

**ADJUSTMENT PROCESSES
IN SELECTED TYPES OF FARMS DEPENDING
ON THEIR INCOME SITUATION**

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Abstract

This article presents the development capacities of farms in groups divided according to the level of income from farm per unit of work of a farmer and farmer's family members. According to the income criterion, farms were separated into:

- *auxiliary in which income from the farm per hour of family work input in the owned farm was lower than the level of payment for employed labour in agriculture;*
- *transitional (“at the crossroads”) in which this income was higher than the level of payment for employed labour in agriculture, but lower than the rate of payment in the national economy;*
- *developmental in which this income was equal to or higher than the rate of payment for labour in the national economy.*

The analysis covered types of farms specialised in: field crops, permanent crops, vegetable crops, dairy cattle raising, granivores raising, and mixed production. The source of research materials was the panel of farms covered by the monitoring of the Polish FADN in 2009-2016. Groups were separated according to the FADN methodology. The development capacities of the analysed farm

groups were determined with the competitiveness index (CI). In the analysed period, the share of auxiliary farms was significant, ranging from 24.5% (dairy farms) to 43.1% (farms with mixed production). This share increased in subsequent periods. These farms did not have development capacities. The share of transitional farms was small, ranging from 8.5% (field crops) to 13% (with mixed production). Farms in this group also did not show developmental capacities. The share of developmental farms was quite varied, ranging from 44.4% (with mixed production) to 69% (with field crops). The applied criterion for the division of farms according to the level of income from farm per unit of work of a farmer and farmer's family members increases the possibilities of their analysis.

Keywords: agricultural holdings, income from farm, auxiliary, transitional and developmental farms, types of farming.

JEL codes: Q12, Q13, Q15.

Introduction

The integration of Poland with the European Union in 2004 increased the pace of economic changes initiated by the change in the political and economic system in 1989. The essence of the changes was the implementation of market economy principles. The introduction of the market system caused a diversification of the growth rate of prices of production factors and prices of products, including agricultural ones. Labour costs in the national economy were increasing the most significantly (wages are their main component), resulting in increased labour costs in agriculture. The increase in prices of means of production purchased by farmers was slightly weaker, and in the sales prices of agricultural products sold by farmers the least dynamic. This is illustrated by the following figures: in 1995-2016, labour costs in the national economy increased more than six times, prices of means of production more than three times, and sales prices of agricultural products more than two times (Runowski, 2018; Ziętara and Mirkowska, 2019). The diverse rate of price increase caused a decrease in the unit profitability of agricultural production. Farmers were subjected to strong pressure to increase production efficiency. The phenomenon of the so-called technology treadmill of W. Cochrane also occurred, according to which, despite an increase in agricultural productivity, farmers' incomes do not increase at the same pace, and even decrease (Czyżewski, 2017). One of the ways to increase production efficiency is specialisation of agricultural holdings, which is additionally forced by recipients of products, demanding large, uniform batches. Brinkmann already took note of this issue formulating the "force theory"¹ affecting farms (Brinkmann, 1922). The importance of specialisation in

¹ T. Brinkmann distinguished two types of forces: "Integrierte Kräfte" and "Diferenzierte Kräfte". The first type is the integrating force on the farm, forcing it to multilateral production in order to evenly and fully use the production factors. Whereas differentiating force occurs in the market environment and forces farms to specialise in production. Differentiating force currently plays a greater role.

improving the farming efficiency was also emphasised by Manteuffel who stated: “Specialisation is aimed at increasing the size of the basic activity, the one which defines the specialisation and thus increases the productivity of work in the activity determining specialisation” (Manteuffel, 1981, p. 160).

Therefore, the questions about specialisation processes in Polish agricultural holdings become valid. What directions of production are there? What is the degree of competitiveness of farms pursuing given directions of production?

In order to find answers, the systematics of farms used by the Polish FADN was used² (Bocian, Osuch and Smolik, 2018). For research purposes, the following types of farming (TF8) of holdings were identified: field crops (1), horticultural (vegetable) crops (2), permanent crops (4), dairy cattle raising (5), herbivores raising (6), granivores raising (7), and mixed productions (8). Vineyards, which are scarce in Poland and not included in the monitoring of the Polish FADN, have been omitted. Table 1 presents the number and structure of agricultural holdings in Poland in 2013-2016 by types of farming. Due to the lack of data, dairy cattle and herbivores are included in Table 1 as “raising of grazing animals.”

Table 1

Number and structure of farms by type of farming in 2013-2016

Years	Types of farming of holdings (number in thous. and structure in %)							
	Total	Field crops	Vegetable crops	Permanent crops	Grazing animals	Granivorous animals	Mixed productions	Unclassified
2013	1429.0	702.9	26.5	63.9	162.1	35.8	407.8	30.0
	100.0	49.2	1.9	4.5	11.3	2.5	28.5	2.1
2016	1410.7	797.4	26.1	58.1	154.5	32.5	317.9	24.2
	100.0	56.5	1.9	4.1	10.9	2.3	22.6	1.7
Economic size (thou. EUR SO/farm)								
2016	16.1	8.3	70.4	25.8	30.9	115.9	15.7	.
Area of the farm (ha UAA/farm)								
2016	9.4	8.6	5.6	6.2	16.0	11.8	8.5	3.0

Source: Statistics Poland, 2014; 2017.

The numbers presented in Table 1 allow the following statements:

- in 2013-2016, the total number of farms decreased by 18.3 thous. (1.3%), from 1429.0 thous. in 2013, to 1410.7 thous. in 2016;
- the number of unclassified farms and farms with mixed production decreased the most – by 19.3% and 22.0%, respectively. The number of farms in the “permanent crops” and “herbivorous animals” types decreased by 9.1% and 9.2%, respectively, while in the “horticultural (vegetable) crops” and “graz-

² FADN – Farm Accountancy Data Network.

- ing animals” types by 1.5% and 4.7%, respectively. However, the number of farms in the “field crops” type increased by 13.4%;
- the structure of farms changed. The share of farms in the “field crops” type dominated and increased in the studied years: from 49.2% to 56.5%. The share of farms in the “mixed” type was significant, and in extreme years amounted to 28.5% and 22.6%. The participation of the “vegetable crops,” “permanent crops,” “granivores” types and unclassified farms was stable or relatively stable, and amounted to 1.9%; 4.5% and 4.1%; 2.5% and 2.3% and 2.1% and 2.7%, respectively. The share of farms with “grazing animals” type was larger and quite stable. This share was 11.3% and 10.9%;
 - the economic size of farms in the specified types was expressed in thous. EUR of SO.³ The average economic size of farms in total in 2016 was 16.1 thous. EUR of SO. According to this criterion, the largest farms were those in the “granivorous” type (115.9 thous. EUR of SO) and with vegetable crops (70.4 thous. EUR of SO). Farms with raising of grazing animals and permanent crops were similar in terms of their economic size, where it amounted to 30.9 and 25.8 thous. EUR of SO, respectively. Farms with field crops and mixed production were the smallest – their average size was 8.3 and 15.7 thous. EUR of SO;
 - the degree of diversity of the area of farms in the separated agricultural types was definitely lower. In 2016, the average area of farms in total was 9.4 ha of utilised agricultural area. Farms raising grazing animals and granivorous animals were larger than the average with an area of 16.0 and 11.8 ha of UAA, respectively. The area of other farms was smaller than the average. Unclassified farms had the smallest area – 3.0 ha of UAA. It is worth emphasising the small area of farms in the “field crops” type which in 2016 was 8.6 ha. Over 50% of farms in this type was using less than 5 ha of UAA. They had the character of auxiliary farms (Józwiak, 2017).

Objective of research, research methods and sources of research materials

The objective of the study is to determine the development capacities of selected types of farming of agricultural holdings, taking into account the level of income obtained from farm per unit of work of a farmer and farmer’s family members on the owned farm. The research covered the following types of farming: field crops, dairy cattle, permanent (orchard) crops, horticultural (vegetable) crops and mixed production, in accordance with the methodology of the Polish FADN.⁴ The develop-

³ SO – Standard Output – standard production value expressed in thous. EUR, calculated as the average value of production from individual production activities over a period of five years in a given region. According to the economic size, six classes of farms were distinguished: very small (2-8 thous. EUR of SO), small (8-25 thous. EUR of SO), medium small (25-50 thous. EUR of SO), medium large (50-100 thous. EUR of SO), large (100-500 thous. EUR of SO) and very large (\geq 500 thous. EUR of SO) (Bocian, Osuch and Smolik, 2018).

⁴ Analysis within the “grazing” type covered “dairy cattle” as the basic type. The “granivorous” type was omitted as including poultry and pigs.

ment capacities of farms of the studied types of farming were determined according to the level of income from farm per unit of work of a farmer and farmer's family members. The full justification for such a classification of farms is presented in the article "The level of labour profitability and development opportunities of agricultural holdings in Poland" (Józwiak, Sobierajewska, Zieliński and Ziętara, 2019).

Calculation of income from farm per family work unit (man-hour, MH) makes it possible to assess its level by reference to the remuneration of employed labour in agriculture (income parity A) and in the national economy (income parity B). Considering the level of income from farm per unit of work of a farmer and farmer's family members on the farm, the studied entities were divided into three classes: auxiliary, transitional and developmental. "Auxiliary" farms are those in which income from farm per family work unit is lower than the payment for employed labour in agriculture, which means that the farmer does not achieve parity A. In this class, the share of income from farm was less than 50% of total income of a farming family (Józwiak, Mirkowska and Ziętara, 2018).

Due to the fact that a unit income obtained from the work on the farm is smaller than the level of parity A, the farmer is confronted with the problem of whether to continue running the farm or give up and try to take up a job as a hired worker. The possibilities for farmers using farms in this class to find work outside the farm are limited, although they have been growing recently. They depend on the qualifications and the condition of the economy in the immediate environment (Sikorska, 2013). A farmer who resigns from running a farm may take up a job as a hired worker at another farmer, accepting the level of remuneration of employed workers in agriculture (parity A). There is also a situation that a farming family receiving a unit income from work on the farm owned lower than the level of parity A does not give up running their farm, but its members undertake paid employment outside it as employed people, and at the same time the production is reorganised or modernised with support from the RDP (Józwiak, 2017). In the first case observed more frequently (Dudek, 2016), the production is simplified resulting in a reduction of labour input on the farm and an increase in agricultural income per unit of labour input. However, the income from farm is decreasing. The second case occurs less frequently (Dudek, 2016; Żmija, 2016), but results in an increase in income from farm.

In "transitional" farms "at the crossroads" the income from farm is higher than the level of parity A, but lower than parity B, whereas in "developmental" farms, the income from farm is equal to or higher than the level of parity B. A characteristic feature of the auxiliary class is that their number decreases over longer periods (Józwiak, 2017). Transitional farms (at the crossroads) have limited development capacities. Analysing the group of transitional farms in longer periods, it is hard not to see that its number is supplied by developing auxiliary farms, and the economically active part of transitional farms goes to the developmental group. The number of developmental farms usually increases year by year (Józwiak, 2017).

The panel of farms covered by the monitoring of the Polish FADN in 2009-2017 was used as the basic source of research materials. The panel includes 5471 farms, i.e. 45.6% of the population of farms covered by the monitoring of the Polish FADN every year. The study was carried out taking into account mean values from the following three-year periods: 2009-2011; 2012-2014 and 2015-2017. Three-year periods were adopted to avoid annual fluctuations. The number of farms in the analysed types and years including the economic size is given in Table 2. The distribution of the number of the studied farms was strongly asymmetrical. About 98.6% of farms were in the economic size classes from small (EUR 8-25 thous. of SO) to large (EUR 100-500 thous. of SO). The class of very small farms (EUR 2-8 thous. of SO) included 73 farms (1.3%), while the class of very large farms (EUR 500 thous. of SO and more) only 5 farms. Due to the small number, these extreme groups were excluded from the studied population. Ultimately, the population numbered 5,393 farms.

Farms with the mixed production type were the most numerous in the studied population. Their share was 36.9%. The share of farms with field crops and raising dairy cattle was slightly lower, and in the analysed period amounted to 27.0% and 21.3%, respectively. Farms with permanent and vegetable crops were the least numerous; their number was 180 and 164 farms, respectively, and their share was 3.3% and 3.0%, respectively. Small farms (up to EUR 25 thous. of SO), medium small (EUR 25-50 thous. of SO) and medium large (EUR 50-100 thous. of SO) were more strongly represented in all types analysed. The distribution of farms with vegetable crops was more even. In all types except for vegetable crops and mixed production, the number and share of large farms increased in subsequent periods.

Table 3 shows the unit payment for hired labour on farms by type of farming, the level of payment for work in the national economy and the interest rate on long-term bonds in 2009-2017. For the distinguished 3-year periods, the average payment for hired labour in agriculture and in the national economy was calculated per 1 hour of work of FWU.

Table 2

Changes in the number of studied farms by types of farming and economic size in 2009-2017

Types of farming	Years	Economic size classes of farms (thous. EUR SO)						Total
		2-8	8-25	25-50	50-100	100-500	>=500	
Field crops	2009-2011	7	322	394	351	199	2	1275
	2012-2014	18	392	429	357	229	2	1427
	2015-2017	49	392	454	409	258	3	1670
On average	2009-2017	24	404	426	373	228	2	1457
Dairy cattle	2009-2011	3	165	473	383	103	-	1127
	2012-2014	4	161	454	415	131	-	1165
	2015-2017	5	144	419	421	172	-	1161
On average	2009-2017	4	157	449	406	135	-	1151
Permanent crops	2009-2011	3	81	62	20	4	-	170
	2012-2014	3	86	60	25	6	-	180
	2015-2017	8	88	57	30	8	-	191
On average	2009-2017	4	85	60	25	6	-	180
Vegetable crops	2009-2011	1	34	33	50	47	-2	165
	2012-2014	1	34	33	46	49	4	165
	2015-2017	2	30	32	41	52	2	161
On average	2009-2017	2	30	33	45	49	2	164
Mixed	2009-2011	22	766	744	524	171	1	2228
	2012-2014	39	681	321	459	188	-1	1988
	2015-2017	44	564	505	417	192	1	1723
On average	2009-2017	39	674	626	467	184	1	1991

Source: Polish FADN 2009-2017.

Table 3

Payment for employed labour in agricultural holdings by types of farming in the national economy and interest rate on long-term bonds in 2009-2017

Farm types	Classes of farms by the level of income from farm (PLN/h) in periods		
	2009-2011	2012-2014	2015-2017
Field crops	8.47	9.42	13.48
Dairy cattle	8.97	10.19	13.18
Permanent (orchard) crops	8.19	8.62	11.98
Vegetable crops	8.54	9.39	12.05
Mixed	8.13	9.37	13.02
Payment for work in the national economy (PLN/h)	11.81	13.63	15.38
Interest rate on long-term bonds (%)	5.90	5.20	2.60

Source: own research.

The interest rate on 10-year bonds was also determined as the basis for determining the cost of using equity, being the basis for calculating the competitiveness index. The analysis of the costs of employed labour in agriculture indicates that in 2009-2017:

- in individual three-year periods, the lowest costs of employed labour were observed in orchard farms and were lower than the highest costs in the case of dairy farms by 9%, 15% and 9%, respectively;
- in the analysed periods, there was an increase in the cost of employed labour in the range of 40% to 60%; the largest in mixed farms and with field crops (60%), while smallest in vegetable farms (40%). Payment for work in the national economy increased 30% in this period;
- the difference between payment for employed labour in agriculture and payment for work in the national economy decreased. In the first three years (2009-2011), payment for employed labour in the studied types of farms was on average 28% lower, and in the last three years (2015-2017) 17% lower than payment in the national economy;
- the interest rate on 10-year bonds also decreased from 5.9% to 2.6%, i.e. by 3.3 percentage points.

The following indicators were included in the analysis of separated classes of farms: economic size of the farm (thous. SO), farm area (ha of UAA), share of leased land (%), labour input (AWU/farm), share of employed labour, technical equipment of labour (value of assets in thous. EUR/AWU), average payment for employed labour on farms (PLN/h), income from farm per family work unit (FWU) (PLN/h), income parity indicator (A), income parity indicator (B), competitiveness index (CI).⁵

Adjustment processes on farms with field crops

The numbers characterising changes that occurred on farms with field crops are presented in Tables 4 and 5. They allow the following statements:

- in the analysed periods, the structure of farms changed: the share of auxiliary farms increased from 17.7% to 32.2%, of transitional farms decreased from 9.1% to 3.9%. The share of developmental farms remained at a stable level of about 69.0%;
- the studied farms differed in economic size. The average economic size of auxiliary farms was EUR 24.7 thous. of SO and showed a downward trend in subsequent periods. The average size of transitional farms was EUR 28.6 thous. of SO. It showed an upward trend and was 16% larger than that of auxiliary farms. The average economic size of developmental farms was EUR 77.3 thous. of SO, it showed an upward trend and was about twice as large as that of auxiliary farms;

⁵ The competitiveness index (CI) was calculated as the quotient of income from farm and estimated costs of family work (according to the average net remuneration for work in the national economy), own land (according to the rate of lease rent) and equity (according to the interest rate of ten-year bonds) (Kleinhanss, 2015).

- the area of farms was related to the economic size. Their average area in subsequent groups was 23.5, 27.4 and 75.8 ha of UAA, respectively, and was stable;
- farms of all groups used leased land whose average share in subsequent groups increased from 23.7% to 34.9%;
- total labour input expressed in AWU per farm on auxiliary and transitional farms was similar and amounted to 1.68 AWU on average, while on developmental farms it was 19% higher (2 AWU);
- the studied farms used employed labour. Its share in total outlays of auxiliary and transitional farms was similar and amounted to 7.5% and 7.3%, respectively, while in developmental farms it was 19.1%;
- the analysed farms differed in technical equipment of labour. On auxiliary and transitional farms it was similar and amounted to 193.6 and 204.9 thous. EUR/UAA, respectively. However, on developmental farms it was more than twice as high and amounted to 434 thous. EUR/AWU;
- payment for employed labour showed an increasing tendency in subsequent periods and groups. It was the lowest on auxiliary farms, where it amounted to 9.44 PLN/h on average, on transitional farms it was about 6% higher, and on developmental farms it amounted to 10.6 PLN/h and was by 12.3% higher than on auxiliary farms;
- income from farm per hour of family work varied considerably. It was the lowest on auxiliary farms where it amounted to 5.3 PLN/h on average, and on transitional farms 12 PLN/h. So it was 126% higher than in the previous group. It was definitely higher on developmental farms where it amounted to 48.5 PLN/h. In all groups it showed a growing tendency in subsequent periods;
- the parity A and B indicators on auxiliary farms were 50.9% and 38.6%, respectively. This means that income from farm per hour of family work was significantly lower than parity income, by 49.1 and 61.3 percentage points, respectively. In the case of transitional farms, this income was higher than payment for employed labour in agriculture, on average by 16%, but lower than payment for work in the national economy by 12.7% on average. Income parity A and B indicators on developmental farms amounted to 360% and 324.2%, respectively;
- auxiliary and transitional farms did not have the ability to compete. Their competitiveness index was 0.35 and 0.74, respectively. Only developmental farms showed this ability, with the competitiveness index amounting to 1.77 on average.

Table 4

Features of farms with field crops in 2009-2017

Periods	Classes of farms		
	Auxiliary	Transitional	Developmental
Number/Structure of farms (%)			
2009-2011	226/17.7	116/9.1	933/72.2
2012-2014	238/16.6	178/12.5	1011/70.8
2015-2017	538/32.2	66/3.9	1066/63.9
Economic size of farms (thou. EUR SO)			
2009-2011	28.2	26.4	74.6
2012-2014	20.8	28.5	77.0
2015-2017	25.0	30.8	80.4
Utilised agricultural area (ha)			
2009-2011	26.1	25.6	73.5
2012-2014	20.6	25.2	76.6
2015-2017	23.9	31.5	77.3
The share of leased area (%)			
2009-2011	24.9	38.3	37.9
2012-2014	21.4	27.0	34.7
2015-2017	24.7	26.6	32.1
Labour input (AWU/farm)			
2009-2011	1.74	1.68	2.06
2012-2014	1.68	1.85	1.99
2015-2017	1.62	1.50	1.94
Share of employed labour (%)			
2009-2011	9.8	6.0	19.4
2012-2014	6.0	11.4	20.1
2015-2017	6.8	4.6	18.0
Technical equipment of labour (thous. EUR/AWU)			
2009-2011	205.6	166.5	377.6
2012-2014	175.0	179.1	452.1
2015-2017	200.3	269.2	472.5

Source: own research.

Table 5

Payment for employed labour, income from farm, income parity and competitiveness index on farms with field crops in 2009-2017

Periods	Classes of farms		
	Auxiliary	Transitional	Developmental
Payment for employed labour on farms (PLN/h)			
2009-2011	7.94	7.34	8.55
2012-2014	8.10	8.24	9.62
2015-2017	12.28	14.37	13.68
Income from farm (PLN/h)			
2009-2011	4.49	10.13	43.40
2012-2014	4.63	11.38	53.40
2015-2017	6.80	14.48	48.62
Indicator of parity A (%)			
2009-2011	53.0	119.6	321.9
2012-2014	49.1	120.8	396.1
2015-2017	50.5	107.4	360.7
Indicator of parity B (%)			
2009-2011	38.0	85.8	282.2
2012-2014	34.0	83.5	347.2
2015-2017	44.2	94.1	316.1
Competitiveness Index			
2009-2011	0.29	0.76	1.72
2012-2014	0.33	0.77	1.84
2015-2017	0.42	0.70	1.75

Source: own research.

Adjustment processes on farms specialising in dairy cattle

The numbers characterising changes in the organisation of dairy farms in the analysed periods are presented in Tables 6 and 7. Based on them, the following statements can be made:

- in the studied periods, the structure of the analysed dairy farms was quite stable. The average share of auxiliary farms was about 24.5%, showing a slight upward trend. The share of transitional farms was definitely lower, which was 10.3% on average, with a downward trend: from 12.9% to 6.4%. The share of developmental farms was by far the highest and stable, and amounted to 65.2% on average;

Table 6

Features of farms specialising in dairy cattle farming in 2009-2017

Periods	Classes of farms		
	Auxiliary	Transitional	Developmental
Number/structure of farms			
2009-2011	279/24.7	145/12.9	703/62.4
2012-2014	261/22.4	136/11.7	768/65.9
2015-2017	305/26.3	74/6.4	782/67.3
Economic size of farms (thou. EUR SO)			
2009-2011	29.3	37.3	67.2
2012-2014	29.8	34.4	74.5
2015-2017	33.0	40.6	78.7
Utilised agricultural area (ha)			
2009-2011	18.2	22.6	36.7
2012-2014	18.8	21.0	38.6
2015-2017	20.6	24.6	40.3
The share of leased area (%)			
2009-2011	25.8	28.3	30.0
2012-2014	26.6	24.3	31.3
2015-2017	27.2	24.4	31.8
Labour input (AWU/holding)			
2009-2011	1.87	1.97	2.07
2012-2014	1.87	1.94	2.12
2015-2017	1.87	2.00	2.10
Share of employed labour (%)			
2009-2011	1.0	1.0	6.8
2012-2014	1.0	1.0	7.5
2015-2017	2.1	1.5	6.2
Technical equipment of labour (thous. EUR/AWU)			
2009-2011	184.1	216.7	379.2
2012-2014	196.5	210.5	440.2
2015-2017	199.7	216.5	473.4

Source: own research.

- the economic size of farms showed an upward trend in all groups and periods. The average size of auxiliary farms was EUR 30.7 thous. of SO, while of transitional farms EUR 37.4 thous. of SO and was by 21.8% higher. The average economic size of developmental farms was EUR 73.5 thous. of SO and was by 139% higher than that of auxiliary farms;

- the area of the dairy farms studied was related to the economic size, but not as strongly as on farms with field crops. The average area of auxiliary dairy farms was 19.2 ha, and of transitional farms 22.7 ha of UAA, showing a growing tendency in subsequent periods. The average area of developmental dairy farms was 38.5 ha of UAA, with an increasing tendency. It was two times larger than the size of auxiliary farms;
- the analysed farms used leased land but to a fairly moderate extent. Its share was in the range of 25.7% (transitional) to 31% (developmental);
- labour inputs were stable over time and not very diverse between groups: on developmental farms they amounted to 2.1 AWU and were by 12% higher than on auxiliary farms. Auxiliary and transitional dairy farms made little use of employed labour (1.25%). The share of employed labour on developmental farms was slightly higher, at 6.8%;
- there were distinct differences in technical equipment of labour. On developmental farms, the value of assets per AWU was on average EUR 431 thous. and was twice as high as in both other groups;

Table 7

Payment for employed labour, income from farm, income parity and competitiveness index on farms with dairy cattle in 2009-2017

Periods	Classes of farms		
	Auxiliary	Transitional	Developmental
Payment for employed labour on farms (PLN/h)			
2009-2011	9.01	7.68	8.93
2012-2014	9.16	9.95	10.25
2015-2017	13.07	12.19	13.22
Income from farm (PLN/h)			
2009-2011	5.61	10.34	28.61
2012-2014	6.09	11.95	35.41
2015-2017	8.08	14.18	39.16
Indicator of parity A (%)			
2009-2011	62.5	115.3	318.9
2012-2014	59.8	117.3	347.5
2015-2017	61.3	107.6	297.1
Indicator of parity B (%)			
2009-2011	47.50	87.5	242.2
2012-2014	44.70	87.7	250.8
2015-2017	52.50	92.2	254.6
Competitiveness Index			
2009-2011	0.38	0.71	1.30
2012-2014	0.41	0.72	1.44
2015-2017	0.52	0.90	1.80

Source: own research.

- payment for employed labour showed a growing tendency in subsequent periods. The highest increase occurred in the case of transitional farms in which it was 58.7%, while in developmental farms 48%, and in auxiliary farms 45%. The diversification of payment between the groups was small. The difference between the extreme groups was 8.6%;
- income from farm per hour of family work (FWU) increased in subsequent periods, in the range of 36.9% (developmental farms) to 47% (auxiliary farms). There were distinct differences between the groups. On auxiliary farms, the income was on average 6.6 PLN/h, on temporary farms 12.1 PLN/h and on developmental farms 34.4 PLN/ha;
- the indicator of parity A in the periods was quite stable. It increased in subsequent groups. On average, on auxiliary farms it was 61.2%, on transitional farms 113.4%, and on developmental farms 321.2%. The indicator of parity B was lower in subsequent groups. On auxiliary farms it was 48%, on transitional farms 89.1%, and on developmental farms 249.2%;
- the value of the competitiveness index (CI) shows that auxiliary and transitional farms did not have the ability to compete. Their average value of the CI was 0.44 and 0.78, respectively, with an upward trend in subsequent periods. Developmental farms showed the ability to compete. The average value of the CI was 1.51, showing an upward trend, from 1.30 to 1.80.

Adjustment processes on farms with permanent crops

The numbers characterising changes occurring on farms with permanent crops are presented in Tables 8 and 9. They allow the following statements:

- the structure of the analysed orchard farms is polarised. Extreme groups occupy the dominant position. The average share of auxiliary farms was 39.5% and developmental farms 47.6%. There was an upward trend in the group of auxiliary farms, from 37.0% to 46.1%, and a downward trend in the group of developmental farms, from 50% to 44%. The average share of transitional farms was 12.8%, with a downward trend in subsequent periods, from 13.0% to 9.9%;
- the economic size of auxiliary and transitional farms was similar and amounted to EUR 25.3 and 26.9 thous. of SO, respectively, showing a downward trend in subsequent periods. The average economic size of developmental farms amounted to EUR 42.7 thous. of SO. It was stable in subsequent periods and by about 64% larger than that of farms from other groups;
- similar trends occurred in the UAA which on auxiliary and transitional farms amounted to 11 ha on average, while in developmental farms – 17.8 ha of UAA, and was by about 73% larger than in other groups. The area of farms in all groups was stable in subsequent periods;
- even though the analysed orchard farms used leased land, it was to a small extent – from 6.7% on auxiliary farms to 12.1% on transitional farms;
- labour input on auxiliary and transitional farms was similar, amounted to 2.3 and 2.5 AWU per farm, respectively, and showed a downward trend in subse-

quent periods. Labour input on developmental farms was 3.4 AWU on average and showed an upward trend. Farms of all groups used employed labour. Its share in total labour input of auxiliary and transitional farms was similar and amounted to 30.8% and 28.1%, respectively. On developmental farms it was definitely higher and quite stable, amounting to 52.3% on average;

- technical equipment of labour on auxiliary and transitional farms was similar and amounted to 187.9 and 172.2 thous. EUR/AWU, respectively, however on developmental farms it was by about 35% higher. In the first two groups of farms, there was a downward trend, while in developmental farms an upward trend;

Table 8

Features of farms with permanent (orchard) crops in 2009-2017

Periods	Classes of farms		
	Auxiliary	Transitional	Developmental
Number/Structure of farms (%)			
2009-2011	63/37.0	22/13.0	85/50.0
2012-2014	64/35.5	28/15.6	88/48.9
2015-2017	88/46.1	19/9.9	84/44.0
Economic size of farms (thou. EUR SO)			
2009-2011	26.8	27.0	41.6
2012-2014	24.7	28.0	41.8
2015-2017	24.3	25.8	44.8
Utilised agricultural area (ha)			
2009-2011	11.5	11.4	17.6
2012-2014	10.7	11.9	17.4
2015-2017	10.7	9.8	18.3
The share of leased area (%)			
2009-2011	7.0	11.1	15.3
2012-2014	6.5	10.9	6.3
2015-2017	6.7	14.3	7.1
Labour input (AWU/farm)			
2009-2011	2.52	2.65	3.08
2012-2014	2.36	2.77	3.65
2015-2017	1.89	2.14	3.35
Share of employed labour (%)			
2009-2011	36.9	28.7	50.6
2012-2014	34.3	31.0	56.4
2015-2017	21.2	25.7	49.9
Technical equipment of labour (thous. EUR/AWU)			
2009-2011	197.0	196.7	222.5
2012-2014	189.6	142.1	230.9
2015-2017	177.0	177.8	277.9

Source: own research.

Table 9

Payment for employed labour, income from farm, income parity and competitiveness index on farms with permanent crops in 2009-2017

Periods	Classes of farms		
	Auxiliary	Transitional	Developmental
Payment for employed labour on farms (PLN/h)			
2009-2011	7.80	8.46	8.33
2012-2014	8.51	8.32	8.64
2015-2017	12.06	11.36	12.0
Income from farm (PLN/h)			
2009-2011	2.0	10.12	32.07
2012-2014	3.2	11.10	35.55
2015-2017	5.0	13.29	42.40
Indicator of parity A (%)			
2009-2011	24.4	123.6	391.6
2012-2014	37.1	128.7	412.4
2015-2017	41.7	110.9	353.9
Indicator of parity B (%)			
2009-2011	16.9	85.7	271.5
2012-2014	23.5	81.4	260.8
2015-2017	32.5	86.4	275.7
Competitiveness Index			
2009-2011	0.11	0.54	1.38
2012-2014	0.18	0.80	2.40
2015-2017	0.40	0.89	1.98

Source: own research.

- the degree of diversification of payment for employed labour was low, ranging from PLN 9.4/h on transition farms to 9.7 PLN/h on developmental farms. There was an upward trend in all groups in subsequent periods, the largest on auxiliary farms in which this payment increased 54.6%, and the lowest on transitional farms in which it was 34.3%;
- income from farm per hour of family work varied considerably. It was the lowest on auxiliary farms with 3.4 PLN/h on average, and the highest on developmental farms with 36.7 PLN/h. In all groups, income increased in subsequent periods: the most on auxiliary farms in which it increased 150%, while on transition and development 31.3% and 32.2%, respectively. Income parity indicators varied strongly between groups of farms. On auxiliary farms, the values of indicators A and B were 34.4% and 24.3%, respectively. Transitional farms exceeded the parity A income, but did not reach the level of parity B income, whose indicator was 84.5%. Developmental farms received income much higher than parity A and B income;

- similarly to the previous types of farming, auxiliary and transitional farms do not have the ability to compete. Their competitiveness index (CI) was 0.23 and 0.74, respectively, with an upward trend in subsequent periods. The ability to compete was demonstrated by developmental farms.

Adjustment processes on farms with vegetable crops

The numbers characterising changes occurring on farms with vegetable crops are presented in Tables 10 and 11. They allow the following statements:

- the structure of these farms was dominated by developmental farms – their average share was 53.6%, and auxiliary farms with 37.3% share. The share of transitional farms was 9.2% on average. The structure of farms was stable in subsequent periods;
- the economic size of auxiliary and transitional farms was similar and amounted to 51.6 and 65.6 thous. EUR of SO, respectively. On auxiliary farms it was stable in subsequent periods, while on transitional farms it increased. The growth rate was 30.5%. The economic size of developmental farms was on average EUR 129 thous. of SO, showing an upward trend. The growth rate was 34.8%. It was about twice as large as on other farms;
- the area of auxiliary and transitional farms was similar, and amounted to 5.0 and 5.6 ha of UAA, respectively. The area of developmental farms was definitely larger – about 50%. It also increased in subsequent periods from 7 to 9 ha of UAA;
- the analysed vegetable farms used leased land. Its share in auxiliary and transitional farms was small and amounted to 8.3% and 6.5%, respectively. On developmental farms it was much higher, it amounted to 25.7%, showing an upward trend from 23.9% to 31.1%;
- total labour input varied – it was lower on auxiliary and transitional farms in which it amounted to 2.3 and 2.8 AWU, respectively. On developmental farms it was about two times larger. It amounted to 5.2 AWU;
- all the farms used employed labour. Its share in total input of auxiliary and transitional farms and amounted to 22.6% and 29.2%, respectively, while on developmental farms 66%, showing an upward trend from 62.1% to 68.7%;
- the degree of diversification in terms of technical equipment of labour was lower than in the previously discussed types of farms. On developmental farms, the rate of technical equipment of labour amounted to 207 thous. EUR/AWU and was 62.6% and 34.7% higher, respectively, than on auxiliary and transitional farms;

Table 10

Features of farms with vegetable crops in 2009-2017

Periods	Classes of farms		
	Auxiliary	Transitional	Developmental
Number/structure of farms (%)			
2009-2011	64/38.7	15/9.1	86/52.1
2012-2014	58/35.1	15/9.1	92/55.8
2015-2017	61/37.9	15/9.3	85/52.8
Economic size of farms (thou. EUR SO)			
2009-2011	53.0	59.0	110.0
2012-2014	47.3	60.9	128.7
2015-2017	54.4	77.	148.3
Utilised agricultural area (ha)			
2009-2011	5.4	5.5	7.0
2012-2014	5.3	3.9	7.7
2015-2017	4.2	7.4	9.0
The share of leased area (%)			
2009-2011	7.4	12.7	23.9
2012-2014	9.4	1.5	22.1
2015-2017	8.0	5.4	31.1
Labour input (AWU/farm)			
2009-2011	2.64	3.10	4.57
2012-2014	2.16	2.91	5.28
2015-2017	2.15	2.26	5.68
Share of employed labour (%)			
2009-2011	30.3	38.7	62.1
2012-2014	17.1	33.0	67.0
2015-2017	20.5	15.9	68.7
Technical equipment of labour (thous. EUR/AWU)			
2009-2011	130.9	133.4	209.6
2012-2014	117.9	173.9	197.0
2015-2017	133.0	153.8	214.5

Source: own research.

- the degree of diversification of payment for employed labour was small. It was always ranging from 9.4 to 10 PLN/h. In all groups it showed a growing tendency in subsequent periods. It increased the most considerably in auxiliary farms – 51%, and 40% in developmental farms;
- the degree of diversification of income from farm per hour of family work was large. On auxiliary farms it was 4.2 PLN/h on average, while on developmental farms 45.1 PLN/h. It showed an upward trend in subsequent periods. The income parity A and B indicator on auxiliary farms was low and amounted to 42.1% and 30.9%, respectively. On transition farms, the A indicator was 117.4%

and B indicator 85.7%. The parity A and B indicators on developmental farms were high, reaching 453.1% and 331.8%, respectively;

- values of competitiveness indices indicate that auxiliary and transitional farms do not have the ability to compete. Such abilities are demonstrated by developmental farms in which in the first two periods the CI was 1.79 and 1.87, respectively, while in the third period 2.51, indicating full competitiveness of this group of farms.

Table 11

Payment for employed labour, income from farm, income parity and competitiveness index on farms with vegetable crops in 2009-2017

Periods	Classes of farms		
	Auxiliary	Transitional	Developmental
Payment for employed labour on farms (PLN/h)			
2009-2011	8.03	9.35	8.59
2012-2014	8.71	7.99	9.50
2015-2017	12.12	11.00	12.05
Income from farm (PLN/h)			
2009-2011	3.66	10.16	40.51
2012-2014	3.70	11.44	43.10
2015-2017	5.30	13.43	51.70
Indicator of parity A (%)			
2009-2011	42.8	119.0	474.3
2012-2014	39.4	121.8	456.0
2015-2017	44.0	111.4	429.0
Indicator of parity B (%)			
2009-2011	31.0	86.0	343.0
2012-2014	27.1	83.9	316.2
2015-2017	34.5	87.3	336.1
Competitiveness Index			
2009-2011	0.24	0.62	1.79
2012-2014	0.28	0.74	1.87
2015-2017	0.37	0.97	2.51

Source: own research.

Adjustment processes on farms with mixed production

The numbers characterising changes on “mixed” type of farms are presented in Tables 12 and 13. They allow the following statements to be made:

- the structure of mixed farms was dominated by auxiliary and developmental farms. Their average share was 43.1% and 44%, respectively. In the analysed period, the share of auxiliary farms showed an increasing tendency, while the share of developmental farms a decreasing tendency. The share of transitional farms was 13%. It showed a downward trend from 16.3% to 7.2%;

Table 12

Features of mixed-production farms in 2009-2017

Periods	Classes of farms		
	Auxiliary	Transitional	Developmental
Number/Structure of holdings (%)			
2009-2011	843/37.8	363/16.3	1022/45.8
2012-2014	812/40.9	303/15.2	873/43.9
2015-2017	872/50.6	125/7.2	726/42.2
Economic size of farms (thou. EUR SO)			
2009-2011	22.1	34.8	68.6
2012-2014	23.4	36.4	73.9
2015-2017	26.8	39.3	81.1
Utilised agricultural area (ha)			
2009-2011	15.5	21.6	41.0
2012-2014	16.7	24.3	44.6
2015-2017	18.8	27.0	47.9
The share of leased area (%)			
2009-2011	19.4	22.2	28.0
2012-2014	21.0	26.7	29.1
2015-2017	22.3	24.8	29.6
Labour input (AWU/holding)			
2009-2011	1.68	1.82	2.00
2012-2014	1.71	1.79	2.04
2015-2017	1.68	1.68	1.96
Share of employed labour (%)			
2009-2011	1.8	2.7	11.5
2012-2014	2.9	2.2	11.8
2015-2017	1.2	1.2	7.1
Technical equipment of labour (thous. EUR/AWU)			
2009-2011	154.9	187.1	322.4
2012-2014	164.2	203.0	371.8
2015-2017	173.6	222.6	395.2

Source: own research.

- the analysed groups of farms differed in economic size. According to this criterion, auxiliary farms were the smallest. On average, their size was EUR 24.1 thous. of SO. Transitional farms were by about 53% larger. Developmental farms were about three times larger than auxiliary farms. In all groups, the economic size of farms increased in subsequent periods;
- similar relationships occurred in the UAA. The area of auxiliary farms was 17 ha, while in the case of developmental farms 44.5 ha. It was over 2.6 times larger than that of auxiliary farms and 1.8 times larger than that of transitional farms. In all groups, the area of farms increased in subsequent periods;

- farms of all groups used leased land whose share was ranging from 21% (auxiliary farms) to 29% (developmental farms);
- the degree of diversification of labour input was not large, the area of variation did not exceed 20%. On auxiliary farms it amounted to 1.69, and on developmental farms 2 AWU/farm. On transition and developmental farms there was a downward trend in subsequent periods;
- mixed farms used employed labour to a small extent. Its share in total labour input on auxiliary and transitional farms did not exceed 2%. On developmental farms it was larger and amounted to 10%;
- the analysed farms differed in technical equipment of labour. It was the smallest on auxiliary farms. Their value of assets amounted to 164.2 thous. EUR/AWU. On transitional farms it was 24% larger and on developmental farms 121% larger. In all groups, the level of technical equipment of labour increased in subsequent years;

Table 13

Payment for employed labour, income from farm, income parity and competitiveness index on mixed-production farms in 2009-2017

Periods	Classes of farms		
	Auxiliary	Transitional	Developmental
Payment for employed labour on farms (PLN/h)			
2009-2011	7.67	7.68	8.22
2012-2014	8.48	8.87	9.60
2015-2017	12.47	11.69	13.15
Income from farm (PLN/h)			
2009-2011	4.42	9.92	26.66
2012-2014	4.57	11.25	32.10
2015-2017	6.47	14.11	32.75
Indicator of parity A (%)			
2009-2011	54.4	122.0	327.9
2012-2014	48.7	120.0	342.6
2015-2017	49.7	108.4	251.5
Indicator of parity B (%)			
2009-2011	37.4	84.0	225.7
2012-2014	33.5	82.5	235.5
2015-2017	42.07	91.7	212.9
Competitiveness Index			
2009-2011	0.36	0.71	1.31
2012-2014	0.35	0.73	1.37
2015-2017	0.42	0.89	1.48

Source: own research.

- the degree of diversification of payment for employed labour was small. The area of variation was about 8%. The payment was the lowest in auxiliary farms, and the highest in developmental farms, where it amounted to 10.3 PLN/h. There was an upward trend in all groups of farms. Labour costs increased the most, i.e. about 63%, on auxiliary farms and the least on transitional farms – about 52%;
- income from farm per hour of family work varied considerably. On average, on auxiliary farms it amounted to 5.15 PLN/h. On transitional farms it was by 129% larger and on developmental farms by about 500% larger;
- income parity A and B indicators on auxiliary farms were low and amounted to 50.9% and 37.6%, respectively. Transitional farms obtained parity A income, while the parity B income indicator was 86.1%. Developmental farms received income three times exceeding parity A and twice parity B;
- auxiliary and transitional farms did not have the ability to compete. Their CI was 0.38 and 0.78, respectively. Developmental farms, in which the CI was 1.39, were able to compete. In all groups, the value of the CI showed an upward trend.

Summary and conclusions

In 2013, the Central Statistical Office in Poland changed the definition of an agricultural holding, and this precluded a retrospective analysis of the characterised phenomenon using mass statistics materials over long-term. Materials covering the period from 2013 to 2016 indicate that the number of farms decreased by 1.3%. Therefore, the process of concentration of production on the functioning agricultural holdings could occur. The number of farms with mixed production but also specialised in vegetable and orchard production, raising of grazing animals and fed with concentrated feed (granivores) decreased, but at the same time the number of farms with field crops increased. As a result, the share of farms with specialised production increased to 75.7% (by 6.3 percentage points).

The structure of farms by types of farming also changed. Farms specialised in field crops maintained their dominant position. Despite a decrease, the share of farms with mixed production was still significant. The share of farms with grazing animals and orchard farms was relatively stable. The share of vegetable farms, farms with granivorous and unclassified farms was quite stable but low.

The research, using the results of monitoring of Polish FADN for 2007-2017, allows the following conclusions.

1. The share of auxiliary farms in individual types of farming was significant. It was ranging from 24.5% (farms with dairy cattle) to 43.1% (farms with mixed production). In all types it increased in subsequent periods. The average economic size of this group included the range from EUR 24.1 thous. of SO (mixed) to EUR 51.6 thous. of SO (vegetable). The average area of farms with field crops, dairy cattle and with mixed production was 23.5, 19.2 and 17 ha of UAA, respectively. The area of orchard and vegetable farms was 5 and 11 ha of UAA, respectively. Farms in this group did not achieve income parity in relation to

payment for employed labour in agriculture (parity A) and payment in the national economy (parity B). The parity A indicator was in the range of 34.4% (orchard) to 61.29% (dairy cattle). The parity B indicator was lower, ranging from 24.3% (orchard) to 48% (dairy cattle). Auxiliary farms of all types did not have the ability to compete. The CI was low, in the range of 0.23 (orchard) to 0.47 (dairy cattle).

2. The share of transitional farms in individual types of farming was small, in the range of 8.5% (field crops) to 13% (mixed). There was a downward trend in all types, the strongest in the mixed production type, from 16% to 7.2%. The average economic size of this group of farms was in the range of EUR 26.9 thous. of SO (orchard) to EUR 65.7 thous. of SO (vegetable) and was larger than that of auxiliary farms by 25% on average. The area of transitional farms: with field crops, dairy and mixed was similar, in the range of 22.7 ha (dairy) to 27.4 ha (with field crops). All farms in this group received income higher than parity A. The indicator of this parity was ranging from 113.4% (dairy) to 121.1% (orchard). However, they did not achieve income at the parity B level. The indicator was ranging from 84.5% (orchard) to 87.8% (field crops). Transitional farms did not have the ability to compete: the competitiveness index was in the range of 0.74 to 0.78.
3. The share of developmental farms in individual types was diverse but significant, ranging from 44.4% (mixed) to 69% (with field crops). The average economic size of this group varied, ranging from EUR 42.7 thous. of SO (mixed) to EUR 129 thous. of SO (vegetable). The area also varied. The largest in this respect were farms with field crops, the area of which was 75.8 ha of UAA. Dairy and mixed farms used on average 38.5 and 44.5 ha of UAA. Orchard and vegetable farms were definitely smaller in terms of area, 17.8 and 7.8 ha of UAA, respectively. All farms in this group had an income exceeding parity A (more than three times) and B income (more than twice). Farms of this group showed the ability to compete in all periods, while orchard farms in 2012-2014 and vegetable farms in 2015-2017 were fully competitive. Their competitiveness index was 2.4 and 2.5, respectively.
4. Application of the criterion of the level of income from farm per unit of work of a farmer (and farmer's family members) compared to payment for employed labour in agriculture and wages in the national economy to the classification of farms in terms of their nature is justified. The division of farms according to this criterion into auxiliary, transitional and developmental allows for an in-depth analysis from the point of view of agricultural policy. The area criterion does not lose its significance from the point of view of organisation of farms, however it is of little use from an economic and social point of view.

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PROCESY DOSTOSOWAWCZE W WYBRANYCH TYPACH GOSPODARSTW ROLNYCH W ZALEŻNOŚCI OD ICH SYTUACJI DOCHODOWEJ

Abstrakt

W artykule przedstawiono możliwości rozwojowe gospodarstw w grupach wydzielonych według poziomu dochodu z gospodarstwa w przeliczeniu na jednostkę nakładów pracy własnej rolnika i członków jego rodziny oraz według typów rolniczych. Według kryterium dochodu wydzielono gospodarstwa:

- *pomocnicze, w których dochód z gospodarstwa w przeliczeniu na godzinę nakładu pracy własnej rodziny rolniczej w posiadanym gospodarstwie był niższy od stawki opłaty pracy najemnej w rolnictwie;*
- *przejściowe (na rozdrożu), w których dochód ów był wyższy od stawki opłaty pracy najemnej w rolnictwie, ale niższy od stawki opłaty w gospodarce narodowej;*
- *rozwojowe, w których dochód ten był równy lub wyższy stawce opłaty pracy w gospodarce narodowej.*

Analizą objęto typy gospodarstw wyspecjalizowanych w: uprawach polowych, uprawach trwałych, uprawach warzywniczych, chowie krów mlecznych, chowie zwierząt ziarnożernych i z produkcją mieszaną. Źródłem materiałów badawczych był panel gospodarstw objętych monitoringiem Polskiego FADN w latach 2009-2016. Grupy wydzielono zgodnie z metodyką FADN. Możliwości rozwojowe analizowanych grup gospodarstw określono wskaźnikiem konkurencyjności (Wk). W analizowanym okresie znaczący był udział gospodarstw pomocniczych, zawarty w przedziale od 24,5% (gospodarstwa mleczne) do 43,1% (gospodarstwa z produkcją mieszaną). Udział ten zwiększał się w kolejnych okresach. Gospodarstwa te nie miały zdolności rozwojowych. Udział gospodarstw przejściowych był niewielki, mieścił się w przedziale od 8,5% (uprawy polowe) do 13% (z produkcją mieszaną). Gospodarstwa tej grupy również nie wykazywały zdolności rozwojowych. Udział gospodarstw rozwojowych był dość zróżnicowany, zawarty w przedziale od 44,4% (z produkcją mieszaną) do 69% (z uprawami polowymi). Zastosowane kryterium podziału gospodarstw według poziomu dochodu z gospodarstwa na jednostkę nakładów pracy własnej rolnika i członków jego rodziny zwiększa możliwości ich analizy.

Słowa kluczowe: gospodarstwa rolne, dochód z gospodarstwa, gospodarstwa pomocnicze, przejściowe i rozwojowe, typy rolnicze.

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