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FARMS COMBINING ORGANIC AND CONVENTIONAL PRODUCTION METHODS AT THE BACKGROUND OF ORGANIC FARMS

Summary

Organic farming in Poland covers farms using only organic farming methods and farms where organic and conventional systems coexist. Statistics capture them jointly as organic farms.

This distorts the real picture of the Polish organic farming, especially the average area of farms, and production and economic situation, which is evidenced by data from organic farms keeping accounting under the Polish FADN. There were considerable differences between the analysed organic and "mixed" farms as regards the cropping structure and livestock population, level of incurred costs and production efficiency, thereby their profitability. Results of the analyses proved that mixed farms were fairly competitive in economic terms against farms using strictly organic production methods, and their income was far less dependent on external support, although the level of subsidies to operating activities per 1 ha of utilised agricultural area was close to the level noted for organic farms.

Key words: organic farming, organic and conventional production system, agricultural accountancy, organic production efficiency, profitability of organic farms

Introduction

Organic farming in the European Union works based on a number of laws applicable to all the EU Member States. The Council Regulation (EC) No. 834/2007[1] is the fundamental legal act laying down the criteria for organic agri-

[1] Council Regulation (EC) No. 834/2007 of 28 June 2007 on organic production and labelling of organic products (OJ EU L 189 of 20.07.2007, as amended).

cultural production. The preamble to the Regulation emphasises the double functions of organic farming – manufacture of products to the market and environmental protection. Given the environmental functions, the Common Agricultural Policy (CAP) launched financial instruments to support organic farming – payments to organic production were targeted at farmers taking up agri-environmental programmes. This motivated farmers to convert conventional farms into organic production systems. In Poland, after accession to the European Union, the number of organic farms and the utilised agricultural area (UAA) under organic system has increased considerably in our country, just like earlier in other Member States. The growth rate of manufactured organic raw materials and products in Poland is much slower, though, which has numerous reasons.

Insufficient volume of commercial organic production is caused, e.g., by inappropriate production organisation. For instance, larger farms often aim to win subsidies and not to develop durably under the organic system. Such units have larger fodder area, but, at the same time, they have low stocking density or they resign completely from rearing livestock; they are also slower as regards increasing crop area against the total UAA (Kuś J. 2010). Subsistence farms or farms of low production marketability represent a large percentage of the Polish organic farms (Brodzińska K. 2014). Review of the Polish FADN[2] accounting data shows that low production marketability is caused also by the existence of mixed farms, i.e. farms using both organic and conventional production methods at one farm. In its current wording, the Council Regulation (EC) No. 834/2007 allows for coexistence of the two production systems at one farm. In such a case, the farmer undertakes to respect the rules of their coexistence provided for in the law, which are laid down in Article 11 of the above-quoted Regulation. He is required to separate the land, animals, and products used for, or produced by, the organic methods from those used for, or produced by, the non-organic production methods and keep adequate records to show the separation.

However, the coexistence of the organic and conventional (hereinafter referred to as mixed) system at one farm provokes numerous controversies, raises doubts regarding conditions and quality of manufactured organic products, conservation of biodiversity and purposefulness of targeting environmental payments to such units. This support should be strongly coupled with the production effect of organic farming, because the method of organic food production has an automatic positive impact on the environment, resulting from the applicable production rules. A system of payments and incentives should be applied to organic food production (Jasiński J., Michalska S., Śpiewak R. 2014), as the system results in reduction in agricultural output by elimination of synthetic chemistry products. It is especially recommended to support organic farms rearing animals (Nachtman G. 2014; Brodzińska K. 2009), and in case of crop production – farms

[2] System for accountancy data collection from agricultural holdings and use thereof.

increasing food availability and not only crop area (Brodzińska K. 2009). It needs to be noted that agricultural land resources should, above all, be used for production of food raw materials. From the perspective of the society, safeguarding relevant quantity and quality of food is the basic parameter of agriculture efficiency assessment (Floriańczyk Z., Buks J. 2012).

Production under two systems at a single farm can also hinder control of production process, which is essential to obtain an organic product certificate. This aspect has been noted in the Rural Development Programme 2014-2020 (RDP 2014-2020) – the problem of controlling the organic production process was highlighted. A number of respondents, taking part in public consultations concerning the organic farming sector under the works on the amendment of the Council Regulation (EC) No. 834/2007, discussed the shortcomings of combining the two production systems. The postulates especially include calls to run the entire farm in accordance with the requirements applicable for organic production. This is evidenced by the quote: "The risk of non-compliance with the organic production rules is considered higher in agricultural holdings which include units not managed under organic production rules. Therefore, after an appropriate conversion period, all agricultural holdings in the Union which aim to become organic should be entirely managed in compliance with the requirements applicable to organic production."[3] Is this a viable solution? We will see after entry into force of the amended law, but the opponents of these changes expect a setback in development of organic farming and return of many farmers to the conventional system.

Mixed farms in Poland

For many farmers in Poland the dual production system is beneficial, especially when soil quality does not guarantee good yields under the conventional system. This provides an opportunity to raise additional funds by shifting some part of utilised agricultural area to organic tracks. It is not clear what is the exact number of agricultural holdings where organic and conventional production coexists, but among 27,093 organic farms registered in a public database at the end of 2013[4] some part carried out production under the dual system. No mention on the issue in public statistics probably hampers estimation of the actual organic production situation in Poland and distorts the economic picture of organic farms, in particular with reference to the average area of organic farms. The results of the Polish FADN accounting are of some help at this point as they can be used as a basis for assessing the economic situation of such farms.

[3] Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on organic production and labelling of organic products, amending Regulation (EU) No. XXX/XXX of the European Parliament and of the Council [Official Controls Regulation] and repealing Council Regulation (EC) No. 834/2007. Brussels, 24.3.2014.

[4] The Main Inspectorate of Agricultural and Food Quality Inspection.

Numerous objections to the coexistence of the organic and conventional production systems show that it is important to diagnose the economic and production situation of such agricultural holdings[5] and significance of payments, determine their position against fully organic farms, thereby, assess the threats to organic farming development.

Results for mixed farms keeping accounting in the Polish FADN have been presented for the very first time and they are a kind of novelty (G. Nachtman, M. Puchalska 2015). As of 2013, two groups were selected from the database of organic farms under the Polish FADN: one includes 100% organic units, and the other covers units carrying out only some part of its production in compliance with the requirements of organic farming. The figures are presented as arithmetic means for 2013. The data collection formula under the system does not allow to abstract information on the organic from information on conventional part of production, thus the descriptions refer to the entire holding and not to the organic part only. The situation of mixed farms was investigated at the background of farms applying only organic production methods included in the Polish FADN database. These are certified farms. The research material refers to 113 mixed farms and 301 organic farms.

To get to the bottom of farms' functioning, the analysis was held in 4 groups separated by size of UAA and termed as follow: "small" (from 5 to <= 10 ha), "medium-small" (from 10 to <= 20 ha), "medium-large" (from 20 to <= 30 ha) and "very large" (>50 ha). For the "large" group (from 30 to <= 50 ha), only data for organic farms were presented because mixed farms were represented by less than 15 units[6]. The number of farms in the group of up to 5 ha of UAA was also insufficient for both production systems.

Characteristics of researched farms

Based on the review of source materials for mixed farms from the Polish FADN database, it is possible to conclude that they limited, for instance, the number of crops – in the organic part, and livestock population. At the same time, because of more intensive character of production in the conventional segment, their economic situation was better than the situation of farms applying only the organic production system. Mixed farms were characterised by wide variety of production organisation methods. They included units which used the entire utilised agricultural area (UAA) for cultivation of organic field crops and orchards, but their leading line of production was a conventional poultry or pig farm. There were also farms specialising in conventional field crops, which treated only grassland as organic and, at the same time, kept no animals

[5] To simplify, further on in the paper farms carrying out organic and conventional production are termed "mixed", and farms using only organic methods – "organic".

[6] The FADN methodology excludes the possibility to publish data for a group of less than 15 farms.

at the farm. Additionally, there were also cases of cultivation of the same species of plants both under the organic and conventional system. These conclusions are based on the identification of the types of crops, level of yields, level and type of incurred inputs of means of production, type of purchased means of production and fodder for animals. It is assumed that often enough organic farming took place on poorer quality soils, especially in large area farms. This has already been proved by the analyses of organic farms from the Polish FADN system (Nachtman G. 2013). Cultivation on poorer quality UAA requires higher inputs of means of production, which in case of organic farming can be offset by environmental payments. It is also important that among mixed farms more than 1/4 had over 50 ha of UAA, while among organic farms only 1/10 had such an area (Table 1).

Discussion of results

Production organisation. The average UAA in three of the smallest groups (from "small" to "medium-large") was very similar for farms of the two systems. In the group of above 50 ha mixed farms had an average area by ca. 30% larger than the organic ones. They were also characterised by a higher economic potential, except for "medium-small", but then, the economic size of units of more than 50 ha of UAA was as much 2 times larger than that of organic farms. Based on the data collected in the FADN system, it is clear that the share of respective production branches is quite varied (Table 1, Figure 2). Fodder crops had the highest share in UAA, both for mixed and organic farms, and in area groups of up to 30 ha for mixed farms they constituted by ca. 9% less than for organic farms, and in groups of above 50 ha by ca. 6% less. For mixed farms, fodder crops represented the highest share (49.4%) in the group of 5-10 ha of UAA. The organic farms were in an opposite situation: in the UAA group of 5-10 ha fodder crops had the lowest share (40.2%), while in other groups their share grew and amounted to ca. 50-60%. The second place in the cropping structure belonged to cereals – they constituted from ca. 24% to 40% of UAA, both for mixed and organic farms (Table 1) and, except for "small" units, their share was by ca. 8% higher in the remaining area groups of mixed farms against organic farms.

The other field crops covered from 4.5% to 12% of UAA at mixed farms, growing along with a growth in the farm area. The case was opposite for organic farms – field crops represented the lowest share (less than 4%) for the largest area farms (above 50 ha) and in smaller area groups they represented from 7.2% to 11.0%. Mixed farms, as compared to organic ones, were characterised by a higher share of fruit crops in all groups of UAA. They covered as much as 19.1% of the area at "small" farms, and in two subsequent area groups – ca. 11% per each, dropping to the value of 4.6% in the "very large" group. For organic farms, the highest share of orchards (12.5%) was also typical of "small" farms, but in other groups it represented from 2% to 5.9% of UAA – Table 1.

Vegetables were an important component of crops, especially for organic farms of up to 20 ha. They covered, at the most, 5% in UAA, but their role in revenues from production was as important as production of fruit cultivated at a larger scale. For mixed farms, vegetables represented the highest share (4.4%) in the cropping structure of "medium-large" farms.

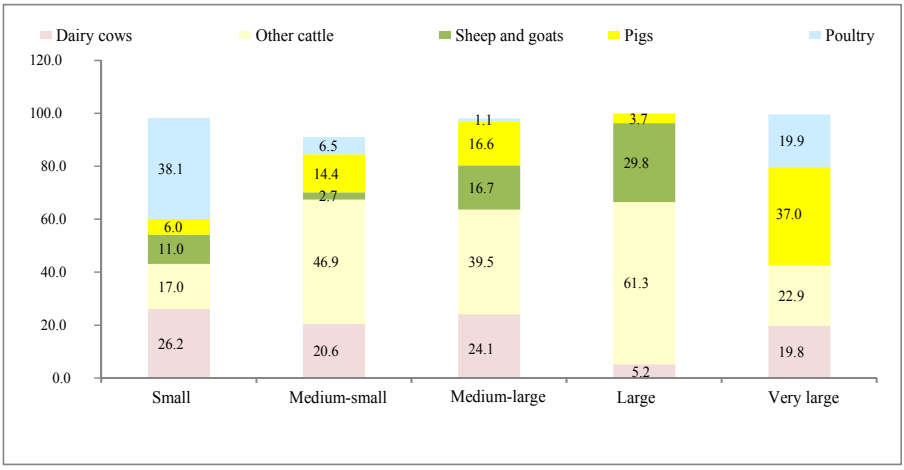


Fig. 1. Percentage structure of livestock population – mixed farm

Source: calculations based on the data of the Polish FADN.

Considerable differences characterised farms in terms of livestock population: mixed farms had more of them and their stocking density per 1 ha of UAA was higher, except for "medium-large" units. The differences were especially clear for "small" and "very large" farms. The stocking density of mixed farms was, on average, by ca. 2 times higher than for organic ones. The highest stocking density per 1 ha of UAA among all of the analysed groups was noted for "small" mixed farms and it amounted to 1.44 LU[7], for other groups – from 0.55 to 0.41 LU (Table 1). For organic farms, the highest stocking density was also noted for "small" units (0.65 LU/ha), decreasing along with an increase in the area to the level of 0.19 LU at "very large" farms. Similarly, as the UAA grew the stocking density per fodder area unit fell. The stocking density of organic farms was slightly lower than for corresponding groups of mixed farms.

[7] LU (Livestock Unit) – calculation unit for livestock according to the FADN methodology. 1 LU is equal to 1 dairy cow or to 1 bull aged 2 or more. Other animals represent a relevant part of such calculation unit, for example, ewe = 0.1 LU, pig for fattening = 0.3 LU.

Table 1

Economic size and production organisation of mixed and organic farms

Farm type	Small 5<ha≤10	Medium-small 10<ha≤20	Medium-large 20<ha≤30	Large 30<ha≤50	Very large ha>50
			Number of farms		
Mixed	15	26	28	13	29
Organic	68	93	53	44	34
			Economic size in EUR thousand		
Mixed	15,135	16,040	25,222	.	118,672
Organic	11,035	16,264	19,678	29,884	64,831
			Utilised agricultural area – ha		
Mixed	7.6	15.0	23.8	.	137.4
Organic	7.8	14.2	25.1	39.4	104.5
			Share of additionally leased UAA – %		
Mixed	15.5	14.0	19.9	.	24.2
Organic	9.3	15.5	20.6	21.0	36.4
			Share of cereals in UAA – %		
Mixed	23.5	37.8	32.1	.	39.2
Organic	32.4	29.6	24.2	30.1	31.7
			Share of other field crops – %		
Mixed	4.5	8.4	10.5	.	11.9
Organic	7.7	7.2	11.0	7.5	3.8
			Share of vegetables in UAA – %		
Mixed	1.8	1.9	4.4	.	0.1
Organic	5.0	4.4	0.9	0.8	1.0
			Share of orchards in UAA – %		
Mixed	19.1	10.6	11.1	.	4.6
Organic	12.5	5.9	2.0	4.6	3.1
			Share of fodder crops in UAA – %		
Mixed	49.4	40.1	40.9	.	40.8
Organic	40.2	50.4	59.9	54.7	56.5
			Total livestock – LU		
Mixed	10.9	8.2	9.7	.	62.6
Organic	5.1	7.4	11.9	14.7	20.3
			LU per 1 ha of UAA		
Mixed	1.44	0.55	0.41	.	0.46
Organic	0.65	0.52	0.47	0.37	0.19
			LU per 1 ha of fodder area		
Mixed	1.54	0.88	0.78	.	0.44
Organic	1.19	0.83	0.65	0.49	0.26

Source: own calculations based on the data of the Polish FADN.

Livestock population, apart from varied stocking density, was characterised by species differentiation. Mixed farms of extreme area sizes ("small" and "very large") were distinguished by large share of poultry and pigs: in total, respectively, 44.1% and 56.9% of the population (Figure 1). As for farms from 10 to 50 ha, cattle had the highest share – in total from 63.6% to 67.5% of the livestock.

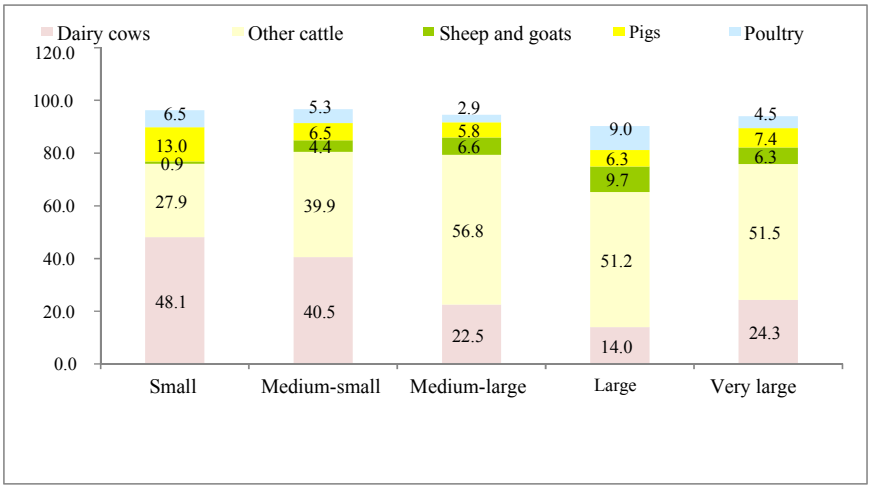


Fig. 2. Percentage structure of livestock population – organic farms
Source: based on the data of the Polish FADN.

As for organic farms, pig and poultry rearing was less popular and these species together constituted a maximum of 19.5% of the population ("small" farms). The dominant species was cattle, for smaller farms (up to 20 ha of UAA) dairy cows and for larger ones (above 20 ha) beef cattle. In total, it represented from ca. 65% to 80% of the population in respective groups.

Production intensity. In the two analysed farm types costs of running operations, just like production organisation, were fashioned differently showing a clear advantage of production intensity in respective area groups of mixed units (Table 2). The only exception were "medium-small" farms (10-20 ha of UAA), where total costs per 1 ha – indicating the production intensity – were by 10% lower than for organic farms. The highest production intensity, both for mixed and organic farms, was typical for "small" units, where total costs per 1 ha of UAA amounted, respectively, to PLN 6,342 and PLN 4,624. The high costs comprise mainly direct costs, including fodder, farming overheads, but also high costs of hired labour and land rent. Along with a growth in the area, production intensity dropped for both farm types. As for mixed farms, it was valued as follow: 3,127 PLN/ha ("medium-small"), 3,815 PLN/ha ("medium-large")

and 2,858 PLN/ha ("very large") – Table 2. The cut in costs was more severe for organic farms, as it dropped from the level of PLN 3,433 at "medium-small" farms to PLN 1,583 for "very large" ones. In the group of "very large" farms the difference in the production intensity between mixed and organic farms was the highest. Total costs for organic units were lower by 81%, but similar proportions existed in production efficiency.

Analysis of individual components of total costs points to a downward trend observed for most of them along with a growth in area of the two farm types. What is unusual is the fact that for mixed "very large" farms direct costs (including fertilisers, plant protection products and fodder for granivores) were higher than for farms of 10-30 ha. "Medium-large" mixed units were some sort of an exception among all farms, as they incurred the highest costs of remunerations per 1 ha (PLN 649). The very low level of fertilisation costs (8-56 PLN/ha) and plant protection products (1-21 PLN/ha) for organic farms should also be noted. They were by several times higher for mixed farms (115-292 PLN/ha), but, at the same time, far below much higher amounts spent by conventional farms covered by the Polish FADN, which additionally grew along with a growth in farm area (G. Nachtman, M. Puchalska 2015).

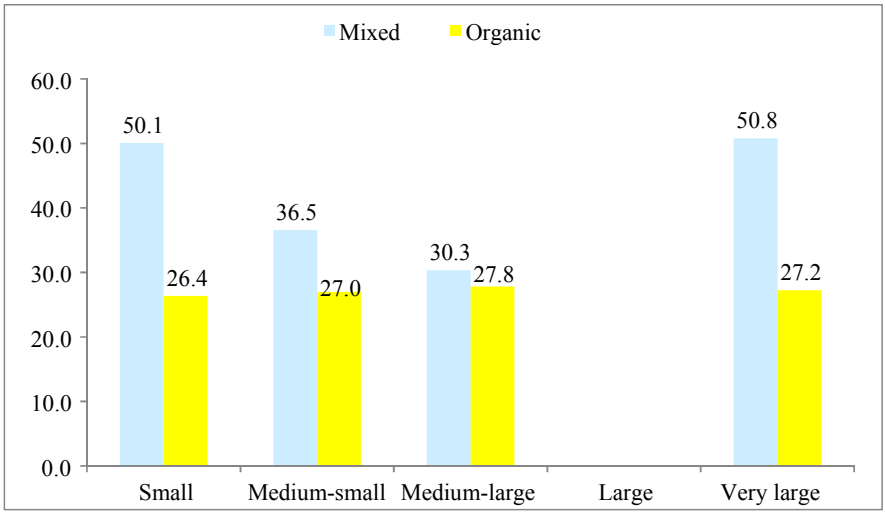


Fig. 3. Share of direct costs in total costs for mixed and organic farms – %

Source: calculations based on the data of the Polish FADN.

Table 2

Production costs per 1 ha of UAA for mixed and organic farms

Farm type	Small	Medium-small	Medium-large	Large	Very large
	5<ha≤10	10<ha≤20	20<ha≤30	30<ha≤50	ha>50
			Total costs – PLN/ha		
Mixed	6,342	3,127	3,815	.	2,858
Organic	4,624	3,433	2,369	2,007	1,583
			Direct costs – PLN/ha		
Mixed	3,176	1,143	1,157	.	1,451
Organic	1,220	926	659	511	431
			including:		
			fertilisers – PLN/ha		
Mixed	187	115	228	.	292
Organic	52	36	8	18	56
			plant protection products – PLN/ha		
Mixed	54	33	81	.	141
Organic	21	12	1	10	11
			seeds and seedlings – PLN/ha		
Mixed	130	135	225	.	141
Organic	160	142	92	106	87
			fodder for herbivores – PLN/ha		
Mixed	612	483	247	.	114
Organic	459	423	350	181	141
			fodder for granivores – PLN/ha		
Mixed	1,895	224	165	.	653
Organic	288	145	101	117	81
			Farming overheads – PLN/ha		
Mixed	1,343	965	976	.	628
Organic	1,584	1,189	812	704	503
			Costs of external factors of production		
Mixed	489	168	772	.	346
Organic	376	305	147	190	234
			Remunerations – PLN/ha		
Mixed	447	78	649	.	202
Organic	318	215	68	94	99
			Rent – PLN/ha		
Mixed	32	42	57	60	72
Organic	20	32	35	44	99
			Interest		
Mixed	10	48	66	.	73
Organic	38	58	44	52	36

Source: calculations based on the data of the Polish FADN.

Production efficiency is to the greatest extent determined by the incurred direct inputs of factors of production, illustrated by the level of direct costs. For "small" and "very large" mixed units they represented, on average, ca. 50% of total costs (Figure 3), which included costs of purchase of fodder. As shown by the Polish FADN accounting results, such a level of direct costs is characteristic for farms oriented at poultry production and pig rearing. Source data of the researched farms confirm that these activities are executed under the conventional system, which is supported by the type of purchased concentrated feeds, chemical agents used in agriculture and veterinary services. For mixed farms of 10-30 ha direct costs amounted to ca. 30-36% of total costs value. The share of direct costs was much lower for organic farms; they were at the level of ca. 27% of the total costs value (Figure 3), regardless of the area size of the farm.

Production structure, level and efficiency. The production structure review shows major differences in the crop and livestock production in the total output, especially for mixed farms. The share of crop production ranged from 32.8% to 70.7% for mixed farms and for organic farms – from 45.1% to 65.2% (Table 3).

For mixed farms, the highest share of crop production was noted for "medium--large" units, and for organic ones – for "very large" ones. Livestock production dominated in case of "small" and "very large" (66.4% and 56.9%) mixed farms. In the two groups, the production of eggs (38.1% and 27.5% of the total output value) and cow milk (nearly 13%) was the most important, while for organic farms it was mainly cow milk and live cattle production. For farms of up to 20 ha of UAA, the higher share in the total output fell to milk (23-24%) and for farms of 20-50 ha – live cattle (ca. 20-23%) – Table 3.

The crop production structure of "small" and "medium-small" mixed farms was dominated by fruit; "medium-large" by vegetables and "very large" by cereals. It is interesting that for "very large" mixed farms, where the share of orchards in the UAA and their area were higher than for organic farms from the group, fruit production accounted for only a fraction of a percent, while for organic farms it was as much as 27.4% of the total output value. In case of smaller area organic farms (up to 20 ha), vegetables and fruit prevailed in crop production. In total, they amounted to ca. 26-30% of the total output. Their share fell to ca. 10-12% for farms of 20-50 ha of UAA, where cereals represented the highest share (ca. 17-20% of the total output value). The high share of fruit (27.4%) in the production of the largest area organic farms (above 50 ha) is rather noteworthy – Table 3.

Data from Table 1 show that organic and mixed farms in the three of the smallest area groups had a similar UAA. However, the executed production programme allowed for a similar production value (ca. PLN 55 thousand) only in case of "medium-small" farms. In the remaining groups, the total output was higher for mixed farms even by ca. 2 times ("medium-large" and "very large"). These results were, in general, reflected by higher production efficiency

of mixed farms. Table 4 presents productivity of factors of production, technical efficiency of wheat and cow milk production as well as cost-effectiveness as regards 1 ha of production.

Table 3

Total output per farm and percentage share of more important components

Farm type	Small	Medium-small	Medium-large	Large	Very large
	5<ha≤10	10<ha≤20	20<ha≤30	30<ha≤50	ha>50
			Share of crop production – %		
Mixed	32.8	55.5	70.7	.	42.0
Organic	48.5	51.1	46.5	45.1	65.2
			including:		
			share of cereals – %		
Mixed	5.5	18.0	13.6	.	26.6
Organic	10.1	12.6	17.1	20.4	21.9
			share of vegetables, strawberries – %		
Mixed	4.4	7.9	20.8	.	0.2
Organic	15.3	15.8	5.3	8.6	6.3
			share of fruit – %		
Mixed	17.4	20.0	15.3	.	0.4
Organic	14.3	9.8	6.9	0.6	27.4
			Share of livestock production – %		
Mixed	66.4	43.9	26.6	3.9	56.9
Organic	48.0	44.9	51.6	49.8	33.1
			including:		
			share of cow milk and milk products – %		
Mixed	12.8	10.4	9.4	.	12.8
Organic	23.2	24.0	17.3	9.9	15.2
			share of live cattle – %		
Mixed	8.5	18.1	10.6	.	5.7
Organic	13.5	11.0	22.6	19.7	9.6
			share of live pigs – %		
Mixed	4.4	5.8	4.7	.	9.6
Organic	5.9	3.0	4.0	3.5	2.6
			share of egg production – %		
Mixed	38.1	7.0	0.6	.	27.5
Organic	4.2	2.2	4.7	3.6	5.4

Source: calculations based on the data of the Polish FADN.

Table 4

Farming efficiency for mixed and organic farms

Farm type	Small	Medium-small	Medium-large	Large	Very large
	5<ha≤10	10<ha≤20	20<ha≤30	30<ha≤50	ha>50
Total output – PLN					
Mixed	68,537	55,298	107,367	.	469,720
Organic	40,398	55,665	54,933	68,415	202,195
Total costs – PLN					
Mixed	48,205	46,872	90,980	.	392,754
Organic	35,886	48,805	59,380	79,004	165,463
Total output surplus over total costs – PLN					
Mixed	20,332	8,427	16,387	.	76,966
Organic	4,512	6,861	-4,447	-10,589	36,732
Production per 1 ha of UAA – PLN					
Mixed	9,016	3,689	4,502	.	3,418
Organic	5,206	3,915	2,191	1,738	1,934
Crop production per 1 ha of UAA – PLN					
Mixed	3,013	2,071	3,216	.	1,485
Organic	2,583	2,051	1,039	802	1,311
Production of cereals per 1 ha of their cultivation – PLN					
Mixed	2,096	1,751	1,911	.	2,320
Organic	1,614	1,669	1,548	1,178	1,336
Production of vegetables and strawberries per 1 ha of their cultivation – PLN					
Mixed	21,857	14,959	21,286	.	9,576
Organic	15,917	14,005	12,618	18,060	11,780
Production of fruit per 1 ha of their cultivation – PLN					
Mixed	8,218	6,977	6,420	.	329
Organic	5,965	6,515	7,763	244	17,352
Livestock production per 1 LU – PLN					
Mixed	4,169	2,960	2,932	.	4,275
Organic	3,815	3,395	2,392	2,325	3,303
Production per 1 AWU – PLN					
Mixed	43,334	31,282	65,160	.	207,922
Organic	21,603	32,976	22,960	26,321	75,817
Wheat yield – dt/ha					
Mixed	35.5	31.1	40.6	.	51.7
Organic	28.4	30.7	33.3	20.0	29.1
Milk yield of cows – kg/cow					
Mixed	2,984	3,165	3,902	.	3,615
Organic	3,580	3,728	2,997	3,123	4,746

Source: calculations based on the data of the Polish FADN.

Production, given the obtained production surplus over incurred costs, was cost-effective in all area groups of mixed farms. However, among organic farms a significant part of the researched population (32.2%) suffered losses – this referred to units of 20-50 ha of UAA ("medium-large" and "large"). The fact stemmed from low productivity both of crops and livestock – crop production value per 1 ha equalled, respectively, PLN 1,039 and PLN 802; and livestock production: PLN 2,392 and PLN 2,325 per LU. Very low costs of yield-enhancing agents were, arguably, one of the reasons for so poor results; this in turn caused low technical productivity of production, which is evidenced, at the very least, by wheat yield and milk yield of cows (Table 4). Moreover, "large" organic farms practically did not get any harvest from orchards, which covered 4.6% of UAA (ca. 2 ha) and fruit production per 1 ha of crops amounted to only PLN 244. Maybe this was not the fruiting period for orchards? A similar situation took place for "very large" mixed farms, where orchards represented 4.6% in UAA (6.3 ha), and production value per 1 ha was only PLN 329. However, it needs to be noted that orchard production was fairly efficient at smaller area farms (up to 30 ha), both organic and mixed ones. "Very large" organic farms (17,352 PLN/ha) were characterised by an exceptionally high productivity of fruit.

Table 5

Profitability and payments for mixed and organic farms

Farm type	Small	Medium-small	Medium-large	Large	Very large
	5<ha≤10	10<ha≤20	20<ha≤30	30<ha≤50	ha>50
			Income from family farm – PLN		
Mixed	35,988	34,718	62,663	.	292,383
Organic	20,289	34,060	40,551	58,865	213,829
			Payments to operating activities – PLN		
Mixed	16,682	27,345	47,028	.	219,499
Organic	16,561	27,692	47,904	73,759	179,128
			Income per 1 ha of own UAA – PLN		
Mixed	5,601	2,695	3,280 .		2,808
Organic	2,882	2,836	2,037	1,893	3,218
			Payments per 1 ha of UAA – PLN		
Mixed	2,195	1,824	1,972	.	1,597
Organic	2,134	1,948	1,911	1,874	1,714
			Share of payments in income from a family farm – %		
Mixed	46.4	78.8	75.0	.	75.1
Organic	81.6	81.3	118.1	125.3	83.8
			Payments to production ratio – %		
Mixed	24.3	49.4	43.8	.	46.7
Organic	41.0	49.7	87.2	107.8	88.6

Source: calculations based on the data of the Polish FADN.

No such differences were noted for productivity of vegetable crops. Except for the "very large" group it was higher for mixed farms ranging from PLN 9,576 to PLN 21,857 per ha of vegetables, and for organic farms – from PLN 11,780 to PLN 18,060 per ha. Mixed farms were also characterised by higher productivity of cereals than organic farms, especially in the group of the largest area ones. Wheat yield amounted to 51.7 dt/ha. Except for the group of "medium-small" farms, also production per 1 LU was higher for mixed farms, and what is important – it was the highest for "very large" farms (4,275 PLN/LU), by 29% higher than for organic farms. But it needs to be noted that in most of the groups milk yield of cows was higher for organic farms – Table 4.

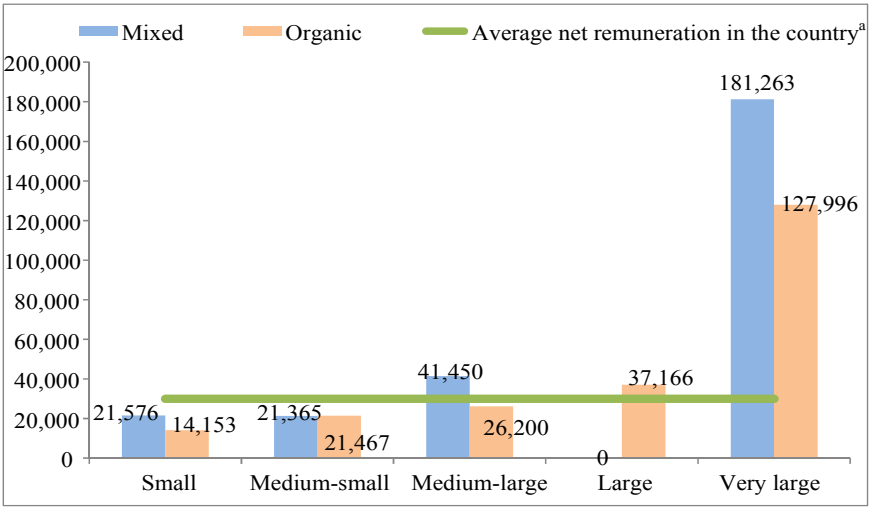
High differentiation of the production level in respective area groups was reflected in economic labour productivity. It ranged from PLN 21,603 to PLN 32,976 per AWU for organic farms, except for "very large" farms. Its lowest value (31,282 PLN/AWU) for mixed farms was noted in the group of "medium-small" units. For the largest area organic farms, production was valued at PLN 75,817 per AWU, and for mixed ones it was almost 3 times higher (Table 4).

Profitability of farms. Financial result of running operating activities in the form of income from a family farm ultimately points to economic competitiveness of the analysed mixed farms against organic ones.

Income advantage of mixed farms grew after adding the payments to operating activities. As shown by data in Table 5, the amount of received payments per 1 ha of UAA was almost identical for organic and mixed farms. The final amount of income from family farm was at a level quite similar to the level for "small" and "medium-small" mixed farms (PLN 35,988 and PLN 34,718), for "medium-large" farms it was PLN 62,663 and for "very large" PLN 292,383. The advantage of income in case of the smallest area mixed farms as compared to organic farms totalled the most – 77.4%. Income for "small" organic farms was at only PLN 20,289 and in the largest area farms – PLN 213,829. Owing to the financial support, organic farms, which incurred production losses ("medium-large" and "large"), also achieved a positive income result, but some part of payments covered production costs. In 2013, in the remaining groups of organic farms payments constituted income in ca. 81-84% – Table 5. Production in the analysed organic farms would have been impossible without external support; there would be no incentive to continue it in the next year. For mixed farms, payments had a lower share in the income, in particular as for "small" units (46.4%); for other units it amounted to ca. 75-79%.

Income situation of organic farms is even worse if income per full-time employee in a farmer's family (FWU) is taken into account – Figure 4. For farms of up to 30 ha of UAA (from "small" to "medium-large") the income ranged from PLN 14,153 to PLN 26,200. Only in the group of "large", i.e. with area from 30 to 50 ha, it exceeded by ca. 7 thousand the value of average net remuneration in the national economy. For mixed farms this threshold was exceeded by ca. PLN

11 thousand by smaller area farms (from 20 to 30 ha). The level of average net remuneration was exceeded by several times for "very large" farms, both organic and mixed. Looking at the area scale, they were also the largest beneficiaries of payments. Because of the payments, income per 1 ha of own UAA was higher by 15%, for the largest organic farms than the income of mixed farms, although land productivity of the latter was higher by 77% than for organic farms.



[a] Average net remuneration in the country = PLN 29,953.

Fig. 4. Income per full-time employee in a farmer's family (FWU) for mixed and organic farms – PLN

Source: calculations based on the data of the Polish FADN.

Conclusions

Poland allows for coexistence of organic and conventional production system at a single farm. Such mixed units are captured as organic farms in statistics. The Proposal for amendment of the Regulation No. 834/2007 on organic production of 2014 assumes exclusion of such mixed farms from the organic farming sector, because lessons learned in the past show that it is difficult to control such units and that there are doubts regarding the quality of their organic production. Moreover, their economic condition also blurs the real picture of organic farming economics and hinders assessment of its development perspectives.

Accounting data analysis for mixed farms covered by the Polish FADN clearly shows their income competitiveness against organic farms in individual area groups. This follows from the fact that conventional production is more beneficial in economic terms than the organic one. Mixed farms, as a general rule,

incurred higher production costs, but these resulted in higher production efficiency. However, the productivity level of fruit crops at the largest area farms and, similarly, "large" organic farms, raises strong objections. Mixed farms were, in general, characterised by higher stocking density per 1 ha, which followed from their rearing under the conventional rather than organic system, in particular as regards granivores. Similarities existed between mixed and organic farms as regards payments to operating activities – their level per 1 ha was very similar. They determined the survival of mixed farms, just like in the case of most of organic farms, where the share of payments in income amounted from 81.3% to 125.3%. The payments compensated for low land productivity of organic farms, especially units of more than 20 ha. This suggests that the farms use low quality soils, which should be verified in further research.

Differences in financial results of the analysed mixed and organic farms show that, in the future, a prohibition to join the organic and conventional systems together can discourage farmers from taking up organic production and it can result in resignation from organic production by farmers who, today, carry out this type of production in some part of the farm.

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GOSPODARSTWA ŁĄCZĄCE EKOLOGICZNE I KONWENCJONALNE METODY PRODUKCJI NA TLE EKOLOGICZNYCH

Abstrakt

Rolnictwo ekologiczne w Polsce obejmuje gospodarstwa stosujące wyłącznie ekologiczne metody produkcji oraz takie, w których współistnieje system ekologiczny i konwencjonalny. W danych statystycznych są one ujmowane łącznie jako gospodarstwa ekologiczne.

Zaburza to prawdziwy obraz polskiego rolnictwa ekologicznego, zwłaszcza średnią powierzchnię obszarową gospodarstwa, sytuację produkcyjno-ekonomiczną. Potwierdzają to dane z gospodarstw ekologicznych prowadzących rachunkowość w systemie Polski FADN. Między analizowanymi gospodarstwami ekologicznymi a „mieszanymi" istniały znaczne różnice w strukturze upraw i pogłowiu zwierząt, poziomie ponoszonych kosztów i efektywności produkcji, a tym samym w ich dochodowości. Wyniki analizy dowiodły, że gospodarstwa mieszane były dość konkurencyjne ekonomicznie w stosunku do gospodarstw stosujących wyłącznie ekologiczny system produkcji, a ich dochód w znacznie mniejszym stopniu zależał od wsparcia zewnętrznego, choć poziom dopłat do działalności operacyjnej na 1 ha użytków rolnych był zbliżony do poziomu w gospodarstwach ekologicznych.

Słowa kluczowe: rolnictwo ekologiczne, ekologiczny i konwencjonalny system produkcji, rachunkowość rolna, efektywność produkcji ekologicznej, dochodowość gospodarstw ekologicznych

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