.60148	0.196457	9.37345	0.21643	0.986525	0.002202	1.824810	1.241632	2.681899	0.002202	−620.657	7.22794	0.007178
The fact of managing **a farm by a young farmer**	0.38299	0.267268	2.05347	−0.14084	0.906828	0.151860	1.466668	0.868626	2.476456	0.151860	−619.508	2.29753	0.129580
Value of assets per 1 ha of UAA	−0.00001	0.000004	10.85141	−0.00002	−0.000005	0.000987	0.999988	0.999981	0.999995	0.000987	−616.596	5.82378	0.015811
Shannon-Wiener index	−0.80335	0.142361	31.84416	−1.08237	−0.524329	0.000000	0.447826	0.338791	0.591953	0.000000	−598.838	35.51664	0.000000
Agricultural income per 1 ha of UAA	0.00003	0.000024	1.85906	−0.00001	0.000079	0.172734	1.000032	0.999986	1.000079	0.172734	−597.920	1.83623	0.175394
UAA on a farm	−0.00587	0.002552	5.29913	−0.01088	−0.000873	0.021336	0.994143	0.989183	0.999128	0.021336	−594.860	6.11888	0.013375

Pseudo-R2 Nagelkerke's = 0.102283; Statistically significant explanatory variables are shown in bold. Source: own study on the basis program Statistica and Polish FADN from 2019 to 2021.

The farmer's higher education was the factor with a high positive correlation. It was found that having higher education resulted (exp(β) = 1.824810) in the greatest increase in the probability of undertaking organic production. Older farmers were also more likely to switch to organic farming (exp(β) = 1.029145). The state of affairs means that in the surveyed group of farms, farmers with more experience and better education are more interested in the organic system. It should be noted that in this context, the greater age of the farmer may, in practice, result in a re-evaluation of certain priorities, for example, a shift from quantity to quality of agricultural production. Another statistically significant variable was the ownership of land on the farm in the form of rent. Owning land without a title to the farm resulted in a decrease in the probability of switching to organic production methods (exp(β) = 0.297171). The situation is justified because a farmer conducting organic production signs a five-year commitment not to discontinue it on the declared agricultural plots. No ownership rights to some land mean an increase in the risk associated with potential financial claims of the Agency for Restructuring and Modernization of Agriculture in the event of loss of the ability to use the lands during the implementation of the organic obligation.

The value of the Shannon–Wiener index was another important factor describing the probability of a farm switching to organic production methods. The index determines the degree of simplification of the sowing structure (the lower the index value, the greater the simplification in plant production). The value of the estimates of this parameter was exp(β) = 0.447826. The relationship confirms the often smaller diversity of crops on organic farms, as compared to conventional ones.

The obtained model also showed small negative relationships between the value of assets per 1 ha of UAA, the farm area (ha) the tendency to undertake organic farming on a farm.

5. Discussion

The analysis carried out proves that the process of increasing the area and number of organic farms in the EU is progressing, although its strength varies in individual member states. However, it should be noted that in Europe, including the EU, there are not only changes in production from conventional to organic, but also from organic to conventional. For example, in Switzerland, as a result of the situation, the number of farms with organic production remained almost unchanged in 2008–2017 [59]. In Denmark, however, the number of organic farms grew rapidly until 2001. However, since 2002, there has been a profound breakdown in the current trend. It slowed down only in 2012–2014, and from the following year, the number of organic farms in Denmark began to grow again [60].

In Poland, farms operating in areas with a high share of ANCs are distinguished by two features, as compared to farms in other areas. The first is not only the poor quality of soil, but also the often smaller share of arable land and large permanent grasslands, as well as the location in communes with a large share of areas with agriculture meeting the characteristics of High Nature Value farmlands (HNVfs) in communes. The second feature of farms operating in areas with a high share of ANCs is expressed in the faster development of organic farming. It is evidenced by the fact that in 2014–2022, in the area of the communes, 71.6% to 74.8% of the total area of UAA with organic farming supported under the CAP 2014–2020 was located. Moreover, the share of area devoted to organic production in communes with a high share of ANCs was more than twice as large as in communes with more favorable conditions. A probable and important cause of the phenomenon was the possibility of obtaining subsidies for organic farming provided under the CAP 2014–2020. Organic subsidies are able to, first of all, improve the income of farms operating on ANCs in the situation of their limited ability to intensify conventional production. Similar findings result from the analyses of Kołoszko-Chomentowska [61]; they pointed out that public funds under environmental measures, including organic farming, are an important and sometimes leading source of income for farms in these areas. These opinions are continued in the research of Jansky et al. [62], Haring and Offermann [63],

Kallas et al. [64] and Perpar and Udovc [65], according to whom organic farming supported by public funds is an important opportunity for the operation of farms in ANCs.

Our findings confirm that organic farms achieve lower production effects than conventional farms, ranging from 4 to 69%. In turn, the review of research results included in Section 3 of the paper suggests, on average, 3% to 60% lower yields in the organic system. The above-mentioned research results indicate that the disproportions are largely dependent on the species of cultivated plants and the fact and scale of the use of agricultural practices consistent with the idea of the organic farming system. In this study, we additionally proved that the disproportions also depend to some extent on the natural management conditions and are often greater in areas with a greater saturation of ANCs. The state of affairs is also confirmed by the results of research by Redlichova et al. [66], who conducted it on data from farms keeping accounts for the Czech FADN in ANCs and beyond. In this context, interesting analytical results are also provided by Siegrist et al. [67], who established that in the event of unfavorable climatic conditions, in the form of more and more frequent and more intense droughts, a properly implemented organic farming system compared to conventional farming ensures greater crop stability, which results from the greater ability of ecologically used soils to retain rainwater.

It was established that in the organic farming system, as compared to conventional farming, there are disproportions in crop yields. However, it should be emphasized that, especially in ANCs, an important goal of organic farming should be not only the production of (1) high-quality market goods, the sale of which can significantly improve farm income in a situation of limited possibilities of intensifying conventional production, but also (2) a range of environmental goods for society, resulting from the proper protection of their often valuable and diverse landscape.

6. Conclusions

Organic farming is an important part of the agricultural sector—also in Europe—which is of multifunctional significance. This is the basic form of sustainable agriculture. In addition to providing production volume and economic benefits to the farmer, it also provides benefits for society and the natural environment. The need to develop organic farming is additionally reinforced by the observed problems in the natural environment—its ongoing degradation, depletion of natural resources, disruption of ecosystem services and reduction in biodiversity. These issues directly affect agricultural producers. In this context, promoting pro-environmental activities—such as organic farming—is crucial both for agricultural producers and, more broadly, for the environment, social and natural.

Organic farming has been developing in the EU for years, but the pace of the development is still not at a sufficient level to meet the EGD goals in the 2030 perspective. The visible distance prompts us, on the one hand, to take further actions to support this agricultural system, including institutional and social, and on the other hand, to look for advantages—market and non-market—of organic farming and to stimulate its development. Currently, administrative instruments for its support under the EU CAP play an important role.

This paper presents the results of research conducted on various statistical data resources regarding agriculture on organic farms operating in the EU, and primarily in Poland. The focus was on the conditions for the operation of organic farms, through their location in areas characterized by difficult management conditions (ANCs). The production potential and production effects of organic farms were considered as one of the important factors in the development of this production system in the EU, including Poland, as well as the determinants of pro-environmental agricultural activity.

The research conducted allowed for the following conclusions to be formulated:

1. Taking into account the current development of the organic farming sector, including changes in the number of farms and the area of organic UAA in the EU in general and in the Member States, as well as the strategic goals for Europe by 2030, implementation

of the "organic" target at the level of 25% of agricultural land in an organic system will be very difficult.

2. Trends observed in individual countries in the development of organic agriculture indicate that this market segment has different economic importance, which may result from local and national conditions, including market, social and production. Austria, Sweden and Estonia are distinguished by a high share of organic area—over 20%. There are prospects for the development of the organic system in the Czech Republic, Latvia, Italy and Finland. France is the leader in terms of absolute area of organic UAA. However, in Poland, the market segment is still of little economic importance. However, it develops unevenly and to a large extent, this state of affairs depends on the natural management conditions.
3. In Poland, agriculture often conducts agricultural activities in difficult or even particularly difficult conditions within the delimitation of ANCs. It turns out that the organic farming measure under the EU CAP provides an important opportunity to support agriculture in these areas. In Poland, this measure is implemented in the vast majority of communes with a high saturation of ANCs. It should be emphasized that in these communes, the share of organic area supported under the CAP in the total area of UAA was more than twice as high as in the remaining communes. Farms on ANCs therefore see a greater real chance for further durability and development through participation in the organic farming system supported by the CAP.
4. Organic farms, as compared to conventional farms, are characterized by lower production potential, as well as different production technology expressed in less technical work equipment and greater use of human labor per unit area. Moreover, on organic farms, there is extensification of agricultural production, expressed in smaller production effects. However, worse natural conditions reinforce these disproportions.
5. In the EU, including Poland, the current tendency of agriculture to participate in the organic farming system depends on many factors. There is no doubt, however, that the leading one among them is the possibility of obtaining satisfactory financial compensation for the extensification of agricultural production due to participation in this system, which is reflected in lower production effects. In agriculture in Poland, the possession of worse natural conditions established as part of the delimitation of ANCs is an important determinant that also determines the greater willingness to participate in this production system. The greater presence of HNVfs characterized by diverse landscapes, often belonging to the Natura 2000 network, which are subject to special care by society, is one of the strengths of the areas, which may naturally strengthen the importance of organic farming in these areas. Moreover, based on the Polish FADN data, it turns out that important factors co-determining participation in the organic farming system are also the fact that the farmer has a higher age and a higher level of education.

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