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## **COMPETITIVENESS OF ORGANIC CROP FARMS AGAINST A BACKGROUND OF FARMS INVOLVED IN THE LIVESTOCK PRODUCTION**

### **Abstract**

*The major problem of organic farms in Poland is abandonment of animal breeding. This results in a shortage of animal products sought by consumers and it also prevents improvement of soil fertility on many farms, and it often blights the principles of sustainable development. The universality of this phenomenon in Polish organic farming is explained by the example of production and economic results of organic farms of the Polish FADN, which in 2012 were divided into two groups. One run only crop production and the other crop and animal production.*

*The results show that farms without livestock were “easier” to run and production for such farms was even 2 times less labour-intensive and, despite lower land productivity, it was more profitable. This followed mainly from subsidies granted to crop area whose amount grew along with a growth in the area scale of a farm. The amount of the subsidies is in no way dependent on the number of animals, thus, farmers are not bounded to keep animals on organic farms.*

*Subsidies granted, exclusively, for keeping animals for animal farms were minor and could not boost animal production. Economic results of farms keeping animals were, thus, much lower than those obtained on crop farms. Therefore, it is presently difficult to opt for keeping animals on organic farms, especially large-scale organic farms. Therefore, it is necessary to change the organic farm support system with public funds.*

**Keywords:** competitiveness, organic farm, crop farm, livestock farm, FADN, production and economic results.

## Introduction

Organic farming in Poland is becoming a more and more popular form of farming. The number of farms and the utilised agricultural area shifted to organic production methods are steadily growing, particularly, since the accession to the European Union. The decisive factor in this process, in addition to the demand, became supporting organic crops with subsidies from public funds. As early as in the pre-accession period, launching support for farmers stimulated the development of this type of farms. In the period after World War II, not before the 1980s did organic farming start coming back to life, mainly thanks to the EKOLAND Association<sup>1</sup>. In Poland, this form of farming was known already in the interwar period, at the early stage of its formation in Europe, though, at that time, there was no definition of organic farming. Back then, the pioneer of organic production methods in Poland was Count Stanisław Karłowski, who switched his entire land estate of 1724 ha to the biodynamic production method, while promoting widely this production system (Tyburski J., Żakowska-Biemas S. 2007).

A stimulus to build the organic production system was the fact of recognising the value of natural ways to grow crops and breed livestock. The fundamental objective of organic agriculture is to take care of soil fertility, crop quality, giving up the use of chemical synthesis products. Over the years, various production methods have been formed in organic farming, but always based on the natural processes taking place in the environment. The most famous include the following types of farming: biodynamic, organic-biological, organic, biological (Tyburski J., Żakowska-Biemas S. 2007). On the basis of those methods, the objectives for the organic farming system, currently popularised in the European Union, have been developed.

During the post-war reconstruction of organic farming in Poland, initially such activity was taken mostly by enthusiasts, often following the idea of living in harmony with the forces of nature, respect for nature, need for a healthy lifestyle. In fact, the organic farming criteria were difficult to meet for the wide group of farmers accustomed to the intensive way of production, and its economic effects did not encourage to shift to this way of farming. There was no public aid. The situation has been changing slowly. An expression of institutional interest in organic farming was the introduction of a small amount of subsidies to the costs of farm control in 1998, and in the following years, subsidies to the cultivation area (Tyburski J., Żakowska-Biemas S. 2007). The year 2001 saw also the legal authorisation of organic farming by enacting the Act on organic agriculture. These two factors – subsidies and regulations – contributed to the development of organic farms. In 2001, their number (1787) increased by more than 3 times in relation to 1999 (555 farms). At the end of 2013, organic production methods were applied by 26,598 farms cultivating 669,492 ha of

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<sup>1</sup> EKOLAND Association of Organic Food Producers.

utilised agricultural area (UAA)<sup>2</sup>. This shows the importance of financial and institutional aid for such farms.

### **The essence of organic production**

Currently, a question is often asked why, despite this large growth rate of organic farms over the past years, the market of organic products develops much more slowly. In searching for an answer to this question, it is worth noting that achieving good production effects depends on many factors, including food resources of the soil, its quality, ability to manage the farm. This forces a need for the good professional background, systematic education (*Kryteria rolnictwa...*). An additional barrier to taking up this production activity is created by bureaucratic requirements – the more diverse is the production structure and the share of livestock, the more extensive is the range of administrative responsibilities (Kowalski J. 2013).

In the organic production system, the main task is the ability to fertilise the soil. For this purpose, we use, e.g. appropriately composed crop rotation and natural fertilisers. A properly managed organic farm should then have livestock, as this promotes keeping the feed and fertilisation balance (Tyburski J., Żakowska-Biemas S. 2007; Metera D., Sakowski T. 2008). Now, a fairly common practice is to give up livestock breeding, frequent in farms with the large share of fodder crops, especially grassland. In these farms, we can expect shortages of nutrients, soil depletion, which automatically reduces their yields.

Some farmers, when turning their conventional farms into organic farms, probably do not always realise how rigorous this production method is. There are also those, who follow economic account only, deliberately giving up the fundamental principle of combining the crop production with the livestock production and using only the minimum organic production rules, in order to get subsidies. In his sociological studies on the creation of a portrait of Polish organic farmers, Piotr Bielski described such a group of farmers, who are unaware of the complexity of organic farming, as “subsidy-based” (Bielski P. 2009). Land utilised in this way does not bring the expected production effects, thus it does not enhance the market of organic farming products.

Meanwhile, the share of livestock in the organic farm is not only a way to improve the soil fertility, but also the activity leading to the sustainable development by rational management of nutrients (Kwiatkowski C.A. et al. 2013). The Council Regulation (EC) 834/2007<sup>3</sup>, defining the framework of organic farming throughout the European Union, stresses in the preamble that the livestock production is fundamental to the organisation of agricultural production on organic farms as it contributes to soil improvement and the development of sustainable agriculture.

<sup>2</sup> Data from the Agricultural and Food Quality Inspection.

<sup>3</sup> 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).

The concept of sustainable development is currently the main idea of the Common Agricultural Policy (CAP) and treats organic farming as one of the elements of this process. The fact that farming follows in this direction is stimulated by the financial instruments from the second pillar of the CAP, which are materialised as the Rural Development Programme (RDP). In this draft document for 2014-2020<sup>4</sup> organic farming is defined as “a way of farming with the sustainable crop and livestock production within the farm, based on the technologically unprocessed biological and mineral products”. This document stresses the coexistence of the directions of the crop and livestock production. For organic farming, organic subsidies are available from this programme. The studies confirm that they are strongly related to the farmers’ interest in organic production methods (Floriańczyk Z., Buks J., Jarzębowski S. 2013). So far, organic subsidies have been received by a large number of farms without livestock, although specialised farms, for example, vegetable-growing, use natural fertilisers from other organic farms and should not be accused of giving up livestock breeding. In obtaining organic subsidies, there were the cases of serious abuse, a commonly known example of which is walnut. The Supreme Audit Office showed that the dynamic growth of walnut crops resulted from the use of the highest payment rate (PLN 1800) per 1 ha of new plantings, without specifying the minimum cultivation requirements, apart from the sowing density amounting to 50 seedlings per 1 ha<sup>5</sup>. This cultivation area increased from 0.6 thousand ha in 2005 to 44,567 ha in 2011<sup>6</sup>. Abuse is evidenced by the fact that after liquidating organic subsidies to those crops in 2011, their cultivation area decreased already in 2012 to 20,950 ha<sup>7</sup>.

Therefore, easy access to organic subsidies resulted from the national regulations, too liberal in treating the links between the organic crop production and the livestock production, or other, even those not precisely defining the criteria of established fruit plantations, as seen on the example of walnut. This phenomenon is accompanied by the low efficiency of the enforcement of legal requirements in implementing the commitments taken by farmers in the organic production (Kociszewski K. 2014). As a result, despite the relatively large production potential of organic farming, we still observe a weak market of organic products. One of the reasons is definitely the limited share of livestock in the farm, as they, in addition to food products, also deliver manure – their absence may pose a danger to the environment. For example, the studies on the soil richness in minerals indicate that no livestock production impedes their circulation, and thus distorts the environmental balance (Stalenga J., Jończyk K., Kuś J. 2004).

<sup>4</sup> Draft Rural Development Programme for 2014-2020 (RDP 2014-2020). The Ministry of Agriculture and Rural Development, 7 April 2014.

<sup>5</sup> Informacja o wynikach kontroli rolnictwa ekologicznego w Polsce. Najwyższa Izba Kontroli, Warszawa, luty 2010..

<sup>6</sup> Unpublished data from the Agricultural and Food Quality Inspection.

<sup>7</sup> As footnote 6.

Is, therefore, giving up livestock breeding in organic farms justified in economic terms? This information is provided by the Polish FADN data used in the analysis. The primary objective of this paper is to determine the differences in economic outcomes (and the reasons for their existence) between organic farms conducting the livestock production and those involved in the crop production only.

### **Method and study material**

The analysis involved two groups of certified organic farms, included in the Polish FADN database in 2012. From 315 farms keeping accounts in that year, four were excluded due to the excessively large differences in resources and production organisation. These were quite highly specialised farms (swine and poultry) which in terms of results differed from the rest. The remaining community of the farms was divided into two groups: A (conducting both crop and livestock production – keeping livestock) and B (conducting crop production only – crop farms). Group A consisted of 243 units, and Group B – 68. On the basis of the data collected in the Polish FADN database, tabulations were developed in the form of arithmetic averages, concerning the resources and production organisation as well as the efficiency and profitability of farms. The organic farms in question are not representative in statistical terms of all organic farms in Poland, but they illustrate these trends becoming stronger and stronger for several years in the development of organic farming in the country. A certain flaw in assessing the activity of these farms, especially crop farms, is their diversity in terms of the crop production structure. In fact, this group includes both the farms conducting the large-scale fruit-growing production and those which have only grassland or other fodder crops, despite the lack of livestock.

### **Discussion of the results**

#### ***Resources and production organisation involving livestock***

The organic farms with livestock (Group A) differed from the crop farms (Group B) in terms of owned resources.

In the Group A farms, the utilised agricultural area was smaller by half (on average, 28.9 ha when compared to 61.4 ha in Group B). The level of total assets per 1 ha of UAA was, on average, by 32% higher – PLN 27,344. This result was affected mainly by the value of the buildings and also livestock breeding. The value of the buildings per 1 ha of UAA in the farms with livestock (PLN 4533) was more than twice the value of this equipment in the farms without livestock (crop farms), and the value of machinery and equipment was higher by about 10%. The livestock population was diverse. On average, it was 14.15 LU, whereby cattle was dominant. Per 1 ha of utilised agricultural area, the average stocking density was 0.49 LU and per unit of forage area – 0.64 LU. Feed for these animals was provided by cultivating fodder plants on 60% of agricultural land. In addition, 27% of the utilised agricultural area were taken by cereals; other crops were of low importance (Table 1).

Table 1

*Assets and their structure in organic farm*

Variable	A – farms with livestock	B – crop farms
Number of farms in the sample	243	68
Economic size (EUR of SO)	19,829	27,682
<b>Utilised agricultural area (ha)</b>	<b>28.9</b>	<b>61.4</b>
including: cereals	7.9	28.7
other field crops <sup>a</sup>	2.2	6.3
fodder crops	17.3	16.8
vegetables	0.3	1.2
orchards	0.6	6.0
<i>Share of cereals (%)</i>	27.3	46.8
<i>Share of fodder crops (%)</i>	60.0	27.3
<i>Share of additionally leased utilised agricultural area (%)</i>	24.3	32.8
<b>Livestock in total (LU<sup>b</sup>)</b>	<b>14.15</b>	<b>x</b>
including: dairy cows and other cattle	10.71	x
sheep and goats	0.79	x
swine	1.08	x
poultry	0.86	x
Stocking density of grazing livestock (LU/ha of forage area)	0.64	x
Stocking density (LU/ha of UAA)	0.49	x
<b>Total labour inputs (AWU)<sup>c</sup></b>	<b>1.85</b>	<b>2.04</b>
Total labour input/100 ha (AWU)	6.42	3.32
<b>Value of total assets (PLN)</b>	<b>788,897</b>	<b>1,276,332</b>
Value of assets per 1 ha of UAA (PLN)	27,344	20,778
Value of buildings per 1 ha of UAA (PLN)	4533	2186
Value of machinery and equipment per 1 ha of UAA (PLN)	3583	3242
Value of a herd of livestock per 1 ha of UAA (PLN)	1569	x
Value of land, plantings and production quotas per 1 ha of UAA (PLN)	15,910	13,892

<sup>a</sup> According to the FADN, they include: legumes for seeds, potatoes, sugar beets, herbs, oilseeds and fibre plants, hops, tobacco, other industrial plants.

<sup>b</sup> According to the FADN methodology, the number of livestock in the farm is defined by the total number of conversion units, expressed in livestock units – *LU*. One LU is equivalent to 1 dairy cow or 1 bull aged 2 years or more. Other animals are, respectively, a part of such livestock unit, for example, ewe = 0.1 LU, fattener = 0.3.

<sup>c</sup> According to the FADN methodology, labour inputs are the total labour input within the framework of the operating activity of the farm. They are expressed in AWU (Annual *Work Unit*). Within the framework of the total labour inputs, we distinguish the labour inputs of unpaid persons – FWU (Family *Work Unit*). It should be noted that according to the FADN methodology, until 2010 AWU (FWU) was equal to 2200 hours, while since 2011 it is equal to 2120 hours.

Source: own calculations based on the Polish FADN data.

It is worth noting that the Council Regulation (EC) No. 834/2007, indicating the need to combine the crop production and the livestock production does not specify any recommendations as to the stocking density in the organic farms, while in Article 14 points to the principle of limiting the number of animals, with a view to minimising overgrazing, poaching of soil, erosion, or pollution caused by animals or by the spreading of their manure. According to experts, “on organic farms, it is advantageous to have the stocking density of 0.6-0.8 LU per 1 ha of utilised agricultural area, as it allows to produce the right amount of feed for these animals, and other land should be allocated to commercial crops” (Tyburski J., Żakowska-Biemas S. 2007). Therefore, in the Group A farms the stocking density was at the level fairly close to the recommendations.

In the case of the Group B farms, i.e. crop farms, it is important that, despite the lack of livestock, fodder crops took almost 1/3 of utilised agricultural area. The majority, nearly 47% of the area, were allocated to growing cereals, to fruit plantations and other field crops – about 10% each.

The farms with livestock stood out against a background of the crop farms thanks to their high labour inputs – 2 times higher per 100 ha of utilised agricultural area.

### **Assessment of the production intensity and resource efficiency**

On the farms which are so differently organised in terms of production there were significant differences in the level of the production intensity and cost structure.

As can be seen in Figure 1, in the farms conducting the crop and livestock production (Group A) unit costs of production per hectare were by 17% higher than in the group of the farms without livestock (respectively, PLN 2339 and 2006). Except for the costs of external factors, all values of total cost components were higher, i.e. direct costs, farming overheads and estimated cost of fixed assets depreciation. In the crop farms, the higher costs of external factors resulted from a need to pay for the higher inputs of paid employment.

The higher unit costs indicate the higher production intensity in the farms conducting the crop and livestock production. At the same time, however, the results show that this production was more labour- and cost-intensive. If we adopt as an indicator the number of working hours per 1 ha of UAA, on the farms with livestock, working time was two times longer (145 hours) – Figure 2.

The total labour inputs expressed in AWU per farm amounted to 6.42 AWU in the farms with livestock and 3.32 AWU in the farms without livestock.



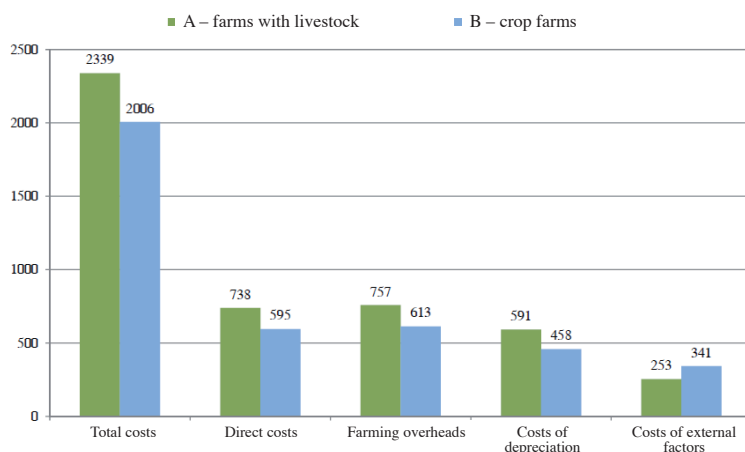


Fig. 1. Costs of production in PLN/ha of UAA on organic farms.

Source: as in Table 1.

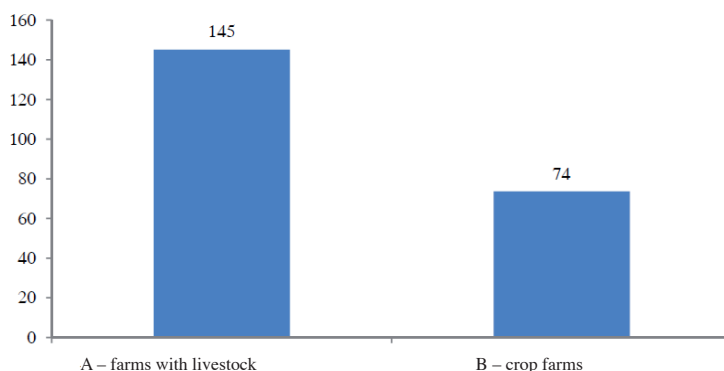


Fig. 2. Labour inputs in hours per 1 ha of utilised agricultural area on organic farms.

Source: as in Table 1.

On the farms with livestock, the cost efficiency was also lower – the value of production per 1 PLN of costs was by PLN 0.07 lower than in the compared crop farms (Table 2).

The high labour intensity on the farms with livestock resulted in the reduced labour productivity. In economic terms, it was, on average, PLN 42,727 of the production value per AWU, while in the crop plants PLN 75,003 per AWU were worked out (Table 2). In the Group A farms, the land productivity per 1 ha of UAA was higher, but only by 10%. Therefore, the production effects on the farms with livestock were not much competitive in relation to the crop farms. This competitiveness was not also improved by subsidies to the operating activity which were at the similar level in both groups. They averaged PLN 1549/ha in the Group A farms and PLN 1428/ha in the Group B farms (Table 2).



Table 2

*Efficiency of production and costs incurred on organic farms*

Variable	A – farms with livestock	B – crop farms
Total production per 1 ha of UAA (PLN)	2744	2490
Crop production per 1 ha of UAA (PLN)	1262	2516
Livestock production per 1 LU (PLN)	2900	x
Livestock production per 1 ha of UAA (PLN)	1423	x
Total production per PLN 100 of assets	10	12
Total production per 1 AWU (PLN)	42,727	75,003
Production per PLN 1 of costs in total (PLN)	1.17	1.24
Subsidies to operating activity per 1 ha of UAA (PLN)	1549	1428

Source: as in Table 1.

Table 3

*Profitability and subsidies to operating activity on organic far*

Variable	A – farms with livestock	B – crop farms
Family farm income (FFI) (PLN)	54,546	115,981
Farm profit (FFI less the value of estimated own labour) (PLN)	22,987	93,963
Income (FFI) per FWU (PLN)	34,704	90,361
Income (FFI) per 1 ha of own UAA (PLN)	2491	2808
Income (FFI) per PLN 100 of assets (PLN)	7	9
Share of subsidies to operating activity in FFI (%)	81.9	75.6
Subsidy/production value ratio (%)	56.4	57.4
Subsidies to the operating activity per farm – PLN	44,685	87,722
including: agri-environmental payments	13,470	30,957
subsidies to livestock production <sup>a</sup>	605	0
subsidies to less-favoured areas	3651	5874
single area payment	17,366	35,409
animal payment <sup>b</sup>	3138	292
Share in subsidies to operating activities – %, including: agri-environmental payments	30.1	35.3
subsidies to livestock production	1.4	0.0
subsidies to less-favoured areas	8.2	6.7
single area payment	38.9	40.4
animal payment	7.0	0.3

<sup>a</sup> According to the FADN methodology, these are cumulative subsidies (symbol SE 615) to the production of milk, subsidies to rearing cattle other than dairy cows, to ewes and nannies, products made of their milk and other subsidies to livestock production.

<sup>b</sup> Complementary payment to the cultivation area of fodder crops grown on permanent grassland (the so-called animal payment).

Source: as in Table 1.

It should be noted, that subsidies are granted primarily to the cultivation area of crops. The livestock production makes use of this support to a limited extent, and this applies to all farms, not only organic ones. In the case of the Group A farms, conducting crop and livestock production, subsidies to livestock production averaged PLN 605 per farm and accounted for only 1.4% of the value of all subsidies to operating activities (Table 3). We can see then that the livestock production was not specifically supported, which also may discourage farmers from taking up livestock breeding. It should be added that this payment does not cover the so-called animal payment, also dependent on the cultivation area, in this case of fodder crops on permanent grassland. In the analysed organic Group A farms, animal payment was, on average, PLN 3138 per farm. In a small amount (PLN 292) it was also paid to the crop farms (Group B), as it is historical payment and was dependent on the possession of livestock in previous periods (Table 3). Therefore, this payment did not stimulate the development of the livestock production.

In the crop production, in many cases it is possible to make use of combining subsidies in the same area, for example, due to agri-environmental programmes and the LFA.

Probably, accumulation of subsidies in many farms improves the economic results so much that it leads to giving up livestock breeding. Table 3 shows that both the farms with livestock, as well as those conducting only the crop production, used available instruments. It is worth noting that the share of individual subsidies in the structure of total operating subsidies was quite similar in both groups of farms. Interestingly, the level of obtained agri-environmental payments in both groups of farms classified in this way was by about PLN 3-4 thousand higher than due to single area payments (Table 3).

The analysed accounting data shows the “strength” of agri-environment payments in creating and functioning of the organic farms. This analysis, as well as the number of other analyses made according to the Polish FADN database, confirms the view that subsidies are the foundation of economic success of many organic farms, increasing with the increase in UAA. With the increase in UAA on the organic farms, the amount of subsidies increases and although this is generally accompanied by decreased land productivity, the profitability of the farms also grows significantly. This translates into the growing share of subsidies in creating income as the utilised agricultural area grows (Nachtman G. 2009, 2013).

The diversification of the production on farms with livestock (Group A) did not provide them with a clear economic advantage. Despite the higher land productivity, as well as larger subsidies per 1 ha of UAA, the profitability of own land was lower than on farms without livestock. On the basis of the data in Table 3, it is known that it was, on average, PLN 2491, i.e. by more than PLN 300 less per 1 ha of own UAA than in the crop farms. In view of the fact that the uti-

lised agricultural area in those farms was by about 2 times smaller, the production capacity of those farms also was smaller. This translated into family farm income (FFI = PLN 54,546), which was also by more than 2 times lower. Even greater differences between these two groups of farms show up in assessing farm profit, which is left after deducting the estimated costs of own labour from income. On the farms with livestock, profit was PLN 22,987, and on crop farms it was as much as PLN 93,963 (Table 3). On the example of the analysed organic farms, it is clear that maximising profit takes place mainly by enlarging the area of land, which allows to increase the production scale and supply of subsidies.

Income per farmer's family member in the Group A farms (PLN 34,704) accounted for, on average, 1/3 income achieved in the Group B farms (without livestock).

In both groups of the farms, income was shaped more by subsidies than by the output. The share of subsidies was higher on farms with livestock and amounted to 81.9% when compared to 75.6% on farms without livestock.

In the light of the results achieved by these two analysed groups, it can be seen clearly that the farms without livestock are competitive when compared to the farms conducting the crop and livestock production. Their competitiveness is determined primarily by the twice lower level of the labour-intensity of production. However, due to the lack of livestock, such organic farms probably do not always conduct the production fully compatible with the rules of organic farming.

The presented results of the analysis lead to a conclusion on the advisability of amendments to the system of subsidies for organic farming towards greater support for farms with livestock, which will allow to make the production sustainable.

The phenomenon of giving up livestock breeding is currently growing due to the unprofitability of the production. From the reports of field experts working for the Polish FADN, it results that especially small farms, not just organic ones, increasingly give up the livestock production, mainly the one not covered by subsidies (for example, swine) (Nęczyńska E. 2014). Yet, farms giving up livestock breeding still devote large areas of arable land for permanent grassland (PG) and fodder crops. This proves the rational operation of the farmers, on whom the CAP imposes further obligations so as to obtain direct payments. As from 2015, a prerequisite to obtain payments will be to maintain PG, ecological focus areas and crop diversification, which is a part of the so-called greening.<sup>8</sup> This will not apply to organic farms, since by nature they are found to comply with the greening requirement. However, the question arises whether the greening policy will not affect, in a negative way, the state of the livestock population in organic farms.

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<sup>8</sup> <http://www.arimr.gov.pl>.

### Summary

Organic farms, conducting the crop and livestock production, in comparison to those conducting the crop production only differed essentially in terms of their financial status, production organisation and efficiency. The farms with livestock were characterised by the lower production scale and lower subsidies, which was associated, above all, with the twice smaller land area. The production conducted on these farms was more labour- and cost-intensive, but the productivity remained at the level similar to that in the farms without livestock. With the total production costs per 1 ha of UAA higher by almost 17% than in the Group A farms, the land productivity was by 10% higher, also subsidies to the operating activity per 1 ha of UAA were higher by 8%. Despite this, FFI per 1 ha of own land was much lower, and per farmer's family member it was only 1/3 of income achieved by the crop farms. This resulted mainly from the lower production scale and the approximately twice higher labour-intensity of production, as well as lower subsidies. The farms with the crop production only (without livestock), with the similar economic efficiency of production per 1 land unit, derived much larger financial benefits due to subsidies. The studies confirm a need to introduce amendments to the rules of supporting organic farms. The presented results, although they are only the arithmetic average for the entire group, point to the economic advantage of the farms without livestock, mainly due to the lower labour intensity of production.

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Accepted for print: 12.12.2014.

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