e-ISSN 2392-3458

Problems of Agricultural Economics
Zagadnienia Ekonomiki Rolnej

www.zer.waw.pl

1(358) 2019, 64-87

DOI: 10.30858/zer/104385

ECONOMIC SIZE AND PRODUCTION EFFICIENCY OF FARMS SPECIALIZING IN FIELD CROPS IN POLAND

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Abstract

The article presents the economic results and production efficiency for farms specializing in field crops classified by economic size classes. The FADN UE data from 2010 and 2015 were used for the analysis. The income from the farm was a measure of the economic situation. The assessment of production efficiency was carried out at the production and technical level, the profitability of current assets as well as the cost consumption and economic efficiency of production were examined. The debt of farms was also analyzed.

Income from the farm without subsidies for operating activities in economic size classes 1-5 successively increased, while for farms in the sixth class there was a strong decline in it, as a result income was a negative value. In 2010, the subsidies covered the loss on production and ensured a certain amount of income, while in 2015 the loss was only partially covered (in 95%). The highest income without subsidies per 1 ha of arable land was obtained on farms from the third and fourth economic size classes (in 2010: EUR 267 and EUR 201, respectively, in 2015 – EUR 161 and EUR 193). Farm production in the third and fourth classes also stand out in terms of production efficiency, while in sixth class of farms, the efficiency was the lowest. Together with the increase in the economic size of farms, their debt increased. In all groups, the liabilities were mostly long-term loans, but its smallest share was found in the sixth class of farms. This means that significant funds were allocated to finance the current operations of these farms.

Keywords: farms specializing in field crops, farm income, parity income, efficiency, subsidies.

JEL codes: D33, Q12, Q14.

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Introduction

In Poland, farms specialising in field crops have a significant share in the total number of farms in the country. Data from the Statistics Poland (pol. *Główny Urząd Statystyczny*, GUS) shows that in 2010 their share was 39.9% and in 2016 – 56.5%. However, it should be noted that such a significant increase in the share of field farms in 2016 resulted mainly from changes in the methodology of research conducted by the Statistics Poland (as a result of these changes the total number of farms decreased by 25.4%).[1] According to the research by the Statistics Poland, in 2010 the number of farms specialising in field crops was 754,210 and in 2016, 797,409, so there was an increase of 5.7%. In 2010, the utilised agricultural area on these farms amounted to 5,926 thousand ha, and in 2016 – 7,643 thousand ha, and in the total utilised agricultural area in the country it was 39.4% and 52.6%, respectively. The average utilised agricultural area per one farm in 2010 was 7.86 ha, and in 2016 – 9.59 ha. It should be noted that in the research years, the area occupied by cereals significantly increased in the area under cultivation on field farms; in 2010, its share was 42.1%, while in 2016 – 58.2% (GUS, 2012, 2017a).

For many farms plant production is the most important source of income, and the condition and development potential of farms affect the entire agriculture. However, specialisation in plant production and often low diversity of species of crops may be a threat to the environment. Intensive use of soil combined with the simplification of crop rotations and the dominance of cereal crops may lead to a reduction in the amount of organic residues entering the humus transformation cycle, and as a consequence to a reduction in its content in soil (Krasowicz et al., 2011).

The natural significance of crop rotation is not always appreciated by agricultural producers. The desire to obtain the highest profitability of production forces specialisation which sometimes leads to the use of various simplifications. With long-term lack of diversification of cultivated plants, their yields decrease, and the extent of the decrease is largely determined by habitat conditions, the level of agro-technics and the selection of cultivated plant species. This is particularly true for non-livestock farms and non-bedding methods of raising animals. Under these circumstances, less and less land is fertilised with manure. The research results show that these farms are exposed to the negative effects of drought more than others. The adverse effect of drought on the economic effects of farms is stronger if the needs related to organic fertilisation are not balanced. In the absence of natural fertilisers of animal origin on the farms, their substitute can be properly prepared straw and catch crop grown for ploughing (Józwiak and Zieliński (ed.), 2018).

[1] Due to the introduction of changes in the methodology of agricultural research aimed at adaptation to the EU standards and taking into account changes taking place in the Polish agriculture, the definition of an agricultural holding has changed. According to the current definition, the 2016 farm structure survey (similarly to 2013) did not include owners of agricultural areas who do not conduct agricultural activity and owners of agricultural area of less than 1 ha conducting small-scale agricultural activity (GUS, 2017a).

The economic size of the farm is one of the criteria used to characterise it. In Poland, according to the classification carried out in accordance with the rules of the Community Typology for Agricultural Holdings, there are mostly very small and small entities, i.e. with economic size from EUR 2 thousand to EUR 8 thousand and from EUR 8 thousand to EUR 25 thousand (Bocian, Cholewa and Tarasiuk, 2014, 2017). Research carried out using agricultural accounting results collected in the framework of the FADN showed that in 2010 among farms specialising in field crops, units from these two economic size classes accounted for a total of 85.9%, and in 2015 – 84.4% (Farm Accountancy Data Network, 2018). The structure of the Polish farms in terms of economic strength is not favourable, however, a similar situation also occurs in other countries, especially from the Central and Eastern Europe, such as Romania and Bulgaria (Skarżyńska, Augustyńska-Grzymek and Abramczuk, 2014).

Aiming at favourable economic effects and competitive advantage, management decisions of farm managers should primarily lead to the optimal use of working capital and fixed capital. Management efficiency, which is an important determinant of the success of agricultural holdings in conditions of volatile environmental, is also important. Research on the economic situation and production efficiency on farms classified by the economic size has been largely embedded in the widely used framework of neoclassical economics. It shows the differences in the effects of farms, in particular by reference to technical efficiency and differences in the internal structure of farms. Differences in the results of farms also place the research carried out in institutional economics. According to literature on the subject, the behaviour of farm managers is shaped by institutions (formal and informal rules, regulations) (Gorton and Davidova, 2004, as in: Williamson, 1988). Therefore, the analysis should not include only the internal structure of farms but also capture the institutional embedment of farms and the relations between organisations (Gorton and Davidova, 2004, as in: Pollak, 1985).

Purpose of the study, data sources and methodology

The purpose of the study was to assess economic results and production efficiency on farms specialising in field crops and classified by economic size. The assessment also included the possibility of realisation of income by these farms which would ensure payment for the labour of the farmer and farmer's family members at the parity level, i.e. at the level received by people employed in the national economy.

The subject of research were farms specialising in field crops, i.e. in the cultivation of cereals, oil plants and protein crops (type 15) and various field crop species (type 16) (Bocian et al., 2014). Data from 2010 and 2015 collected and processed under the FADN EU was used for the analysis (Farm Accountancy..., 2018). The intention was to examine the repeatability of the direction of change in research results in separated groups of farms in two research years. 2010 was the first year in which the Community Typology for Agricultural Holdings was based on the Standard Output parameter, and 2015 was the last year for which data at the beginning of research work was available.

The results of farms in tabular form are presented for each research year on average in a sample and in six groups of farms separated according to economic size expressed in the value of the Standard Output (SO).[2] The nomenclature of economic size classes is as follows: **(1)** 2 ≤ 8 – very small, **(2)** 8 ≤ 25 – small, **(3)** 25 ≤ 50 – medium-small, **(4)** 50 ≤ 100 – medium-large, **(5)** 10 ≤ 500 – large, **(6)** ≥ 500 – very large. Horizontal and vertical analysis was used to compare the parameters characterising farms in the research years and in separated groups, i.e. economic size classes.

The analysis covered production capacities of farms, i.e. the utilised agricultural area (UAA), labour input expressed by the number of annual work units (AWU[3]) and total assets.[4] The organisation of production on farms and the technical equipment of land and labour, which is expressed by the relation of the value of machinery and technical equipment to the utilised agricultural area and the number of family work units, respectively, were examined. The equipment of farms with buildings was also checked (along with their permanent equipment); for this purpose an indicator which shows the burden of the size of these resources expressed in terms of value on 1 ha of utilised agricultural area (UAA) was used.

The basic assessment measure of the economic results was farms income but the study also included production value and costs. The analysis also covered the cost-intensity of agricultural production, and its amount was determined by the reference of total costs to the value of production. The research examined also the burden of the cost of depreciation of fixed assets and the cost of external factors on the production. The expression was the percentage relation of depreciation and the cost of external factors to the value of production, respectively.

The assessment of production efficiency was carried out using the following indicators:

- the share of gross margin[5] in the value of agricultural production – efficiency at the production and technical level (Kulawik (ed.), 2013, as in: Dabbert and Braun, 2012),
- the relation between gross value added (without subsidies) and intermediate consumption – profitability of input of current assets measured by the value of intermediate consumption,

[2] Standard Output is the average production value of 5 years from a specific plant and animal production activity obtained during a year from 1 ha and from 1 animal in the production conditions average for a given region (Bocian, Mańko, Osuch and Płonka, 2014).

[3] Annual work unit (AWU) – total labour input as part of operations of an agricultural holding (in Poland, it is 2120 hours), expressed in family work units (Floriańczyk et al., 2014).

[4] Farm assets (means of production) are divided into fixed and current. **Fixed assets** include: agricultural land, permanent crops and production quotas, farm buildings and their permanent equipment, machinery, devices and means of transport, and basic herd females. **Current assets** include: the value of all production animals (except for basic herd animals, stocks of agricultural products, value of standing crops, shares of the farm in agricultural units, short-term receivables and cash in hand and on the bank account in the amount necessary for the current operation of the agricultural holding (Floriańczyk et al., 2014).

[5] Direct surplus = agricultural production less the value of direct costs and the value of direct costs of forestry production.

- the relation between gross value added (without subsidies) and total production value – economic efficiency of production (Czyżewski and Henisz-Matuszczak, 2007).

Moreover , the analysis covered examination of the debt of farms and its structure as well as equity debt. The following indicators were used in the research:

$$\textit{Indebtedness of farms (\%)} = \frac{\textit{total liabilities}}{\textit{total assets}} \textit{ x 100} \quad (1)$$

$$\textit{Debt structure indicator (\%)} = \frac{\textit{long-term liabilities}}{\textit{total liabilities}} \textit{ x 100} \quad (2)$$

$$\textit{Equity debt (\%)} = \frac{\textit{total liabilities}}{\textit{aquity}} \textit{ x 100} \quad (3)$$

The indicator describing the indebtedness of farms shows what part of the value of assets are liabilities, hence it determines the degree of securing the repayment of the entire debt of farms with their assets. The higher the ratio, the higher the financial risk. In individual farms, the value of this indicator should not exceed 50% (Goraj and Kulawik, 1995). The debt structure indicator expresses the percentage share of the value of long-term liabilities in total liabilities. Higher result of this indicator means greater financial stability of farms (Nowak, 2008). Equity debt is, than, characterised by the percentage relation between total value of liabilities and the value of equity, i.e. total assets less total liabilities. This indicator shows financial risk associated with running a production activity. The increase in the value of the indicator should be interpreted as a deterioration of the creditworthiness of the company resulting from an increase in debt.

In order to carry out research in accordance with the stated goal, on the basis of public statistics, the so-called parity income, which corresponds to the average net salary in the national economy, was calculated. The calculations were made for each year of research. In order to convert the parity income from PLN to EUR, the conversion rates according to the European Central Bank were applied: in 2010, EUR 1 = PLN 3.9947, and in 2015, EUR 1 = PLN 4.1841 (European Central Bank, 2018). This income was the basis for calculating the parity income ratio, which is reflected by the relation between the farm income with subsidies per family work unit (FWU[6]) and net salary in the national economy.

[6] Family work unit (FWU) – labour input in the operations of an agricultural holding of unpaid persons, mainly family members (in Poland, it is 2120 hours), expressed in family work units (Floriańczyk et al., 2014).

Characteristics of the studied holdings

The results of research included in Table 1 show that the utilised agricultural area increased along with the increase in the economic size of farms. The share of leased land was also gradually increasing and in 2010, in the sixth economic size class it amounted to 62.5%, and in 2015 – 55.1%. In the remaining groups of farms the majority was own utilised agricultural area, though.

Labour input expressed in the number of annual work units (AWU), also increased along with the increase in the economic size of farms. But, the share of family work units (FWU) in total input (AWU) decreased. In both research years, their largest share was recorded on farms from the first economic size class (in 2010 – 96.7%, and in 2015 – 95.5%), and the smallest share – from the sixth class (in 2010 – 0.5%, and in 2015 – 0.9%). Total labour input per 100 ha of utilised agricultural area (AWU/100 ha of UAA) was the highest on farms from the first economic size class, and the lowest in 2010 from the fifth class, and in 2015 – from the sixth class. Comparing the extreme values, in 2010 the difference between them was 6.1-fold, and in 2015 – 7.0-fold.

Assets (total property) are an important element in assessing the production potential of farms. The results indicate that fixed assets dominated total assets, on average in the sample their share in 2010 was 88.2%, and in 2015 – 90.2%. In groups of farms, the share of fixed assets decreased along with the increase in the economic size (in 2010, the decrease was not one-way). On farms from the first economic size class in 2010, it amounted to 91.8% and in 2015 – 93.3%, while on farms from the sixth class – 51.8% and 62.6%, respectively.

The structure of assets on frams from the sixth class was more favourable than in classes 1-5. Fixed assets are a creator of high fixed costs, so they are a factor limiting the ability to earn income. A larger share in the asset structure of current assets is more advantageous because these assets create greater opportunities to adapt to the needs of the market, and as a result contribute to the increase in income. The mutual relationship between fixed assets and current assets is a differentiated quantity. Due to the specific nature of activity of agricultural enterprises, in general, fixed components of assets, which are necessary to implement the production process, have a relatively large share in the structure of assets.

The value of total assets per 1 ha of UAA was the highest on farms from the first economic size class and showed a decrease in successive classes. As a result, on farms from the sixth class compared to the first class, in 2010 it was by 67.9% lower, and in 2015 – by 60.8%. The decrease in total assets was determined only by fixed assets. The value of current assets per 1 ha of UAA increased along with the increase in the economic size of farms, although it was not a one-way increase. In successive groups of farms, a decrease in the share of equity in total assets was also noted. This means that the debt of farms was gradually increasing, thus entities with the highest economic strength (class 6) were the most indebted.

Table 1

Characteristics of the studied farms specialising in field crops in the research years

Specification		On average, in the sample	Economic size classes of farms, EUR thousand of SO					
			(1) 2 ≤ 8	(2) 8 ≤ 25	(3) 25 ≤ 50	(4) 50 ≤ 100	(5) 100 ≤ 500	(6) ≥ 500
2010								
Utilised agricultural area (UAA)[a]	ha	25.96	10.43	17.39	43.21	86.60	249.67	1 126.95
The share of leased UAA	%	32.6	12.8	20.9	33.3	37.7	47.2	62.5
Total labour input	AWU	1.57	1.21	1.51	2.14	2.30	4.72	28.56
including: family work units (FWU)	%	83.4	96.7	92.1	76.6	75.2	30.9	0.5
Total labour input per 100 ha of UAA	AWU	6.05	11.60	8.68	4.95	2.66	1.89	2.53
Total assets	EUR/farm	156,965	80,583	128,514	283,094	530,518	1,043,554	2,797,803
including: fixed assets	%	88.2	91.8	90.7	89.2	90.0	84.4	51.8
Total assets	EUR/ha of UAA	6,046	7,726	7,390	6,552	6,126	4,180	2,483
Fixed assets	EUR/ha of UAA	5,331	7,094	6,701	5,846	5,512	3,529	1,286
Current assets	EUR/ha of UAA	716	632	689	706	614	650	1 197
Equity in total assets	%	92.6	99.1	96.7	93.1	88.1	84.3	63.1
2015								
Utilised agricultural area (UAA)[a]	ha	21.69	8.63	16.15	32.47	63.28	181.90	922.48
The share of leased UAA	%	26.2	9.0	18.5	29.1	33.7	33.4	55.1
Total labour input	AWU	1.46	1.10	1.52	1.87	2.27	3.69	16.87
including: family work units (FWU)	%	87.0	95.5	92.1	85.6	76.7	42.5	0.9
Total labour input per 100 ha of UAA	AWU	6.73	12.75	9.41	5.76	3.59	2.03	1.83
Total assets	EUR/farm	166,566	77,554	143,784	262,365	494,618	1,142,015	3,246,175
including: fixed assets	%	90.2	93.3	92.4	91.5	91.3	87.0	62.6
Total assets	EUR/ha of UAA	7,679	8,987	8,903	8,080	7,816	6,278	3,519
Fixed assets	EUR/ha of UAA	6,930	8,384	8,227	7,390	7,139	5,463	2,204
Current assets	EUR/ha of UAA	750	602	676	690	677	815	1 315
Equity in total assets	%	93.2	99.5	97.4	93.3	89.4	84.1	73.0

[a] Total own and leased utilised agricultural area.

Source: own study based on the FADN EU (Farm Accountancy…, 2018).

Organisation and intensity of production on the studied farms

The determinant of the organisation of plant production was the share of specific groups of plants in the utilised agricultural area. In both research years, cereals dominated in the structure of utilised agricultural area, on average in the sample their share in 2010 was 62.8%, and in 2015 – 60.6%, other field crops accounted for 24.1% and 25.1%, respectively. The share of cereals in the utilised agricultural area decreased along with the increase in the economic size and the area of farms, although the decrease in the share was not always one-way. In 2010, the share of cereals was ranging between 57.0-65.1%, and in 2015 – 57.0-66.7% – Table 2.

Table 2

Organisation and intensity of production on farms specialising in field crops in the research years

Specification			On average in the sample	Economic size classes of farms, EUR thousand of SO					
				(1) 2 ≤ 8	(2) 8 ≤ 25	(3) 25 ≤ 50	(4) 50 ≤ 100	(5) 100 ≤ 500	(6) ≥ 500
2010									
The share of cereals and other field crops in UAA		%	86.9	80.1	84.9	88.6	89.8	91.9	89.9
of which:	cereals		62.8	65.0	65.1	62.6	60.9	62.0	57.0
	other field crops		24.1	15.1	19.8	26.0	28.9	29.9	32.9
The share of plant production in total production of the farm		%	92.8	88.8	93.4	93.2	94.6	95.4	90.3
Total costs		EUR/ha of UAA	802	688	762	778	728	790	1,256
including:	direct costs		316	217	282	333	331	345	492
	cost of external factors		98	27	52	81	73	137	322
2015									
The share of cereals and other field crops in UAA		%	85.7	79.9	82.4	85.9	88.7	91.8	91.5
of which:	cereals		60.6	66.7	61.1	57.7	57.0	59.5	58.0
	other field crops		25.1	13.2	21.3	28.2	31.7	32.3	33.5
The share of plant production in total production of the farm		%	92.6	88.5	92.2	92.4	94.7	94.4	93.0
Total costs		EUR/ha of UAA	950	786	866	945	975	991	1 421
including:	direct costs		389	251	325	410	453	451	621
	cost of external factors		107	35	61	83	98	151	340

Source: as for Table 1.

This means that the rules of rotation have been preserved, which is a positive phenomenon. Rotation as the basis for crop rotation is conducive to the creation of the best conditions for yielding crops and has no negative impact on the environment. It should be noted that on farms which are the largest in terms of area, the share of cereals in the utilised agricultural area was generally lower than in other groups of farms. The research results show that the share of other field crops on farms from successive economic size classes was gradually increasing – in 2010, it was ranging from 15.1% to 32.9%, and in 2015 from 13.2% to 33.5%. In the structure of the production value, the share of plant production on average in the sample in both research years was similar, it amounted to 92.8% and 92.6%. Whereas in groups of farms in 2010, it was within the limits of 88.8-95.4%, and in 2015 – 88.5-94.7%.

Cultivation of cereal plays an important role in shaping the economic situation of the majority of farms. However, a large share of cereal in sowing can be called a "high-risk variable." This is due to the fact that with the share of cereals amounting to 75% and more, and the consequent need to cultivate them after each other, it is difficult to provide species with appropriate positions. The consequence is a decrease in yields. Even though thanks to appropriate technological measures relatively high grain yields can be obtained, in each case they will be smaller than in the correct crop rotation. The use of a higher level of agro-technics only partially mitigates the negative production consequences of the increased share of cereals in sowing (Smagacz and Kuś, 2010). It should be added that crop rotation shapes the balance of organic matter in the soil, and its content is the basic condition for obtaining stable and satisfactory yields.

The measure of production intensity were the total costs incurred per 1 ha of utilised agricultural area and their components, i.e. direct costs and the cost of external factors. It was noted that a positive correlation between the amount of these costs and the economic strength and area of farms. The largest diversification resulting from the comparison of extreme values was noted in the case of the cost of external factors, in 2010 – 11.9-fold, and in 2015 – 9.7-fold. The diversification of direct costs in the research years was 2.3 and 2.5-fold, respectively, while the diversification of total costs in both years was 1.8-fold.

Equipment with fixed assets and technical equipment of land and labour

While assessing the differences in equipment of farms with machinery and technical devices, their value was qualified in relation to the resources of land and labour. In order to secure the production processes, farms must also be equipped with buildings. The size and type of buildings should result from the direction of production and should be adapted to the size and structure of production. In order to show the differences in the equipment with buildings of farms of various economic size, the burden of their value on the land was assessed – Table 3.

The results show that the value of buildings including their permanent equipment calculated per 1 ha of utilised agricultural area in both research years was the highest on farms from the first economic size class, while in successive groups of farms it gradually decreased. As a result, the value of buildings on farms from the sixth class compared to the first class in 2010 was 7.6 times lower, and in 2015 – 6.0 times.

The value of machinery and technical devices per 1 ha of utilised agricultural area characterises the technical equipment of land. In both research years, the largest was recorded on farms in the fourth class (in 2010 – EUR 1238, in 2015 – EUR 1643), and the smallest in the sixth class (in 2010 – EUR 452, in 2015 – EUR 444). This means that on farms with the highest economic strength (class 6) in 2010 technical equipment was by 63.5% lower, and in 2015 – by 73.0%. But then, comparing the technical equipment of land on farms from the sixth class to the first class, in 2010 it was 41.9% lower, and in 2015 – 42.4%. The research results suggest more rational equipment with machinery and technical devices of farms with the largest area. At the same time, they indicate relatively large resources of fixed assets on farms from the first class, which can be described as

economically weak; they were also the smallest in terms of the area. In literature on the subject, these resources are considered a factor exerting a large influence on the organisation of a farm, current operation, but also on economic and financial results (Łęczycki, 2005).

Table 3

Equipment with fixed assets and technical equipment of land and labour on farms specialising in field crops in the research years

Specification		On average, in the sample	Economic size classes of farms, EUR thousand of SO					
			(1) 2 ≤ 8	(2) 8 ≤ 25	(3) 25 ≤ 50	(4) 50 ≤ 100	(5) 100 ≤ 500	(6) ≥ 500
2010								
Resources of farm per 1 ha of total UAA, own and leased, EUR								
total assets without land		2,567	2,977	3,040	2,810	2,506	1,807	1,880
buildings and their permanent equipment		926	1,557	1,320	926	647	352	204
machinery and technical devices		914	778	1,020	1,166	1,238	798	452
Resources of farm per 1 ha of own UAA, EUR								
total assets without land		3,806	3,416	3,845	4,213	4,024	3,423	5 017
buildings and their permanent equipment		1 372	1,786	1,669	1,388	1,039	667	543
machinery and technical devices		1 356	892	1,290	1,748	1,987	1,512	1,207
Resources of farm per 1 AWU								
total utilised agricultural area	ha	16.54	8.62	11.52	20.19	37.65	52.90	39.46
machinery and technical devices	EUR	15,118	6,703	11,744	23,540	46,603	42,222	17,849
2015								
Resources of farm per 1 ha of total UAA, own and leased, EUR								
total assets without land		3,077	3,387	3,456	3,304	3,170	2,459	2,137
buildings and their permanent equipment		1,193	2,010	1,596	1,143	838	471	337
machinery and technical devices		1,118	771	1,171	1,457	1,643	1,145	444
Resources of farm per 1 ha of own UAA, EUR								
total assets without land		4,169	3,724	4,242	4,658	4,784	3,691	4 765
buildings and their permanent equipment		1 617	2,209	1,959	1,611	1,265	707	752
machinery and technical devices		1 514	847	1,437	2,054	2,480	1,719	990
Resources of farm per 1 AWU								
total utilised agricultural area	ha	14.86	7.85	10.63	17.36	27.88	49.30	54.68
machinery and technical devices	EUR	16,606	6,046	12,439	25,299	45,803	56,450	24,269

Source: as for Table 1.

The equipment of farms with machinery and technical devices also affects the technical equipment of labour (which is manifested in the value of machinery and devices per 1 AWU). In both years, this ratio was the lowest on farms in the first class (in 2010 – EUR 6703, in 2015 – EUR 6046), and the highest in 2010 on farms from the fourth class (EUR 46 603), and in 2015 from the fifth class (EUR 56 450). This means that on economically stronger farms the level of technical equipment was higher. While comparing farms from these classes, the advantage of the economically stronger ones in 2010 was 7.0-fold, and in 2015 – 9.3-fold. It should be added that the technical equipment of labour is characterised by a much greater diversity – resulting from a comparison of extreme values – than the measure describing the "mechanisation rate" of land.

The utilised agricultural area per 1 AWU was also assessed. This figure on farms from the first class, i.e. economically weak, did not exceed 10 ha, while in other groups of farms it was larger. In 2010, it was the largest on farms classified to the fifth economic size class (52.90 ha), and in 2015 to the sixth class (54.68 ha). This means that the involvement of the labour force (expressed in AWU) on farms from the first economic size class was much larger.

As already mentioned, utilised agricultural area of the economically strongest farms (class 6) was, to the smallest extent, own resources of agricultural families– the share of leased UAA in 2010 amounted to 62.5%, and in 2015 – 55.1%. On economically weaker farms, the share of foreign land was smaller but also relatively large. In this context, it is possible to hypothetically consider the situation of farms in the case of a limitation or lack of lease. It is estimated that in some groups, especially larger ones in terms of area and economically, targeted investment was made (mainly in machinery and devices) due to larger area of land used. The calculations indicate that in the case of using only own land, the size of the presented measures would be significantly higher compared to those obtained for the use of own and leased land – on average in the sample in 2010 by 48.3%, and in 2015 by 35.5%. As the area and economic strength of farms increased, this relationship increased. In the economically weakest units in 2010 the measures would increase by 14.7%, and in 2015 by 9.9%, while in the economically strongest ones, by 166.9% and 123.0%, respectively in the research years. This indicates much larger resources per 1 ha of utilised agricultural area. In this reality, machinery and technical devices as well as buildings and structures would be used only partially. This situation would have a negative impact on the economic results of farms because the irrational use of these resources (resulting from over-investment of farms) would cause an increase in costs and a decrease in production profitability.

Costs and economic results of the studied farms

Investment in the resources of fixed assets is connected with large one-off expenditures but also encumbering the assets with operating costs. The possession and use of fixed assets in the production process is associated with depreciation, which is, for the farm, a cost burdening income. Depreciation is a measure of consumption of fixed assets, thus it is the cost of the business. However, these are assets left on the farm which should enable the exchange of fixed assets consumed in the production process. Modernisation of farms is a condition for their development but due to relatively low profitability of agricultural production, it is also one of the most difficult activities.

The cost of depreciation is an important component of the farm's costs. On average, in the research sample of farms, the share of the depreciation cost of fixed assets in the structure of total costs in 2010 amounted to 20.4%, and in 2015 – 22.3%. The share of the depreciation cost in total costs decreased along with the increase in the economic strength of farms, and on farms in class 6, i.e. the economically strongest ones, it amounted to 8.0% and 8.9%, respectively in the research years (for comparison, on class1 farms, it was 29.3% and 30.8%). An analogous direction of change was shown by the rate of burden of depreciation cost on the agricultural production. In both research years – with the increase in the economic size of farms – the burden of depreciation cost on production was decreasing. On farms from the first class in 2010 it amounted to 26.0%, and in 2015 – 31.0%, while on farms from the sixth class – 8.0% and 9.9%, respectively – Table 4.

The indicator describing the burden of the cost of external factors on production shows a different direction of change. In both research years, in successive groups of farms this burden was gradually increasing. On farms from the sixth class it was the largest, in 2010 it amounted to 25.8%, and in 2016 – 26.6%, the level of burden of farms from the first economic size class exceeded 7.6 and 5.9 times, respectively. In the structure of cost of external factors, the share of remuneration of employed persons was the highest, on average in the sample in 2010, it was 64.0%, and in 2015 – 60.9%. The second item were rents, the share of this cost amounted to 20.5% and 23.8%, respectively. The share of the costs of interest was the smallest in 2010, it amounted to 15.5%, and in 2015 – 15.3%.

Table 4

Costs and economic results of farms specialising in field crops in the research years

Specification		On average, in the sample	Economic size classes of farms, EUR thousand of SO					
			(1) 2 ≤ 8	(2) 8 ≤ 25	(3) 25 ≤ 50	(4) 50 ≤ 100	(5) 100 ≤ 500	(6) ≥ 500
2010								
Depreciation of fixed assets	EUR/ farm	4,240	2,102	3,532	7,388	12,888	28,134	112,842
Burden of depreciation cost on the production	%	16.9	26.0	20.6	16.2	15.8	11.8	8.0
Burden of the cost of external factors on the production	%	10.1	3.4	5.3	7.6	7.7	14.4	25.8
Burden of total costs on the production	%	82.7	88.6	77.3	73.7	77.1	83.0	100.5
The relation between gross margin and the value of production	%	67.4	72.1	71.4	68.5	64.9	63.8	60.6
The relation between gross value added without subsidies and intermediate consumption	%	75.7	61.9	90.3	98.6	84.4	73.7	46.4
The relation between gross value added without subsidies and production value		0.42	0.37	0.46	0.49	0.45	0.42	0.31
Total production value	EUR/ha of UAA	969	776	985	1,056	944	952	1249
Farm income without subsidies	EUR/farm	3,851	601	3,432	11,548	17,449	39,204	-31,529
	EUR/ha of UAA	148	58	197	267	201	157	-28
Subsidies to operations	EUR/farm	8,073	3,839	5,502	13,148	25,872	70,999	295,436
	EUR/ha of UAA	311	368	316	304	299	284	262
Farm income with subsidies	EUR/farm	11,924	4,440	8,934	24,696	43,321	110,203	263,907
	EUR/ha of UAA	459	426	514	572	500	441	234
	EUR/FWU	9,102	3,795	6,427	15,059	25,041	75,482	1,885,050
Parity income ratio[a]	%	140.5	58.6	99.2	232.5	386.6	1,165.5	29,105.6
2015								
Depreciation of fixed assets	EUR/farm	4,591	2,090	3,870	7,474	13,808	30,021	116,764
Burden of depreciation cost on the production	%	20.3	31.0	24.2	20.5	18.6	14.6	9.9
Burden of the cost of external factors on the production	%	10.2	4.5	6.2	7.4	8.3	13.4	26.6
Burden of total costs on the production	%	91.1	100.5	87.5	84.3	83.1	87.9	111.2
The relation between gross margin and the value of production	%	62.7	67.9	67.2	63.4	61.4	60.0	51.4
The relation between gross value added without subsidies and intermediate consumption	%	60.9	47.0	70.5	74.4	75.5	63.6	29.5
The relation between gross value added without subsidies and production value		0.37	0.31	0.40	0.42	0.42	0.38	0.22
Total production value	EUR/ha of UAA	1,043	782	990	1,121	1,174	1,127	1,278
Farm income without subsidies	EUR/farm	1,522	-346	1,592	5,222	12,222	22,276	-169,584
	EUR/ha of UAA	70	-40	99	161	193	122	-184
Subsidies to operations	EUR/farm	5,572	2,462	4,553	9,041	16,269	39,500	161,140
	EUR/ha of UAA	257	285	282	278	257	217	175
Farm income with subsidies	EUR/farm	7,094	2,116	6,145	14,263	28,491	61,776	-8,444
	EUR/ha of UAA	327	245	380	439	450	340	-9
	EUR/FWU	5,586	2,015	4,389	8,914	16,374	39,348	-52,775
Parity income ratio[a]	%	74.8	27.0	58.8	119.4	219.4	527.1	-707.0

[a] The relation between farm income with subsidies per family work unit (FWU) and the net salary in the national economy.

Source: as for Table 1.

Costs in the production process are an important decision element, and their level largely depends on the farmer. Information helpful in managing the production process can be obtained by referring the total costs to the value of production generated with their participation. The research results show that the cost-intensity of production was subject to large fluctuations. In 2010, it was ranging from 73.7% in the third class to 100.5% in the sixth class, and in 2015 it was within the range of 83.1-111.2%, respectively on the farms from the fourth and sixth class. This means that in both research years on farms from the sixth class, agricultural production was economically ineffective, total costs exceeded the value of generated production. A similar situation occurred also in 2015 on farms from the first class, the indicator determining the cost-intensity of production amounted to 100.5%. In 2015, market conditions of agricultural production unfavourable for producers contributed to this to some extent. The ratio of prices of agricultural products sold to goods and services purchased in 2010 was 110.1%, while in 2015 it was 98.8% (GUS, 2017a). Despite this, it is estimated that the management decisions taken by the manager and, consequently, the internal situation on the farms, had a greater impact. Production in agriculture is a complex process and the situation and development of farms, regardless of external conditions resulting from external impact on agriculture, are strongly influenced by internal factors resulting from the quality and manner of use of production potential, i.e. land, labour and capital resources.

While analysing the efficiency of functioning of farms specialising in field crops, research used the ratio of the gross margin in the value of production, i.e. the relation reflecting the efficiency at the production and technical level. This efficiency decreased with the increase in the economic size of farms. On farms from the first class it was the highest (in 2010 – 72.1%, in 2015 – 67.9%), and the lowest in those classified to the sixth class (in 2010 – 60.6%, in 2015 – 51.4%).

Referring the gross value added to the input of current assets measured by the value of intermediate consumption, it turned out that the profitability ratio of the above-mentioned input in 2010 was the most favourable on farms classified to the third class (98.6%), and in 2015 – fourth class (75.5%). However, on the economically strongest farms (class 6), the profitability of input of current assets was the lowest, in 2010 it amounted to 46.4%, and in 2015 – 29.5%.

The relation between gross value added (without subsidies) and total production value reflects the economic efficiency of production. On farms from the sixth economic size class, and, at the same time, the largest in terms of size, the economic efficiency of production was the lowest (similarly to production and technical efficiency). In 2010, in general a production unit generated 0.31 units of gross value added, and in 2015 – only 0.22 units. In 2010, farms from the third economic size class were in the most favourable situation – farmers obtained 0.49 units of gross value added from a unit of total production value. Whereas in 2015, farms from the third and fourth class were characterised by the highest economic efficiency – the indicator was the same, it amounted to 0.42. At this stage of concluding, it is clear that the economic efficiency of production did not increase along with the

utilised agricultural area (and at the same time the economic size of farms). On the largest farms in terms of size (sixth class), the economic efficiency of production was weaker than on farms with smaller area (i.e. from the first to fifth classes).

Income from the farm is an economic effect of the conducted activity, and the efficiency of production has a significant impact on its amount. Favourable production results do not always mean equally favourable economic results, if production is unprofitable, its increase will cause deterioration of the economic situation. That is why production efficiency is so important.

The results of research included in Table 4 show that the income from the farm without subsidies to operations in economic size classes from the first to the fifth was gradually increasing, while on farms from the sixth class a very strong decrease was recorded. In this group of farms in both research years, income without subsidies was negative, in 2010 the loss per farm amounted to EUR 31,529, and in 2015 to EUR 169,587. It should be added that in 2015, the loss was also suffered by farmers whose farms were qualified to the first economic size class (EUR 346 per farm). In both research years, the highest income from a farm without subsidies calculated per 1 ha of utilised agricultural area was obtained on farms from the third and fourth economic size class.

Subsidies recorded at the farm level have an impact on the amount of income, but its increase does not result from the improvement of agricultural production efficiency. The amount of subsidies per 1 ha of utilised agricultural area decreased along with the increase in the area of farms (and their economic strength). This is related to the criteria for granting subsidies and the fulfilment of specific requirements by the farms.

The farm income per 1 full-time family work unit (FWU) reflects the potential amount of payment for own labour input (i.e. of the farmer and family members). The comparison of this income with the parity income allows determining whether the payment for own labour was made at the level obtained by people employed in the national economy. Research showed that, on average in the sample in 2010, income with subsidies per 1 full-time worker exceeded the average net salary in the national economy 40.5%, while in 2015 it constituted only 74.8% of its level (in 2010, the parity income per 1 full-time worker amounted to EUR 6477, and in 2015 – EUR 7465).

The requirements of the parity farm were also met by units classified in 2010 to the economic size classes 3-6, and in 2015 – to classes 3-5. Farms from these classes supported by subsidies provided income which exceeded the average net salary in the economy. On the farms from the first and second economic size class, income per 1 family work unit in 2010 was 58.6% and 99.2%, respectively, and in 2015 – 27.0% and 58.8% of the average salary in the national economy. However, in 2015, on the economically strongest farms (class 6), the labour of the farmer and his family members remained unpaid. Despite support by subsidies, farm income calculated with subsidies was negative. However, due to subsidies, the loss decreased by 95%, it amounted to EUR 8,444 per farm, while without the support of subsidies – EUR 169,584 per farm. – Table 4.

The results of research show that despite support of subsidies, there are still agricultural holdings whose economic situation is generally not good. Income of the agricultural population is often lower than the average salary in the national economy, and sometimes farmers do not get a return on the involvement of own labour input at all.

Debt of farms

The ratio which reflects the relation between liabilities and the value of total assets was used to assess the debt of farms. Calculations indicate that the debt increased along with the increase in the economic size of farms. Entities from the first class were the least indebted, in 2010, the indicator was 0.9%, and in 2015 – 0.5%. Whereas the most indebted were the economically strongest entities, i.e. from the sixth class, the indicator which determines the share of liabilities in inancing the assets of farms in 2010 was 36.9%, and in 2015 – 27.0% (Table 5). However, the indebtedness of these farms did not exceed the limit value, i.e. 50% (Ziętara, 1998). Too large indebtedness can lead to many negative effects, *inter alia*, loss of financial liquidity of farms.

Table 5

Selected indicators characterising financial risk of farms specialising in field crops in the research years

Specification		On average, in the sample	Economic size classes of farms, EUR thousand of SO					
			(1) 2 ≤ 8	(2) 8 ≤ 25	(3) 25 ≤ 50	(4) 50 ≤ 100	(5) 100 ≤ 500	(6) ≥ 500
2010								
Degree of indebtedness of farms	%	7.4	0.9	3.3	6.9	11.9	15.7	36.9
Equity debt	%	8.0	0.9	3.4	7.4	13.6	18.6	58.6
Indebtedness structure indicator	%	70.5	63.8	71.4	73.5	78.8	73.6	56.9
2015								
Degree of indebtedness of farms	%	6.8	0.5	2.6	6.7	10.6	15.9	27.0
Equity debt	%	7.3	0.5	2.7	7.2	11.9	18.9	37.0
Indebtedness structure indicator	%	75.0	77.4	71.5	77.0	79.1	78.2	64.4

Source: as for Table 1.

An important aspect of the analysis of debt of farms is the equity debt ratio. Improper proportions between foreign capital and equity in financing the operations of farms may increase the likelihood of losing liquidity or even lead to insolvency. On farms from the sixth economic size class, equity debt was the highest, especially in 2010 when it amounted to 58.6% (in 2015 – 37.0%). Dependence on foreign funds may be a serious problem. In the case of difficulties with repayment of the loan, farmers risk not only the future of the farm, but also the very existence of the family.

The structure of liabilities in all groups of farms was dominated by long-term loans; in 2010, their share in liabilities was ranging between 56.9-78.8%, and in 2015 – 64.4-79.1%. In both research years, the lowest share of long-term loans was recorded on farms from the sixth class, and the highest share – from the fourth class. Long-term loans are generally used to finance investment projects, which indicates further development of farms. However, it should be noted that on the farms from the sixth economic size class, short-term loans also had a significant share in liabilities (in 2010 – 43.1%, and in 2015 – 35.6%). This means that the funds were used to finance the current activity of farms.

According to the literature, the components of foreign capital, especially those from the group of long-term liabilities, determine the level of financial independence of a company and thus affect the degree of its solvency. It is difficult to determine the exemplary level of safe long-term debt. It depends not only on the type of conducted economic activity, but also on the overall financial condition of the company or its development phase (Zelek, 2003). Usually, the desired long-term debt ratio is 0.5, while companies in which it exceeds 1 are considered seriously indebted (Wiśniewski and Skoczylas, 2002).

Final comments and conclusions

In Poland, farms specialising in field crops – compared to other agricultural types – constitute the largest group, therefore, their impact on the situation in the entire agriculture is significant. According to research by the Statistics Poland, the number of these farms in successive classes of economic size is gradually decreasing along with the increase in the economic size. This means that the classes of economically weaker farms are more numerous than economically stronger classes. The characteristics of farms specialising in field crops and classified by the economic size was done in 2010 and 2015. The obtained results allow formulating the following conclusions.

1. The utilised agricultural area and the share of leased land increased along with the increase in the economic size of farms. On farms from classes 1-5, the majority were own utilised agricultural areas, while in the sixth economic size class leased areas dominated, in 2010 their share was 62.5%, and in 2015 – 55.1%.

2. Labour resources, expressed in the number of annual work units (AWU) and the value of assets increased gradually along with the increase in the economic size. On farms from classes 1-5, total assets were dominated by fixed assets, in 2010, their share was ranging between 91.8-84.4%, and in 2015 – 93.3-87,0%. In contrast, on farms from the sixth class, the share of fixed assets was smaller, 51.8% and 62.6%, respectively.
3. The production intensity was higher on economically stronger farms. There was a positive correlation between the amount of direct costs, costs of external factors and total costs incurred per 1 ha of utilised agricultural area and economic strength, and thus the area of farms. The largest diversification resulting from the comparison of extreme values was noted in the case of the cost of external factors, in 2010 – 11.9-fold, and in 2015 – 9.7-fold.
4. The burden of the value of buildings on land (1 ha of UAA) in both research years was the largest on farms from the first economic size class, and was gradually decreasing in successive classes. Thereby, on farms from the sixth class compared to the first class, in 2010 it was 7.6 times lower, and in 2015 – 6.0 times.
5. Technical equipment of land (value of machinery and technical devices per 1 ha of UAA) in both research years was the greatest on farms from the fourth class, and the lowest in the sixth class – in 2010 it was by 63.5% lower, and in 2015 – by 73.0%.
6. Technical equipment of labour (value of machinery and technical devices per AWU) on economically stronger farms was larger. The results indicate that it was the lowest on farms from the first class, and in 2010 the highest in the fourth class, and in 2015 in the fifth class. While comparing farms from these classes, the advantage of the economically stronger ones in 2010 was 7.0-fold, and in 2015 – 9.3-fold. Technical equipment of labour was characterised by greater diversity – resulting from a comparison of extreme values – than the measure describing the "mechanisation rate" of land.
7. In both research years, on the economically strongest farms, i.e. from the sixth class, the cost-intensity of production was the highest. Consequently, total costs exceeded the value of generated production, which means that production was economically ineffective. In 2010, the indicator determining the cost-intensity of production was 100.5% and in 2015 – 111.2%. Farms classified in the first economic size class in 2015 were also in a similar situation (the indicator was 100.5%). In both research years, the cost-intensity of production was the lowest on farms from the third and fourth class, in 2010 the indicator was 73.7% and 77.1%, respectively, and in 2015 – 84.3% and 83.1%.
8. The burden of the cost of external factors on the production increased along with the increase in the economic size of farms. It was the highest on farms from the sixth class, in 2010 it was 25.8%, and in 2016 – 26.6%. Compared to the lowest burden of farms from the first economic size class, it was 7.6 and 5.9 times higher, respectively in the research years.

9. Production and technical efficiency as well as economic efficiency of production were the lowest on the economically strongest farms, i.e. from the sixth class. The first indicator reflects the share of gross margin in the value of production (in 2010 – 60.6%, and in 2015 – 51.4%), and the second indicator shows how many units of gross value added (without subsidies) farmers could get from a unit of total production value (in 2010 – 0.31, and in 2015 – 0.22).
10. The indicator determining the profitability of input of current assets was also the lowest on the economically strongest farms, in 2010 it amounted to 46.4%, and in 2015 – 29.5%. In 2010, this indicator was the most favourable on farms classified to the third class (98.6%), and in 2015 – to the fourth class (75.5%).
11. In 2015, compared to 2010, the income situation of farms specialising in field crops deteriorated. On average in the sample, income from the farm without subsidies to operations decreased by 60.5%, and with subsidies – by 40.5%. In both research years, income without subsidies in classes of economic size from the first to the fifth was gradually increasing, while on farms from the sixth class there was a strong decrease. As a consequence, farmers suffered a loss (income without subsidies was negative), but in 2015 it was 5.4 times greater than in the first research year. In 2010, the loss generated in the production process was covered by subsidies, and their surplus generated certain level of income, while in 2015 the loss was covered only in 95.0%. The income situation of farms in the third and fourth economic size class was relatively the best. This is proven by the highest income without subsidies per 1 ha of utilised agricultural area. In 2010, this income on farms from the third class amounted to EUR 267, and from the fourth class – EUR 201, while in 2015, EUR 161 and EUR 193, respectively.
12. In 2010, on average in the sample and in economic size classes 3-6, and in 2015 in classes 3-5, income from the farm with subsidies per 1 family work unit was higher than the average net salary in the national economy. The remaining farms from the research sample did not meet the requirements of the parity farm, which means that the labour of farmer and family members was partially paid or unpaid.
13. Their debt increased along with the increase in the economic size of farms. Entities from the sixth class were the most indebted, in 2010 the indicator showing the indebtedness was 36.9%, and in 2015 – 27.0%. On these farms, equity was the most heavily indebted (in 2010 – 58.6%, and in 2015 – 37.0%). In all groups of farms, the liabilities were dominated by long-term loans, but the lowest share was recorded on farms from the sixth class (in 2010 – 56.9%, and in 2015 – 64.4%). This means that significant funds were used to finance the current activity of farms.

To sum up, it should be stated that in terms of production efficiency, farms in the third and fourth economic size class definitely stand out. In these units, the cost-intensity of production was the lowest, while the production and technical efficiency, profitability of current assets and economic efficiency of production were at a high level. As a result, income from the farm without subsidies was realised and its amount per 1 ha of utilised agricultural area – in comparison to units from other economic size classes – was the highest. After taking into account subsidies, their share on the farm income (with subsidies) was the lowest, in 2010 in the third class it was 53.2%, and in the fourth class – 59.7%, while in 2015 – 63.4% and 57.1%, respectively. Support of subsidies for these farms was of the relatively lowest importance.

On the economically strongest farms, i.e. from the sixth economic size class, the indicators characterising production and technical efficiency, the profitability of input of current assets and the economic efficiency of production were the lowest. On these farms, costs exceeded the value of generated production, and as a result income without subsidies was negative. In 2010, subsidies fully covered the loss, and in 2015 only partially.

In the context of the obtained results, the situation of the economically strongest farms (class 6) in the coming years should be considered. A particular threat may be limitation or lack of lease and smaller subsidies. In the former case, one should expect lower revenues and considerably greater burden of the value of owned machinery and technical devices as well as the value of buildings and structures on the land. Research indicates that in the case of using only own land – in comparison to the situation occurring in the research years (i.e. the use of own and leased land) – the size of indicators describing the saturation of land by fixed assets in 2010 would be by 166.9% higher, and in 2015 – by 123.0%. This situation will imply an increase in the cost of maintaining fixed assets due to their irrational use, i.e. according to the efficiency and size of the production. If fixed assets are not used adequately to their effective productivity, the costs of their maintenance burden the farm, i.e. burden the volume of generated production, despite the fact that they did not generate any added value. This causes an increase in unit production costs and a decrease in profitability. A high rate of land saturation with capital is not always beneficial, it often leads to a deterioration of management efficiency.

The reduction of subsidies may also be very unfavourable for the economically strongest farms. Currently, considerable funds from the EU and the national budget are directed to agriculture and rural areas. However, this situation will not last forever, it is possible that in the future this support will be significantly limited. Both situations considered hypothetically will have a negative impact on the economic effects of these farms.

In the light of the results obtained, it is assessed that the improvement of the situation of farms classified to the sixth economic size class should be sought primarily in the improvement of the efficiency of management. Rational management decisions taken by farm managers as well as measures and mechanisms which determine changes stimulating the improvement of the effectiveness of agricultural production and labour productivity are particularly important.

References

Bocian, M., Cholewa, I., Tarasiuk, R. (2014). Współczynniki Standardowej Produkcji „2010" dla celów Wspólnotowej Typologii Gospodarstw Rolnych. Retrieved from: http://fadn.pl/wp-content/ uploads/2015/01/wspolczynniki_SO_2010.pdf (access date: 27.08.2018).

Bocian, M., Cholewa, I., Tarasiuk, R. (2017). Współczynniki Standardowej Produkcji „2013" dla celów Wspólnotowej Typologii Gospodarstw Rolnych. Retrieved from: http://fadn.pl/wp-content/ uploads/2018/01/wspolczynniki_SO_2013.pdf (access date: 27.08.2018).

Czyżewski, A., Henisz-Matuszczak, A. (2007). Sprawność ekonomiczna gospodarstw rolnych w wybranych regionach Unii Europejskiej i Polski. Próba oceny. *Folia Universitatis Agriculturae Stetinensis. Oeconomica, No. 254*(47), pp. 49-58.

Dabbert, S., Braun, J. (2012). *Landwirtschafliche Betriebslehre: Grundwissen Bachelor*. Auflage 3, Ulmer UTB: Stuttgart.

European Central Bank. Polish zloty (PLN). (2018). Retrieved from: https://www.ecb. EURpa.eu /stats/policy _and_exchange_rates/ EUR_reference_exchange_rates/html/ EURfxref-graph-pln.en.html (access date: 27.08.2018).

Farm Accountancy Data Network. (2018). Retrieved from: http://ec. eurpa.eu/agriculture/rica (access date: 11.04.2018).

Floriańczyk, Z., Mańko, S., Osuch, D., Płonka, R. (2014). *Wyniki standardowe 2013 uzyskane przez gospodarstwa rolne uczestniczące w Polskim FADN. Część I. Wyniki standardowe*. Retrieved from: http://fadn.pl/publikacje/wyniki-standardowe-2/wyniki-standardowe-srednie-wazone/? strona=2 (access date: 12.05.2018).

Goraj, L., Kulawik, J. (1995). *Analiza finansowa gospodarstw prowadzących rachunkowość rolną*. Warszawa: IERiGŻ.

Gorton, M., Davidova, pp. (2004). Farm productivity and efficiency in the CEE applicant countries: a synthesis of results. *Agricultural Economics*, No. 30, pp. 1-16.

GUS (2012). *Charakterystyka gospodarstw rolnych. Powszechny Spis Rolny 2010*. Warszawa: GUS.

GUS (2017a). C*harakterystyka gospodarstw rolnych w 2016 r*. Warszawa: GUS.

GUS (2017b). *Rolnictwo w 2016 r*. Warszawa: GUS.

Józwiak, W., Zieliński, M. (ed.). (2018). *Przedsiębiorstwo i gospodarstwo rolne wobec zmian klimatu i polityki rolnej (4)*. Monografie Programu Wieloletniego 2015-2019, No. 76. Warszawa: IERiGŻ-PIB.

Krasowicz, S., Oleszek, W., Horabik, J., Dębicki, R., Jankowiak, J., Stuczyński, T., Jadczyszyn, J. (2011). Racjonalne gospodarowanie środowiskiem glebowym Polski. *Polish Journal of Agronomy*, No. 7, pp. 43-58.

Kulawik, J. (ed.). (2013). Dopłaty bezpośrednie i dotacje budżetowe a finanse oraz funkcjonowanie gospodarstw i przedsiębiorstw rolniczych (3). Monografia Programu Wieloletniego 2011-2014, No. 82, Warszawa: IERiGŻ-PIB.

Łęczycki, K. (2005). Wybrane problemy klasyfikacji środków trwałych w gospodarstwie rolniczym. *Pamiętnik Puławski*, No. 139, pp. 105-112.

Nowak, E. (2008). *Analiza sprawozdań finansowych*. Warszawa: PWE.

Pollak, R. (1985). A transaction cost approach to families and households. *Journal of Economic Literature,* z. 23, No. 2, pp. 581-608.

Skarżyńska, A., Augustyńska-Grzymek, I., Abramczuk, Ł. (2014). The use of capital and condition of economically weak farms in the selected Central and Eastern European countries. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, No. 14*(2), pp. 285-296.

Smagacz, J., Kuś, J. (2010). Wpływ długotrwałego stosowania płodozmianów zbożowych na plonowanie zbóż oraz wybrane chemiczne właściwości gleby. *Fragmenta Agronomica* vol. 27, issue 4, pp. 119-134.

Waśniewski, T., Skoczylas, W. (2002). *Teoria i praktyka analizy finansowej w przedsiębiorstwie*. Warszawa: Fundacja Rozwoju Rachunkowości w Polsce.

Williamson, O. (1988). The logic of economic organization. *Journal of Law, Economics, and Organization*, vol. 4, issue 1, pp. 65-117.

Zelek, A. (2003). *Zarządzanie kryzysem w przedsiębiorstwie. Perspektywa strategiczna*. Warszawa: ORGMASZ.

Ziętara, W. (1998). *Ekonomika i organizacja przedsiębiorstwa rolniczego*. Warszawa: FAPA.

WIELKOŚĆ EKONOMICZNA A EFEKTYWNOŚĆ PRODUKCJI W GOSPODARSTWACH SPECJALIZUJĄCYCH SIĘ W UPRAWACH POLOWYCH W POLSCE

Abstrakt

W artykule przedstawiono wyniki ekonomiczne i efektywność produkcji w gospodarstwach specjalizujących się w uprawach polowych sklasyfikowanych według klas wielkości ekonomicznej. Do analizy wykorzystano dane FADN UE z 2010 i 2015 roku. Miarą oceny sytuacji ekonomicznej był dochód z gospodarstwa. Ocenę efektywności produkcji przeprowadzono na poziomie produkcyjno-technicznym, zbadano dochodowość nakładów środków obrotowych oraz kosztochłonność i sprawność ekonomiczną produkcji. Analizie poddano także zadłużenie gospodarstw.

Dochód z gospodarstwa bez dopłat do działalności operacyjnej w klasach wielkości ekonomicznej 1-5 sukcesywnie rósł, a w jednostkach z klasy szóstej nastąpił jego spadek, w efekcie dając wartość ujemną. W 2010 roku dopłaty pokryły stratę z produkcji i zapewniły określoną wysokość dochodu, natomiast w 2015 roku strata została pokryta tylko częściowo (w 95%). Najwyższy dochód bez dopłat na 1 ha użytków rolnych uzyskano w gospodarstwach z trzeciej i czwartej klasy wielkości ekonomicznej (w 2010 r. odpowiednio 267 i 201 EUR, a w 2015 roku – 161 i 193 EUR). Pod względem efektywności produkcji także wyróżniają się gospodarstwa z klasy trzeciej i czwartej, natomiast w gospodarstwach z klasy szóstej wskaźniki charakteryzujące efektywność były najniższe. Wraz ze wzrostem wielkości ekonomicznej gospodarstw zwiększało się ich zadłużenie. We wszystkich grupach w zobowiązaniach przeważały kredyty długoterminowe, ale najmniejszy ich udział stwierdzono w gospodarstwach z klasy szóstej. Oznacza to, że znaczne środki były przeznaczane na finansowanie bieżącej działalności tych gospodarstw.

Słowa kluczowe: gospodarstwa specjalizujące się w uprawach polowych, dochód z gospodarstwa, dochód parytetowy, efektywność, dopłaty.

Accepted for print: 15.03.2019.