p-ISSN 0044-1600
e-ISSN 2392-3458

Zagadnienia Ekonomiki Rolnej
Problems of Agricultural Economics

www.zer.waw.pl

2(367) 2021, 101-118

DOI: 10.30858/zer/135653

ECONOMIC SITUATION OF ORGANIC FARMS IN POLAND ON THE BACKGROUND OF THE EUROPEAN UNION

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Abstract

Organic agriculture is a relatively new production system, which is growing in importance worldwide. As in all enterprises, economic results are important for organic farms. This article aims to determine the economic situation of organic farms against the background of conventional entities on the example of Poland by comparing production potential and relations between production factors, production volume, and the economic results. The analysis was based on the data of the Polish FADN. Since organic farms in Poland are subject to the special EU support, the economic results were presented in two variants, i.e. with and without subsidies for operating activities. Such an approach constitutes an attempt to assess to what extent the two analyzed groups (i.e. organic and conventional farms) can function on the market without public support. The analysis was conducted for two extreme periods, i.e. 2007-2009 and 2016--2018. The first one marks the moment of launching the first Rural Development Programme in Poland for a full seven-year implementation period. The year 2018 provides the latest data available. According to the results, organic farms have lower production potential than conventional farms and less favourable relationships between production factors. Yields and animal productivity are also lower. More importantly, they achieve much lower economic results, which are

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in large part generated by direct payments. In conclusion, the study showed a high production and income inefficiency of organic farms and their significant dependence on public support.

Keywords: organic agriculture, organic farms, conventional farms.

JEL Codes: Q10, Q12, Q14.

Introduction

Agriculture in the 21st century is facing numerous challenges (Abumhadi at al., 2012). The changing trends in the food market and ensuring the proper quantity and quality of food products for a growing population are just two major challenges. The production conditions of food are now becoming more and more complicated. With increasing urbanization and globalization, the resources of cultivated land are diminishing and, at the same time, the demand for bio-energy raw materials is increasing, which contributes to the competition for land with food products. But most importantly, despite progress in agriculture, processing, and storage, several hundred million people still suffer from hunger and malnutrition (Ramankutty et al., 2018; von Braun, 2010). This means that modern agriculture requires an increased productivity, which particularly relates to the productivity of land whose resources either do not grow at all or grow at a slower rate than the world population. Furthermore, new areas for farming production are acquired at the expense of environmentally valuable areas such as tropical rainforests (Chomitz et al., 2007; Hartemink, 2005; Lapola et al., 2013). Nevertheless, in developed countries, there is a phenomenon of an ageing society and an increase in diseases and ailments resulting from the insufficient quality of food products made using conventional methods. This means that the basic challenge is not so much the quantity, but the quality of the products. What is also important is that in affluent societies, the average residents spend a relatively small part of their income on food (Zhang, 2017), so they can afford to buy more expensive products of better quality. What is more, in highly developed countries there is a high environmental awareness of the population. All this makes it possible that, mainly in such countries, the alternative to industrial agriculture is a model of multifunctional and sustainable agriculture, which also includes organic agriculture. Currently, an increased interest in organic agriculture can be observed in the EU countries (Golinowska, 2013) and the literature (Lazić, 2010; Łuczka, 2019) emphasizes its dual nature. Firstly, it is a system that positively influences the natural environment, which undoubtedly contributes to the achievement of broadly understood agri-environmental benefits. Secondly, organic agriculture is a response to the changing structure of the market demand. The dual nature of this production system results in the fact that the farms using that system generate positive external effects and provide market products. In turn, in many countries (including the European Union), this translates into a system of financing farms, where part of the income comes from public support and the other part from market activity. Despite the social benefits and high-quality

products, the majority of organic farms are not able to generate enough income due to low productivity. Nevertheless, excessive aid from public institutions may give rise to the temptation of abuse, in the form of a desire to obtain aid resources at the expense of market activity or even at the expense of generating positive external effects. A significant increase in the number of organic farms in the period after the establishment of the EU support (Padel and Lampkin, 2007) may indicate the dominance of motivation related to obtaining a support. Therefore, this article aims to indicate the differences between production possibilities and economic performance of both organic and conventional farms.

Organic agriculture is often referred to interchangeably as 'organic agriculture' or 'biological agriculture' (Pretty et al., 2010; Kirchmann et al., 2016; Connor, 2018). Depending on the type of production method used, organic, biological, and also biodynamic agriculture can be distinguished (Golinowska, 2013). Organic agriculture is a conventional category, as its concept includes many different aspects and methods of farming (Łuczka-Bakuła, 1993; Badgley et al., 2007). It is the multidimensionality that makes it impossible to develop a clear definition (Smoluk-Sikorska and Łuczka-Bakuła, 2014; Alexandratos and Bruinsma, 2006). However, there are several essential aspects which determine that a given production belongs to organic agriculture (Table 1).

Table 1

Organic agriculture according to world literature

Author of the definition	Content of the definition
Kristiansen, Taji, and Reganold, 2006	"Ecological agriculture is only a small part of the agribusiness world, which in itself is only a small part of the wider global socio-economic system".
International Federation of Organic Agriculture Movements EU Group, 2020	"Ecological agriculture is aimed at using renewable resources".
Topp et al., 2007	"Ecological agriculture is aimed at achieving the economic, environmental, and social dimensions of sustainable development. The basic aim of ecological agriculture is to use renewable resources and to increase recycling and reduce waste".
Manchala Santhoshkuma, Chandramohan Reddy, and Sangwan, 2017	"Ecological agriculture meets not only the food requirements of the current generation in an environmentally friendly manner, but also the requirements of future generations and maintains our environment. Provides macro- and microelements to crops and improves the physical, chemical, and biological properties of the soil".
Reganold and Wachter, 2016	"Ecological agriculture combines traditional methods of cultivation oriented towards environmental protection with modern agricultural technologies. It focuses on crop rotation, crop, and livestock diversification and improvement of the soil by adding compost and animal and green manure".

Eurostat, 2019	"Ecological agriculture is a method of agricultural production and it places the greatest emphasis on the environment and nature protection and, when it comes to animal production, on animal welfare aspects. Ecological production includes comprehensive systems for managing crop and livestock production which focuses on farm management practices over non-agricultural inputs".
International Foundation for Organic Agriculture – IFOAM, 2017	"Defines ecological agriculture as a combination of different farming concepts which take into account the state of the soil, crops, and animals. The basic element of ecological production should be the production of high-quality goods, taking into account the natural environment".
FAO and WHO, 1999	"Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems".
Babović, 2008	"Organic agriculture is a sustainable integral ecological system for the production of safe, quality, certified foods, and at the same time it is strictly controlled in order to meet the wishes and needs of consumers, while achieving economic and ecological profits and preserving the environment".
Lazić, 2010	"Organic agriculture protects the natural environment and is a prospective activity in the economy, as it contributes to the optimal use of resources, the development of rural areas and villages, sustainable exports, economic growth, and the increase in living standards".

Source: own study based on the literature.

By delving into the specificity of organic agriculture, we can therefore notice many economic, social, environmental, health, and ethical, as well as esthetic benefits. These benefits are part of the idea of sustainable development. A characteristic feature of organic agriculture is to ensure a properly selected crop rotation (Staniak, 2014) and the total rejection of fertilizers and pesticides. The scope of organic agriculture is not only a strictly defined production technology, but also the fulfilment of social, economic, energy, quality, and food objectives (Turczak, 2014). The result of organic agriculture is a product with appropriate properties, which is produced in a sustainable manner regarding ecological, economic, and social aspects. Organic production is based only on natural production methods and means (Łukasiński, 2008). The product must meet the relevant production and quality requirements confirmed by certificates and inspections to be considered organic (Łukasiński, 2008). Additionally, restrictive requirements related to organic activities cause that the sector is still underdeveloped (Golinowska, 2013). It should be pointed out that organic agriculture is a specific method of production, requiring continuous improvement and knowledge development. Organic production is distinguished by its higher labor input and it is time-consuming in comparison to conventional agriculture, which results in higher prices of products. This not only

results in relatively low demand for organic food, but is also the reason why this food is still a luxury product, which is not available to everyone Among other reasons, this is why the highest level of consumption of organic food is in affluent countries, including mainly European ones. In 2015, in terms of the value of organic products consumed, the following countries were in the top ten: Switzerland, Sweden, Luxembourg, Liechtenstein, Austria, the USA, Germany, France, and Canada (Drygas, Nurzyńska, and Bańkowska, 2019). These countries are, on the one hand, wealthy and, on the other hand, facing the problems of an ageing society. Another reason that influences the development of organic agriculture is the limited availability of organic products. Organic food is still a niche product. Additionally, in Poland, the public support influences organic production, because it would be unprofitable without it. What is important is that the dynamics of the development of organic agriculture in Poland occurred only after accession to the European Union, mainly thanks to beneficial financial support conditions.

The basic goal of the paper is to determine the economic situation of Polish organic farms against the background of conventional entities by comparing production potential and relations between production factors, production volume, and the economic results.

Materials and Methods

The study was conducted based on the FADN results. The study used the data included in the "Time series" database, which is one of the specific products of the Polish FADN (http://fadn.pl/publikacje/szeregi-czasowe/), where the results of agricultural accounting were collected, grouped according to a few criteria, primarily including the type of farms (TF8), economic size class (ES6) and the classes of agricultural area (UAA6). The specificity of the Polish FADN in comparison with other European countries is the separation of farms using organic production and conventional ones (SN32), which enabled the authors to perform economic and financial analysis of both groups. Although, according to the FADN assumptions, the particular results, which are the arithmetic average of the particular farms, are only representative for agricultural types, economic sizes and FADN regions, the grouping according to other criteria (in this case conventional and organic farms) gives an idea of the economic situation of both groups of subjects.

The study carried out is comparative and is based on a comparison of conventional and organic farms regarding production potential and the relation between production factors, the volume of crop and animal production, and the economic results. As organic agriculture is subject to the special EU support, the net added value is presented in two variants: with and without subsidies for operating activities. The aim of such an approach was an attempt to assess to what extent the two analyzed groups can function without public support. The particular variables (SE) used in this study follow the definitions of the Polish and European FADN (http://fadn.pl/wp-content/uploads/2012/12/RICC-882-rev9.2-Definitions-of-Variables.pdf). The study was conducted for two periods, i.e. 2007-2009 and 2016-2018

(average from both three years). The first one refers to launching the first Rural Development Program in Poland for a full seven-year implementation period. Previous programs were either pre-accession support (SAPARD) or operated only from 2004-2006 (Sectoral Operating Program "Agriculture" and Rural Development Plan). The period 2016-2018 include the latest available data. Each time the growth rate of the analyzed phenomena was determined to indicate differences in the rate of their changes in organic and conventional farms. The three-year average was used to eliminate annual fluctuations.

In the analysis, the following variable were used:

- SE020: Annual Work Unit
- SE025: Total Utilized Agricultural Area (ha/farm)
- SE035: Crop cultivation area (ha/farm)
- SE080: Total livestock unit (LU)
- SE110: Yield of wheat (dt/ha)
- SE120: Stocking density (LU/ha)
- SE125: Milk yield (kg/cow)
- SE206: Total output livestock & livestock products (euro/farm)
- SE436: Total assets (euro/farm)
- SE415: Farm Net Value Added (euro/farm)
- SE605: Total subsidies – excluding on investments

The study was carried out for conventional farms (indicator 1 for SN 32) and organic farms (indicator 2). The study is supplemented by an analysis of the state of organic agriculture in the EU countries based on Research Institute of Organic Agriculture (https://statistics.fibl.org).

Results and Discussion

Organic agriculture in the European Union

Table 2 presents the share of organic and in-conversion land in the EU countries. At the level of the whole group, there is a quite significant increase from 4% in 2007 to 7.7% in 2018. This means that the policies pursued by the EU and market trends are encouraging farmers to use organic production methods. Countries such as Austria, the Czech Republic, Estonia, Latvia, Italy, Slovakia, Slovenia, and Sweden are those with the highest share of organic land. Nevertheless, even there, the share does not exceed 25% of the UAA of the given country, which means that, despite its advantages, the organic agriculture is not a widely used production system, which in turn indicates that it also has several disadvantages, which include, in the first place, the above-mentioned low productivity and still niche nature of more expensive organic products. The complicated conversion procedures and the obligation to submit to systematic inspections by certifying bodies may also be a limiting factor.

Table 2

Share of organic and in-conversion land in the EU countries (total farmland area=100)

Country	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
EU	4.0	4.3	4.6	5.1	5.2	5.5	5.7	5.8	6.2	6.7	7.2	7.7
Austria	18.4	18.9	19.5	20.6	20.5	20.8	21.1	21.0	21.3	21.9	24.0	24.7
Belgium	2.4	2.6	3.0	4.3	4.0	4.4	4.8	5.1	5.3	6.0	6.4	6.8
Bulgaria	0.5	0.6	0.4	0.6	0.6	0.9	1.2	1.6	2.6	3.5	2.9	3.5
Croatia	0.6	0.8	1.1	1.8	2.4	2.4	2.6	3.2	4.8	6.0	6.2	6.6
Cyprus	1.6	1.6	2.5	3.0	3.1	3.4	4.0	3.6	3.7	4.9	5.0	5.4
Czech Republic	7.4	8.0	9.4	10.6	10.9	11.1	11.2	11.2	11.4	11.6	12.4	12.8
Denmark	5.5	5.6	5.9	6.1	6.1	6.6	6.5	6.3	6.4	7.7	8.6	9.8
Estonia	8.7	9.6	10.2	11.9	14.2	15.3	15.8	16.3	16.3	18.9	20.5	21.6
Finland	6.5	6.6	7.3	7.4	8.2	8.7	9.0	9.3	9.9	10.4	11.4	13.0
France	2.0	2.1	2.5	3.0	3.5	3.7	3.8	4.0	4.8	5.5	6.3	7.3
Germany	5.1	5.4	5.6	5.9	6.1	6.2	6.3	6.3	6.5	7.5	8.2	9.1
Greece	3.4	3.8	3.9	3.7	2.6	5.6	4.6	4.4	5.0	4.2	5.0	6.0
Hungary	2.9	2.9	3.3	2.1	2.7	2.8	2.8	2.7	2.8	4.0	4.3	4.5
Ireland	1.0	1.1	1.2	1.0	1.1	1.1	1.1	1.1	1.5	1.6	1.5	2.4
Italy	9.0	7.9	8.7	8.7	8.6	9.1	10.3	10.8	11.7	14.5	15.4	15.8
Latvia	8.2	8.9	8.7	9.1	10.1	10.8	11.0	11.2	12.8	14.3	14.8	15.4
Lithuania	4.5	4.6	4.8	5.2	5.4	5.4	5.7	5.7	7.4	7.7	8.1	8.3
Luxembourg	2.6	2.7	2.8	2.8	2.8	3.2	3.4	3.4	3.2	3.3	4.2	4.4
Malta	0.1	0.1	0.3	0.2	0.2	0.4	0.1	0.3	0.3	0.2	0.4	0.5
Netherlands	2.5	2.6	2.7	2.4	2.5	2.5	2.7	2.7	2.7	2.8	3.0	3.1
Poland	1.9	2.0	2.4	3.4	3.9	4.3	4.7	4.6	4.0	3.7	3.4	3.4
Portugal	6.7	6.2	4.4	5.8	5.8	6.0	5.4	5.8	6.6	6.7	7.0	5.9
Romania	1.0	1.0	1.2	1.3	1.6	2.1	2.3	2.2	1.9	1.7	2.0	2.5
Slovakia	6.1	7.3	7.5	9.0	8.8	8.8	8.3	9.5	9.6	9.9	10.0	10.0
Slovenia	6.0	6.1	6.0	6.4	6.7	7.3	8.0	8.5	8.7	9.0	9.5	9.9
Spain	3.2	4.5	5.4	6.1	6.8	6.7	6.9	7.3	8.5	8.7	8.9	9.6
Sweden	9.9	10.8	12.6	14.3	15.7	15.6	16.3	16.4	16.9	18.0	18.8	19.9
United Kingdom	3.7	4.1	4.2	4.1	3.7	3.4	3.3	3.0	2.9	2.9	2.9	2.7

Source: own study based on https://statistics.fibl.org (access date: 06.07.2020).

In the case of Romania, Poland, the United Kingdom, Luxembourg, Ireland, Hungary, and Bulgaria, the share of organic and in-conversion land was low. It can be noticed that out of the countries mentioned where the share of organic and in-conversion land was low, only for the United Kingdom it was decreasing over the period considered. The rest of the countries, although they also had a low rate, did not observe significant decreases (however, compared to previous years, insignificant decreases also occurred). Again, it can be assumed that the increase in the share of land is related to the obtaining of the public support and is a significant incentive for conversion to organic production. Under current economic conditions, it is essential to intensify agriculture by producing more and more food, but at the same time preserving biodiversity, what is defined as sustainable growth (Schrama at al. 2018). The production potential of the organic farms of the European Union is important, because it creates added value for the entire Community. In Slovakia, organic agriculture has existed since 1991. However, the increase in acreage occurred years after the country acceded to the EU. As in Poland, support dedicated to the establishment, development and functioning of organic production has contributed to the significant development of these farms and to minimizing production and economic differences in comparison to conventional farms (Palsova, Schwarczova, Schwarcz, and Bandlerova, 2014). Romania is an interesting case; organic land in that country constitutes only 3.38% of the country's total utilized agricultural land and, at the same time, the average annual increase in area is estimated at around 23%, which makes Romania the 16th country in the world in terms of the total area of certified organic crops and, at the same time, the 20th country in the world in terms of exporting organic products (Jelocnik, Ion, Jovanović, and Propescu, 2015). In Belgium, a comparative study was carried out between conventional wheat production and organic production. The results confirmed that organic production is not yet efficient enough to fully replace the conventional one (Stappen et al., 2015). In turn, a study conducted in the United Kingdom has shown that vegetables are currently the most similar in yielding, whereas, in the case of other crops, the effects of losses caused by e.g. moulds are too high in organic entities, so abandoning conventional agriculture at this stage is socially unjustified (Smith et al., 2018).

Production potential

The basic feature of organic agriculture is the abandonment of chemical production means (Schrama et al., 2018), which, among others, results in the necessity to substitute capital with labor and consequently leads to a different allocation of production factors compared to conventional farms. What may be interesting in this context is that the number of full-time employees (Annual Work Unit) is higher in conventional farms than in organic farms (Table 3). Firstly, in both cases, this is due to the limited number of farming families, and secondly, the slightly lower use of labor in organic entities may be the result of their generally lower profitability, which forces some family members to work outside agriculture. Besides,

conventional farms are much larger (about 30% in both periods). Similar results were presented by (Gołaś, 2017), who indicated that conventional farms fully use the chemical means of production, achieving higher production volumes. The capital equipment of organic entities is also much lower, although it should be noticed that in both analyzed groups there was an increase in the value of assets from 2007--2009 to 2017-2018.

Table 3

Production potential of organic and conventional farms in the Polish FADN sample from 2007-2009 and 2016-2018

Specification	Unit	Organic		Conventional		Conventional = 100	
		2007-2009	2016-2018	2007-2009	2017-2018	2007-2009	2016-2018
UAA	ha	32.1	29.7	45.1	44.9	71.2	66.2
Labor input	AWU	2.0	1.8	2.4	2.1	85.8	88.1
Value of assets	PLN	482,277	854,306	881,991	1,542,207	54.7	55.4

Source: own calculations based on http://fadn.pl/publikacje/szeregi-czasowe/ (access date: 24.01.2021).

Different production technology also results in different relations between production factors. First of all, in organic farms, the capital-labor ratio is much lower, which indirectly indicates the use of more labor-intensive production techniques (Table 4). However, it should be noticed that the differences between the two groups have somewhat diminished during the analyzed period, which may result, among other things, from a higher level of aid resources for organic farms. Also, (Ligenzowska, 2014; Duda-Krynicka and Jaskólecki, 2010; Golik and Żmija, 2017) indicated that this situation may result from the state policy regarding subsidies for organic production, because since Poland's accession to the European Union some aid resources strictly dedicated to organic agriculture have been implemented. Furthermore, in other EU countries, e.g. Slovenia, Italy, or Latvia, attention is drawn to the fact that organic agriculture should be properly financed, as it is part of the idea of sustainable production within the CAP objectives (Euruostat, 2019).

For the same reasons, the land-capital ratio in the case of organic farms is higher than that of conventional farms, and in the analyzed period the differences were greater. Organic farms are also characterized by a greater number of AWUs per 100 ha, which also results from substituting capital with labor.

Table 4

Relations between production factors in the case of organic and conventional farms in the Polish FADN sample from 2007-2009 and 2016-2018

Specification	Unit	Organic		Conventional		Conventional = 100	
		2007-2009	2016-2018	2007-2009	2017-2018	2007-2009	2016-2018
Capital-labour ratio (Assets / AWU)	PLN	236,797	466,834	371,625	742,636	63.7	62.9
Land-capital ratio (Assets / ha)	PLN	15,012	28,758	19,559	34,383	76.8	83.6
Land-labour ratio	AWU/100 ha	6.3	6.2	5.3	4.6	120.5	133.1

Source: own calculations based on http://fadn.pl/publikacje/szeregi-czasowe/ (access date: 24.01.2021).

Crop and animal production

One of the assumptions of organic agriculture is the use of crop rotation, which is intended to contribute to maintaining soil fertility without the use of synthetic fertilizers. In fact, the area of crop cultivation on conventional farms is much larger than on organic farms and, more importantly, the share of crops in the sowing structure is much larger in conventional (Table 5). However, yields are much lower on organic farms (in the FADN system, wheat is an example crop). Between 2016 and 2018, on organic farms, they constituted slightly more than half of the yields obtained by conventional entities (from 2007-2009 it was about 60%). This state of affairs indirectly indicates that the organic system, despite its advantages, may at most constitute a kind of niche supplement to agricultural production. The complete abandonment of industrial means of production may lead to a significant decrease in the production volume, which may be dangerous for food security even in affluent countries.

Table 5

Selected parameters of the crop production in the case of organic and conventional farms in the Polish FADN sample from 2007-2009 and 2016-2018

Specification	Unit	Organic		Conventional		Conventional =100	
		2007-2009	2016-2018	2007-2009	2017-2018	2007-2009	2016-2018
Crop cultivation area	ha/farm	11.5	8.1	27.0	24.4	42.6	33.1
Share of the crop cultivation area in the UAA	Sowing area = 100	35.8	27.2	59.8	54.5	59.8	50.0
Yield of wheat	(dt/ha)	33.4	30.5	54.8	58.1	60.8	52.5

Source: own calculations based on http://fadn.pl/publikacje/szeregi-czasowe/ (access date: 24.01.2021).

Livestock production on organic farms is similarly extensive. The stocking density from 2007-2009 and 2016-2018 is about of 40% in the case of conventional farms (Table 6). This may be due to the need to observe environmental standards (mainly the emission of greenhouse gases and biogens), but it may also be one of the effects of obtaining public support. Significant income from public support may discourage labor-intensive animal production, all the more so as the failure to apply numerous standards results in reduced payments. The production extensiveness of organic farms is also visible in the case of cow productivity, which was over 35% lower than that of conventional production. In this case, the reasons may be similar – the natural production extensiveness of the system, or the lack of economic incentive for intensification due to the use of the public support system. Certainly, a smaller volume of production in entities using organic methods may be compensated by higher quality, which in turn should be reflected in higher prices. In the Polish reality of recent years, however, this has not happened. If from 2007-2009, the value of animal production accounted for over 80% of that obtained in conventional entities, then in 2017 it was already 56%. This may indicate, on the one hand, the above-mentioned domination of the public support, but also, indirectly, the relatively shallow domestic market of organic products, where it is difficult to generate added value resulting from high quality.

Table 6

Selected parameters of the animal production in the case of organic and conventional farms in the Polish FADN sample from 2007-2009 and 2016-2018

Specification	Unit of measurement	Organic		Conventional		Conventional =100	
		2007-2009	2016-2018	2007-2009	2017-2018	2007-2009	2016-2018
Stocking density	LU/ha	0.7	0.7	1.6	1.6	42.2	44.2
Milk yield	kg/cow	3,593	4,099	5,588	6,572	64.3	62.4
Total output livestock and livestock products	PLN/ LU	2,754	2,701	3,433	4,792	80.2	56.4

Source: own calculations based on http://fadn.pl/publikacje/szeregi-czasowe/ (access date: 24.01.2021).

Economic performance

Achieving economic performance that enables an enterprise to operate is an essential objective in the activities of any company, including farms. Comparative analysis of organic and conventional farms has been conducted at the Farm Net Value Added level, which, according to the FADN methodology (https://ec.europa.eu/agriculture/rica/), is the difference between total output and specific costs and total farming overheads (together constituting intermediate consumption) and depreciation, adjusted for balance current subsidies and taxes. This figure constitutes the excess obtained by all production factors, regardless of who owns them. It does not include the cost of external factors (wages, lease fees, and interest on loans), which allows comparing entities operating based on both own and external production factors (own or hired labor, own or leased land, equity or loans, respectively).

Table 7

Total economic performance of organic and conventional farms in the Polish FADN from 2007-2009 and 2016-2018

Specification	Unit	Organic		Conventional		Conventional = 100	
		2007-2009	2016-2018	2007-2009	2017-2018	2007-2009	2016-2018
Farm Net Value Added	PLN/farm	58,480	76,171	97,001	120,397	60.3	63.3
Farm Net Value Added	PLN/AWU	28,714	41,623	40,871	57,976	70.3	71.8
Farm Net Value Added	PLN/ha	1,820	2,564	2,151	2,684	84.6	95.5
FNVA – total subsidies excluding on investments	PLN/farm	14,165	20,143	54,308	63,072	26.1	31.9
FNVA – total subsidies excluding on investments	PLN/ha	6,955	11,007	22,883	30,372	30.4	36.2
FNVA – total subsidies excluding on investments	PLN/AWU	441	678	1,204	1,406	36.6	48.2
Share of total subsidies excluding on investments in Farm Net Value Added	%	76	74	44	48	172.2	154.5

Source: own calculations based on http://fadn.pl/publikacje/szeregi-czasowe/ (access date: 24.01.2021).

Smaller area, lower labor commitment and smaller assets in the case of organic farms contribute to the fact that the Farm Net Value Added is in both periods about 40% smaller there than in the case of conventional farms (Table 7). This figure is basically similar to that of production indicators. Slightly more beneficial for organic entities is the amount of net added value per person and especially per 1 ha of the UAA. Taking into account that the net added value account includes both income from market activities (value of the crop, animal, and other production) and subsidies for operating activities, it is reasonable to examine to what extent it is generated by the activity of farmers themselves and by public support. It turns out that without subsidies, organic farms would only be able to generate a small part of the excess obtained by their conventional counterparts, which concerns both the total size as well as per person and per hectare of the UAA. However, the distance between the two groups is diminishing. What is more, the share of subsidies in net added value is much higher in the case of organic farms. From 2016-2018, it constituted 76%, which means that Polish organic farms are almost entirely dependent on public aid. Without taking this into account, the total net added value decreased from EUR 76,171 to EUR 20,143. The situation is similar with regard to the profitability of labor and land. On the one hand, this is the result of extensive production and, on the other hand, the above-mentioned shallowness of the market for these products. However, it should be noticed that a similar phenomenon, yet on a smaller scale, also occurs on conventional farms, where the net added value is decreasing without subsidies and their importance is increasing. From 2016-2018, almost half of this group is publicly supported.

Organic agriculture is an issue that is repeatedly discussed internationally (Kwasek and Obiedzińska, 2014; Kirchman and Bergström, 2008; Domagała-Świątkiewicz, 2005; Głodowska and Gałązka, 2018; Obiedzińska, 2013; Małżewska, 2015; Golik and Żmija, 2017; Runowski, 1996; Ciepielewska, 2014; Tyburski, 2013; Cupiał, Klimas, Szeląg-Sikora, Niemiec, and Sikora, 2013). In Poland (Kwasek and Obiedzińska, 2014) indicated that when comparing the production results of certified organic farms with the results of average conventional farms of the same types keeping agricultural accounts, it was noticed that organic farms obtain values at the level of about 33% of the results obtained by all the FADN farms. The presented results of the study confirm that this is a multidimensional and current topic for further studies. In Poland, organic agriculture is an issue which is strictly related to public support. The EU funds received by farmers partly compensate for lost profits, but it should be mentioned that without the subsidies this sector would have had problems to operate or would not exist at all, at least in economic and market terms, and would only be a niche activity of the small group of involved farmers, as it was before Poland acceded to the EU. Certainly, one should be aware that these losses result from external benefits generated by organic farms, thus the EU support is justified.

Organic agriculture proves that progress and modernity do not necessarily mean a reduction in soil fertility, the destruction of the landscape, water contamination, and the deterioration of human and animal health, as well as the waste of non-renewable natural resources.

Conclusions

The conducted study showed a high production and income inefficiency of the Polish organic farms and their significant dependence on public support. One must agree with the opinion that their function goes beyond providing only market products and ensuring food security. Due to the abandonment of chemical means of production and the focus on using natural dependencies in the production process, they also play an important role in environmental protection, especially in agricultural areas. The nature of the phenomenon of high-quality products is slightly more complex because, on the one hand, they constitute a specific public good that improves the health of society and, on the other hand, it is reflected in a higher price on the market. The social function of organic farms predestines them to obtain public support, although the scale of the significance of the public support in Poland should raise concerns, especially as the level of dependence is increasing. It can be assumed that the most stable conditions for the functioning of this type of entity would be their strong establishment in the local and supra-local market. Otherwise, their existence depends on the decisions of political bodies independent of farmers. In this context, what is particularly worrying is that the high significance of public funds discourages the active search for market niches, which is particularly important in the case of organic farms which produce non-standard products that require special treatment in order to reach their customers. It should be mentioned that the reason for it is not only the relatively low wealth of the Polish society. The shal-

lowness of the domestic market mentioned in the text could be compensated by exports to more affluent countries of the European Union, although this would require even more advanced marketing activity, which, as has been noted, is not in the current interest of farmers, whose economic excesses are provided almost completely by public transfers. Moreover, the proven considerable extensiveness of production makes it necessary to look critically at organic agriculture as a real alternative to conventional production, which is related not only to Poland, but to all countries. Significantly lower labor and, most importantly, land productivity may threaten the food security of even affluent countries, which is why it is currently not the dominant model in any country. This does not mean that organic agriculture is not fulfilling its role. By producing high-quality products, it fills a production gap (which is particularly important for people suffering from nutritional problems) and contributes to the protection of the agricultural environment. Nevertheless, at least with the current level of production and the technologies applied, it should be assumed that this will rather be a niche activity.

References

Abumhadi, N., Todorovska, E., Assenov, B., Tsonev, S., Vulcheva, D., Vulchev, D., Atanasova, L., Savova, S., Atanassov, A. (2012). Agricultural Research in 21st Century: Challenges Facing the Food Security under the Impacts of Climate Change. *Bulgarian Journal of Agricultural Science, 18*(6), pp. 801-818.

Alexandratos, N., Bruinsma, J. (2006). *World Agriculture Towards 2030/2050. The 2012 Revision*. Rome: Agricultural Development Economics Division. Food and Agriculture Organization.

Babović, J. (2008). Agrobiznis u organskoj proizvodnji, Agromenadžment i standardi kvaliteta, Marketing organske proizvodnje. *Multifunkcionalni i ruralni razvoj – agroturizam. Monografija, Organska poljoprivreda.* Novi Sad: Institut za ratarstvo i povrtarstvo.

Badgley, C., Moghtander, J., Quintero, E. (2007). Organic Agriculture and the Global Food Supply. *Renewable Agriculture and Food Systems*, 22, pp. 86-108.

Braun, J. von (2010). Food Insecurity, Hunger and Malnutrition: Necessary Policy and Technology Changes. *New Biotechnology, 27*(5), pp. 449-452.

Chomitz, K., Buys, P., De Luca, G., Thomas, T.S., Wertz-Kanaunnikoff, S. (2007). At Loggerheads? Agricultural Expansion, Poverty Reduction and Environment in the Tropical Forests. *A World Bank Policy Research Report*. The World Bank.

Ciepielewska, M. (2014). Rolnictwo ekologiczne i GMO szansą dla rozwoju polskiej gospodarki? Korzyści i zagrożenia. *Gospodarka w Praktyce i Teorii, 4*(37), p. 8.

Connor, D.J. (2018). Land Required for Legumes Restricts the Contribution of Organic Agriculture to Global Food Security. *Outlook on Agriculture*, 21, pp. 277-282.

Cupiał, M., Klimas, A., Szeląg-Sikora, A., Niemiec, M., Sikora, J. (2013). Problem gospodarowania składnikami pokarmowymi roślin w gospodarstwach ekologicznych. *Proceedings of ECOpole, 7*(2), pp. 553-554.

Domagała-Świątkiewicz, I. (2005). Wpływ działalności rolniczej na środowisko naturalne. In: K. Wiecha, H. Kołoczka, P. Kaszycki, (eds.), *Ochrona środowiska naturalnego w XXI wieku. Nowe wyzwania i zagrożenia* (pp. 57-71). Fundacja na rzecz Wspierania Badań Naukowych, Kraków.

Drygas, M., Nurzyńska, I., Bańkowska, K. (2019). *Charakterystyka i uwarunkowania rozwoju rolnictwa ekologicznego w Polsce.* Warszawa: IRWiR-PAN.

Duda-Krynicka, M., Jaskólecki, H. (2010). Historia i perspektywy rozwoju rolnictwa ekologicznego w Polsce. *Problemy Ekologii, 14*(2), pp. 85-91.

European Commission (2020). Farm Accountancy Data Network. Retrieved from: https://ec.europa.eu/agriculture/rica/ (access date: 04.04.2020).

FADN (2021). Szeregi czasowe. Retrieved from: http://fadn.pl/publikacje/szeregi-czasowe/ (access date: 24.01.2021).

FADN (2014). Definitions of Variables Used in FADN Standard Results. Retrieved from: http://fadn.pl/wp-content/uploads/2012/12/RICC-882-rev9.2-Definitions-of-Variables.pdf (access date: 21.03.2020).

FAO and WHO (1998). Joint FAO/WHO Food Standards Programme Codex Alimentarius Commission. Report of the 30th Session of the Codex Committee on Pesticide Residues, 2025 April 1998. Retrieved from: https://www.faostat.fao.org (access date: 05.07.2017).

FiBL Statistics (2020). FiBL Statistics – European and Global Organic Farming Statistics. Retrieved from: https://statistics.fibl.org (access date: 06.07.2020).

Głodowska, M., Gałązka, A. (2018). Intensyfikacja rolnictwa a środowisko naturalne. *Zeszyty Problemowe Postępów Nauk Rolniczych*, No. 592, pp. 10-11.

Gołaś, Z. (2017). Organization, Productivity and Profitability of Organic and Conventional Dairy Farms. *Infrastructure and Ecology of Rural Areas, 1*(1), pp. 101-117.

Golik, D., Żmija, D. (2017). Rolnictwo ekologiczne i perspektywy jego rozwoju w Polsce w świetle doświadczeń unijnych. *Zeszyty Naukowe Uniwersytet Ekonomiczny w Krakowie, 1*(961), pp. 117-129. DOI: 10.15678/ZNUEK.2017.0961.0108.

Golinowska, M. (2013). Rolnictwo ekologiczne i żywność ekologiczna. *Rozwój rolnictwa ekologicznego*, 13, p. 72.

Hartemink, A.E. (2005). Plantation Agriculture in the Tropics. Environmental Issues. *Agriculture, 34*(1), pp. 11-21.

International Federation of Organic Agriculture Movements EU Group (2020). *IBMA AND IFOAM EU Collaborative Roadmap for Organic Farming 2019-2024.* Belgium: IFOAM EU.

International Foundation for Organic Agriculture (2017). Organic Agriculture & Pesticides. Germany: Organic Agriculture & Food Security.

Jelocnik, M., Ion, R.A., Jovanović, M., Popescu, C.G. (2015). Has Organic Farming Potential for Development? Comparative Study in Romania and Serbia. *Procedia Economics and Finance*, 22, pp. 268-276.

Kirchmann, H., Bergström, L. (2008). *Organic Crop Production – Ambitions and Limitations*. Dordrecht: Springer Science.

Kirchmann, H., Bergström, L., Kätterer, T. (2016). Dreams of Organic Farming. Facts and Myths. Retrievered from: http://pub.epsilon.slu.se/13967/. (access date: 15.01.2019).

Kristiansen, P., Taji A., Reganold, J. (2006). *Organic Agriculture. A Global Perspective.* Australia. CSIRO Publishing.

Kwasek, M., Obiedzińska, A. (2014). Zrównoważone systemy rolnicze. Charakterystyka systemów rolniczych. Alternatywne systemy rolnicze. Rolnictwo ekologiczne. In: M. Kwasek (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (26). Zrównoważone systemy rolnicze i zrównoważona dieta* (p. 17-21). Program Wieloletni 2011-2014, No. 119. Warszawa: IERiGŻ-PIB.

Lapola, D., Martinelli, L., Peres, C. et al. (2013). Pervasive Transition of the Brazilian Land-Use System. *Nature Climate Change*, 4, pp. 27-35.

Lazić, B. (2010). Organska poljoprivreda – zalog za budućnost. *Organic News*, 1, p. 8-9.

Ligenzowska, J. (2014). Organic Farming in the World. *Problemy Rolnictwa Światowego, 14*(3), pp. 150-157.

Łuczka, W. (2019). Changes in the Behavior of Organic Food Consumers. *Ekonomia i Środowisko*, Vol. 70, No. 3, pp. 140-153.

Łuczka-Bakuła, W. (1993). *Istota i cele rolnictwa ekologicznego, próba interpretacji. Od ekologicznego rolnictwa do rynku ekologicznej żywności.* Poznań: Wydawnictwo WiS.

Łukasiński, W. (2008). Zarządzanie jakością produktu ekologicznego. *Żywność. Nauka. Technologia. Jakość, 1*(56), pp. 146-153.

Małżewska, S. (2015). Środowiskowe dobra publiczne w rolnictwie i na obszarach wiejskich. *Ekonomia i Środowisko, 1*(52), pp. 132-147.

Manchala Santhoshkumar, G., Chandramohan R., Sangwan P.S. (2017). A Review on Organic Farming – Sustainable Agriculture Development. *International Journal of Pure & Applied Biosciences, 5*(4), pp. 1277-1282.

Kwasek, M., Obiedzińska, A. (2013). Spożycie żywności a środowisko. In: J.S. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (20). Wybrane zagadnienia zrównoważonego rozwoju i rolnictwa* (pp. 139-152). Program Wieloletni 2011-2014, No. 93. Warszawa: IERiGŻ-PIB.

Padel, S., Lampkin, N. (2007). The Development of Governmental Support for Organic Farming in Europe. *Organic Farming An International History*, pp. 93-122.

Palsova, L., Schwarczova, L., Schwarcz, P., Bandlerova, A. (2014). The Support of Implementation of Organic Farming in the Slovak Republic in the Context of Sustainable Development. *Procedia – Social and Behavioral Sciences*, 110, pp. 520-529.

Pretty, J., Sutherland, W.J., Ashby, J. (2010). The Top 100 Questions of Importance to the Future of Global Agriculture. *International Journal of Agricultural Sustainability*, 8, pp. 219-236.

Ramankutty, N., Mehrabi, Z., Waha, K., Jarvis, L., Kremen, C., Herrero, M., Rieseberg, L.H. (2018). Trends in Global Agricultural Land Use: Implications for Environmental Health and Food Security. *Annual Review of Plant Biology, 69*(1), p. 69:14.1-14.27.

Reganold, J.P., Wachter, J.M. (2016). Organic Agriculture in the Twenty-Frst Century. *Nature Plants, 2*(2), 15221.

Runowski, H. (1996). *Pojęcie rolnictwa ekologicznego. Ograniczenia i szanse rolnictwa ekologicznego.* Warszawa: SSGW.

Schrama, M., de Haan, J.J., Kroonen, M., Verstegen, H., Van der Putten, W.H. (2018). Crop Yield Gap and Stability in Organic and Conventional Farming System. *Agriculture, Ecosystems and Environment*, 256, pp. 123-130.

Smith, L.G., Jones, P.J., Kirk, G.J.D. et al. (2018). Modelling the Production Impacts of a Widespread Conversion to Organic Agriculture in England and Wales. *Land Use Policy*, 76, pp. 391-404.

Smoluk-Sikorska, J., Łuczka-Bakuła, W. (2014). *Istota i korzyści rolnictwa ekologicznego. Uwarunkowania handlu detalicznego żywnością ekologiczną.* Warszawa: Difin.

Staniak, S. (2014). Charakterystyka żywności produkowanej w warunkach rolnictwa ekologicznego. *Polish Journal of Agronomy*, 19, pp. 25-35.

Stappen, F.V., Loriers, A., Mathot, M. Planchon, V., Stilmant, D., Debode, F. (2015). Organic Versus Conventional Farming: the Case of Wheat Production in Wallonia (Belgium). *Agriculture and Agricultural Science Procedia*, 7, pp. 272-279.

Turczak, A. (2014). Perspektywy rozwoju rolnictwa ekologicznego w Polsce. *Zeszyty Naukowe Zachodniopomorskiej Szkoły Biznesu. Firma i Rynek*, 1, pp. 59-72.

Topp, C.F.E., Stockdale, E.A., Watson, C.A., Rees, R.M. (2007). Estimating Resource Use Efficiencies in Organic Agriculture: A Review of Budgeting Approaches Used. *Journal Science Food Agriculture*, 87, pp. 2782-2790.

Tyburski, J. (2013). *Czym jest żywność ekologiczna. Żywność ekologiczna.* Olsztyn: Uniwersytet Warmińsko-Mazurski, p. 10.

Zhang, Y. (2017). Social Class Differences in Consumption Propensity in Contemporary China – from Survival-Oriented Consumption to Development-Oriented Consumption. *The Journal of Chinese Sociology*, 4, 21.

SYTUACJA EKONOMICZNA GOSPODARSTW EKOLOGICZNYCH W POLSCE NA TLE UNII EUROPEJSKIEJ

Abstrakt

Rolnictwo ekologiczne to stosunkowo nowy system produkcji, którego znaczenie rośnie na całym świecie. Podobnie jak w przypadku wszystkich przedsiębiorstw, także dla gospodarstw ekologicznych wyniki ekonomiczne mają fundamentalne znaczenie. Celem artykułu było określenie sytuacji ekonomicznej gospodarstw ekologicznych na tle podmiotów konwencjonalnych na przykładzie Polski poprzez porównanie potencjału produkcyjnego oraz relacji między czynnikami produkcji, wielkości produkcji i uzyskanych wyników ekonomicznych. Analizę oparto na danych Polskiego FADN. Ze względu na fakt, że gospodarstwa ekologiczne w Polsce objęte są specjalnym wsparciem Unii Europejskiej, wyniki ekonomiczne przedstawiono w dwóch wariantach, tj. z dopłatami do działalności operacyjnej i bez nich. Takie podejście jest próbą oceny, na ile dwie analizowane grupy (tj. gospodarstwa ekologiczne i konwencjonalne) mogą funkcjonować na rynku bez wsparcia publicznego. Analiza została przeprowadzona dla dwóch skrajnych okresów, tj. lat 2007-2009 i 2016-2018. Pierwszy to moment uruchomienia pierwszego w Polsce Programu Rozwoju Obszarów Wiejskich na pełny siedmioletni okres realizacji. Rok 2018 to najnowsze dostępne dane. Z przeprowadzonych badań wynika, że gospodarstwa ekologiczne mają niższy potencjał produkcyjny niż gospodarstwa konwencjonalne i mniej korzystne relacje między czynnikami produkcji. Plony i produktywność zwierząt są również mniejsze. Najważniejsze jest to, że osiągają znacznie niższe wyniki ekonomiczne, które w dużej mierze są generowane przez dopłaty bezpośrednie. Podsumowując, badanie wykazało wysoką nieefektywność produkcyjną i dochodową gospodarstw ekologicznych oraz ich znaczną zależność od wsparcia publicznego.

Słowa kluczowe: rolnictwo ekologiczne, gospodarstwa ekologiczne, gospodarstwa konwencjonalne.

Submission date: 11.02.2021.
Final pctgcu date: 15.03.2021.
Acceptance date: 09.04.2021.