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Marek Zieliński*, Barbara Gołębiewska**, Marcin Adamski*, Jolanta Sobierajewska*

Importance of natural conditions in Poland in the operation of fully organic farms and those with co-existing conventional production

* Institute of Agricultural and Food Economics - National Research Institute, Warsaw, Poland
e-mail: adamski@ierigz.waw.pl
** Warsaw University of Life Sciences, Warsaw, Poland

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Abstract
This study addresses the issue of assessing the functioning of farms in areas with diverse natural farming conditions by evaluating them using the latest version of the Agricultural Production Area Valorization (APAV) index. Analyses were performed on three types of farms: fully organic farms, organic farms with co-existing conventional production, and conventional-production farms. To achieve the research objective, 259 communes were selected depending on the level of their APAV. Assessments were made of their production potential, production organization, production and economic results in communes with average APAVs below, equal to, and higher than the national average (66.6 points) based on data from farms continuously keeping accounts for the Polish farm accountancy data network (FADN) in between 2019-2021. The Shannon-Wiener index (S-W index) was used to measure the degree of diversity of crop species in the farms' sown crops, and determine what proportion of those were structure-forming plants. This research demonstrates that in order for interest in organic production to develop under current conditions, there must be sufficient financial support for agricultural producers, especially in areas with more difficult farming conditions.

1. INTRODUCTION

Agriculture and its products play a key role in the existence of humanity. The green revolution of the 20th century significantly increased agricultural production around the world [Salehnia, Rafati 2023]. However, it has also had negative effects. Despite significantly improving the food supply, it has also caused unfavourable transformations of the natural environment due to pollution and excessive consumption of natural resources. Agriculture in its current form plays a key role not only in providing food and raw materials for production, but also in environmental protection, including maintaining biodiversity and attractive landscapes. However, intensified production has had a negative impact on environmental resources, including soil, water, and air quality, as well as biodiversity [Gołębiewska et al. 2016]. A desirable alternative is a food system that raises incomes and increases food security, but in such a way that the environment is protected; farmers and workers have fair access to the means of food production, while receiving a fair return for their work; and consumers receive safe food [Sligh, Cierpka, 2007]. The best way to achieve this goal is to use efficiency-improving measures in conventional agriculture while reducing negative externalities, while also introducing organic farming [Gamage et al. 2023]. The literature indicates that organic farming systems may result in a lower level of production than the conventionally-managed systems [Sapinas, Abbott 2020]. In Western European countries, however, the demand for agricultural products from organic farms is increasing [Mazurek-Kusiak et al. 2021]. In addition to their positive impact on the environment, such products are desired by consumers because they are perceived as healthier and safer. Research by Jespersen et al. [2017] indicates that for all types of farms, organic farming makes significant positive contributions to biodiversity as well as to human and animal health compared to conventional agriculture.

In the current economic reality, characterised by an increase in negative changes in the natural environment caused by intensive agricultural production, preventing the negative effects of food production is becoming increasingly crucial. Sanctions, restrictions, environmental regulations and financial incentives, as well as informal information activities addressed to a wide range of

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agricultural producers, can all play an important role in this initiative. Willingness to apply these activities to agriculture is particularly strong in the European Union (EU). The treaty on the Functioning of the European Union espouses, among the values it seeks to cultivate, the preservation, protection and improvement of the natural environment [Treaty…2012].

The EU's readiness to take such actions as of late has been evidenced by the introduction of the European Green Deal in 2019, which established the direction of institutional actions to protect the natural environment [EC 2020a; 2020b; 2021]. In the opinion of the European Commission (EC), improving the condition of soil, water and air, restoring biodiversity, and demonstrating greater care for areas of particular natural value will have a key role to play in its goals. The EC report indicates an intention to increase the share of land intended for organic agriculture to at least 25% of the EU's utilised agricultural area (UAA) by 2030 [EC 2019; Ziętara, Mirkowska 2021]. During this period, Poland will strive to achieve organic production in at least 7% of its total agricultural area [Ministry of Agriculture and Rural Development 2022a; 2022b].

Specific measures under the next Common Agricultural Policies (CAP) [Jaime et al. 2016; Runowski 2016; Stolze et al. 2016; Schulte et al. 2019] are designed to ensure that agriculture in the EU provides high-quality market goods and contributes to the public good of environmental protection. The CAP measures specifically refer to organic farming, which plays an important role in this context [Offermann et al. 2009; Łuczka et al. 2021]. Under this organic farming measure, producers who stop using conventional practices will receive financial support to compensate for their increased costs and lost income [Jarczok-Guzy 2020; Mennig, Sauer 2022]. After the transition period to the organic system, beneficiaries of the measure will also have the opportunity to sell certified organic products.

This method of management may be especially favourable in areas where extensive organization of agricultural production prevails due to poorer natural conditions. Possibilities for carrying out conventional agricultural production in these areas are often limited. This fact is important in the context of Polish agriculture, in which agriculture under difficult natural conditions has always had a significant role [Krasowicz 2017; 2019]. In Poland, over half of the communes (57.5%) are characterised by difficult natural conditions for agriculture. This is evidenced by the APAV, which is below the national average (66.6 points) [Igras et al. 2010; Kutkowska et al. 2018; Jadczyszyn 2022]. Such areas may, to a large extent, be predestined for ecologically-minded agriculture, because they often have the advantage of various high-value components of the natural environment in the landscape. This may additionally strengthen the popularity of spending time in these areas, with visitors often consuming local organic products.

The study addresses the issue of assessing the effects of agricultural production in three types of farms—organic systems, conventional ones and those combining characteristics of both—in areas with various natural farming conditions. This is in line with the EU objective of increasing the importance of areas covered by organic farming. There is still a paucity of this type of data in the national and international literature, especially in relation to areas that have proven challenging for agriculture.

2. MATERIALS AND METHODS

The basic aim of this research is to assess the functioning of farms in areas with different types of natural farming conditions. It seeks to examine the relationship between natural farming conditions and production potential, as well as production organization, including the diversification of the crops, and well as the agricultural and economic outputs of farms. These analyses were performed by dividing farms into three categories: those having fully organic production, organic combined with conventional production, or fully conventional. The research used farm data from the Polish FADN that was continuously kept from 2019–2021.

As mentioned in the introduction, the diversity of natural farming conditions in Polish agriculture justifies the research formulated here. The differentiation was determined using the APAV, which was developed at the Institute of Soil Science and Plant Cultivation—National Research Institute in the 1970s as part of research on the methodology of agricultural land assessment in Poland [ONW]. The APAV is a synthetic indicator of conditions for agricultural production based on four basic environmental elements: soil quality and suitability, soil water conditions, relief, and agroclimatic conditions. The weights assumed in the valuation of individual factors reflect their importance on crop outputs [Zieliński et al. 2023]. The theoretical value of the valorization index ranges from 31 points for the poorest habitats least useful for agriculture, to 120 points for the best habitats with optimal conditions for plant growth [Witek et al. 1994]. As mentioned in the introduction, the average value of Agricultural Production Area Valorization index (APAV) for communes across Poland is 66.6 points (Figure 1). The Kościelisko commune was determined to have the lowest APAV value (Malopolska Region: 31.0 points), and the Żurawina commune was found to have the highest (Lower Silesian Region: 108 points). The study uses the latest update of the APAV index, which was also used to make the most recent delimitation of current ANC zones (areas facing natural or other specific constraints) in 2019.[1]

1 The new delimitation of the areas was prepared at the request of the Ministry of Agriculture and Rural Development and the European Commission and was carried out using the Institute of Soil Science and Plant Cultivation-State Research Institute's biophysical criteria and the Institute of Agricultural and Food Economics-National Research Institute's fine-tuning procedure [EC 2016; Zieliński, Łopatka, Koza 2000; Zieliński, Koza, Łopatka 2022]. There are currently five ANC zones in Poland: (1) zone I, facing significant natural constraints; (2)

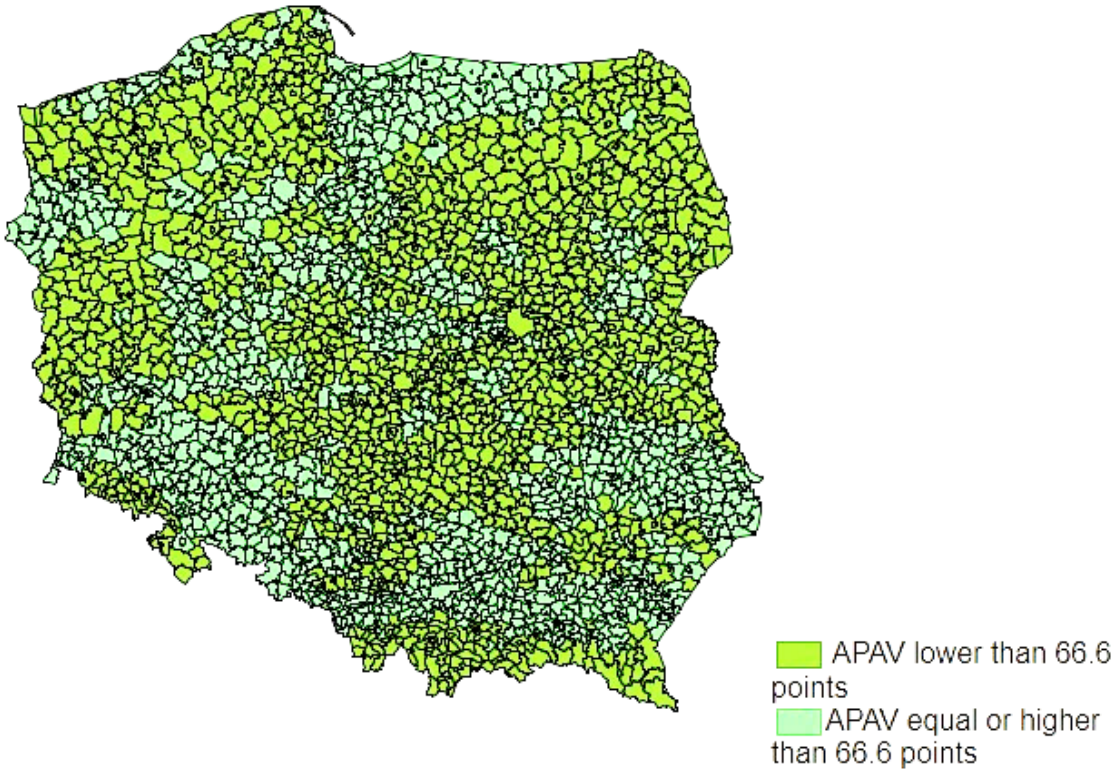


Figure 1. Distribution of communes in Poland, depending on their APAV index values
Source: Own study, based on data from the Institute of Soil Science and Plant Cultivation–National Research Institute

Table 1. Farms surveyed by FADN from 2019–2021, organised by natural farming conditions and agricultural production system

Farms	Natural conditions	
	difficult	favourable
Fully ecological	225	47
Ecological with conventional production	100	31
With only conventional production	977	261

Source: Own study, based on Polish FADN data for 2019–2021

Two groups of communes were established among these regions. The first one had an average APAV index of less than 66.6 points; this group is hereinafter referred to as "communes with difficult management conditions." There were 725,700 farms in these areas in 2019, 719,700 in 2020, and 709,900 in 2021, constituting 55.7, 55.8, and 55.9% of the total number of farms in Poland, and 53.0, 53.2 and 53.2% of the total UAA (usable agricultural area) in the country, respectively [Agency for Restructuring and Modernization of Agriculture 2022]. The second group, consisting of communes with APAV indices of 66.6 points and more, will be referred to as "communes with favourable economic conditions."

A total of 259 communes were included in this study, chosen from the pool surveyed by the Polish FADN during the period of analysis (Table 1; Figure 2). This larger pool included communes with fully organic farms (272) and organic farms with combined conventional production (131), as well as farms conducting production using the conventional system (1,238 farms).

The basic characteristics of organic farms receiving EU support under the CAP were determined based on data from the Agency for Restructuring and Modernization of Agriculture. The data came from applications submitted by farms from 2014–2020 for the organic farming measure of the CAP as part of its 2014–2022 campaign.

zone II, facing significant natural constraints; (3) zone I, affected by specific constraints; (4) foothills, affected by specific constraints; and (5) mountains [Ministry of Agriculture and Rural Development 2019].

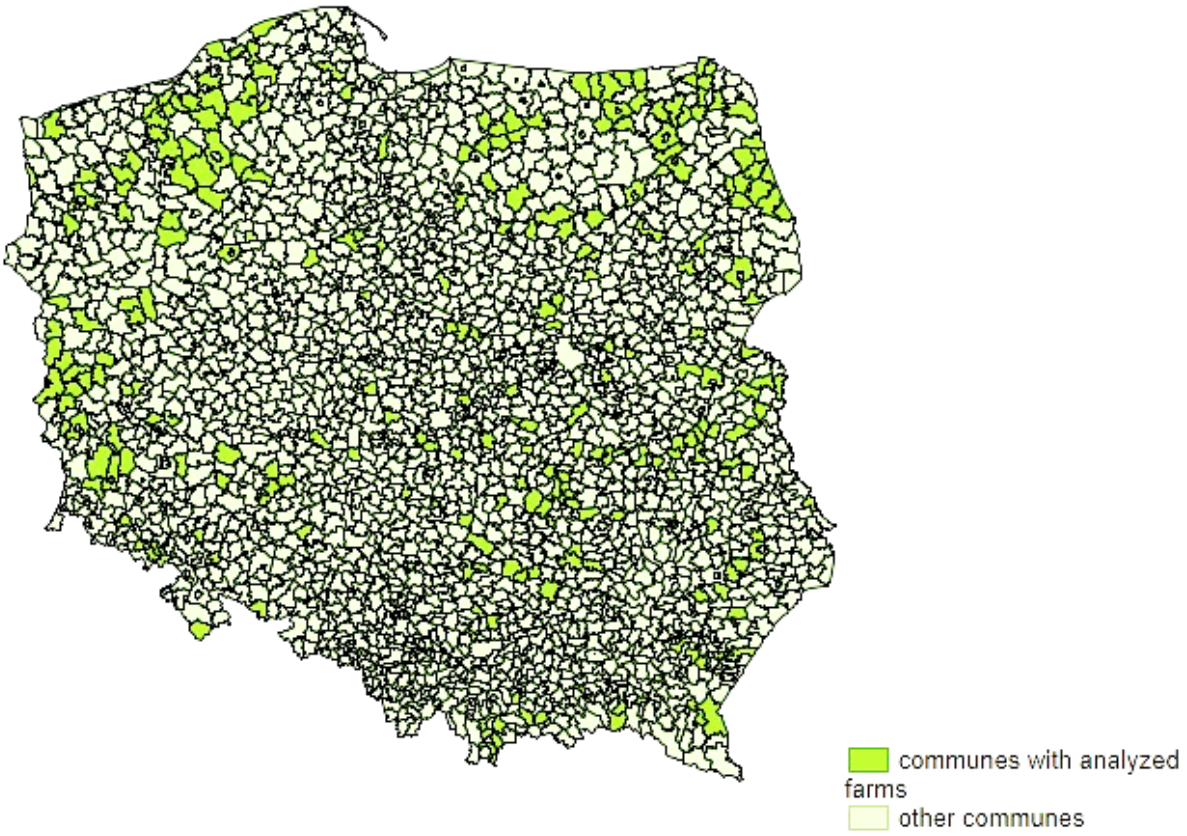


Figure 2. Distribution of communes with farms covered by the analysis based on Polish FADN data for 2019–2021

The productive potential, organization, and economic results of farms from the two separate groups of communes were assessed based on data from organic-only farms, combined organic and conventional farms, and conventional-only farms. The diversity of crop species and share of structure-forming plants were also measured[2] to evaluate whether these metrics have any relation to the agricultural production system. For this purpose, the Shannon-Wiener index (S-W index) was used (formula 1), in a similar manner to Matyka [2017]:

$$index\ S-W = -\sum_{i=1}^{S}(p_i)(lnp_i) \quad (1)$$

where: p_i = share of the area of a given crop i of the species (i=1) in the sown area; lnp_i = the natural logarithm of i (the share of a given plant species in the sown area); and s = the sum of the products p_i and lnp_i.

3. RESEARCH RESULTS AND DISCUSSION

As mentioned in the introduction, Poland's communes have diverse natural conditions for agricultural production, and a large share of them have a low average APAV. However, one common advantage enjoyed by the communes is their various high-value natural landscape features. This diversity in the landscape is reflected in the areas' integrated Nature and Tourism Index (NTI), a metric established by the Institute of Soil Science and Plant Cultivation-State Research Institute. In combination with the APAV, it has been used by the Ministry of Agriculture and Rural Development and the European Commission to delimit the ANC areas in Poland, affected by specific constraints, since 2019 [Łopatka et al. 2017; Zieliński et al. 2020]. The NTI represents the share of natural features across a given commune, such as permanent grasslands, forests, water reservoirs and other areas that have not been subject to strong anthropopressure.[3]

2 Structural plants include small- and large-seeded legumes, i.e., small broad beans, broad beans, chickpeas, sainfoin, beans, peas, trefoil, clover, alfalfa, lupins, melilot, field peas, serradella, lentils, soybeans, vetches and phacelia.

3 The average Nature and Tourism Index in the country is 35.6 points out of 100 possible points. Communes with an average Nature and Tourism Index equal to or greater than the national average cover 57.7% of the country's land area [Łopatka et al. 2017].

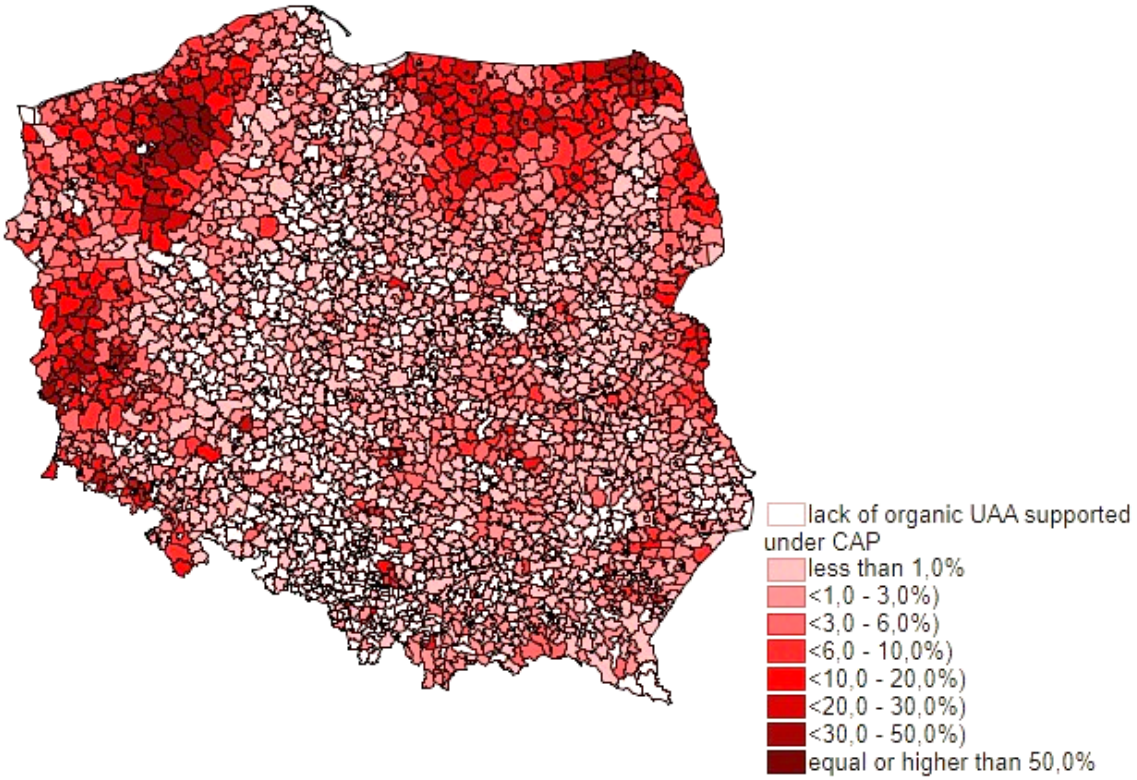


Figure 3. Share of supported organic farmland within the total UAA in 2022, by commune
Source: Own study, based on data from the Agency for Restructuring and Modernization of Agriculture (2023)

In the analysed communes with difficult management conditions, the average NTI was 44.3 points, while in communes with more favourable natural conditions, it was 27.0 points, indicating a much more diversified landscape. The high natural value of communes with difficult management conditions is also evident in their proportion of Natura 2000 network areas: in those difficult communes, the share of such areas in the network amounted to 27.6% of the total land area, compared to 15.5% in the remaining communes. It turns out that farms operating in areas with difficult natural conditions play a particularly strong role in maintaining the good condition of the natural environment, which is characterised by a highly diversified and often exceptionally valuable landscape. In this context, the organic production system has much to offer in creating opportunities for farms in the areas to maintain their economic viability while keeping the natural environment in good condition. This raises questions about the status and territorial distribution of organic production in Polish agriculture (supported by EU funds in 2014–2022, and covering the entire duration of the 2014–2020 CAP).

In Poland between 2014 and 2022, the total area of organic farmland fluctuated, starting out at 657,900 ha in 2014 and ending up at 554,600 ha as of 2022 [IJARS 2023]. The proportion of organic agricultural land supported by the EU funds increased from 77.8% (2014) to 82.4% in 2022 [Agency for Restructuring and Modernization of Agriculture 2023]. It should be emphasised that large fluctuations in the proportion of organic farmland within the total UAA occurred across the communes. In 2022, it ranged from 0.003% (Biały Bór commune) to 63.7% (West Pomeranian Region) (Figure 3).

As mentioned above, from 2014–2022 there were large fluctuations in the proportion of organic farmland. In the case of farmland supported under the CAP, the most significant decrease took place between 2014 and 2018, when it decreased by 28.2% and ended up at 367,300 ha. However, since 2019, its area had increased again, reaching 457,200 ha in 2022 (Figure 4).

In 2014–2022, the total area of supported organic farmland was located in communes with difficult management conditions, from 74.9% (2015) to 76.6% (2014). For example, in 2022, the total supported UAA across all communes amounted to 346,900 ha, while the proportion of UAA in communes with more favoUrable economic conditions totalled 110,300 ha (Figure 5).

Regardless of how well it is managed, adjacent conventional agricultural production is a significant weakness for many farms with organic production, despite support from EU funds. It creates justified concerns about the quality and health-promoting properties of the farms' produce and, consequently, limits confidence in its quality. Nachtman [2015] enumerates the controversies created by the co-

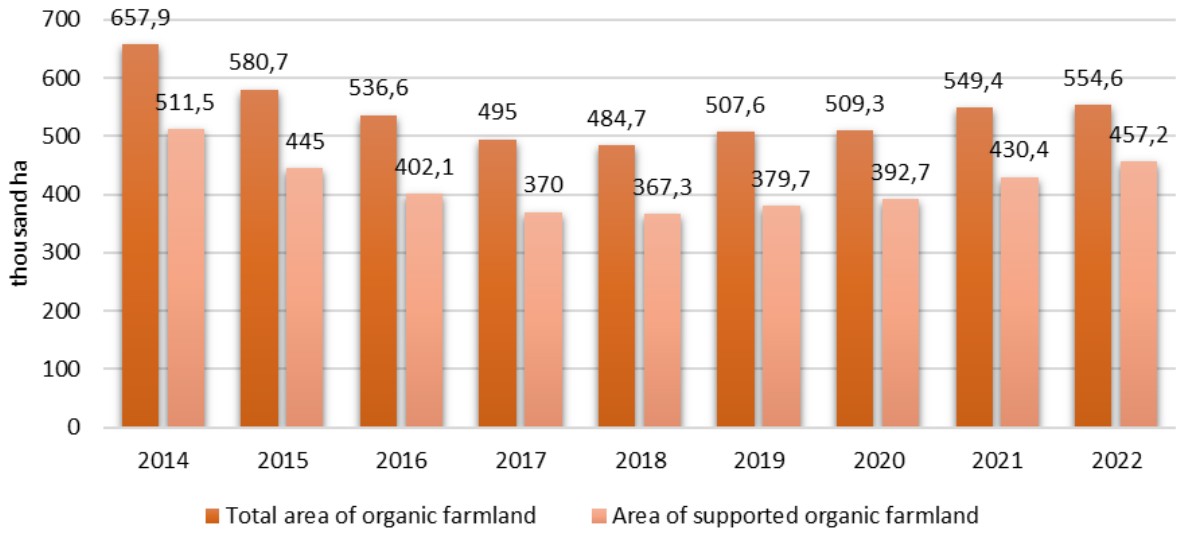


Figure 4. Proportion of organic farmland supported under the CAP from 2014–2022
Source: Own study, based on data from the Agricultural and Food Quality Inspection and the Agency for Restructuring and Modernization of Agriculture (2023)

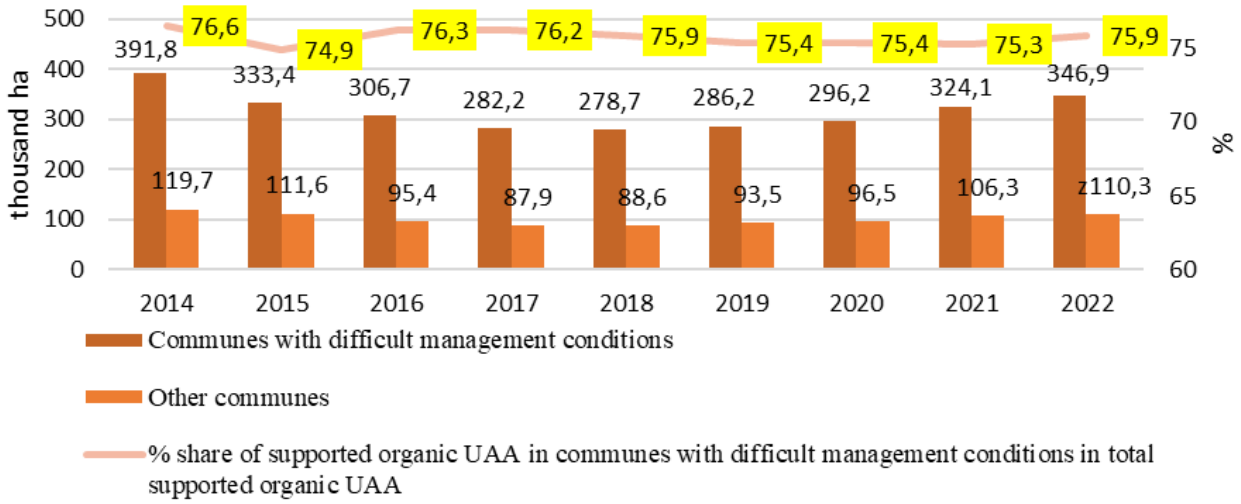


Figure 5. Share of land area of supported organic UAA in communes with difficult farming conditions, as compared to communes with more favourable conditions, from 2014–2022
Source: Agricultural and Food Quality Inspection; Agency for Restructuring and Modernization of Agriculture (2023)

existence of organic and conventional systems on one farm, including concerns about the appropriateness of directing ecological subsidies to such units. In 2022, this type of mixed farm comprised 30.8% of the total UAA of supported organic farms, 32.4% of communes with difficult conditions, and 25.8% of those with favourable conditions. However, it should be noted that in communes with difficult management conditions, supported organic farms with co-existing conventional production comprised 57.2% of the total UAA, while in the communes with favourable conditions, it was 40.5% (Table 2, Figure 6 and 7).

As of 2022, the largest shares of organic farms receiving benefits under the EU's organic farming measure were documented in the northeastern, northwestern and western regions of Poland. It should be added that in the northwestern and western areas, supported fully-organic farms predominated, while in the northeastern part, there was a greater proportion of organic farms with co-existing conventional production (Figures 6 and 7).

The productive and economic potential of fully organic farms is presented in comparison to two groups of farms, namely organic farms with co-existing conventional

Table 2. Selected features of organic farming and organic farming with co-existing conventional production in communes with diversified natural management conditions in 2022

Description	Natural conditions			
	Difficult		Favourable	
	Types of farms			
	Ecological	Ecological with co-existing conventional production	Ecological	Ecological with co-existing conventional production
Number of farms (thousands)	9768	4690	3526	1225
Total UAA on organic farms (thousand ha)	243.2	181.4	81.2	71.9
Area of organic UAA on organic farms (thousand ha)	243.2	103.7	81.2	29.1

Source: Own study based on data from the Agency for Restructuring and Modernization of Agriculture (2023)

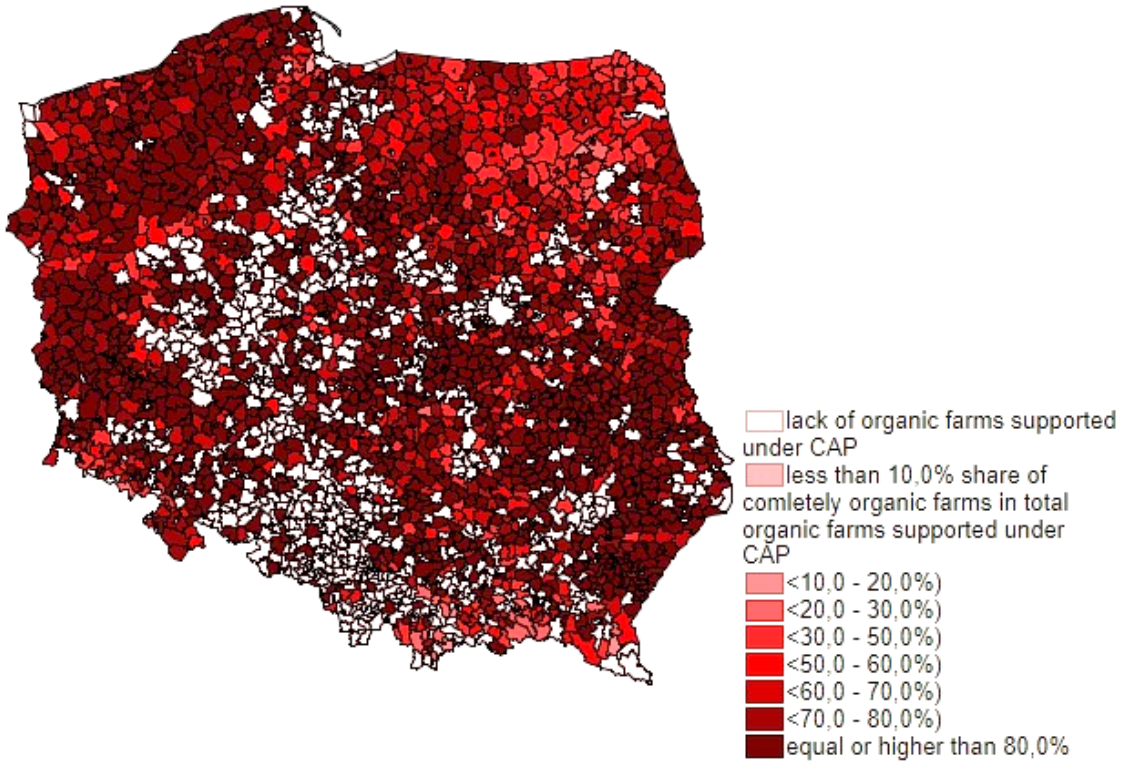


Figure 6. UAA share of supported fully organic farms out of the total number of supported farms, and those with co-existing conventional production by communes, in 2022
Source: Own study, based on data from Agency for Restructuring and Modernization of Agriculture (2023)

production and conventional farms. Additionally, the farms were divided into two groups depending on the average APAV in the commune in which they were located.

Based on the data in Table 3, it can be concluded that farms with some degree of organic production, as compared to fully conventional farms, are marked by their higher labour inputs and greater share of hired labour. This is consistent with the research of Nachtman and Żekało [2006] and Galiak [2015], which found that the total labour input on organic farms was approximately 2% higher compared to conventional farms. This is a generalizable pattern, as stated by Szmidt et al. [2018], because organic farms are characterised by a higher level of labour intensity. Relationships were different, however, in leased land, where fully organic farms had a smaller share in the total UAA.

In fully organic farms, the value of assets per 1 ha of UAA was PLN 38,000/ha in the group with worse environmental conditions; in the remaining groups, it was PLN 47,000/ha.

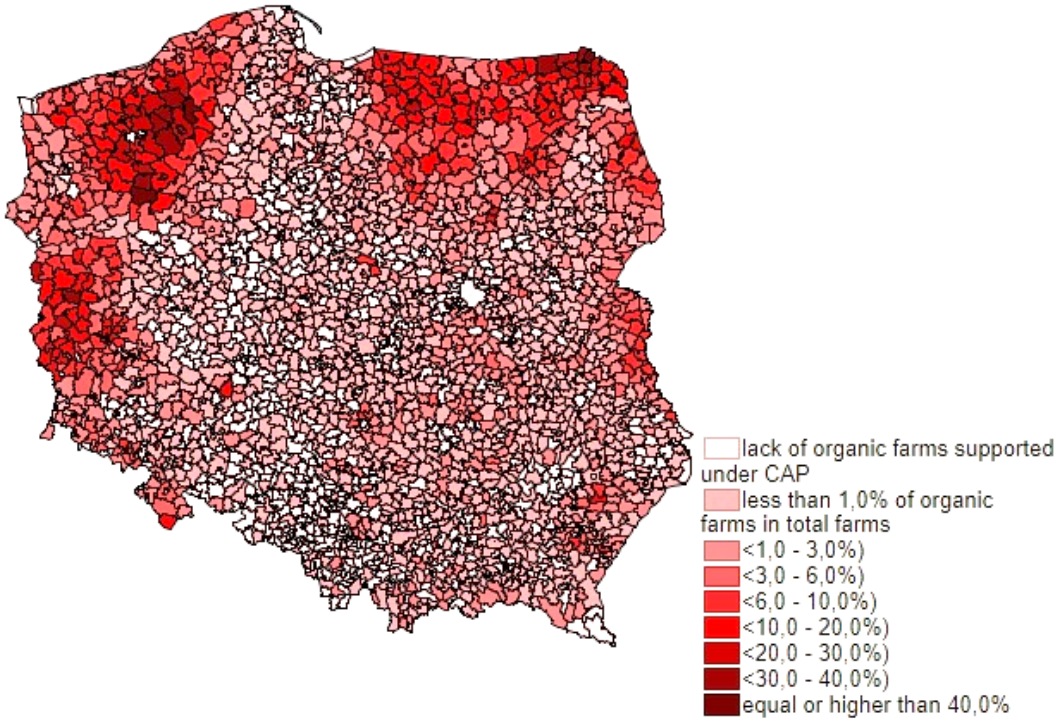


Figure 7. Share of supported organic farms out of the total number of farms in 2022, by commune
Source: Own study, based on data from Agency for Restructuring and Modernization of Agriculture (2023)

Table 3. Production potential and organization of fully organic farms, compared to organic farms with co-existing conventional and conventional production in 2019–2021

Description	Communes with natural conditions					
	Difficult			Favourable		
	Farms					
	ecological	ecological with co-existing conventional production	conventional	ecological	ecological with co-existing conventional production	conventional
Total labour input (AWU/100 ha of UAA)	9.36	8.61	8.71	12.78	9.57	7.34
Share of own work (%)	94	93	96	88	92	95
Share of rented land (%)	17	30	24	20	32	28
Value of assets (PLN thousand/ha)	38.34	39.66	43.28	47.45	38.41	41.65
Asset value (PLN thousand/AWU)	671.03	706.62	739.42	610.54	901.74	1003.26
Animal density (SD/100 UAA)	46.84	51.84	86.71	61.65	22.31	49.83

Source: Own study, based on Polish FADN data for 2019–2021

Table 4. Costs, production and economic outputs of fully organic farms, compared to farms with co-existing conventional production and fully conventional farms

Description	Communes with natural conditions					
	Difficult			Favourable		
	Farms					
	fully ecological	ecological with co-existing conventional production	conventional	fully ecological	ecological with co-existing conventional production	conventional
Total costs (PLN thousand/ha), including:	4.5	3.6	5.8	4.1	5.0	5.3
- Direct costs (PLN thousand/ha)	1.6	1.0	2.9	1.2	1.1	2.5
- Costs of external factors (PLN thousand/ha)	0.46	0.41	0.33	0.48	0.82	0.30
Wheat yield (dt/ha)	41.8	33.2	46.8	49.1	42.3	56.6
Land productivity (PLN thousand/ha)	5.09	3.93	7.22	5.56	7.06	7.11
Income from a family farm (PLN thousand/farm)	77.62	65.16	92.10	100.23	95.25	134.52
Share of subsidies in farm income (%)	89.8	96.1	53.5	67.1	57.5	44.0

Source: Own study based on Polish FADN data for 2019–2021

These did not differ significantly from the asset values of organic farms with co-existing conventional production, or from those of fully conventional farms. Disproportions to the detriment of organic farms were visible in the ratio of asset value per labour unit (AWU); the farms had less technical work equipment, and made greater use of human labour (Table 3), which was an important reason for the situation.

Sadowski et al. [2021] found similar comparisons between organic and conventional farms. Surveying organic and conventional farms in the years ranging from 2007–2009 and 2016–2018, they found that the capital equipment of organic farms was at a much lower level than that of conventional farms.

In the organizational features of the farms studied, significant differences were observed in the animal density. On fully organic farms with difficult conditions, the average animal density was 47 SD/100 ha, as compared to 87 SD/100 ha on fully conventional farms. However, fully organic farms operating in good environmental conditions had a higher animal density, at 62 SD/100 ha, compared to 50 SD/100 ha on conventional farms (Table 3).

A comparison of the total costs incurred per ha of UAA showed that fully organic farms and those with co-existing conventional production had lower costs than those incurred on conventional farms. Greater differences were visible in the direct costs per ha of UAA, which is certainly a consequence of the requirements of organic production (i.e., the ban on the use of chemical plant protection products and artificial fertilizers).

On the other hand, the costs of external factors, where hired labour is taken into account, there was another difference in the costs incurred between fully organic farms with co-existing conventional production and fully conventional farms (Table 4).

The organic production system usually results in a reduction in crop yield and, as a result, reduces a farm's commercial production. This pattern can be seen in the analysed groups of farms, where wheat yields obtained on farms with some degree of organic production were clearly lower than on fully conventional farms. This state of affairs was also reflected in the economic outcomes achieved by the farms.

Unfavourable economic outcomes for farms with organic production concern their potential income. This relationship would be even more to their disadvantage after netting the income from operating subsidies. Regardless of natural conditions, subsidies made up a much higher share of income farms with organic production compared to fully conventional farms. The results therefore prove the importance of operational support, including incentives for organic production, in offsetting the economic disadvantages faced by organic, especially those operating in difficult farming conditions.

Table 5. The value of farms' S-W index and the share of structure-forming plants in their crop mix, by agricultural production system

Farms	Communes with natural conditions			
	Difficult		Favourable	
	S-W index (points)	Share of structure-forming plants in arable land (%)	S-W index (points)	Share of structure-forming plants in arable land (%)
Fully ecological	1.30	13.6	1.30	12.3
Ecological with co-existing conventional production	1.50	10.5	1.70	10.4
With only conventional production	1.51	5.4	1.59	4.2

Source: Own study based on Polish FADN data for 2019–2021

In agriculture, including organic production, two important principles for keeping the natural environment in good condition are the use of a diversified sowing structure and the presence of structure-forming plants, a key pro-environmental element in the organization of plant production. In practice, however, significant diversification of the crop structure is particularly difficult to achieve on farms operating in areas with worse farming conditions. The range of plants that can be grown in such areas is limited by various species' requirements for soil quality. For the successful cultivation of these less-hardy plants, it is often necessary to use a wide range of chemical means of production, which are prohibited in organic farming.

In the three-year period analysed, the value of the S-W index for the diversity of the structure-forming crop species at the farms ranged from 1.30 to 1.70 points (Table 5).

Fully organic farms turned out to have the least diversified structure regardless of farming conditions at 1.30 points. A likely reason for this is the need to limit the number of cultivated plants due to their narrow specialization, which may not be adapted to the expectations of the organic product market, as well as a lack of human labour inputs that would allow for more diversified production. A higher S-index was achieved by organic farms with co-existing conventional production (1.50 points) and conventional farms (1.51 points) in difficult farming conditions, compared to solely organic farms. Poor soil quality probably also limited the number of cultivated plants, but the possibility of using chemical means of production in conventional crops could have largely compensated for it. Under favourable conditions, organic farms with co-existing conventional production had the highest S-W index (1.70 points), followed by those with solely conventional production (1.59 points), as these conditions make it possible to grow plants with higher soil-quality requirements.

Analyzing the diversification of the crop structure on fully organic farms proved that those farms, regardless of the quality of their soil, have more limited possibilities in this respect. Organic farms with co-existing conventional production and fully conventional farms fared better in this respect. On the other hand, fully organic farms used structure-forming plants to a wider extent.

4. CONCLUSIONS

Based on the results of this research, it can be concluded that there is a significant difference between the characteristics of fully organic farms, organic farms with co-existing conventional production and typically conventional farms depending on their surrounding natural conditions. Since 2014, there has been a significant change in the area of organic farmland, which shrank significantly despite receiving support under the CAP. Since 2019, there has been a slow but steady increase, but recent years have also seen a trend toward combining organic and conventional production on one farm. This may lead to questions about the quality of products from these farms.

The conducted research and analyses allow for the formulation of several general conclusions and opinions:

1. It was found that the largest share of organic farms benefiting from EU support were in the northeastern, northwestern and western parts of Poland. In the northwestern and western areas, EU-supported fully organic farms prevailed, while the northeastern part had a greater saturation of organic farms with co-existing conventional production.
2. The research confirmed that more difficult farming conditions encourage farmers to use more support from the EU funds under the organic farming measure. Moreover, on combined organic/conventional in communes with difficult farming conditions, the share of supported organic agricultural land in the total area of agricultural land was almost 17% larger than in communes with more favourable conditions. This drives home the importance of also supporting organic production on farms with co-existing conventional production in difficult farming conditions.

3. It was also found that the labour inputs and the share of hired labour were higher on farms saturated with organic production, as compared to fully conventional farms, which is consistent with previous research by other authors. Organic farms were also characterised by having less technical labour input per employee. The reason was the greater use of human labour.
4. Different dependencies occurred in the case of land leasing. On fully organic farms, the share of leased land within the total agricultural area was smaller. Similarly, the value of assets per 1 ha of UAA was lower in fully organic farms than in conventional farms. Farming conditions also had an effect on animal density. On fully organic farms with difficult conditions, animal density was lower than on fully conventional farms. In favourable conditions, however, organic had higher animal stocking rates, with an animal density 12 SD higher than on conventional farms.
5. The research also confirmed that the costs incurred were lower on organic farms and those with combined production than on conventional farms.
6. Unfavourable income relations were also found for farms with some degree of organic production, despite the additional support they receive. On farms with organic production, the share of subsidies in income was much higher compared to fully conventional farms, regardless of natural conditions.

Thus, in conclusion, under current development conditions for organic production, there must be sufficient financial support. Otherwise, most agricultural producers will not be interested in organic agriculture. This is particularly important on fully organic farms, because the range of possible crops for commercial production on those farms is more limited, especially in areas with difficult conditions, as evidenced by their low S-W index. In this respect, farms with combined conventional production and fully conventional farms were in a better situation than organic farms, especially in areas with favourable farming conditions, as demonstrated by their higher S-W index compared to fully organic farms.

To sum up, it should be emphasised that in Poland, the financial support offered to farms under the EU CAP plays the biggest role in stimulating the development of organic agriculture. There is no doubt that it can facilitate the functioning of such farms, especially those with difficult natural conditions. However, increasing the number of organic farms with co-existing conventional production has the disadvantage of being somewhat contrary to the idea of organic farming. It seems that in order to remedy the unfavourable situation, differentiated payment rates for organic crops should be considered in the future depending on the saturation of organic farms. Fully organic farms should receive the highest payment rates for this purpose. On the other hand, the role of the EU CAP is crucial in supporting organic farming, allowing it to achieve a balance between productivity and ensuring satisfactory income.

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