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ECONOMIC SUSTAINABILITY OF ORGANIC FARMS IN 2010-2013*

Abstract

In line with the “Condition of organic farming in Poland. The report 2013-2014”, issued by the Main Inspectorate of the Agricultural and Food Quality Inspection (www.ijhar-s.gov.pl), production solely under the organic system was carried out, at that time, by 67% and 60% of organic farms, respectively. The remaining share are entities producing under both organic and conventional methods. According to research, held under the Polish FADN, these farms are highly varied in organisational, production and economic terms. Farms using solely organic methods are distinguished by more holistic approach to executed farming activities, they are also more reliable as regards the quality of manufactured organic food, but they achieve poorer economic results. This is evidenced in the following paper discussing the organisation, production and economic results of such farms grouped according to the size of UAA. Research proved that their production effects over a few years were fairly similar and dropped along with an increase in the area of farms but, at the same time, production intensity dropped. Very poor soil quality also constrained production. The analysis showed that these farms are weak in terms of production and economy, highly dependent on subsidies and rather unlikely to develop in the coming years.

Key words: organic farm, organic production system, organic farming, organic production intensity, organic subsidies, production efficiency, income, organic food market, land productivity

* The paper concerns organic farms applying solely organic production methods. *The Council Regulation (EC) No. 834/2007 of 28 June 2007 on organic production and labelling of organic products* allows for running mixed farms, i.e. applying both organic and conventional production methods at a single farm.

Introduction

Over 10 years of Poland's involvement in the Common Agricultural Policy was a time of vital developments for organic farming. The Ministry of Agriculture and Rural Development (MARD) expects further development of this segment of agriculture, growth in its competitiveness and rise in organic food supply to the market¹. Achievement of these targets largely depends on sustainability of farms and their continuous and conscious participation in the system. This is preconditioned, above all, by cost-effectiveness of production, its competitiveness against conventional production, and making the farms independent from the inflow of payments.

The ability of farms to compete rests largely on the status of resources of a farm, e.g. the quantity and quality of land, assets and funds, potential of the human factor (knowledge, skills, determination in pursuing one's goals). A farm competitive against other, similar entities in the market is also more sustainable in the longer time perspective (Józwiak (ed.), 2014). Sustainability of farms means their ability not only to pursue current activity but also to develop. This is possible if the farm has relevant economic efficiency which is measured with the level of income and should ensure coverage of costs of use of own factors of production (land, capital and labour) and should enable investments in new assets, not only replacement of the old ones (Józwiak (ed.), 2014; Zięta, 2012).

General overview of the Polish organic agriculture

At present, the Polish organic agriculture is characterised by high fragmentation, i.e. low land resources. In 2013, nearly 70% of organic farms were entities of up to 20 ha of utilised agricultural area (UAA) and 18.8% of them had less than 5 ha of UAA². Probably, many of the farms will not handle the competition and will drop out from the organic farming sector. It seems that the process of elimination has already started as in 2014, as compared to 2013, GIJHARS has noted a several percent fall in the number of farms of up to 10 ha of UAA. The total UAA under organic crops also decreased by 1.9%³. It is the livestock population, however, not the UAA that has troubled organic farming in Poland for years. Its growth rate was much slower and disproportionate to the increase in UAA.

The idea behind the organic farming combines the crop and livestock production, the drive at keeping fodder and fertiliser balance and the need to rear animals at an organic farm resulting therefrom, which is to adequately direct the production and, consequently, provide raw materials and ready products to the market. According to the "Organic Farming Criteria"⁴, mandatory for the mem-

¹ *Ramowy Plan Działań dla Żywności i Rolnictwa Ekologicznego w Polsce na lata 2014-2020.*

² *Raport o stanie rolnictwa ekologicznego w Polsce w latach 2013-2014* (2015). Warszawa: IJHARS.

³ <http://www.ijhar-s.gov.pl/index.php/raporty-i-analizy.html>.

⁴ <http://www.ekoland.pl> (*Kryteria rolnictwa ekologicznego Stowarzyszenia Ekoland*).

bers of the Ekoland Association, livestock rearing is an integral part of an organic farm and it is systematically bound to the crop production pursued at the farm. In Poland, many farms failed to observe this principle, but they were still acting in line with the law, as from the point of view of the overriding EU document referring to organic farming, namely the Council Regulation (EC) No. 834/2007, this holistic approach is not obligatory.

Lack of animals understates the role of such farms not only in the organic food market but also contradicts the idea of environmental sustainability associated with the organic farming. As stated by Zegar “it is difficult to clearly assess the sustainability of farms without livestock production, ergo animal fertilisers, in a long-term perspective” (Zegar, 2009).

The lessons learned from the membership in the European Union in the past 10 years indicate that organic farming in Poland developed mainly due to availability of payments, which had no effect on better marketability of organic farming production (Brodzińska, 2014) and development of organic food market in Poland (Pawlewicz and Szamrowski, 2014). It is also true that sometimes payments were targeted at areas, where no actual production has been conducted (Kociszewski, 2014). Organic farming is to be further supported from the state budget under the Rural Development Programme 2014-2020 (RDP 2014-2020) [*Program Rozwoju Obszarów Wiejskich 2014-2020*]. The next edition of this programme verifies the level of payments and scopes of digressiveness of payments; and also emphasises the postulated coupling of crop and livestock production, which is to result in an obligation to rear livestock. This should contribute to the improvement of marketability of production, because, according to Brodzińska (2014), its level at an organic farm depends on the presence of animals. So far, low level of organic production marketability resulted in a low share of products from the Polish farms in the organic food market (Brodzińska, 2014). Because supply of the Polish organic farming products was low, comparing to the potential of organic farms in Poland, most of organic food was imported from abroad (Pawlewicz and Szamrowski, 2014). To date, livestock rearing was not a business for many farmers as – according to surveys – many organic farms did not pursue livestock production at all and obtained better economic results than those keeping livestock (Nachtman, 2014). Mixed production farms – farms combining organic and conventional production – also proved competitive compared to farms carrying out solely organic production (Nachtman, 2015). Restrictions regarding the obligation to keep animals at organic farms, which use the support under the RDP 2014-2020, should cause a growth in the livestock population but can result in resignation from organic farming, as well.

The above-outlined problems add to the uncertainty as to the development of organic production and growth in its supply to the market, although the demand for organic food regularly grows (Kwasek, 2013). The development of the organic food market described in the document “Framework Action Plan for Organic

Food and Farming in Poland for 2014-2020” [*Ramowy Plan Działań dla Żywności i Rolnictwa Ekologicznego w Polsce*] assumes a growth in the inflow of that food to the market and expects that in 2020 the value of the market will amount, at least, to EUR 210 million. Today, experts estimate that its level in 2015 will reach the value of PLN 700 million⁵, which represents ca. EUR 170 million. If the average annual growth rate of this market is at least 15% then, in line with the assumptions, the organic food market should considerably exceed the assumed level.

Hence, it is important whether or not the Polish organic farming reaches the assumed level of development of the market in the future. This should be fostered by the growth in competitiveness of organic farms. It can be stated that these should be primarily units conducting solely organic production across the entire farm. Thus, it becomes necessary to broaden the knowledge on the production and economic situation of such organic farms. This can foster the assessment of development perspectives of organic farming and food market. Therefore, the study aims to present the effects of organic farms, their organisation and operating costs over several years and to point out their development perspectives.

Research material, methodical issues

Analysis covers certified organic farms continually keeping accounting records under the Polish FADN system in 2010-2013. These entities implemented agricultural activity solely with the use of organic methods and were situated across the entire country. Given the importance of such farms for the organic farming sector, the results were presented in five ranges of UAA and as an average for the group. The following farm groups were selected: from 5 to ≤ 10 ha (“small” – 43 farms), from 10 to ≤ 20 ha (“medium-small” – 65 farms), from 20 to ≤ 30 ha (“medium-large” – 33 farms), from 30 to ≤ 50 ha (“large” – 30 farms) and above 50 ha (“very large”⁶ – 21 farms). A total of 196 of the same farms took part in the research each year.

Results of the farms are published for the first time and presented as arithmetic means. The paper presents the status of resources and manner of production organisation, level of production and costs, and efficiency of farming. The effects of farming were assessed on the basis of income from a family farm (IFFF). The capacity of researched farms to develop was assessed on the basis of the index of income per one uncovered person in the farmer’s family, status of the replacement of assets and profit earned from a farm. The idea of profit from a farm is understood in this case as the income from a family farm less the payment for conventional costs of own labour of a farmer and his family (Goraj and Mańko, 2011).

⁵ www.portalspozywczy.pl.

⁶ Names according to the nomenclature of the Polish FADN. *Wyniki Standardowe 2013 uzyskane przez ekologiczne gospodarstwa rolne*. (2014) Część I. Wyniki Standardowe. Warszawa.

Discussion of results

Production potential of farms. Researched organic farms had quite low economic potential. On average, in the entire group, their economic size ranged from EUR 22 thousand to EUR 23 thousand of SO7 in all the years of the research – Table 1. In line with the EU methodology, these farms are included in the fifth class of economic size (15 thousand \leq EUR < 25 thousand); hence, to the group of farms of small economic strength (Bocian, Cholewa and Tarasiuk, 2014). This value results from low economic size of most of the analysed farms, because only the units above 30 ha of UAA exceeded the average. The area group characterised by the lowest economic strength was the group of farms with the smallest land resources, along with a growth in their area the economic size also grew and this regularity was present in all years of the research. But the labour inputs looked different. On average, in the entire group these amounted to ca. 6 AWU per 100 ha of UAA. They were the highest for “small” farms (from 5 ha to 10 ha) and “medium-small” farms (from 10 ha to 20 ha) – in the 2010-2013 research period they amounted, respectively, to 20-22 AWU and 13-14 AWU per 100 ha of UAA.

Labour resources dropped along with a growth in the area and at “very large” farms (above 50 ha of UAA) amounted to only 1.6-1.5 AWU per 100 ha of UAA. The share of contractual employment in total labour ranged from 3% to 15% in respective groups of UAA and had different values in different years, but was always the lowest in the group of “medium-large” farms (20-30 ha). The value of assets per 1 ha of UAA dropped along with a growth in UAA, but it oscillated over the years. For the smallest area farms it amounted to PLN 35-40 thousand, and for the largest – PLN 12-14 thousand per ha (Table 1).

Over four years, there were some, but not very significant, changes in the resources of the factors of production (Table 2). The economic size dropped both on average for the overall population of farms, and in individual area groups of farms. The only exception in this regard were the largest area farms. In 2013, against 2010, their economic strength grew by 3.4%, their land area and value of assets per 1 ha of UAA increased the most; at the same time, the drop in total labour resources was the highest for these farms. What is important, apart from the group of the largest area farms, in 2013 against 2010, the resources of own labour force dropped in all other groups. This can signal the changes taking place in the agricultural labour market and verify the opinions about large labour resources in agriculture, thus contributing to the development of organic farming.

⁷ Standard Output is the average, for 5 years, output value of a specified crop or livestock production activity, obtained per 1 ha or from 1 livestock unit in one year, under average production conditions for the given region.

Table 1

<i>Production potential of organic farms in 2010-2013</i>								
Years	Farm groups	Economic size (EUR)	UAA (ha)	Total labour force/farm (AWU) ^a	Labour force per 100 ha of UAA (AWU)	Share of paid employment (%)	Value of assets per 1 ha of UAA	Soil valuation index
2010	Average	23,098	28.6	1.78	6.23	10.5	21,017	0.60
	5<ha≤10	11,545	7.8	1.56	20.03	7.4	35,208	0.61
	10<ha≤20	18,118	14.2	1.93	13.61	15.0	32,111	0.68
	20<ha≤30	21,240	25.1	1.69	6.74	2.5	25,003	0.53
	30<ha≤50	31,563	39.1	1.88	4.80	9.6	23,127	0.57
	ha>50	56,096	111.0	1.82	1.64	8.4	11,863	0.50
2011	Average	22,731	29.1	1.78	6.12	11.0	21,813	0.60
	5<ha≤10	11,496	7.7	1.70	22.03	13.4	39,665	0.61
	10<ha≤20	17,008	14.4	1.88	13.05	13.8	32,976	0.68
	20<ha≤30	20,513	25.4	1.66	6.53	4.2	25,116	0.49
	30<ha≤50	30,532	39.3	1.90	4.84	11.2	24,169	0.57
	ha>50	56,183	108.1	1.76	1.63	7.4	12,876	0.50
2012	Average	22,375	29.0	1.78	6.12	12.0	22,321	0.60
	5<ha≤10	11,140	7.7	1.57	20.24	8.2	38,682	0.60
	10<ha≤20	16,892	14.3	1.82	12.74	12.1	34,167	0.68
	20<ha≤30	19,831	25.1	1.71	6.81	7.9	24,765	0.52
	30<ha≤50	29,920	39.6	1.97	4.97	14.1	24,520	0.56
	ha>50	57,970	113.8	1.81	1.59	10.0	13,222	0.50
2013	Average	22,225	29.5	1.75	5.95	11.9	22,492	0.61
	5<ha≤10	10,524	7.8	1.59	20.38	9.9	39,231	0.60
	10<ha≤20	17,040	14.1	1.81	12.82	11.8	33,517	0.67
	20<ha≤30	19,988	24.9	1.72	6.90	7.4	26,615	0.57
	30<ha≤50	28,682	39.7	1.90	4.77	15.4	24,819	0.57
	ha>50	57,977	114.6	1.76	1.54	10.0	13,720	0.50

^a According to the FADN methodology, labour inputs constitute the total labour input under operating activities of a farm and are expressed in persons working full-time – AWU (Annual Work Unit). By 2010, the AWU corresponded to 2,200 working hours, and as from 2011 it is the equivalent of 2,120 hours.

Source: own calculations based on the Polish FADN data.

Production possibilities of farms is predetermined not only by land resources but also by land quality. As given in Table 1, the soil valuation index on average for the entire population of farms amounted to only 0.60. Its average value in individual area groups was the highest for farms having from 10 ha to 20 ha of land (0.68-0.67), and the lowest for the largest area farms (0.50). This means that production capacities of the latter are limited as these are poor soils⁸. It seems that so low soil quality in the analysed farms signals a certain trend, namely resignation from the conventional production methods for the benefit of organic ones in case of poor soils.

Table 2
Dynamics of changes in the value of factors of production and economic size in 2013 against 2010 (2010=100)

Farm groups	Economic size (EUR)	UAA (ha)	Total labour force (AWU)	Own labour force (FWU)	Value of assets per 1 ha of UAA (PLN)
Average	96.2	103.1	98.4	96.4	107.0
5<ha≤10	91.2	100.1	101.9	99.1	111.4
10<ha≤20	94.1	99.2	93.5	96.9	104.4
20<ha≤30	94.1	99.3	101.7	96.6	106.4
30<ha≤50	90.9	101.5	100.9	94.5	107.3
ha>50	103.4	103.2	96.5	100.1	115.6

Source: own calculations based on the Polish FADN data.

Production organisation. Undoubtedly, low soil quality affected the structure of crops and the condition of livestock population.

On average, in the entire population fodder crops (50-54%) had the major share in UAA, growing slightly over the next years (Table 3). Their share increased along with a growth in the area of farms and it was the largest in “medium-large” units (from 61% to 64% of UAA). It should be noted that fodder crops were predominated by grasslands for most of these farms.

Cereals were also commonly cultivated. On average, in the entire population, their share in the UAA was decreasing – from 37% in 2010 to 33% in 2013. Mostly, the largest area (>50 ha) and the smallest area (5-10 ha) farms were focused on their cultivation – cereals covered from 36% to 40% of UAA. An exception was the year 2010, when “very large” farms had nearly 45% of UAA under cereal cultivation (Table 3). Fruit orchards and vegetables were not as popular. Such plantations existed mainly in the structure of UAA of smaller area farms. In 2010-2013, in case of “small” farms the area of orchards rep-

⁸ Based on the soil valuation index, four soil classes are identified in Poland, among them the poorest quality soils, described as poor soils, have the index of up to 0.80. The next level is from 0.81 to 1.20, marked as average soils. The best quality soils have the index value above 1.60 (Harasim, 2006).

resented, on average, ca. 1 ha (12-14% of UAA) and for “medium-small” approximately 0.7 ha (ca. 5% of UAA). The largest vegetable cultivation area was at “medium-small” farms and it ranged over the years from 0.6 ha to 0.8 ha (ca. 4-5% in UAA). Other crops⁹ played an important role especially for “large” farms (30-50 ha) reaching the share of ca. 13-14%; in other groups their share varied over the years from 7% to 11%.

Table 3

Area and structure of crops of organic farms in 2010-2013

Years	Farm groups	Cultivation area (ha)					Structure of crops (%)				
		Cereals	Orchards	Vegetables	Fodder crops	Other crops	Cereals	Orchards	Vegetables	Fodder crops	Other crops
	Average	10.6	0.7	0.4	14.2	2.7	37.0	2.4	1.3	49.8	9.5
2010	5<ha<10	2.8	1.0	0.2	2.9	0.9	36.3	12.4	2.4	37.8	11.2
	10<ha<20	4.7	0.7	0.8	6.4	1.6	33.3	5.0	5.4	45.1	11.2
	20<ha<30	6.8	0.7	0.2	15.2	2.2	26.9	2.9	0.7	60.8	8.7
	30<ha<50	12.5	0.0	0.4	21.1	5.1	32.0	0.1	1.0	53.8	13.1
	ha>50	49.7	0.4	0.0	52.8	8.0	44.8	0.4	0.0	47.6	7.2
	Average	10.0	0.7	0.4	15.2	2.7	34.4	2.4	1.3	52.5	9.4
2011	5<ha<10	2.9	1.1	0.2	2.7	0.8	37.9	13.8	2.8	35.0	10.6
	10<ha<20	4.9	0.6	0.7	6.9	1.2	34.2	4.5	4.7	48.3	8.3
	20<ha<30	6.0	0.8	0.2	16.3	2.1	23.7	3.3	0.7	64.0	8.3
	30<ha<50	11.6	0.1	0.5	22.8	4.2	29.6	0.3	1.3	58.1	10.6
	ha>50	42.9	0.4	0.1	54.4	10.3	39.7	0.4	0.1	50.4	9.5
	Average	9.7	0.7	0.4	15.3	3.0	33.3	2.4	1.3	52.6	10.4
2012	5<ha<10	2.9	1.0	0.2	2.8	0.8	37.5	12.8	2.5	36.8	10.4
	10<ha<20	4.6	0.7	0.7	7.1	1.3	31.9	4.6	4.7	49.8	9.1
	20<ha<30	6.0	0.8	0.3	15.4	2.6	24.0	3.3	1.1	61.3	10.2
	30<ha<50	11.0	0.1	0.4	22.6	5.4	27.9	0.1	1.1	57.2	13.7
	ha>50	44.9	0.5	0.1	57.9	10.6	39.4	0.4	0.0	50.8	9.3
	Average	9.8	0.6	0.4	15.8	2.8	33.1	2.2	1.3	53.7	9.7
2013	5<ha<10	3.0	0.9	0.3	3.0	0.7	37.9	11.5	3.5	38.0	9.2
	10<ha<20	4.1	0.7	0.6	7.5	1.2	28.8	4.7	4.3	53.5	8.7
	20<ha<30	5.7	0.7	0.3	15.7	2.4	23.0	2.9	1.4	62.9	9.8
	30<ha<50	11.7	0.1	0.5	22.3	5.2	29.4	0.1	1.2	56.1	13.2
	ha>50	45.0	0.2	0.1	59.7	9.7	39.3	0.2	0.1	52.1	8.4

Source: own calculations based on the Polish FADN data.

⁹ Other crops cover other field crops (marked as SE041 in the FADN methodology) and fallow land and land set-aside.

Table 4

Livestock population and its percentage structure at organic farms in 2010-2013

Years	Farm groups	Livestock population (LU)		Forage area per 1 LU ^a	LU/ha of UAA	Structure of livestock population (%)					
		Total	Dairy cows			Dairy cows	Other cattle	Sheep and goats	Poultry	Pigs	Other
	Average	10.42	2.89	1.9	0.36	27.7	38.7	6.6	8.8	11.6	6.5
2010	5<ha<10	6.21	2.42	0.8	0.80	39.0	21.7	0.1	16.1	20.1	2.9
	10<ha<20	8.75	3.66	0.9	0.62	41.8	37.2	2.6	2.8	11.1	4.5
	20<ha<30	13.15	2.91	1.5	0.52	22.1	45.9	8.1	6.6	12.5	4.8
	30<ha<50	17.19	2.66	1.9	0.44	15.5	39.1	10.7	14.7	9.8	10.2
	ha>50	12.03	2.22	5.7	0.11	18.5	46.7	11.7	7.0	6.1	10.0
	Average	9.86	2.82	2.0	0.34	28.6	40.9	6.7	7.3	10.1	6.3
2011	5<ha<10	5.93	2.43	0.7	0.77	40.9	22.2	0.2	17.2	17.3	2.1
	10<ha<20	8.10	3.46	1.0	0.56	42.7	36.9	2.3	2.8	9.7	5.6
	20<ha<30	11.96	2.85	1.6	0.47	23.8	51.3	7.8	4.2	9.5	3.4
	30<ha<50	15.72	2.82	1.9	0.40	18.0	46.9	11.7	10.4	1.2	11.7
	ha>50	13.55	1.95	5.9	0.13	14.4	42.6	11.3	6.6	18.2	6.8
	Average	9.72	2.68	2.0	0.33	27.5	43.2	6.3	7.4	9.6	6.0
2012	5<ha<10	5.97	2.61	0.7	0.77	43.8	21.5	0.2	16.8	16.0	1.8
	10<ha<20	7.73	3.26	1.1	0.54	42.2	38.4	2.2	2.6	9.1	5.5
	20<ha<30	11.55	2.26	1.6	0.46	19.6	55.6	8.8	2.9	9.6	3.6
	30<ha<50	15.52	3.35	1.8	0.39	21.6	48.8	8.7	9.2	0.8	10.9
	ha>50	13.84	1.03	6.4	0.12	7.5	45.5	11.9	10.6	18.9	5.6
	Average	9.71	2.62	2.1	0.32	27.0	45.9	6.0	7.5	7.6	6.1
2013	5<ha<10	5.47	2.65	0.7	0.70	48.5	24.9	0.1	7.1	15.8	3.6
	10<ha<20	8.06	3.31	1.2	0.57	41.1	38.4	1.7	6.2	8.1	4.5
	20<ha<30	11.71	2.41	1.5	0.47	20.6	56.4	10.0	2.7	6.3	4.1
	30<ha<50	15.20	1.93	1.9	0.38	12.7	53.5	10.9	12.0	0.8	10.0
	ha>50	14.23	2.30	5.9	0.12	16.2	49.9	5.2	9.9	11.0	7.8

^a Refers to herbivores.

Source: own calculations based on the Polish FADN data.

Fodder crops cultivation in all groups of farms was linked to herbivores rearing. On average, in the population as a whole, there was 1.9-2.1 ha of forage area per 1 LU¹⁰ reared under the grazing system (Table 4). It was the smallest – from 0.7 ha to 1.2 ha – in the two smallest area groups (5-20 ha). The forage area, which at “very large” farms amounted to as much as 5.7-6.4 ha per 1 herbivore, grew along with a growth in the farm area.

Livestock population at the analysed farms showed a downward trend and amounted, on average in the population as a whole, from 10.42 LU to 9.71 LU in subsequent years. It needs to be noted that the dairy cattle population – very important from the point of view of organic food market – amounts, on average, to 1-3 cows per farm and each year the number slightly dropped (Table 4)¹¹. A downward trend over the years, be it a small one, is clear also as regards stocking density per 1 ha of UAA, both for the entire population and in respective groups. “Very large” farms were an exception, as their stocking density in 2010 amounted to only 0.11 LU and increased slightly in subsequent years. Low livestock population at larger area farms could be caused by a lack of labour force needed to handle the herd. As pointed out in Table 1, labour resources at “small” and “medium-small” farms were even several times higher than in other groups of farms.

Referring to the generally low stocking density or low number of livestock reared under the organic system, it should be clear how immense is the administrative burden linked to their rearing. This often discourages the farmers (Bielski, 2009). A farmer is required, for instance, to keep a register of animals, their treatments, the fodder they consume, purchase of means of production, manufactured plant and animal products¹².

Analysing the production organisation the structure of livestock population should be noted. Considering the entire population of 196 farms, it is clear that beef cattle dominated and its share increased year-to-year. In case of area groups it was predominant for farms of more than 20 ha of UAA; the share of sheep and goats for them was also, in general, higher than at farms of up to 20 ha. Whereas, for farms of 5-20 ha of land each year the number of cows exceeded the number

¹⁰ LU (Livestock Unit) is livestock calculation unit that equals 1 dairy cow or 1 bull aged 2 or more. Other animals represent a relevant part of such calculation unit, e.g. pigs for fattening = 0.3 LU, sheep = 0.1 LU, laying hens = 0.014 LU.

¹¹ This trend reflects the situation in the population of organic dairy cows in Poland. According to GIJHARS, in 2013 there was less by ca. 20% of cows than in 2010, when there was less than 24 thousand cows. Instead, farmers introduce beef cattle, which in 2010 amounted to 16.7 units and in 2013 nearly 20 thousand units (growth by ca. 19%) – unpublished GIJHARS data.

¹² Under the *COMMISSION REGULATION (EC) No. 889/2008 of 5 September 2008 laying down detailed rules for the implementation of Council Regulation (EC) No. 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control* (OJ L 250 of 18.9.2008, p. 1).

of beef cattle, which is probably linked to the labour-intensity of milk production and labour resources. At “small” farms the share of poultry and pigs in the livestock population was relatively high, but probably these were mainly used for self-supply purposes. The share of poultry and pigs at large and very large farms varied over the years.

Production level and structure. The manner of production organisation at organic farms translated into its level and structure. On average, for the entire population of farms total production grew over three years from PLN 59,237 in 2010 to PLN 70,440 in 2012 and next it lowered to PLN 65,666 in 2013. This was primarily caused by a drop in the production value in the last year after its regular growth in the first three years (2010-2012) at farms of more than 30 ha of UAA. The production value at farms from 5 ha to 20 ha was characterised by changes over time, and in the group from 20 ha to 30 ha it was at a similar level in 2010 and 2011, and next it increased (Table 5).

On average, in the entire population of farms, crop production had an advantage in the total output, but in 2013 its share decreased, against 2010, by ca. 4 percentage points to the benefit of livestock production (Table 5). Crop production constituted from 54.6% in 2010 to 50.8% in 2013, and livestock production from 41.1% to 45.3%. The share of other production in all the years was slight (ca. 4%). In respective area groups there is a clear differentiation in the share of crop and livestock production, although in area groups of 5-50 ha these were not large differences. The share of crop production totalled from 43% to 54% and livestock production – from 41% to 54%. For entities of more than 50 ha of UAA a downward trend was noted in the share of crop production to the advantage of livestock production from the level of 71.6% in 2010 to 61.3% in 2013.

The crop production value of “small” and “medium-small” farms (up to 20 ha) was predominated by fruit and vegetables; from 21% to 32% of the total output value, changing in respective years. Whereas, cereals were dominant at farms of more than 20 ha of UAA. In 2013, their share decreased decidedly in all area groups; for units of 20-50 ha it dropped from 22-23% in 2010 to 18-16% and for farms >50 ha of UAA: from 55% to less than 44%.

At farms of up to 20 ha the livestock production was dominated by production of cow milk and its products and for farms of 20-50 ha – production of live cattle. At farms of up to 20 ha of UAA the share of milk and milk products totalled from 17% to nearly 27% of the total output value in respective years and showed an upward trend, except for 2011. However, remembering about the small number of dairy cows, the rank of this production was probably slight in the organic food market. In all groups of farms, a growth in the share of production of live cattle was noted. At “small” farms it was from 9% to 13% of the total output value in subsequent years, i.e. ca. 2 times less than at farms having from 20 ha to 50 ha that took the lead as regards the share in total output. For farms having more than 50 ha of UAA live cattle and eggs had a significant share

in the livestock production structure. Especially, the share of egg production at such farms grew year-to-year exceeding in 2012 and 2013 the share of beef production; this points to a growing market trend for these products.

Table 5

Production level and structure at organic farms in 2010-2013

Years	Farm groups	Total output value (PLN)	Share in total output (%)							
			crop production	including:		livestock production	including:			other production
				<i>cereals</i>	<i>fruit and vegetables</i>		<i>milk^a</i>	<i>eggs</i>	<i>live cattle</i>	
	Average	59,237	54.6	25.0	16.5	41.1	14.9	4.6	12.0	4.3
2010	5<ha<10	34,301	44.5	15.1	21.2	52.3	19.2	11.3	10.5	3.2
	10<ha<20	59,485	54.2	13.7	27.5	40.6	21.8	0.9	10.5	5.1
	20<ha<30	48,871	43.4	22.4	8.7	53.7	13.8	5.8	20.7	3.0
	30<ha<50	71,657	49.0	22.7	11.0	47.0	9.8	5.3	14.5	4.0
	ha>50	111,827	71.6	55.2	1.0	23.2	7.1	5.1	8.0	5.2
	Average	65,262	55.5	24.4	16.2	40.7	14.6	4.1	12.5	3.8
2011	5<ha<10	42,257	54.1	12.2	32.0	41.9	16.8	7.6	8.5	4.0
	10<ha<20	62,132	53.1	15.0	24.5	42.0	20.9	1.0	11.0	4.9
	20<ha<30	48,821	47.9	22.0	7.9	50.5	17.3	2.8	20.3	1.6
	30<ha<50	80,297	49.6	20.6	12.2	46.5	11.5	2.5	18.5	3.9
	ha>50	127,161	67.6	50.3	0.8	29.1	5.3	8.4	8.7	3.2
	Average	70,444	54.3	24.0	14.9	42.1	14.0	4.5	14.3	3.6
2012	5<ha<10	37,026	45.3	14.1	24.1	51.0	24.1	6.2	11.6	3.7
	10<ha<20	62,788	50.2	16.0	21.3	44.9	21.8	1.2	12.8	4.9
	20<ha<30	51,109	47.9	22.5	10.9	49.9	12.5	2.8	24.7	2.2
	30<ha<50	90,393	49.2	20.2	11.7	47.5	11.7	2.9	21.0	3.3
	ha>50	162,281	67.0	43.7	0.7	29.8	3.2	10.1	8.1	3.3
	Average	65,666	50.8	20.6	16.9	45.3	16.7	5.0	14.5	3.9
2013	5<ha<10	40,860	46.6	10.8	28.8	49.7	26.6	2.2	12.8	3.7
	10<ha<20	59,636	45.9	11.5	22.4	49.1	26.0	2.7	10.6	5.1
	20<ha<30	55,464	49.0	18.4	16.9	48.8	14.8	2.7	23.4	2.1
	30<ha<50	76,538	45.4	16.4	12.2	50.2	9.1	3.8	20.6	4.4
	ha>50	135,585	61.3	43.6	0.9	35.1	6.9	12.4	11.2	3.6

^a Cow milk and its products.

Source: own calculations based on the Polish FADN data.

Costs and their efficiency. The production level largely depends on the incurred inputs of means of production, which express production intensity in value terms. For the analysed farms the costs per 1 ha of UAA amounted, on average, for the entire population from PLN 1,826 in 2010 to PLN 2,189 in 2013 and increased year-to-year (Table 6). They were the highest for the smallest area farms, where they totalled from PLN 3,700 to PLN 4,500. Along with a growth in farm area production intensity dropped, going down to the value of only ca. PLN 1,000-1,300 at “very large” farms. This points to production extensification at such entities. Thus, it is no accident that very low land productivity was obtained there, which measured by the production value per 1 ha, was within similar ranges as costs (PLN 1,000-1,200 per ha). In other area groups of farms, the production level differed over the years, but the greatest discrepancies were noted for “small” farms getting the highest land productivity. In 2010, production value per 1 ha of UAA amounted to PLN 4,396 and in subsequent years PLN 5,484, PLN 4,787 and PLN 5,232. The level of the index was more even for “medium-small” farms (10-20 ha) – it ranged from PLN 4,200 per ha to PLN 4,400 per ha over the years. As regards these farms, at “medium-large” and “large” (20-50 ha) farms the production value per 1 ha of UAA was by circa half lower, and for “very large” farms (>50 ha) it was lower by even 3-4 times. It needs to be noted that at “very large” farms the production was below the values obtained for payments to operating activities – Table 6.

The presented results perpetuate the view that land efficiency of organic farming drops along with a growth in UAA. The results for land productivity show the importance of adequate stocking density per hectare in organic farming, as the animals provide natural fertilisers. As per Table 1, all groups of farms had a similar, poor soil quality, and despite that the smallest area farms with the highest stocking density achieved quite high output.

Analysis of results in a 4-year period points to unfavourable relations regarding the dynamics of cost and production growth. Based on data contained in Table 6, it was calculated that, on average, production per 1 ha of UAA for the entire population of farms increased in 2013 by 7.7% against 2010 and the total costs by 19.9%. At that time, the amount of payments to operating activities per 1 ha of UAA grew on average by 12.2%. Similarly unfavourable were the relations between the growth rate of production and costs in all groups of farms. At that research time, the rise in costs was higher than the growth in output value.

Economic labour productivity was quite contrary to the land productivity (Table 6). It grew along with an increase in the area scale of farms, except for group from 20 ha to 30 ha of UAA. For “very large” farms the value of the indicator stood out at the background of other groups. Production per 1 AWU grew from PLN 61,379 in 2010 to PLN 89,682 in 2012 after that it fell to PLN 77,037 in 2013. These were values 3-4 times higher than for the smallest area farms, mainly due to much lower labour resources. As regards, efficiency of

using assets, just like in the case of land, farms up to 20 ha of UAA were better; production per PLN 100 of assets amounted to ca. PLN 12-13 and at farms of more than 20 ha of UAA it was usually from PLN 8 to PLN 11.

Table 6

Total costs and productivity of means of production at organic farms in 2010-2013

Years	Farm groups	Total output	Total costs	Production over costs	Payments	Production per AWU (PLN)	Production per PLN 100 of assets (PLN)
	Average	2,070	1,826	245	1,640	33,226	9.9
2010	5<ha<10	4,396	3,728	668	2,041	21,955	12.5
	10<ha<20	4,186	3,162	1024	1,769	30,765	13.0
	20<ha<30	1,950	1,845	105	1,613	28,928	7.8
	30<ha<50	1,831	1,776	55	1,712	38,149	7.9
	ha>50	1,007	994	13	1,499	61,379	8.5
	Average	2,246	2,045	201	1,822	36,699	10.3
2011	5<ha<10	5,484	4,468	1016	2,346	24,894	13.8
	10<ha<20	4,323	3,411	912	1,973	33,132	13.1
	20<ha<30	1,920	1,990	-70	1,929	29,422	7.6
	30<ha<50	2,043	2,029	14	1,892	42,174	8.5
	ha>50	1,176	1,203	-27	1,625	72,358	9.1
	Average	2,425	2,173	253	1,759	39,615	10.9
2012	5<ha<10	4,787	4,254	533	1,998	23,650	12.4
	10<ha<20	4,394	3,489	904	1,986	34,484	12.9
	20<ha<30	2,037	2,071	-34	1,632	29,894	8.2
	30<ha<50	2,285	2,210	75	1,898	45,970	9.3
	ha>50	1,426	1,320	105	1,610	89,682	10.8
	Average	2,229	2,189	40	1,840	37,505	9.9
2013	5<ha<10	5,232	4,495	737	2,127	25,668	13.3
	10<ha<20	4,229	3,600	629	1,948	32,994	12.6
	20<ha<30	2,228	2,272	-44	2,007	32,289	8.4
	30<ha<50	1,926	2,062	-136	1,859	40,367	7.8
	ha>50	1,183	1,355	-172	1,694	77,037	8.6

Source: own calculations based on the Polish FADN data.

Table 7

Efficiency of farming, investment and level of debt at organic farms in 2010-2013

Years	Farm groups	IFFF ^a	IFFF per FWU	Farm profit ^b	Share of payments in IFFF (%)	Gross investments	Net investments	Debt ratio of assets (%)
		PLN				PLN		
	Average	51,912	33,508	10,631	90.4	15,964	1,533	5.6
2010	5<ha<10	19,201	13,386	-18,224	82.9	6,752	-1,029	1.0
	10<ha<20	38,884	23,915	-3,648	64.6	12,647	-7	3.5
	20<ha<30	40,674	27,640	-1,915	99.4	18,734	4,518	5.9
	30<ha<50	67,294	42,452	23,385	99.6	25,104	6,770	6.5
	ha>50	162,034	103,412	118,890	102.7	30,591	731	8.8
	Average	57,714	38,170	14,645	91.8	23,166	7,594	5.9
2011	5<ha<10	25,293	18,773	-14,737	71.5	11,833	3,176	3.4
	10<ha<20	41,094	26,229	-2,918	69.0	10,142	-3,090	3.1
	20<ha<30	45,084	32,219	1,784	108.8	10,208	-4,860	3.9
	30<ha<50	72,891	45,424	26,848	102.0	29,495	9,238	6.1
	ha>50	171,302	110,740	126,981	102.5	95,647	63,870	10.6
	Average	57,073	37,629	11,928	89.5	20,402	4,239	5.9
2012	5<ha<10	18,991	13,643	-22,485	81.4	1,866	-6,906	1.3
	10<ha<20	39,803	25,113	-6,390	71.3	18,361	5,475	3.0
	20<ha<30	37,921	26,163	-7,537	108.0	5,473	-10,423	4.7
	30<ha<50	76,238	47,751	27,504	98.5	30,656	8,789	6.3
	ha>50	194,281	128,675	147,290	94.4	75,872	40,800	11.3
	Average	54,553	38,345	8,597	99.4	22,117	4,524	6.1
2013	5<ha<10	22,116	15,925	-20,606	75.1	7,022	-2,709	1.8
	10<ha<20	36,150	23,821	-11,347	76.0	8,188	-5,514	3.0
	20<ha<30	46,623	37,671	-789	107.2	24,065	7,456	4.9
	30<ha<50	66,827	43,026	19,022	110.5	18,642	-4,065	7.0
	ha>50	173,642	119,855	126,439	111.8	94,870	54,063	10.6

Average net income in the national economy in (PLN)

years	2010	2011	2012	2013
PLN	25,864	27,227	28,854	29,798

^a Income from a family farm.

^b Profit means income from a family farm less conventional costs of own labour, calculated based on the wage paid to employees hired at the farm.

Source: own calculations based on the Polish FADN data.

The relations between the level of costs and the level of obtained production decide on the sustainability of a farm and its development possibilities. Over four years of running agricultural activity, only in 2010 in all groups of farms, production was cost-effective, given the production margin per hectare less costs (Table 6). In 2013, production brought losses in all farms larger than 20 ha of UAA; in 2011 and 2012 these farms also suffered losses or obtained a very low margin. The margin amounting to PLN 14 or PLN 105 was rather symbolic in nature. Data analysis shows that the researched farms larger than 20 ha of UAA had no possibilities of survival solely on production activities. Their survival was based on payments.

Farming efficiency assessment. The basic income category in the FADN methodology is income from a family farm (IFFF). This economic margin is the charge for inputs of own factors of production (land, labour and capital) and for farm management incurred in the production activities. It is desirable to make it as high as possible because its level and investments decide on the development abilities of a farm (Józwiak, 2014). As shown in Table 7, inclusion of payments into the income account significantly improved the economic situation of analysed farms and enabled their functioning. This statement can actually be applied to farms of all area groups.

The share of payments in the income from a family farm was the lowest for farms of up to 20 ha of UAA – 65-83% and it changed in respective years. At farms having more than 20 ha of land the share of payments in income exceeded 100% (from 102% to 112%) in 2011 and 2013, but in the remaining two years it also oscillated around 100%; hence, payments were to finance costs as well. The amount of obtained payments depends on the area and, consequently, the income situation of a farm improved along with a growth in the farm area. “Small” and “medium-small” farms, which incurred very high own labour inputs and obtained high land productivity, achieved low efficiency measured by income value per family work unit (FWU). Since low land resources generated low envelope of payments. Thus, it can be stated that larger farms used a kind of “premium” because they produced much less than smaller area units.

Income from a family farm per family work unit (IFFF/FWU) at “small” farms was within the range of PLN 13-18 thousand and at “medium-small” – PLN 24-26 thousand (Table 7). In all four years of research the income per FWU in the two groups (from 5 ha to 20 ha of UAA) was less than the average net wage in the national economy (parity income) – Table 7. At the same time, these entities did not earned income from a farm, understood as the difference of IFFF and charge for own labour of the farmer and his family – it was negative in all the years. A similar economic situation was at farms having from 20 ha to 30 ha of UAA, except for 2011. The low level of income, especially at farms up to 20 ha, failed to stimulate investments. In general, it was not even the case of own assets replacement – net investments were at a negative level. Thus, farms

of up to 20 ha of UAA did not show signs of development, which is additionally confirmed by very low debt level (1-3.5% of the value of assets). Apparently, these farms acted only as a form of social support and source of employment for their owners and their family members. These farms are able to survive in the present shape and probably even to have some contribution to building the local market of organic products if they have financial support from outside. But with their profitability, they are not able to develop and compete in the market requiring gradual supplies of goods and large batches of homogenous raw materials and ready products.

Some development capacities are inherited in farms having from 20 ha to 30 ha of UAA, which over the years alternately did not replace their assets or did not invest above the level of annual depreciation.

Farms >50 ha of UAA are competitive in terms of economy and development to all area groups. Income per FWU in this case took on the values from PLN 103 thousand in 2010 to PLN 129 thousand in 2012 and PLN 120 thousand in 2013, exceeding by several times the parity level each year. This ensured profit from a farm each year and extended replacement of assets – Table 7. Net investments, except for 2010, were at the level of several thousand PLN, farmers also made financial commitments at a much higher level than at other farms. The debt ratio of assets was at ca. 9-11%.

The farms from the area group 30-50 ha of UAA also offer development opportunities, which is evidenced by both positive income from a farm and incurred net investments.

Conclusions

In 2010-2013, there were slight changes as regards resources of means of production at the researched organic farms, but – what seems to be the most important – own labour force showed a downward trend in 2013 against 2010 at farms of up to 50 ha of UAA. A negative, but common to all the organic farms, characteristic, was very poor soil quality, which decidedly influenced production results. The value of the soil valuation index ranged from 0.49 to 0.68. A question arises: whether the low soil quality at organic farms in Poland is their characteristic feature?

The production effects expressed by productivity index were quite similar in subsequent years in individual groups of farms. Its value ranged from PLN 5.5 thousand to PLN 1.2 thousand per ha and always dropped along with an increase in UAA. Smaller area farms (5-20 ha of UAA) reached higher productivity including in the cultivation of vegetables and orchard plants, but also improving soil fertility as they kept the recommended stocking density for organic farms.

The four-year period of observations of the researched organic farms proves that along with an increase in farm area its output per hectare and production costs dropped. This suggests that farmers at larger area farms, at least some of

them, do not put much store by improvement of production intensity, thus, increasing its efficiency – their income is based on payments. Year-to-year support from external funds was more and more important in income of farms, not only the largest ones; thereby, diminishing the role of manufactured production.

Data analysis covering four years shows that, in the present conditions, relevant land resources are what ensures survival in the market of farms running solely organic production. The resources should amount to at least 20-30 ha. Organic farms of up to 30 ha of UAA, the most resilient as regards production marketability, were not able to compensate even for own labour costs with the achieved income. Only farms above 30 ha of UAA pursued extended replacement of assets and obtained income from a farm. However, it needs to be remembered that high – compared to other farm group – income, especially at farms of more than 50 ha of UAA, was the result of payments. Development and competition in the market should mean that these farms will need to introduce serious changes as regards principles of organic production. Maintaining the production results at the level obtained in the past 4 years does not forecast agrowth in these farms' share in the organic food market development.

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TRWAŁOŚĆ EKONOMICZNA GOSPODARSTW EKOLOGICZNYCH W LATACH 2010-2013

Abstrakt

Według „Raportu o stanie rolnictwa ekologicznego w Polsce w latach 2013-2014” wydanego przez IJHARS (www.ijhar-s.gov.pl), produkcję wyłączenie w systemie ekologicznym prowadziło w tych latach odpowiednio 67 i 60% gospodarstw ekologicznych. Pozostały odsetek tych gospodarstw to podmioty realizujące produkcję rolną zarówno według metod ekologicznych jak i konwencjonalnych. Jak wykazały badania prowadzone w systemie Polski FADN, gospodarstwa te różnią się znacznie od siebie pod względem organizacyjnym, produkcyjnym, ekonomicznym. Gospodarstwa stosujące wyłącznie metody ekologiczne wyróżnia bardziej holistyczne podejście do realizowanej działalności rolniczej, są one bardziej wiarygodne pod względem jakości wytwarzanej żywności ekologicznej, ale uzyskują słabsze efekty ekonomiczne. Potwierdza to niniejsze opracowanie, traktujące o organizacji, wynikach produkcyjno-ekonomicznych takich gospodarstw, pogrupowanych według przedziałów obszarowych użytków rolnych. Badania dowiodły, że ich efekty produkcyjne na przestrzeni kilku lat były dość podobne i malały ze wzrostem obszarowym gospodarstw, jednocześnie jednak zmniejszała się intensywność produkcji. Produkcję ograniczała też bardzo niska jakość gleb. Analiza wskazała na słabość produkcyjną i ekonomiczną tych gospodarstw, ogromne uzależnienie od dopływu dopłat i raczej niewielkie szanse rozwoju w nadchodzących latach.

Słowa kluczowe: gospodarstwo ekologiczne, ekologiczny system produkcji, rolnictwo ekologiczne, intensywność produkcji ekologicznej, dopłaty ekologiczne, efektywność produkcji, dochód, rynek żywności ekologicznej, produktywność ziemi

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