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

Problems of Agricultural Economics

www.zer.waw.pl

2(339) 2014, 39-58

Translation from Polish

WIOLETTA WRZASZCZ
JÓZEF S. ZEGAR
Institute of Agricultural and Food Economics
– National Research Institute
Warsaw

ORGANIC FARMS IN 2005-2010

Abstract

Constitutive feature of organic farming is to carry out sustainable agricultural activity in accordance with the requirements of the soil, plants and animals. The systematic increase in the potential of the organic farms in Poland should be considered as positive and desired direction of agriculture development, due to the numerous environmental, economic and social benefits as well as compliance with the future model of agriculture, based on renewable resources and environmental-friendly and social development of rural areas. The purpose of this article is to provide the basic characteristics of organic farms and their production and economic structures against the background of individual agricultural holding.

Keywords: organic farms, Relative Structure Similarity Index, production potential, production structure, land use, production profile.

Introduction

Organic farms are one of more interesting and promising forms of environmentally friendly agriculture. Such farms feature organic methods of agricultural production, which correspond to soil, crop and animal requirements. Thus, organic farms contribute to keeping soil fertile and to protecting the environment against contamination and pollution coming from agricultural industry. Organic farms in general increase broadly understood food safety, they offer jobs and sources of maintenance for farm families and they keep rural areas viable. Thus, they fit perfectly within the concept of sustainable development of agriculture and rural areas. So far organic farms have still been a niche business, despite the fact that their number has been growing fast (Stolze M., Lampkin N., 2009). In Poland in 2001 organic methods of farming were applied on only

1787 organic farms, of which 669 farms were certified and 1118 of farms were in transition period shifting from conventional to organic farming. In 2010 the number of certified organic farms rose to 12901, and 7681 farms were in the process of transition. In that period, organically certified UAA rose from 12.9 thousand hectares to 308.1 thousand hectares, and in case of farms in transition, their UAA increased from 25.9 thousand hectares to 211.0 thousand hectares. In 2010 the total utilised agricultural area of organic farms reached 519.1 thousand hectares[1]. Especially after the year 2005 did the number of organic farms grow and their UAA grow fast (Toczyński T., Wrzaszcz W., Zegar J.S., 2013).

Systematic growth of organic farm potential in Poland must be regarded as a positive and desired trend of agriculture development, due to numerous environmental, economic and social benefits involved (Runowski H., 2012), and due to the fact that the trend fits perfectly in the future model of agriculture which is supposed to rely on renewable resources, to be environmentally friendly and to benefit rural communities (Zegar J.S., 2012).

Organic farms have already been the focus of studies based on various empirical material originating from FADN (Nachtman G., 2012, 2013), questionnaire (Babicz-Zielińska E., 2010; Janowska-Biernat J., 2009; Szczuka M., Tabor S., 2013), administrative sources (Łuczka-Bakuła W., 2013) and statistics GUS (Wrzaszcz W., Zegar J.S., 2014; Zegar J.St., 2006a, 2006b, 2008).

The aim of this paper is to present the core features of organic farms and their production and economic structure against the background of farms owned by individuals in general and changes which took place in this respect in the period 2005-2010. One has to bear in mind that changes in organic farm structure which occurred in the period under consideration resulted first of all from the fact that an increasing number of conventional farms decided to shift to organic farming.

Object and methods of studies

The study was focused on **farms owned by individuals applying organic production methods** (organic farms), which were certified as organic by a certifying body or which were in the process of shifting to organic production (under a supervision of the certifying body) in 2005, 2007 and 2010.

This analysis relies on public statistics. Studies of farm structure conducted by Central Statistical Office (GUS) served as sources of data in respect of 2005 and 2007, while data concerning 2010 was sourced from the 2010 Agricultural Census (PSR). Tabulations used for the purposes of this article have been prepared by the Statistical Office in Olsztyn.

[1] For the sake of comparison, in 2011 in the EU this number was 186 thousand, with 9.6 million hectares (5.4%) of UAA. Pastures occupy a major part of land subject to organic farming (45%), followed by land under cereal (15%) and permanent crops (13%) production (see: Agra Europe, 2013). According to GIJHARS data, at the end of 2012 in Poland there were 26.4 thousand organic farms, including 662 thousand hectares of organic UAA.

Selected characteristics of organic farms (number, production potential, i.e. UAA, labour input, livestock headage, standard gross margin) were presented against the background of farms owned by individuals in general, which are engaged in farming business. A comparison of production and economic structures of farms was made in the same way. In case of farm production structure, items accounted for included UAA, use of agricultural land, profiling of agricultural production (crops vs livestock farming), field crops and livestock. In case of economic structures items accounted for included production potential (defined by means of standard gross margin), market orientation (defined by means of sales value of agricultural production), as well as sources of income for farming families.

Relative Structure Similarity Index (SSIM) was used in order to compare production and economic structures of farms. This index enables studying differences and similarities of structures between two groups of objects (in other words – it helps compare internal composition of groups under analysis) with respect to the same feature. SSIM is a tool for comparing the structures of various sets in the same moment (period) with respect to the same feature and for comparing changes of structure of a given set in time. Depending on application, indexes in equation 1 relate to compared farm sets (general set and organic farm set) or a given set in various moments (periods). It assumes values from [0;1] range, and the closer to 1 are its values, the more similar are the structures of the groups under study. The following ranges of the index value were assumed for the purposes of interpretation: very big probability 0.9-1.0; big probability 0.8-0.9; medium probability 0.7-0.8; small probability 0.6-0.7; very small probability 0.5-0.6; no probability ≤ 0.5 (Gemzik-Salwach A., 2007; Ostasiewicz S., Rusnak Z., Siedlecka U., 2006).

Relative structure similarity index (Relative SSIM)

$$Relative\ SSIM = \frac{\sum_{i=1}^{n} min(w_{1i}, w_{2i})}{\sum_{i=1}^{n} max(w_{1i}, w_{2i})}$$

where:
$i = 1, 2, ..., n$;
min (w_{1i}, w_{2i}) – minimal value of index in compared groups 1 and 2;
max (w_{1i}, w_{2i}) – maximal value of index in compared groups 1 and 2.

Production potential of organic farms

In recent years the number of organic farms has been growing significantly, including those already holding certificates and those which are in the process of transition into organic production system. In light of public statistics, in the period under study the number of organic farms (those certified and those in transition) grew from 3998 in 2005 to 17,160 in 2010, i.e. more than 4 times (Table 1). The number of farms in the process of transition into organic system of crop farming in the same period increased from 1098 to 8713, i.e. almost 8 times.

Change in number of organic farm was accompanied by changes in production and economic potential of organic farm – a group of organic farms. Between 2005--2010 UAA held by organic farms increased by almost 7 times, including a 3-fold increase in the number of agricultural workers, and a 4-fold increase in livestock headage, while standard gross margin increased only three times. The data shows that organic farming was taken up by farms featuring greater UAA, but lesser labour input, smaller livestock headage and lesser standard gross margin.

Table 1

Production potential of organic farms (EKO) against the total number of farms owned by individuals a

Items	2005		2007		2010	
	Total	EKO	Total	EKO	Total	EKO
Number of farms	2,472.8	3,998	2,387.2	8,335	1,886.9	17,160
in %	100	0.16	100	0.35	100	0.91
Agricultural land in ha	13,605.8	80.7	14,205.4	190.0	13,385.8	552.9
in %	100	0.59	100	1.34	100	4.13
Workers in AWUb	2,246.9	7,126	2,245.8	13,367	2,052.6	23,929
in %	100	0.32	100	0.60	100	1.17
Livestock in LUsc	7,222.5	26,894	7,577.8	50,874	6,567.8	107,828
in %	100	0.37	100	0.67	100	1.64
Standard gross margin in ESUd	8,209.8	50,055	7,901.8	85,350	6,474.6	148,418
in %	100	0.61	100	1.08	100	2.29

Data for farms in general is given in thousand.

[a] 1 AWU means an total full-time labour unit (own and hired labour), which is equivalent to 2120 hours of work per year.

[b] 1 LU is a livestock unit weighing 500 kg (tables of livestock conversion coefficients from physical units to livestock units, see: Toczyński T., Wrzaszcz W., Zegar J.St., 2013).

[c] 1 ESU (European Size Unit) is equivalent to EUR 1,200.00; economic value is defined by means of a sum of standard gross margins of all activities of a given farm.

Source: own study based on GUS data.

Visible growth trends in organic farms resulted mainly from legislation (concerning environmental standards imposed on agricultural producers, cross-compliance schemes forcing pro-environmental actions and financial incentives), as well as changes in consumer preferences towards highly nutritious non-processed food (Łuczka-Bakuła W., 2007). In case of Poland, it is subsidies to organic farming which are the main incentive for conventional farmers to switch to organic production. The subsidies are sometimes criticized as they disturb optimum allocation of resources (Offermann F., Nieberg H., Zander K., 2009). Demand for organic products still plays a secondary role as the reason

for switching to organic farming. In other words, we have still not witnessed a switch from „sucking" organic production (subsidies to organic producers) to „draining" (i.e. consumer demand)[2].

Despite a relatively high dynamics of organic agriculture development, it still remains a niche business, the development of which is constrained by products of conventional farming which are more competitive in terms of price. However, despite the fact that prices are the core factor which creates demand for agri-food products, food quality and cross-compliance practices are more and more frequently noticed by the society, which deserves to be emphasized (Babicz-Zielińska E., 2010).

Production structure

Organic farms stand out profoundly from the whole group of farms owned by individuals in terms of basic features such as size of utilized agricultural area, labour input, livestock headage, standard gross margin. The differences grow bigger with time. In case of utilised agricultural area, organic farms differ more and more in favour from the average farms (3.7-fold difference in the area in 2005, and 4.5-fold in 2010), while in case of labour input, livestock headage and standard gross margin produced those changes were to worse – the differences in 2005, respectively: 2-fold; 2.3-fold; 3.8-fold; and in 2010: 1.3-fold; 1.8-fold; 2.5-fold (Table 2).

Table 2

Basic characteristics of organic farms (EKO) in comparison to farms owned by individuals in general (average per farm)

Items	2005		2007		2010	
	Total	EKO	Total	EKO	Total	EKO
UAA in hectares	5.50	20.19	5.95	22.80	7.09	32.22
Workers in AWU	0.91	1.78	0.94	1.60	1.09	1.39
Livestock in LUs	2.92	6.73	3.17	6.10	3.48	6.28
Standard gross margin in ESU	3.32	12.52	3.31	10.24	3.43	8.65

Note: as in case of Table 1.

Source: own studies based on GUS data.

Organic farms differ in terms of **area structure** from farms owned by individuals in general (Fig. 1). Farms with the agricultural land area exceeding 5 hectares accounted for 69% organic farms in 2005 and 86% in 2010, and 30% and 37% respectively among the total of farms owned by individuals. This conclusion is also confirmed by numbers presented in Table 3. Relative SSIM values of organic farms and the total number of farms owned by individuals in 2005 amounted to mere 0.43, and in 2010 was still lower, namely 0.34, which points to growing differences between the two groups of farms.

[2] Such a switch has already taken place in American farming (Dimitri C., Oberholtzer L., 2005).

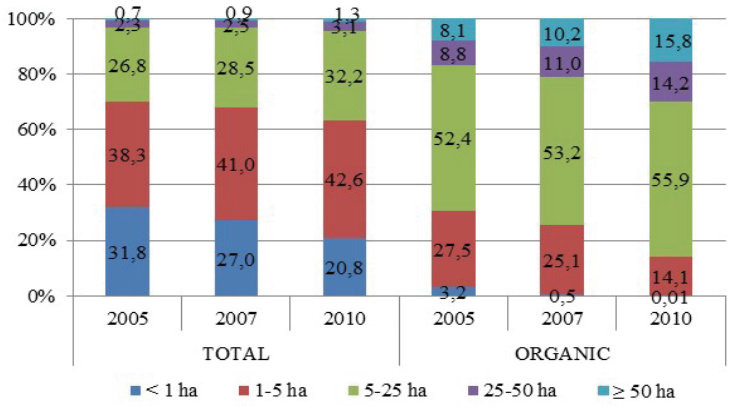

Fig. 1. Area structure of farms owned by individuals in general and organic farms.
Source: own studies based on GUS data.

Structure of agricultural land use in farms owned by individuals was stable in the period under consideration – and dominated by arable land; permanent green areas accounted for almost 1/4 of the area, horticultural area being marginal (Fig. 2, Table 3 – WPS reached 0.95). In case of organic farms the structure differed significantly in particular years under study. Although it was also dominated by arable land, it accounted for relatively smaller part of UAA (approx. 50%), in favour of permanent green areas (almost 40%) and orchards (more than 10%) – which of course results from different specifics of that system of agricultural production. The share of orchards in the structure of UAA in 2010 was bigger almost twice as compared to 2005, which was a consequence of subsidies to organic production, which encouraged horticultural producers to switch to organic farming.

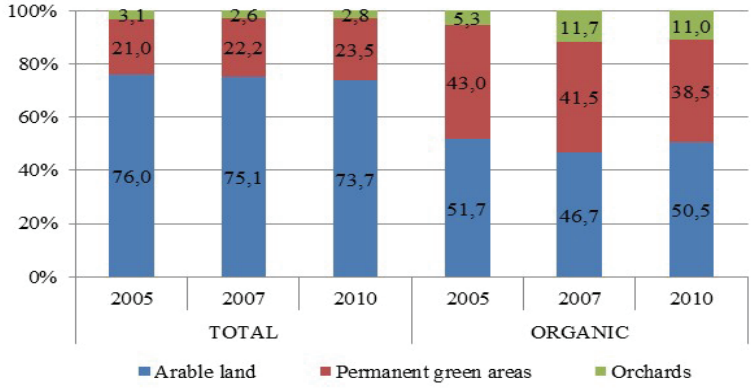

Fig. 2. The structure of UAA in farms owned by individuals in general and in organic farms.
Source: own study based on GUS data.

Table 3

Relative SSIM concerning production structures of farms in general vs. organic farms

Item		Total			Organic farms		
		2005	2007	2010	2005	2007	2010
				UAA			
Total	2005	1	0.91	0.80	0.43	0.38	0.28
	2007	0.91	1	0.88	0.46	0.40	0.30
	2010	0.80	0.88	1	0.51	0.45	0.34
Organic	2005	0.43	0.46	0.51	1	0.90	0.72
	2007	0.38	0.40	0.45	0.90	1	0.79
	2010	0.28	0.30	0.34	0.72	0.79	1
Land use							
Total	2005	1	0.97	0.95	0.61	0.55	0.59
	2007	0.97	1	0.97	0.62	0.56	0.60
	2010	0.95	0.97	1	0.64	0.58	0.62
Organic	2005	0.61	0.62	0.64	1	0.88	0.89
	2007	0.55	0.56	0.58	0.88	1	0.93
	2010	0.59	0.60	0.62	0.89	0.93	1
Production profile							
Total	2005	1	0.96	0.86	0.64	0.67	0.55
	2007	0.96	1	0.85	0.66	0.66	0.53
	2010	0.86	0.85	1	0.66	0.78	0.64
Organic	2005	0.64	0.66	0.66	1	0.84	0.53
	2007	0.67	0.66	0.78	0.84	1	0.64
	2010	0.55	0.53	0.64	0.53	0.64	1
Field crops							
Total	2005	1	0.92	0.90	0.65	0.60	0.60
	2007	0.92	1	0.93	0.66	0.61	0.61
	2010	0.90	0.93	1	0.66	0.61	0.61
Organic	2005	0.65	0.66	0.66	1	0.86	0.84
	2007	0.60	0.61	0.61	0.86	1	0.92
	2010	0.60	0.61	0.61	0.84	0.92	1
Livestock							
Total	2005	1	0.98	0.80	0.60	0.61	0.62
	2007	0.98	1	0.82	0.61	0.62	0.63
	2010	0.80	0.82	1	0.70	0.70	0.76
Organic	2005	0.60	0.61	0.70	1	0.96	0.81
	2007	0.61	0.62	0.70	0.96	1	0.79
	2010	0.62	0.63	0.76	0.81	0.79	1

Source: own studies based on GUS data.

Rural Development Plan 2004-2006 (MRiRW – Attachment L..., 2012) which was implemented since 2005 took account of agri-environmental measures, including financial support of organic farming (certified farms and farms in transition). The financial envelope was favourable especially for organic horticulture, as it increased the profitability of the latter in relation to conventional production – which must nonetheless be regarded as correct strategy in view of labour-consuming mass horticultural production, consumer preferences and awareness of health- and environmental issues, and the need to apply environmentally friendly farming methods. Such measures taken by decision makers resulted in stimulating conventional horticultural producers' interest in organic production – sometimes even too much, as it was the case with walnuts (Nachtman G., 2013b). Taking account of the post 2013 proposals to support organic systems, which provide for degressive agri-environmental payments, the growing trend in organic production is expected to weaken[3]. Greater size of organic farms than conventional farms is the result of economic planning – less added value per square measure – which determines a need to farm greater area and to look for „external" funds, including mainly those originating from governmental programmes.

Changes in **agricultural production profile**, observed in the whole group of farms owned by individuals, are more visible in the group of organic farms (Fig. 3). This is demonstrated by structures corresponding to the profile (Table 3). SSIM index for farms in total for the period 2005-2010 amounted to 0.86, while in case of organic farms it was 0.53, which confirms a very low degree of similarity of organic farm structures in the period concerned, along with a dynamic process of simplifying agricultural production at the same time. Among the total number of entities under consideration, a group of mixed profile farms is stable, considering their percentage. This is an optimistic statement due to the need to implement sustainable development principles; it highlights the importance of cycling of organic matter and nutrients within a business unit, namely within one farm.

Within the population of farms owned by individuals one can, however, see changes in the share of livestock farms (drop by almost a half in the period 2005-2010). Presented structural changes concerning the profile of agricultural production are the consequences of changes in livestock production profitability, which has been declining in the course of recent years. This is chiefly the case with poultry farms, but also pig and cattle farms, which purchase feedstuffs on the market. From the point of view of the need to protect environment, one can see advantages of this trend. Intensive livestock production farms, which do not grow crops, cause significant environmental damage in the area where they are located. External consequences of intensive livestock production include

[3] Rural Development Programme 2014-2020 provides for reduced support to organic farming for farms, the size of which exceeds 30 hectares, regardless of the profile of organic farming, as well as reducing subsidies to 50% of the base rate in case of crops grown on the area ranging from 20.01 to 30 hectares and reducing subsidies to 50% of the base rate in case of horticultural crops grown on the area ranging from 10.01 to 20 hectares (see: Draft Rural Development Programme..., 2013).

inter alia nitrogen surplus (in soil, water and air), carbon, methane and hydrogen emissions, as well as degradation of aesthetical value of the countryside (e.g. odour produced by storage of excessive amount of natural fertilizer). It has to be underlined, however, that such farms are a clear minority in Poland.

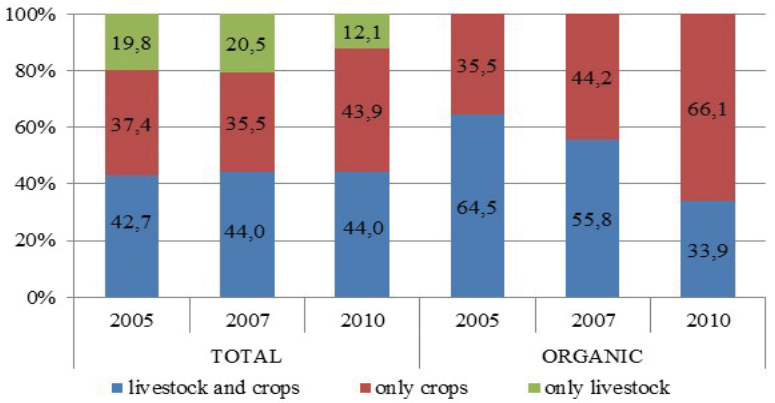

Fig. 3. Agricultural production profile structure of farms owned by individuals in total and of organic farms.

Source: own study based on GUS data.

Organic farms have to use agricultural land, hence Figure 3 takes account of mixed profile organic farms and farms which deal only with crop production. In this case changes feature greater dynamics – which is less favourable in terms of environment. In the period under consideration, the population of mixed profile organic farms dropped by half from 65% to 34%. Organic farms are more and more crop production oriented, traditional crop production involving arable farming, as well as horticultural production, and in some of them exclusively permanent green areas are used, such as meadows and pastures. Thus, organic farms reduce livestock headage or even withdraw from livestock production at all. The reason behind is labour intensity (growing organic crops is more labour intensive than growing conventional crops), economic factors and livestock production requirements in respect of the structure of field crops production, but also – or maybe most of all – the need of narrow specialization of agricultural production for which there is a pressure from the market (uniform and huge batches of produce).

The data showing simplification of agricultural production on those farms contradict the very idea of organic production, according to which those farms should have mixed production profile (crop and livestock production), they should feature a rich variety of crops grown, which would ensure the circulation of organic matter and fertilizers within one farm. Livestock breeding conditions appropriate functioning of agro-ecosystem, which is an underlying principle of organic farming (Tyburski J., Żakowska-Biemans S., 2007).

Structural changes were also noticed **in crop and livestock production** (Table 3, Table 4, Fig. 4). The value of SSIM index reflecting crop production in farms in general was very high in the period under consideration (0.90), which was in principle a consequence of domination of cereal production in field crop farming. However, it is worth highlighting that positive trends are visible in case of cover crops which manage soil fertility and enhanced crop productivity, especially in terms of increasing the share of legumes and aftercrops. The share of cereals in the structure of field crops did not change in the period 2005-2010, however, a decline by 1/3 was observed in soil-degrading crops such as root plants and vegetables. At the same time the share of rape and legumes produced for seeds doubled. Green manure and soiling crops accounted for a stable share. Industrial crops are more and more widely used in production – for food and non-food purposes – which results in changes in production thereof. Aftercrops play a significant role in terms of environment protection (e.g. protection of soil against unfavourable weather conditions, soil quality and productivity improvement), hence one should underline more than two-fold increase in their share in the structure of field crops.

Organic farm group featured greater changes in the structure of crop production in comparison to farms in general (SSIM for the period under consideration in case of organic farms amounted to 0.84, and for the entire farm cohort – 0.90). This translated into growing differences in the period 2005-2010. The structure of crop production in organic farms was more favourable in terms of environmental protection (which is obvious and compatible with the objectives of that system of production), however, domination of cereals is quite explicit (62% in 2005, 58% in 2010). In organic farms, the share of root plant and vegetable production declines, as is the case with farms in general. Cover crops dominate farming in organic farms, however, their share practically did not change in the period under consideration. Significant percentage of green matter, intended for feeding ruminants and for green manure, is quite pronounced (16-22% in organic farms and respectively 5-7% in case of all farms owned by individuals).

In terms of the **structure of livestock production** and livestock density organic farms also differed clearly from average farms (Fig. 4). The biggest differences were seen in 2005, where SSIM value amounted to a mere 0.60. Although in both groups of farms cattle accounted for dominating share of total headage, on farms in general cattle headage was followed by pigs and poultry, while organic farms often bred sheep, goats and horses.

The structure of livestock bred on farms owned by individuals did not change significantly in the period under consideration – the share of cattle and poultry rose insignificantly to the detriment of pigs, goats and horses (SSIM value was high – 0.80). Neither did livestock density change in the period concerned[4]. In case of organic farm, the average pace of changes in livestock structure was similar (SSIM for 2005 and 2010 amounted to 0.81), however in this case the

[4] Livestock density per a hectare of UAA concerns those farms which bred animals.

share of poultry increased significantly. Market requirements – consumers' growing interest in organic poultry – made producers change livestock production profile. Unfortunately, unfavourable trends are seen in livestock headage expressed as livestock density on UAA, as in the period under consideration livestock density decreased by more than 20%.

Table 4

Structure of field crops in farms in general and in organic farms

Items	Total			Organic		
	2005	2007	2010	2005	2007	2010
Cereals	76.8	75.5	75.1	61.7	60.2	58.4
Potatoes	5.8	5.3	4.0	3.0	2.0	2.7
Sugar beet	2.4	2.0	1.8	0.5	0.1	0.2
Root plants intended for animal fodder	0.4	0.3	0.2	0.3	0.2	0.05
Rape and agrimony	3.5	5.2	7.2	2.8	1.8	3.5
Vegetables grown outdoor	1.6	1.7	1.4	1.4	1.4	0.6
Leguminous plants grown for seeds	0.7	0.8	1.4	4.3	4.7	4.3
Crops grown for green matter	6.9	5.3	6.5	16.2	22.2	22.0
Crops grown for green manure	0.3	0.2	0.3	4.6	1.3	0.5
Other crops	1.5	3.5	2.1	5.2	6.1	7.7
Spring aftercrops	1.9	1.5	2.8	4.3	2.5	2.8
Winter aftercrops	1.1	2.2	4.9	2.5	3.1	3.7

Source: own study based on GUS data.

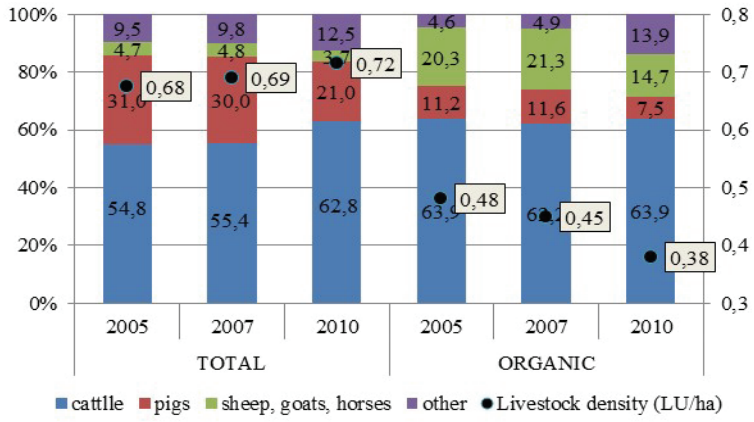

Fig. 4. Agricultural activities involving animal breeding and livestock density (in LUs per 1 hectare of UAA) in organic farms producing livestock at the background of farms owned by individuals in general.

Source: own studies based on GUS data.

Economic structure

The structure of production potential of farms – measured by standard gross margin – is shown in Fig. 5, in which one can see more favourable structure of organic farms in relation to farms in general. Changes in production potential of farms in general were small (which is shown by a high value of SSIM: 0.98 for 2005 and 2010), and significant in terms of organic farms (SSIM: 0.79 for the years under comparison). Production potential structure of organic farms was worse in 2010 than in 2005, which is demonstrated by domination of the group of the smallest farms – the size of which did not exceed 4 ESU (48% in 2005, 60% in 2010). This confirms the hypothesis that the group of organic farms features farms of bigger size yet smaller gross margin, which are rather subsidies oriented.

In order to describe **market orientation** of the analysed farms, they were divided into groups of the following types: a) subsistence farms (in which more than 50% of agricultural production value produced is used for own needs); b) market oriented (which sell at least 50% of agricultural production value produced on the market); c) local market (more than 50% of their produce is sold directly, i.e. on open-air markets, in own shops, or between neighbours) (GUS, 2012).

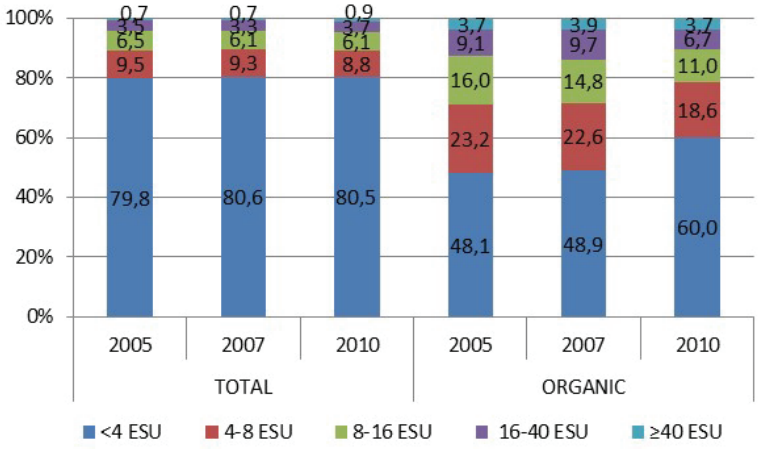

Fig. 5. Production potential structure of farms owned by individuals in general and of organic farms.

Source: own studies based on GUS data.

Organic farms are more strongly related with the market in comparison to average farms, which is demonstrated by a significant portion of so called market-oriented farms. In 2005 and 2010 their share amounted to 77% in each of those years, against 59% and 62% among farms in total, respectively (Fig. 6). Those interrelations may be deemed stable in the period under consideration, both as regards farms in general as well as organic farms (SSIM reached 0.95 and 0.99, respectively).

Table 5

Relative SSIM index of economic structures of farms in general and organic farms

Items		Total			Organic		
		2005	2007	2010	2005	2007	2010
Economic value							
Total	2005	1	0.98	0.98	0.52	0.53	0.67
	2007	0.98	1	0.99	0.51	0.52	0.66
	2010	0.98	0.99	1	0.51	0.52	0.66
Organic	2005	0.52	0.51	0.51	1	0.97	0.79
	2007	0.53	0.52	0.52	0.97	1	0.80
	2010	0.67	0.66	0.66	0.79	0.80	1
Market orientation							
Total	2005	1	0.94	0.95	0.70	0.64	0.69
	2007	0.94	1	0.99	0.74	0.68	0.74
	2010	0.95	0.99	1	0.74	0.68	0.73
Organic	2005	0.70	0.74	0.74	1	0.92	0.99
	2007	0.64	0.68	0.68	0.92	1	0.93
	2010	0.69	0.74	0.73	0.99	0.93	1
Non-agricultural income							
Total	2005	1	0.92	0.86	0.55	0.51	0.54
	2007	0.92	1	0.86	0.54	0.51	0.54
	2010	0.86	0.86	1	0.59	0.56	0.63
Organic	2005	0.55	0.54	0.59	1	0.93	0.85
	2007	0.51	0.51	0.56	0.93	1	0.88
	2010	0.54	0.54	0.63	0.85	0.88	1

Source: own study based on GUS data.

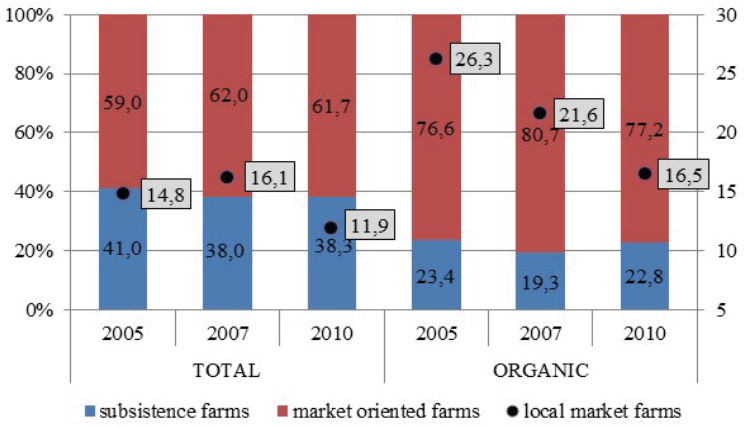

Fig. 6. Market structure of farms owned by individuals in general and of organic farms.
Source: own studies based on GUS data.

In case of their activity on local market, the relations between the analysed groups of farms were quite different. Local activity of farms under study was what made the two groups different – organic farms were bound to local market (Komorowska D., 2008; Koreleska E., 2008), which is conditioned by the fact that shortening of food chain in case of products „sensitive" to transportation gives benefits to consumers as well as to the producer. On one hand, final recipients may verify directly their purchase by exchanging information with producer (e.g. in terms of product quality and characteristics), and they may influence the product price (by possible negotiations and elimination of subsequent components of the product price due to a shorter food chain). On the other hand, though, in case of an agricultural producer, sales on local market reduce a risk of potential losses (related with transportation and storage), and the whole surplus left goes to the producer.

The activity of farms on local market, measured by percentage of farms which sell most of their produce directly, in the whole group of farms owned by individuals was weaker in 2010 than in 2005, and especially in 2007 – the decline in the period 2005-2010 amounted to approx. 3 percentage points. However, in case of organic farms, the difference was 10 points to the detriment of 2010 (26% in 2005, 16% in 2010). The reason behind might be bigger and bigger share of big organic farms, and the corresponding greater production volume – the volume of production changed the competitive position of organic farms and made it possible for them to be more active on the national, and not only local, market. This fits into the trend of shifting into organic farming of farms of big size, which are market oriented, and into the trend of transferring specialization and concentration processes to organic farms, which eventually may undermine the sense of subsidizing organic farms.

Examination of **income structure** of organic farms was done by means of a category of major source of income of a farming family. Income, which determines life standards of a farming family, is the basic economic goal of farmer's economic activity. Income is also an important economic indicator of farm's efficiency. The 2005 and 2007 data collected based on studying the structure of farms, as well as the data of 2010 agricultural census do not include information about absolute income levels. The data informs about **prevailing source of maintenance of a farming family**. This makes it possible to classify farms, and to select farms in which farming is the prevailing source of income to maintain a family.

GUS defines households in which farming is a prevailing source of income as **farmers' households**. These households are the most interesting social and vocational group from economic and social point of view, as they determine production and economic performance in agriculture. They also determine the future of agriculture, and their changes have significant socio-economic impacts, as people who give up running such farms seek alternative income sources, and most frequently other jobs.

As shown in Fig. 7, the share of farmers' households in the group of entities oriented to organic production, was significantly higher in comparison to farms owned by individuals in general. While in the whole group, farmers' households presented a stable share in the period under consideration (27-28%), their number among organic farms declined (from 52% to 46%) – to the benefit of non-agricultural income sources. Among organic farms, contrary to the group of farms owned by individuals in general, a relatively smaller group generated income outside agriculture, however, in recent years, the percentage of organic farms generating non-agricultural income has increased. One may conclude that, in case of organic farms, agricultural activity loses importance as a dominating source of the household income. Income of farming families who run organic farms has gradually been diversifying. Thus, organic farms are becoming more and more similar to an average farm owned by an individual in terms of income structure (this is demonstrated e.g. by growing value of SSIM, which in 2005 was 0.55, and in 2010 – 0.63, Table 5).

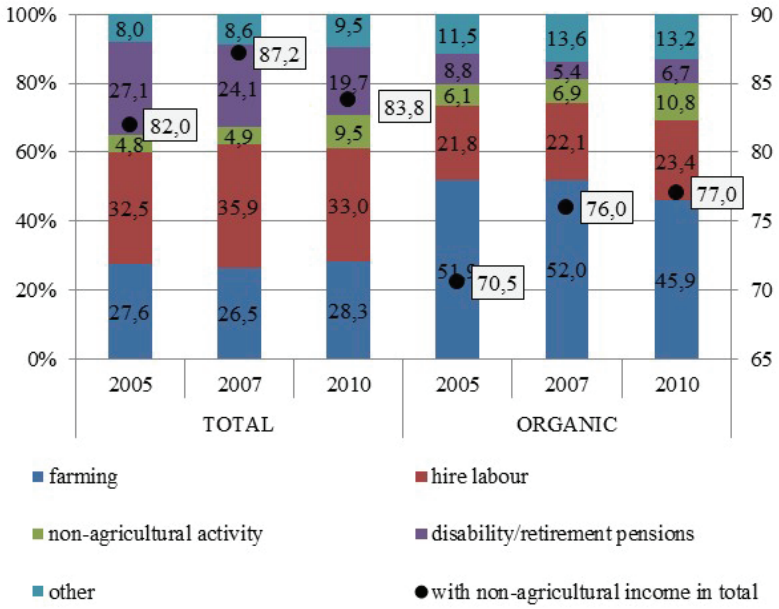

Fig. 7. Income structure of farms owned by individuals and organic farms, and share of farms with non-agricultural income.

Source: own studies based on GUS data.

Figure 8 A, B presents a share of farms owned by individuals in general and organic farms against the type of non-agricultural income. As one can see in the Figure, non-agricultural activity conducted on own account has become more and more important among non-agricultural income; it is more and more

frequently undertaken on organic farms. However, the share of entities in which pensions are a source of income has been declining significantly.

On organic farms, non-agricultural activities conducted are more often related directly with the farm, in comparison to the total of farms owned by individuals (in 2010 the share was 44% and 17%, respectively, where 100% is the total of farms generating non-agricultural income in groups under study). Those farms generated significant additional funds based on farm resources and assets (labour force, land, buildings, machinery, etc.), as they conducted additional production activities as well as rendered services on own account. Assets owned by organic farms enabled them starting rural tourism business and aquaculture, as well as processing of agricultural products. Thanks to such a supplementation of farming activity by non-farming business, farm and family assets were used more effectively, and produced environmental as well as economic benefits.

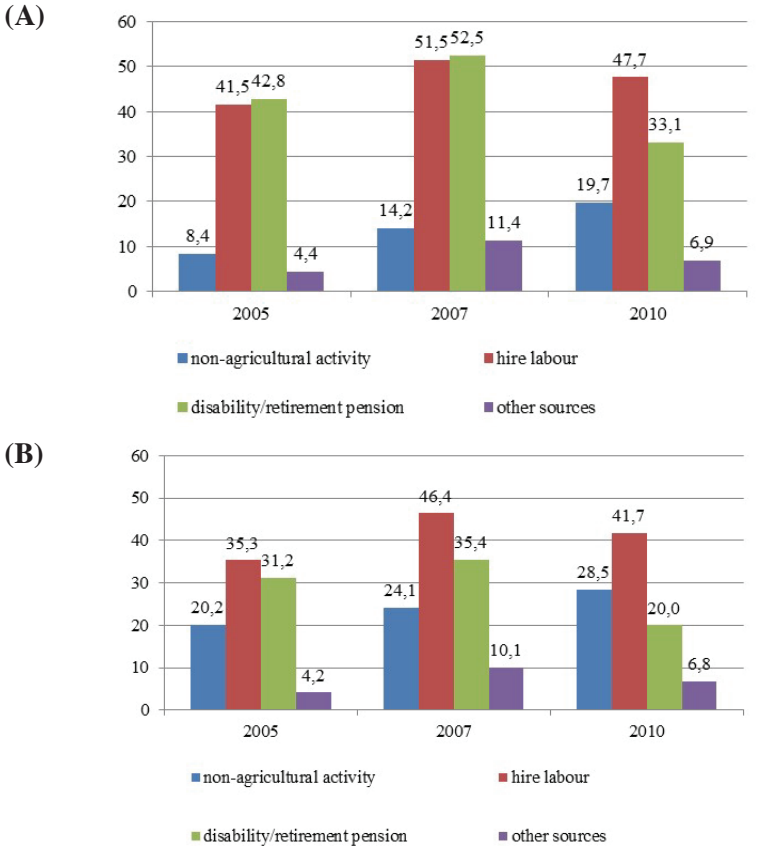

Fig. 8. A, B. Share of farms in general (A) and organic farms (B) by the type of non-agricultural income.

Source: own studies based on GUS data.

Recapitulation

Production and economic changes in the group of organic farms in the period 2005-2010 were presented against the background of farms owned by individuals in general, based on the following GUS data: questionnaire of 2005 and 2007 and agricultural census of 2010.

The years 2005-2010 witnessed significant increase in the number of organic farms – mostly thanks to legislation (especially financial incentives and agri-environmental standards imposed on farms), and to a lesser degree due to prices and demand. Factors such as food quality and awareness of cross-compliance practices are still weaker, yet more and more visible.

The analysis of production and economic structures with the application of the so-called relative structure similarity index (SSIM) showed significant differences between the group of organic farms and the group of all farms owned by individuals. Changes in the former group are greater, which results first of all from the group being joined by farms, the features of which were defined as more favourable. This relates to agrarian structure, the use of land, economic, market and income structures.

Structural changes related with agricultural production profile, which are underway in the group of farms in general and in organic farms, are much more intensive in case of organic farms. Greater and greater orientation of organic farms towards crop production exclusively is a cause of concern, as is the reduction of livestock headage. Data which points to simplification of agricultural production on those farms contradict the very idea of organic production, according to which those farms should feature mixed production profile (namely the production of crops as well as livestock), grow a wide variety of crops, which could ensure the circulation of organic matter and fertilizers within a farm. Significant increase of the share of orchards in the structure of field crops (notorious plantations of walnut) and eliminating livestock production on organic farms raise doubts as the appropriateness of solutions aiming at supporting organic farming. Organic farming certification systems should also be verified.

Although the structure of organic crops is in principle more favourable in terms of environment protection – which is obvious and corresponds with the assumption of this system of production – the share of cover crops has practically not changed in the recent years. However, which is worth underlying – there positive tendencies are visible among farms in general to grow cover plants.

In case of production potential structure measured with standard gross margin – organic farms looked more favourably than farms in total, due to greater surface of UAA. Unfortunately, in recent years that structure declined in the group of organic farms.

Organic farms were and still are more oriented to direct sales (local market), which is desirable in case of products which are sensitive to transportation (shortening of food chain) and in case of economic viability of local commu-

nities (produced added value stays within local economy). However, a trend is visible towards increasing the share of sales to non-local markets, which is related with progressing specialization and increase in the scale of production on organic farms.

Organic farms feature income structure in which farming incomes play a significant role, followed by non-agricultural incomes.

References

1. Agra Europe, no. 2592, 2013 [www.agra-net.com].
2. Babicz-Zielińska E.: Postawy konsumentów wobec nowej żywności. Zeszyty Naukowe Akademii Morskiej w Gdyni, no. 65, 2010.
3. Dimitri C., Oberholtzer L.: Market-led versus government-facilitated growth. Development of the U.S. and EU organic agricultural sectors. USDA, 2005 [www.ers.usda.gov].
4. Gemzik-Salwach A.: Istota i metody analizy finansowej. Rzeszów 2007 [Portal.wsiz.rzeszow.pl/plik.aspx?id=7732].
5. GUS: Charakterystyka gospodarstw rolnych. Powszechny Spis Rolny 2010, Warszawa 2012.
6. Janowska-Biernat J.: Ekonomiczne aspekty stosowania środków ochrony roślin i biopreparatów w wybranych ekologicznych gospodarstwach rolnych. Journal of Agribusiness and Rural Development, no. 3(13), 2009.
7. Komorowska D.: Rolnictwo ekologiczne w strategii poprawy konkurencyjności regionu. Roczniki Naukowe SERiA, t. X, issue 2, 2008.
8. Koreleska E.: Sprzedaż bezpośrednia produktów ekologicznych. Roczniki Naukowe SERiA, t. X, issue 4, 2008.
9. Łuczka-Bakuła W.: Rynek żywności ekologicznej. PWE, Warszawa 2007.
10. Łuczka-Bakuła W.: Rozwój rolnictwa ekologicznego w Polsce po przystąpieniu do UE w aspekcie wsparcia PROW 2004-2006. Roczniki Naukowe SERiA, t. XV, z.1, 2013.
11. Ministerstwo Rolnictwa i Rozwoju Wsi: Projekt Programu Rozwoju Obszarów Wiejskich 2014-2020. Warszawa 2013 [http://www.minrol.gov.pl/pol/Wsparcie-rolnictwa-i-rybolowstwa/PROW-2014-2020].
12. Ministerstwo Rolnictwa i Rozwoju Wsi: Załącznik L do Planu Rozwoju Obszarów Wiejskich 2004-2006: Zestawienie pakietów działań Programu Rolnośrodowiskowego. Warszawa 2012 [http://www.minrol.gov.pl/pol/Wsparcie-rolnictwa-i-rybolowstwa/Plan-Rozwoju-Obszarow-Wiejskich/ Dokumenty-PROW].
13. Nachtman G.: Efektywność ekonomiczna gospodarstw ekologicznych na tle konwencjonalnych w 2010 roku. Zagadnienia Doradztwa Rolniczego, no. 2(68), 2012.
14. Nachtman G.: Dochodowość gospodarstw ekologicznych a wielkość użytków rolnych. Roczniki Ekonomii Rolnictwa i Rozwoju Obszarów Wiejskich, t. 100, issue 1, 2013a.
15. Nachtman G.: Sytuacja gospodarstw zajmujących się produkcją ekologiczną owoców w latach 2010-2011. Zagadnienia Doradztwa Rolniczego, no. 2(72), 2013b.
16. Offermann F., Nieberg H., Zander K.: Dependency of organic farms on direct payments in selected EU memeber states: today and tomorrow. Food Policy, vol. 34, 2009.
17. Ostasiewicz S., Rusnak Z., Siedlecka U.: Statystyka – elementy teorii i zadania. Akademia Ekonomiczna im. Oskara Langego we Wrocławiu, Wrocław 2006.
18. Runowski H.: Rolnictwo ekologiczne w Polsce [w:] Z badań nad rolnictwem społecznie zrównoważonym [15] (ed. J.S. Zegar). Raport Programu Wieloletniego 2011-2014, no. 50. IERiGŻ-PIB, Warszawa 2012.
19. Stolze M., Lampkin N.: Policy for organic farming: rationale and concepts. Food Policy, no. 34, 2009.
20. Szczuka M., Tabor S.: Zróżnicowanie działalności dodatkowej w wybranych gospodarstwach ekologicznych. Inżynieria Rolnicza, issue 2(143), t. 1, 2013.

21. Toczyński T., Wrzaszcz W., Zegar J.S.: Zrównoważanie polskiego rolnictwa. Powszechny Spis Rolny 2010 (ed. J.S. Zegar). GUS, Warszawa 2013.
22. Tyburski J., Żakowska-Biemans S.: Wprowadzenie do rolnictwa ekologicznego. Wydaw- nictwo SGGW, Warszawa 2007.
23. Wrzaszcz W., Zegar J.S.: Struktura społeczno-ekonomiczna gospodarstw ekologicznych w latach 2005, 2007, 2010. Maszynopis złożony do Wiadomości Statystycznych, 2014.
24. Zegar J.S.: Gospodarstwa ekologiczne w rolnictwie indywidualnym. Wiadomości Statystyczne, no. 10, 2006a.
25. Zegar J.S.: Charakterystyka gospodarstw ekologicznych w Polsce [in:] Z badań nad rolnictwem społecznie zrównoważonym [2] (ed. J.S. Zegar). Raport Programu Wieloletniego 2005-2009, no. 30. IERiGŻ-PIB, Warszawa 2006b.
26. Zegar J.S.: Gospodarstwa ekologiczne w rolnictwie indywidualnym. Wiadomości Statystyczne, no. 8, 2008.
27. Zegar J.S.: Współczesne wyzwania rolnictwa. PWN, Warszawa 2012.