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Economic results of selected agricultural products in 2005–2008

Aldona Skarżyńska

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The report is a part of the research topic
Calculation of gross margins for selected agricultural products and classification of agricultural holdings according to EU standards

The aim was to assess the economic results of selected agricultural products. The surveys conducted allowed to show the trends of production costs, income from activity and the degree of remuneration of family labour inputs in the last few years. It was important to examine the differentiation of the results obtained in groups of farms, i.e. the best, the average and the weakest holdings. The determinants of the value of agricultural production and agricultural income were identified, and the relationship between specific costs and total costs as well as between the gross margin and income from activity was analysed.

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I. Introduction

The report represents a synthesis of the results of the surveys of conventional farms conducted in 2005–2008, under the research topic "Calculation of gross margins for selected agricultural products and classification of agricultural holdings according to EU standards", implemented at the IERiGŻ-PIB (Institute of Agricultural and Food Economics – National Research Institute) within the framework of the Multiannual Programme "Economic and Social Conditions of the Development of the Polish Food Economy Following Poland's Accession to the European Union". The programme was established by Resolution of the Council of Ministers No 126/2004 of 18 May 2004 and was realised by IERiGŻ-PIB until 2009.

The schedule under the research topic included the collection of source data for selected activities in crop and livestock production as well as the evaluation of the production and economic results. The main selection criterion was the economic importance of a specific activity. The gathered data constituted the basis for the cost and income accounts, and one of data sources used for the calculation of parameters necessary to classify farms according to the EU rules and to select a representative sample of agricultural holdings.

Therefore, from a methodological point of view, it was justified to survey agricultural production activities of farms purposefully chosen from the representative sample. At the same time, those farms were also in the field of observation of the Polish FADN.

Empirical data on farm activities were collected and processed according to the rules of the Agricultural Products Data Collection System (*System Zbierania Danych o Produktach Rolniczych*) referred to as the AGROKOSZTY system. The survey covered farms located across Poland and engaged in the activities selected for activity surveys. They rank among the economically strongest agricultural holdings, with output above the national average for family farms. For this reason, the results obtained should not be directly translated into national average results. The average results for the surveyed sample of farms are influenced by its structure in terms of production of particular activities and performance of individual holdings. Multiannual surveys indicate, however, that the calculations carried out provide a reliable picture of the income situation in groups of farms, correctly reflect cost trends and can be used to examine interrelations between production profitability and its main determinants.

In the comparative analyses presented in this report, the economic results are measured by the level of income from the activity in question. According to the methodology adopted, it means the value of production less specific and indirect costs, plus subsidies on specific production. The results obtained should be also interpreted in the context of the remuneration of the factors of production, and labour, defined as human physical or mental effort put into the production of goods, is recognised as the main factor. Hence, the report contains information on the degree of labour remuneration.

The numerical description of the selected production activities surveyed in 2005–2008 (i.e. the production of sugar beet, potatoes for human consumption, winter and spring wheat, oats, winter rye, winter rape, pigs for slaughter and dairy cows) was presented in the following breakdown:

- in farms recurring in the survey years,
- in the best, the average and the weakest farms, categorised within the sample according to the quartile method, with the criterion of the gross margin without subsidies from the surveyed activities.

The main objective of the analysis was to demonstrate the trends of production costs, income from activity and the degree of remuneration of family labour over the last few years (i.e. 2005–2008). An important goal was to examine the degree of differentiation of the production and economic results of the surveyed activities between groups of agricultural holdings, i.e. the best, the average and the weakest farms. Thus, the analysis identified factors determining the value of production and the examined categories of income, as well as the degree of the relationship between specific costs and total costs, and between the gross margin and income from activity.

The report also evaluates the role of financial aid in the form of subsidies, the use of production inputs and profitability, significantly affected by production results, relative prices between crop and livestock products and by prices for agricultural inputs. The results reflect changes in external conditions for farming as well as showing the influence of the farmers on the results obtained and the productivity of production factors.

The report presents a number of tables with a rich numerical content which may additionally serve the Reader to perform an independent analysis, depending on the scope of interests.

II. Production and market conditions in agriculture in 2005–2008

The period in question, i.e. 2005–2008, witnessed significant changes in the external conditions for agricultural production, both in economic and climatic terms (Tables II.1 to II.4).

As compared to 2004, in 2005 there was a collapse in agricultural production and a deterioration in economic performance. Total output dropped by 2.5% and stemmed from a considerable fall in crop production (by 8.9%), since livestock production went up in comparison with 2004 (by 5.4%). The year 2005 saw unfavourable production and price conditions for agricultural producers. Relative prices between products sold by family farmers and goods and services purchased by them, i.e. the so-called "price scissors" index, showed a decline on the previous year, down to 96.0%.

Table II.1

Yield of main crops in family farms and annual changes in 2004-2008

Specification	2004	2005	2006	2007	2008	2005/2004	2006/2005	2007/2006	2008/2007
						previous year = 100			
Winter wheat	40.4	37.5	31.4	38.6	39.7	92.8	83.7	122.9	102.8
Spring wheat	33.9	30.5	24.4	31.2	28.6	90,0	80,0	127.9	91.7
Rye	26.8	23.6	19.5	23.7	23.9	88.1	82.6	121.5	100.8
Spring barley	33.5	30.4	24.3	31.4	27.9	90.7	79.9	129.2	88.9
Oats	27.2	24.4	19.1	25.1	23,0	89.7	78.3	131.4	91.6
Winter triticale	34.6	32.2	26.8	33.6	33.7	93.1	83.2	125.4	100.3
Grain maize	56.5	55,0	40.2	63.3	56.5	97.3	73.1	157.5	89.3
Winter rape	28.0	24.4	25.2	25.7	26.2	87.1	103.3	102,0	101.9
Potatoes	193	174	147	204	187	90.2	84.5	138.8	91.7
Sugar beet	426	410	435	503	467	96.2	106.1	115.6	92.8

Source: GUS data.

The year 2006 saw a minor improvement in the economic conditions for farming. The price index for agricultural products (102.6%) exceeded that of agricultural inputs (100.6%) purchased by family farms, which resulted in more advantageous relative prices than in the previous year (102.0%). Regrettably, the production results in agriculture deteriorated in comparison with 2005. 2006 was the second year in a row to witness a decrease in total agricultural output (by 1.4%). As a year before, this fall was determined by a considerable decrease in crop production (by 5.5%) and mostly resulted from unfavourable agrometeorological conditions. Livestock production increased by 2.5% on 2005.

Table II.2

Purchasing prices for basic agricultural products and annual changes in 2004-2008

Specification	2004	2005	2006	2007	2008	2005/2004	2006/2005	2007/2006	2008/2007
	Crop production, PLN/dt					previous year = 100			
Wheat	47.19	36.69	44.76	70.68	64.24	77.7	122.0	157.9	90.9
Rye	35.17	27.64	38.52	60.21	51.65	78.6	139.4	156.3	85.8
Barley	48.91	37.34	40.24	64.11	64.37	76.3	107.8	159.3	100.4
Oats and mixed grains	37.59	29.15	34.85	52.83	50.34	77.5	119.6	151.6	95.3
Triticale	41.45	30.85	36.88	61.11	52.9	74.4	119.5	165.7	86.6
Maize	44.18	35.12	44.75	65.93	52.79	79.5	127.4	147.3	80.1
Industrial rape and turnip rape	86.47	77.33	93.44	95.66	126.77	89.4	120.8	102.4	132.5
Potatoes for human consumption	33.09	37.05	43.54	40.67	39.08	112.0	117.5	93.4	96.1
Sugar beet	18.7	17.53	12.88	10.83	10.37	93.7	73.5	84.1	95.8
	Livestock production								
Cow milk, PLN/litre	0.87	0.93	0.93	1.07	1.02	106.9	100.0	115.1	95.3
Animals for slaughter, PLN/kg									
cattle, excluding calves	3.39	4.05	4.04	3.94	4.03	119.5	99.8	97.5	102.3
pigs	4.18	3.82	3.56	3.46	4.01	91.4	93.2	97.2	115.9
poultry	3.27	3.14	2.76	3.52	3.46	96.0	87.9	127.5	98.3

Source: GUS data.

Table II.3

Indexes of retail prices for agricultural inputs in 2005-2008

Specification	2005	2006	2007	2008
	previous year = 100			
Seed for sowing, young trees, planting stock, etc.	95.4	110.1	132.8	103.0
Mineral or chemical and calcium fertilisers	107.9	100.4	106.6	138.4
of which nitrogenous	108.9	100.4	108.4	128.9
phosphates	101.8	98.4	106.4	155.9
calcium	103.7	101.9	103.2	108.8
Crop protection products	101.7	100.8	101.1	109.9
Breeding animals and fowl	107.6	102.9	102.3	104.1
Animal feedingstuffs	90.4	99.1	116.2	114.5
Agricultural machinery and tools	110.6	102.2	103.1	102.9
Building materials	104.9	100.9	113.0	105.0
Fuels, oils and lubricants (including coal)	107.7	99.6	104.2	107.2
Machinery for agricultural and horticultural production	105.1	104.0	103.9	111.4
Veterinary services	102.3	101.4	101.2	103.1

Source: GUS data.

In comparison with the previous two years, in 2007 there was a marked improvement in the income situation of farmers. Market conditions were favourable for agriculture, prices for products sold by family farms rose at a rate of 14.5%, i.e. more than twice as fast as those for goods and services purchased (6.3%). As a consequence, the relative price index was 107.7%, the most advantageous level in thirteen years, i.e. from 1995. Following two years of decreasing agricultural output, in 2007 very good production results were recorded. In most regions, the temperature and humidity conditions were favourable for yields and had a crucial impact on production. As compared to the previous year, total agricultural output went up by 6.1%, with a rather high growth rate of crop production, at 9.5%, whereas livestock production increased by 2.6%.

Table II.4

Price indexes for agricultural products sold and for goods and services purchased by family farms in 2004-2008

Specification	2004	2005	2006	2007	2008
Agricultural products sold:	**111.4**	**97.9**	**102.6**	**114.5**	**101.2**
crop products	93.1	94.8	114.7	125.1	94.8
livestock products	122.3	99.7	96.7	108.4	104.9
Goods and services purchased:	**108.6**	**102.0**	**100.6**	**106.3**	**111.2**
for consumption	104.1	102.1	100.5	102.2	104.4
for current agricultural production	108.9	101.8	100.5	106.9	112.8
for investment purposes	110.9	106.8	101.9	106.1	105.3
Relative prices ("price scissors" index) between agricultural products sold and goods and services purchased	**102.6**	**96.0**	**102.0**	**107.7**	**91.0**

Source: GUS data.

In 2008 the farming conditions deteriorated again. As compared to 2007, prices for products sold by family farms merely rose by an average of 1.2%, whereas those for goods and services purchased increased by 11.2%. As a consequence, the relative price index (“price scissors”), after having grown to a level favourable for agriculture in 2007 (107.7%), in 2008 dropped again to 91.0%. In 2008 there was an increase in agricultural output (by 3.1%), but the growth rate was lower than in the previous year. It was solely determined by total crop production as it went up by 6.8% on the previous year, whereas livestock production decreased by 1.5%. The rise in crop production stemmed from a higher production of fruit from trees and berries as well as of cereals. At the same time, the fall in livestock production was caused by a decline in pig farming and a reduction in the pig population.

III. Materials and research methodology

The cost and income accounts for production activities presented in the report were compiled on the basis of data collected in the system AGROKOSZTY and the Polish FADN (*Polski FADN*).

Within the framework of the AGROKOSZTY system, detailed data are gathered, for particular types of crop and livestock production, on the level of output, inputs and specific costs. Those data allow to calculate the gross margin. The accounts enabling the calculation of income from activity include both specific and indirect costs. The level of indirect costs for individual holdings was determined on the basis of data provided by the Polish FADN, and then broken down into specific activities pursued in a given farm.

The scope of data collected in the system AGROKOSZTY is very detailed and corresponds to a particular activity in the relevant survey year. The structure of the value of production and indirect costs by type was well-defined, in accordance with the European Union guidelines. The methodology of the gross margin account is also in line the EU requirements[1].

Whereas the classification of particular cost components as specific costs is not problematic, in the case of indirect costs certain doubts may arise. Indirect costs comprise all costs incurred in respect of the operation or mere existence of a farm, therefore they cannot be directly attributed to individual production activities. It is possible to do so in an indirect manner using adequate breakdown keys.

In line with the methodology applied, in the presented accounts indirect costs were broken down into particular activities according to the share of the production value of each activity in the value of total production of a given agricultural holding. To this end, the report draws on the database of the Polish FADN which identifies farms engaged in the activities surveyed in the AGROKOSZTY system; the breakdown algorithm for indirect costs was applied individually to specific farms and activities. The database of Polish FADN also provided general information on the holdings surveyed within the framework of the AGROKOSZTY system.

[1] I. Augustyńska-Grzymek, L. Goraj, S. Jarka, T. Pokrzywa, A. Skarżyńska, *Metodyka liczenia nadwyżki bezpośredniej i zasady klasyfikacji gospodarstw rolniczych*, FAPA, Warsaw 2000.

The unit cost account for agricultural production activities is related to the structure of production costs of a given farm presented in the Individual Report of Agricultural Holding – the Polish FADN[2]. As a consequence, this terminology was adopted for income categories in the activity account.

Accounts including total (specific and indirect) costs allow to show the profitability or unprofitability of production, they also enable to determine the unit production cost, which is most frequently compared with the price for a given product. The calculation of the cost and income account for agricultural production activities, in accordance with the methodology applied in the AGROKOSZTY system, is presented below.

Figure III.1

The calculation method for particular income categories

I		**Value of production**
II	-	*Specific costs*
III	=	**Gross margin less subsidies**
IV	-	*Actual indirect costs (excluding the cost of external factors)*
V	=	**Activity gross value added**
VI	-	*Estimated indirect costs – depreciation*
VII	=	**Activity net value added**
VIII	-	*Cost of external factors*
IX	=	**Income from activity less subsidies**
X	+	*Subsidies*
XI	=	**Income from activity**

In accounts for particular crop and livestock production activities, the **value of production** represents the sum of production of main products and of marketable by-products. It is determined at market selling prices or at ex farm prices (i.e. for on-farm sale).

In the case of crop production, it depends on the yield and the selling price for products. Various losses are deductible from output (per ha). As regards livestock production, the structure of the value of production varies depending on a particular activity. However, the product representing the prime objective of a given production activity is always specified as the main product

[2] L. Goraj, S. Mańko, *Systemy monitorowania sytuacji ekonomicznej i produkcyjnej gospodarstw rolnych* [in:] *Rachunkowość rolnicza*, Difin, Warsaw 2004.

(e.g. milk). At the same time, there may be increase in livestock (e.g. calves weaned from the cow) as well as one or more by-products (e.g. cull animals, wool). Losses deducted from the value of production include livestock deaths in the production process (per livestock head or per 100 kg of gross live weight).

The calculation of the value of output for livestock production excludes the value of manure and slurry produced on the farm.

For particular cost components to be classified as specific costs it is necessary to simultaneously meet the following three conditions, namely:

- those costs can be undoubtedly attributed to a specific activity,
- their level is proportional to the scale of production,
- they have a direct effect on output (in terms of quantity and value).

Specific costs exclude the cost of the service of harvesting, e.g. wheat or maize for green fodder, with a harvester. This cost item satisfies the first and second criteria for specific costs, but it fails to meet the third condition, namely it has no effect on the output. Other components which cannot be classified as specific costs include the cost of the purchase, repair and depreciation of buildings, vehicles and agricultural machinery and equipment as well as the cost of the purchase of fuel. Neither does the gross margin account take into consideration the remuneration of own labour by the farm user and his family members nor the cost of paid labour (except contract specialists).

Cost components classified as specific costs are listed below.

Specific crop costs include the following:

- seed and planting material *(purchased or produced on the farm)*,
- purchased fertilisers[3] *(without lime)*,
- crop protection products,
- plant growth regulators *(rooting hormones, growth regulators, defoliants)*,
- insurance directly concerning a given activity,
- special costs comprising the following:
  - special expenditure on crop production,
  - special services,
  - casual labour hired for special work.

[3] The cost of purchased fertilisers also comprises specialist fertiliser taxes.

Specific livestock costs comprise the following:

- animals entering particular activities, as livestock replacement,
- animal feedingstuffs, broken down into:
  - feedingstuffs not produced on the farm *(mainly purchased)*,
  - farm-produced feedingstuffs, further divided into:
    - ✓ farm-produced feedingstuffs from potentially marketable products,
    - ✓ farm-produced feedingstuffs from unmarketable products,
- rents for the use of forage area rented for a period up to 12 months *(agricultural land and areas excluded from agricultural land, e.g. mountain pasture)*,
- livestock insurance, directly concerning a given activity *(e.g. cows, heifers)*,
- medicines and veterinary services *(including semen for insemination)*,
- veterinary services *(insemination, castration, preventive vaccination)*,
- special costs comprising the following:
  - special expenditure on livestock production,
  - special services,
  - casual labour hired for special work.

The sets of specific costs deducted from the value of production are different for crop production and livestock production. However, in both cases they reflect current market conditions.

The cost components from outside the holding are expressed at purchasing prices, whereas the cost components produced on the farm (e.g. seed, farm-produced feedingstuffs from marketable products) at ex farm selling prices. In the case of livestock production, the exception are farm-produced feedingstuffs from unmarketable products (e.g. maize silage), valued according to specific costs incurred in their production. Subsidies granted are deducted from particular cost components.

The cost account for livestock production activities excludes the value of by-products of crop production (e.g. straw, beet leaves), produced and consumed on the farm as feedingstuffs or bedding.

The account which leads to the calculation of income from activity includes specific and indirect costs. **Indirect costs** of operating activity of the agricultural holding comprise all costs incurred in respect of the functioning or mere existence of the farm; their classification is presented below.

1. Actual indirect costs

Farming overheads

- electricity
- heating fuel
- fuel
- repairs, maintenance and servicing
- services
- insurance (e.g. for farm buildings, non-life and motor insurance)
- other (e.g. charges for water supply, sewerage, telephone)

Taxes

- agricultural
- forestry
- on special activities
- property
- other (i.e. on vehicles)

Cost of external factors

- cost of paid labour
- rent
- interest

2. Estimated indirect costs – depreciation

- depreciation of buildings and fixed equipment
- depreciation of machinery and technical equipment
- depreciation of vehicles
- depreciation of land improvements
- depreciation of orchards and permanent plantations
- depreciation of intangible fixed assets
- depreciation of completed investments in third-party fixed assets

Income from activity represents the value of production less specific and indirect costs plus subsidies granted. This income should provide the remuneration of unpaid labour input, land and own capital as well as management. Income from activity is an appropriate category for the evaluation of the results obtained in the long term, provided that the production capacity of the farm remains unchanged.

The calculation of income from activity excludes the amounts of VAT due and paid.

The item of subsidies only comprises those which directly concern particular activities, mostly supplementary payments. The account does not include area payments since according to the regulations those are paid on eligible agricultural land in the possession of the farmer on the date specified in the relevant act. This item may also comprise special subsidies paid by the Agricultural Market Agency.

The report also presents data on **family and non-family labour input** into a particular activity (in quantitative terms). Such information is collected within the framework of the AGROKOSZTY system, and the records kept allow to determine the labour intensity of production.

In the case of crop production, the labour input recorded is connected with soil preparation prior to sowing, maintenance work, the harvesting and drying of grain. As regards livestock production activities, it mainly includes work related to the care of livestock (cleaning, milking) and the feeding of animals as well as work involved in the production of farm-produced unmarketable feedingstuffs. Records exclude labour input connected with the functioning of the holding as a whole. It applies to administrative work, general farm work or labour input into the repair of buildings or machinery.

The method of presenting the results. The analysis covered the production and economic results in groups of agricultural holdings performing a particular activity (e.g. the growing of winter wheat). The results were presented as average values for the groups specified, and two ways to select farms were applied.

To begin with, a comparative analysis was conducted for production activities prepared on the basis of data obtained from the so-called “holdings recurring in survey years”. It means the selection from the sample of farms in which cyclical records were kept for the same activity, i.e. every two or three years (for instance, in 2005 and 2007, in 2005 and 2008, or in 2006 and 2008). Thus, the results obtained were not subject to deviations resulting from changes in the population of farms. In the four years in question (2005–2008), there were only two surveys of a given activity as, in line with the assumption adopted in the AGROKOSZTY system, data for all activities selected for the survey are not collected annually, but cyclically, every two or three years. Nevertheless, bearing in mind the continuity of the analysis, variables from the created original databases were re-estimated according to specific production and price conditions. The re-estimation concerned all components of the structure of the production value and of the structure of specific and indirect costs. The indexes

applied in the estimation account were prepared on the basis of data of GUS, the Ministry of Agriculture and Rural Development, the Agricultural Market Agency, IERiGŻ-PIB and a number of other sources. The results presented for 2005–2008 indicate the production and economic trends in crop and livestock production activities performed in the same groups of farms.

The second method of selection, or basically of the grouping of agricultural holdings, was the breakdown by the gross margin without subsidies per ha of area under a specific crop, per livestock head (e.g. dairy cow) and per 100 kg of gross live weight. The results were presented as quartiles[4], that is:

- the first, top quartile (25% of the top results in the group of the surveyed holdings): the best farms,
- the second and third quartiles (50% of the medium results in the group of the surveyed holdings): the average farms,
- the fourth quartile (25% of the bottom results in the group of the surveyed holdings): the weakest farms.

The criterion adopted for the grouping of agricultural holdings was the gross margin without subsidies from a given activity. This category takes into account the value of production as well as the incurred and well-defined specific costs, it is therefore useful for the assessment of the competitiveness of specific production activities. The choice of the gross margin as the criterion for farm grouping ensured full comparability at this level, thus eliminating the effect of the method for breaking down indirect costs on the categorisation of holdings.

The results of activities were analysed in the years covered by the surveys (those are actual data). The categorisation allowed to identify the factors determining the gross margin of the surveyed activities, as well as the degree of the relationship between the gross margin and income from activity, and between specific costs and total costs. The results, shown in tables, represent average values for the defined groups of agricultural holdings, i.e. the best, the average and the weakest farms.

The report also contains other calculations; **income from activity per hour of family labour** was computed on the basis of the number of working hours involved in the production of specific agricultural products. This income category reflects the degree of the remuneration of labour input by the farmer and his family with income from activity per ha of area under cultivation, per 100 kg of live weight produced of per livestock head.

[4] W. Ziętara, *Rachunkowość jako pomoc w zarządzaniu gospodarstwem rolniczym,* [in:] *Dostosowanie rachunkowości rolnej IERiGŻ do gospodarki rynkowej, materiały z seminarium,* IERiGŻ, Warsaw 1995.

For the purposes of the analysis, the work of the farmer and his family was valued at a standard rate, determined on the basis of the average wage in the whole national economy in the relevant year (according to GUS). The assumption was that one full-time worker worked in agriculture for 2,200 hours a year. Thus, the **remuneration per hour of labour was calculated to be PLN 8.66 in 2005, PLN 9.02 in 2006, PLN 9.81 in 2007 and PLN 10,74 in 2008**. It should be emphasised, however, that a monetary determination of labour input by the farmer and his family is always a matter of convention in family farms.

A set of **indicators of economic efficiency** (i.e. variables describing relationships between data) was applied to the assessment of the use of inputs and to carry out the financial analysis of production activities. But it should be noted that in specific activities the profitability of production is strictly related to sufficiently high financial results obtained by the farm as a whole since it reflects, among other things, the degree of farming efficiency. The indicators used in the analysis are listed below:

- specific costs incurred for producing a unit of production,
- total costs incurred for producing a unit of production,
- the ratio of the selling price for a product to the total unit cost,
- income from activity per unit of production,
- the ratio of total costs to the value of total production,
- the ratio of total costs to income from activity without subsidies,
- income from activity without subsidies per PLN of the value of total production (profitability of production),
- the share of subsidies in income from activity,
- subsidies per PLN of income from activity without subsidies,
- total (family and non-family) labour input into producing a unit of production (labour intensity of production),
- income from activity per hour of family labour,
- the ratio of income from activity per hour of family labour to a parity rate of the remuneration of family labour.

In the accounts performed, the results of the calculations and the costs incurred by the farmers were given in nominal terms. However, labour input (family and non-family) was only presented in terms of quantity (in hours).

Owing to electronic data processing, in certain cases the sums of elements may slightly differ from the sums “total”.

IV. Economic results of agricultural production activities in 2005–2008

Income represents the prime economic objective for the farmer. The level of income from agricultural activity, i.e. work on his own farm, is the result of a number of factors, particularly the stock of production resources, the method (efficiency) of the use of those resources, the level of production inputs, prices at which the farmer sells his agricultural products and prices for production inputs and services purchased for production. Prices for agricultural products, as prices for production inputs and services purchased, are exogenous (variables) for farmers. The farmer has an influence on the level of production resources of the holding and their productivity. What is important is not only the absolute level of such resources, but also their interrelations.[5]

The survey results presented in the report allow to evaluate the cost and income side of basic agricultural products in 2005–2008. The findings reflect changes in external conditions for farming, which is related to a varying degree of change in the level of output, unit costs as well as selling prices for agricultural products. Furthermore, the ability to exploit the opportunities offered by European integration is also of significance. The survey results indicate that it is a real possibility for improving the income situation of farmers.

1. Activity results in farms recurring in the survey years

In 2005–2008, the survey sample of the AGROKOSZTY system included 8 agricultural activities (7 crop production activities and 1 livestock production activity) which were covered by the survey twice, and 1 activity (dairy cows) covered only once.

The number of farms recurring in the survey years ranged between 18 and 27, only for spring wheat it was 10. Their share in the survey samples for particular activities (due to the different number of holdings in specific years) ranged from 12.7% for pigs for slaughter in 2008 to 27.3% for sugar beet in 2005. At the same time, the respective share for spring wheat was 7.7% in 2005 and 8.8% in 2008 – Table IV.1.1.

[5] J. S. Zegar: *Dochody chłopskie stan-perspektywy-polityka*. *Komunikaty Raporty Ekspertyzy no 439* IERiGŻ, Warsaw 1999.

Table IV.1.1

Agricultural production activities covered by the surveys of the AGROKOSZTY system in 2005–2008

Specification	Survey year and the share of farms recurring in the survey sample in relevant years			
	2005	**2006**	**2007**	**2008**
Sugar beet	**27.3**		**14.6**	
Potatoes for human consumption	**16.7**			**22.8**
Pigs for slaughter	**15.8**			**12.7**
Spring wheat	**7.7**			**8.8**
Oats	**20.7**			**21.3**
Winter wheat		**17.9**		**17.1**
Winter rye		**16.7**		**16.9**
Winter rape		**15.6**		**13.7**
Dairy cows*				

** As between 2005 and 2008 the survey of dairy cows was only conducted in 2006, there are no data on farms recurring in the survey years, therefore the report presents the results for 2006 and the results of the estimation accounts for 2007–2008 (the subsequent survey of dairy cows in 2009). The years of the surveys of agricultural activities are highlighted in green.*

The results for the surveyed activities were presented as average values for the selected groups of holdings, with actual data for the survey years and estimated data for the years when a given activity was not covered by the survey. The starting point for the estimation accounts were the established databases containing actual data.

Sugar beet

Out of the survey sample for sugar beet in 2005 and 2007 27 holdings were selected as farms recurring in both survey years. Those were large holdings in terms of area, specialised in crop production, their share in the value of total output in both years was nearly 80%. At the same time, the share of sugar beet in the value of crop production was 16.6 percentage points lower in 2007 (in 2005 – 38.0%, and in 2007 – 21.4%), as the share in harvested area, with a fall by 2.1 percentage points.

The above figures suggest that farmers changed the type of production, discontinuing the growing of sugar beet and taking up other activities. Most probably, it was due to a marked decrease in profitability.

The surveys demonstrated that there had also been changes in total fixed assets of the holdings, farmers had invested in buildings, tractors as well as in machinery and equipment. As compared to 2005, in 2007 the value of the main

groups of fixed assets per hectare of agricultural land was 19.3% higher. The greatest increase in value was recorded in the case of machinery and equipment for crop production – by 36.3%, whereas there was a slight decline (by 3%) in the value of cars and other vehicles – Table IV.1.2.

Table IV.1.2

Selected information on farms growing sugar beet and potatoes for human consumption recurring in the survey years (actual data)

Specification			Sugar beet		Potatoes for human consumption	
			Survey year			
			2005	**2007**	**2005**	**2008**
Number of farms surveyed			27	27	21	21
Area of agricultural land		[ha]	61.44	65.24	43.44	48.9
Area of arable land		[ha]	58.79	62.72	40.58	45.55
Soil valuation index		[point]	1.32	1.34	0.94	0.97
Area under cultivation		**[ha]**	**9.75**	**9.74**	**2.77**	**3.86**
Share in total area under harvested area		[%]	16.9	14.8	7.1	7.5
Total labour input into the surveyed activity		[hour/ha]	54.9	27.6	121.9	110.8
of which: family labour input			31.7	20.1	100.5	82.9
Total NPK used for the surveyed activity		[kg/ha]	388	406	236	271
Structure of the value of farm production		[%]	100.0	100.0	100.0	100.0
of which:	crop production		79.7	79.6	54.3	57.4
	of which: surveyed activity		38,0	21.4	29.4	28.6
	livestock production		19.5	19.6	43.9	40.6
Value of selected fixed assets		[PLN/farm]	341 939	433 299	285 804	311 113
		[PLN/ha of UAA]	5 566	6 643	6 579	6 362
of which:	buildings and fixed equipment	[PLN/farm]	161 299	192 989	162 256	176 692
		[PLN/ha of UAA]	2 626	2 959	3 735	3 613
	tractors	[PLN/farm]	74 702	92 113	42 521	53 114
		[PLN/ha of UAA]	1 216	1 412	979	1 086
	lorries, vans and other vehicles	[PLN/farm]	12 124	12 429	8 678	9 435
		[PLN/ha of UAA]	197	191	200	193
	machinery, tools and equipment for crop production	[PLN/farm]	93 814	135 768	72 349	71 873
		[PLN/ha of UAA]	1 527	2 081	1 665	1 470

In both survey years, the area of sugar beet plantations was almost the same – approx. 9.8 ha. The root yields were above the national average for family farms, with the difference ranging from 10.3% in 2008 to 20.5% in 2006. At the same time, the selling prices were lower – from 4.9% in 2005 to 18.6% in 2008.

The findings of the surveys of sugar beet conducted in 2005–2008 allow to draw the following conclusions (Table IV.1.3):

- There was a steady fall in the selling price for sugar beet roots and in the value of production per ha of area under sugar beet; the comparison of 2005 and 2008 indicated a deterioration, in both cases the difference was ca. 50%.

Table IV.1.3

Production, costs and income from the growing of sugar beet in farms recurring in the surveys in 2005-2008

(for 2005 and 2007 – actual data, for 2006 and 2008 – estimated data)

Specification		Year			
		2005	**2006**	**2007**	**2008**
Area under cultivation	[ha]	9.75	9.75	9.74	9.74
Root yield	[dt/ha]	491	524	568	515
Selling price for roots	[PLN/dt]	16.68	11.28	10.13	8.44
Selling price for leaves	[PLN/dt]	1.17	1.31	1.85	2.00
		Per ha of area under cultivation			
Total production	**[PLN]**	**8203**	**5929**	**5783**	**4371**
of which: roots		8188	5913	5760	4346
marketable leaves		15	16	23	25
Total specific costs	**[PLN]**	**2210**	**2145**	**2229**	**2759**
of which: seed		645	563	757	738
mineral fertilisers, total		790	803	801	1259
organic fertilisers, purchased		-	-	-	-
crop protection products		682	683	637	726
growth regulators		11	11	9	9
other		82	85	25	27
Gross margin without subsidies	**[PLN]**	**5993**	**3784**	**3553**	**1612**
Actual indirect costs[a]	[PLN]	1403	1455	1187	1329
Gross value added from activity	**[PLN]**	**4590**	**2330**	**2367**	**283**
Depreciation	[PLN]	760	778	592	624
of which: of buildings and fixed equipment		160	162	113	120
of machinery and equipment		289	300	243	258
of vehicles		252	258	188	198
Net value added from activity	**[PLN]**	**3831**	**1551**	**1775**	**-341**
Cost of external factors	[PLN]	452	451	402	459
Income from activity without subsidies	**[PLN]**	**3379**	**1100**	**1372**	**-801**
Subsidies[b]	[PLN]	**-**	1779	1525	1463
Income from activity	**[PLN]**	**3379**	**2879**	**2898**	**662**
TOTAL COSTS	**[PLN]**	***4824***	***4829***	***4410***	***5171***
Annual change		**previous year = 100**			
Root yield		-	106.7	108.4	90.7
Selling price		-	67.6	89.8	83.3
Total production		-	72.3	97.5	75.6
Total specific costs		-	97.1	103.9	123.8
Total costs		-	100.1	91.3	117.3
Subsidies		-	-	85.7	95.9
Income from activity		-	85.2	100.7	22.8

[a] Actual indirect costs without the cost of external factors.

[b] Subsidies include the sugar payment.

[-] - means "not observed".

- The most dramatic decline in prices was observed in 2006 (by 32.4%), the first year of the reform of the sugar market organisation.
- In 2005–2007 the level of specific costs was very stable, almost identical, but 2008 saw a significant increase, by 23.8% on 2007. It was primarily due to a higher cost (by 57.2%) of mineral fertilisers (as a result of a rapid price rise, by an average of 38.4%, according to GUS). In 2008 total cultivation costs per ha were 17.3% higher than in the previous year.
- The lowest unit production cost of 1 dt of roots, both specific and total, was recorded in 2007. There is a very clear correlation between the two cost categories, as well as the correlation between income categories, i.e. the gross margin and income from activity (excluding subsidies).
- In 2005–2008 the income situation of farmers growing sugar beet showed a gradual deterioration. In 2008 the gross margin without subsidies per hectare accounted for a mere 27% of the 2005 level, mostly as a consequence of a lower value of production. Income from activity without subsidies was negative, which means that total costs of cultivation per ha were only covered in part – approx. 85%. The farmers' losses were compensated with the sugar payments, but it should be stressed that those amounts also decreased every year.
- In 2006–2007 income from activity per ha was similar, compared to 2005 it was approx. 15% lower. In 2008 it only amounted to PLN 662 per ha, i.e. a mere 20% of the 2005 level and ca. 23% of income recorded in 2006–2007.

The sugar market is strictly regulated by mechanisms of the common agricultural policy which covered Poland on accession. In accordance with the schedule of reforming the organisation of the sugar market applicable from 1 July 2006, a minimum price for sugar beet was established and compensation in the form of a sugar payment was introduced. The presented results illustrate the effects of the reform on the economic performance of Polish sugar beet growers.

In 2008 the production and market conditions for growing sugar beet were unfavourable. To begin with, in comparison with the previous two survey years, farmers reported lower yields, there was another reduction in the selling price for roots (in line with the reform of the sugar market), the sugar payment was lower, and there was a considerable rise in prices for agricultural inputs, which pushed up cultivation costs.

The analysis of the above-mentioned indicators also demonstrated a fall in the profitability of growing sugar beet. Between 2005 and 2007, the selling price exceeded the unit cost of production (although this ratio also showed a deterioration), but in 2008 the cost of producing 1 dt of roots was 19% higher

than the selling price. A rise was observed in the cost of producing a production unit as well; in 2008 it was double the 2005 figure. At the same time, sugar beet growers were increasingly dependent on external financial assistance, i.e. the sugar payment gained in importance.

As a result of those conditions, income from activity per dt of roots showed a gradual decline; as compared to 2005, in 2008 it went down more than fivefold (in 2005 it was PLN 6.88, and in 2008 – PLN 1.29). But it should be pointed out that its level still ensured full remuneration of family labour (i.e. that of the farmer and his family). However, in 2008 it was only possible thanks to subsidies, income from activity per hour of family labour was 3.1 times higher than the parity rate of labour remuneration adopted for calculations (PLN 10.74 per hour) – Table IV.1.4.

Table IV.1.4

Indicators of economic efficiency of the growing of sugar beet in 2005–2008

Specification	Year			
	2005	**2006**	**2007**	**2008**
Specific costs/dt of roots [PLN]	4.50	4.09	**3.92**	5.36
Total costs/dt of roots [PLN]	9.83	9.21	**7.76**	10.04
Ratio of selling price to total unit cost	**1.7**	1.2	1.3	0.8
Income from activity/dt of roots [PLN]	**6.88**	5.49	5.10	1.29
Ratio of total costs to total production	**0.6**	0.8	0.8	1.2
Ratio of total costs to income from activity without subsidies	**1.4**	4.4	3.2	x
Income from activity without subsidies/PLN of total [PLN]	**0.41**	0.19	0.24	x
Ratio of subsidies to income from activity	-	0.6	0.5	2.2
Subsidies/PLN of income from activity without subsidies [PLN]	-	1.62	1.11	x
Total labour input/dt of roots [hour]	0.11	0.11	**0.05**	**0.05**
Income from activity/hour of family labour [PLN]	106.48	90.72	**143.86**	32.88
Ratio of income from activity/hour of family labour to the parity rate of labour remuneration	12.3	10.1	**14.7**	3.1

[-] - means "not observed".

[x] - means that performing calculations was not justified.

The most favourable values of the indicators are in bold.

In 2009 the production[6] and price results of the growing of sugar beet were better than a year before. Owing to a more favourable exchange rate of the zloty against the euro, the amount of the sugar payment received by beet planters; in the surveyed holdings it was PLN 2,029/ha, against PLN 1,463/ha in 2008, i.e. up by approx. 39%. According to estimates, in 2009 the value of production per ha covered the costs incurred in ca. 95%, 10 percentage points more than

[6] *Wynikowy szacunek produkcji głównych ziemiopłodów rolnych i ogrodniczych w 2009 r., GUS, Warsaw 2009.* The same source of data on production in 2009 for all the products in question.

a year before. Income from activity without subsidies continued to be negative, but it decreased to a much lesser degree. The farmers' losses were compensated by the sugar payment, which generated, as in 2008, income from activity. In 2009 income from activity per ha of sugar beet cultivation is estimated to be 2.6 times higher than in the previous year.

Potatoes for human consumption

Empirical data on potatoes for human consumption were collected in 2005 and 2008, the sample included 21 farms recurring in both years. The area under potatoes was not very large, 2.8 ha and 3.9 ha respectively for the survey years, accounting for over 7% of harvested area.

In the structure of total production, there was a clear gap between crop production and livestock production, by 10.4 percentage points in 2005, and by 16.8 percentage points in 2008. The share of potatoes in the value of crop production was approx. 29% in both years – Table IV.1.2.

In contrast to the survey sample of sugar beet growers, those holdings were characterised by a lower value of fixed assets per ha of agricultural land in the second survey year. It was due to the fact that the farms increased their area, but the value of fixed assets rose to a limited degree (by 8.9%, whereas in holdings growing sugar beet it went up by 26.7%).

The production of potatoes for human consumption in the survey sample of the AGROKOSZTY system was significantly higher in comparison with GUS data for family farms (ranging from 24.1% in 2005 to 31.0% in 2008). The difference results from the fact that public statistics reflect average yields for all the groups of potatoes. Nevertheless, the annual trends in yields are similar. At the same time, the selling price for potatoes for human consumption obtained by the surveyed holdings, as compared to the corresponding GUS data, was only slightly higher (the difference ranging between 1.3% and 3.2%).

The analysis and the findings of the survey of potatoes for human consumption conducted in 2005–2008 allow to draw the following conclusions (Table IV.1.5):

- In 2007–2008 potatoes yields were rather high and similar, the selling price also showed minor changes. But in 2006, when the yield was much lower, the price for potatoes was relatively high. Annual price trends were different, in 2006 the price increased, whereas in 2007–2008 there was a steady fall in price.

Table IV.1.5

Production, costs and income from the growing of potatoes for human consumption in farms recurring in the surveys in 2005–2008

(for 2005 and 2008 – actual data, for 2005–2007 – estimated data)

Specification		Year			
		2005	**2006**	**2007**	**2008**
Area under cultivation	[ha]	2.77	2.77	2.77	3.86
Potato yield	[dt/ha]	216	184	255	245
Selling price for potatoes	[PLN/dt]	37.53	44.11	41.20	40.34
		Per ha of area under cultivation			
Total production	**[PLN]**	**8122**	**8135**	**10486**	**9894**
of which: ziemniaki		8122	8135	10486	9894
Total specific costs	**[PLN]**	**2102**	**2804**	**3389**	**3490**
of which: seed		1133	1826	2372	1977
mineral fertilisers, total		431	438	470	780
organic fertilisers, purchased		17	16	24	-
crop protection products		455	453	451	562
growth regulators		-	-	-	38
other		67	70	72	134
Gross margin without subsidies	**[PLN]**	**6020**	**5331**	**7097**	**6404**
Actual indirect costs[a]	[PLN]	1485	1532	1593	1512
Gross value added from activity	**[PLN]**	**4535**	**3799**	**5504**	**4893**
Depreciation	[PLN]	1451	1487	1593	1078
of which: of buildings and fixed equipment		451	455	511	326
of machinery and equipment		551	572	597	473
of vehicles		444	454	479	277
Net value added from activity	**[PLN]**	**3084**	**2312**	**3911**	**3815**
Cost of external factors	[PLN]	333	332	365	382
Income from activity without subsidies	**[PLN]**	**2750**	**1980**	**3547**	**3432**
Subsidies[b]	[PLN]	-	-	-	-
Income from activity	**[PLN]**	**2750**	**1980**	**3547**	**3432**
TOTAL COSTS	**[PLN]**	***5371***	***6154***	***6939***	***6462***
Annual change		**previous year = 100**			
Potato yield		-	85.2	138.6	96.1
Selling price		-	117.5	93.4	97.9
Total production		-	100.2	128.9	94.4
Total specific costs		-	133.4	120.9	103.0
Total costs		-	114.6	112.8	93.1
Income from activity		-	72.0	179.1	96.8

[a] Actual indirect costs without the cost of external factors.

[-] - means "not observed".

- In 2006 the growing of potatoes was characterised by the however growth rate of specific costs (33.4%) and total costs (14.6%).

  Even though there was also a significant rise in the selling price (by 17.%), compared to 2005 income from activity dropped significantly – by 28%.
- In the period in question, potatoes for human consumption represented a profitable activity, but provided that total production per ha of area under cultivation was sold. In 2007–2008, as compared to the two previous years, income from activity per ha was much higher and rather stable (in 2008 there was a fall by a mere PLN 115, i.e. 3.2%, on 2007).
- The results of the account for potatoes for human consumption indicate a correlation between the gross margin and income from activity per ha of area under cultivation.

It should be pointed out that potatoes for human consumption, in contrast to a number of other crops, are covered by neither financial assistance under the common agricultural policy nor national regulations. This, potato growers are not entitled to aid in the form of supplementary payments, their results mainly result from market and weather conditions. Another important factor is the agricultural production method.

The survey findings suggest a considerable influence of the selling price on economic results of the growing of potatoes for human consumption. It results from the specific characteristics of this activity, their early harvest and sale is also of importance. According to GUS data, potato prices, both selling and marketplace prices, are the highest in June and July, whereas in subsequent months they tend to decline.

The indicators applied for the assessment of the production process provide its technological and economic picture. According to the survey findings, the (specific and total) costs of producing 1 dt of potatoes were the lowest in 2005 and the highest in 2006. As regards income from activity per dt, between 2007 and 2008 it was relatively the highest, nearly identical (PLN 14) – Table IV.1.6.

In the analysed years the ratio of costs to production was favourable for potato growers, as the ratio of the selling price to the cost of producing 1 dt. The presented data also show the degree of remuneration of labour input by the farmer, the ratio of income from activity per hour of family labour to the parity rate of labour remuneration ranged from 2.2-fold in 2006 to 3.9-fold in 2008.

Table IV.1.6

Indicators of economic efficiency of the growing of potatoes for human consumption in 2005–2008

Specification		Year			
		2005	**2006**	**2007**	**2008**
Specific costs/dt of potatoes	[PLN]	**9.71**	15.20	13.32	14.23
Total costs/dt of potatoes	[PLN]	**24.82**	33.37	27.26	26.34
Ratio of selling price to total unit cost		**1.5**	1.3	**1.5**	**1.5**
Income from activity/dt of potatoes	[PLN]	12.71	10.74	13.94	**13.99**
Ratio of total costs to total production		**0.7**	0.8	**0.7**	**0.7**
Ratio of total costs to income from activity		2.0	3.1	2.0	**1.9**
Income from activity/PLN of total production	[PLN]	0.34	0.24	0.34	**0.35**
Total labout input/dt of potatoes	[hour]	0.56	0.66	0.48	**0.45**
Income from activity/hour of family labour	[PLN]	27.36	19.70	35.28	**41.40**
Ratio of income from activity/hour of family labour to the parity rate of labour remuneration		3.2	2.2	3.6	**3.9**

The most favourable values of the indicators are in bold.

The value of production per ha under potatoes for human consumption is estimated to be more than 6% higher in 2009 than a year before, partly due to a rise in the selling price for potatoes. Cultivation costs also showed a rise (by ca. 10%), mainly on account of increased prices for seed potatoes, the cost of seed potatoes per ha was over 18% higher. In the light of those conditions, income from activity per ha is very likely to remain the same as in the previous year. It means that the income situation of growers of potatoes for human consumption has been roughly similar since 2007.

Pigs for slaughter

In the AGROKOSZTY system the surveys of the cost and income situation in pig farming were carried out in 2005 and 2008. The survey sample included 18 holdings covered in both years. The data presented in Table IV.1.7 indicate that those were holdings specialising in pig farming, whose share in livestock production was nearly 99% in the first survey year, and 98% in the second year. At the same time, in both survey years livestock production accounted for approx. 77% of total agricultural production.

Between 2005 and 2008, the surveyed farms reported an increase in the value of production fixed assets, hence the labour input was lower. The cost of fixed assets per ha of agricultural land was by an average of 12% higher in 2008. But the highest growth rate was found in the case of tractors, 61.3%, as well as machinery and equipment for livestock production, 44.2%. At the same

time, there was a fall in the value of cars and other vehicles, both per farm (by 4.2%) and per ha of agricultural land (by 14.2%) – Table IV.1.7.

Table IV.1.7

Selected information on holdings engaged in pig farming and recurring in survey years (actual data)

Specification			Pigs for slaughter	
			Survey year	
			2005	**2008**
Number of farms surveyed			18	18
Area of agricultural land		[ha]	39.56	44.20
Area of arable land		[ha]	38.13	42.59
Soil valuation index		[point]	0.91	0.93
Production of live animals, gross[a]		**[dt/farm]**	**623.17**	**715.37**
Production of live animals, net (increase)		[dt/farm]	288.22	380.89
Average weight of fattening pigs sold		[kg/head]	104	105
Consumption of concentrated feedingstuffs per kg of weight increase		[kg]	4.65	3.95
of which:	concentrates and industrial compound feed		0.52	0.48
	cereal grain and middlings		3.68	3.13
Total labour input per 100 kg of gross live weight		[hour]	2.6	2.3
of which:	family labour input		2.0	1.4
Structure of farm production		[%]	100.0	100.0
of which:	crop production		22.3	21.4
	livestock production		76.7	77.3
	of which: live pigs		98.7	98.0
Value of selected fixed assets		[PLN/farm]	476 455	596 364
		[PLN/ha of UAA]	12 043	13 492
of which:	buildings and fixed equipment	[PLN/farm]	323 519	367 303
		[PLN/ha of UAA]	8 178	8 310
	tractors	[PLN/farm]	60 416	108 857
		[PLN/ha of UAA]	1 527	2 463
	lorries, vans and other vehicles	[PLN/farm]	9 233	8 848
		[PLN/ha of UAA]	233	200
	Machinery, tools and equipment for crop production	[PLN/farm]	57 911	70 531
		[PLN/ha of UAA]	1 464	1 596
	Machinery, tools and equipment for livestock production	[PLN/farm]	25 376	40 826
		[PLN/ha of UAA]	641	924

[a] Increases + weight of purchased animals.

The production of pigs for slaughter in the surveyed holdings was rather large, in 2005 an average of 600 fattening pigs were sold, and in 2008 – 680. As compared to the corresponding GUS data, the selling price for pigs for slaughter was higher, by 2% in 2005–2007, and by 5.7% in 2008.

Table IV.1.8

Production, costs and income from pig farming in holdings recurring in the surveys in 2005–2008

(in 2005 and 2008 – actual data, for 2006–2007 – estimated data)

Specification		Year			
		2005	**2006**	**2007**	**2008**
Gross production of pigs for slaughter	[dt/farm]	623.17	623.17	623.17	715.37
Selling price for pigs for slaughter	[PLN/kg]	3.90	3.63	3.53	4.24
		Per 100 kg of gross live weight			
Total production	**[PLN]**	**390**	**363**	**353**	**424**
of which: pigs for slaughter (fattening pigs)		390	363	353	424
Total specific costs	**[PLN]**	**314**	**305**	**345**	**402**
of which: livestock replacement		194	178	176	231
purchased feedingstuffs		70	71	87	89
farm-produced marketable		44	49	74	72
other		7	7	7	10
Gross margin without subsidies	**[PLN]**	**76**	**58**	**9**	**22**
Actual indirect costs[a]	[PLN]	34	35	37	46
Gross value added from activity	**[PLN]**	**42**	**23**	**-28**	**-24**
Depreciation	[PLN]	29	29	31	33
of which: of buildings and fixed equipment		12	12	13	10
of machinery and equipment		9	9	10	12
of vehicles		8	8	8	11
Net value added from activity	**[PLN]**	**13**	**-6**	**-60**	**-57**
Cost of external factors	[PLN]	12	12	13	18
Income from activity without subsidies	**[PLN]**	**1**	**-18**	**-73**	**-75**
Subsidies[b]	[PLN]	-	-	-	-
Income from activity	**[PLN]**	**1**	**-18**	**-73**	**-75**
COSTS, TOTAL	**[PLN]**	***389***	***382***	***426***	***498***
Annual change		**previous year = 100**			
Selling price for pigs for slaughter		-	93.1	97.2	120.1
Total specific costs		-	97.1	113.1	116.5
Total costs		-	98.2	111.5	116.9

[a] Actual indirect costs without the cost of external factors.

[-] - means "not observed".

The evaluation of the cost and income side of the production of pigs for slaughter in 2005–2008 allows to draw the following conclusions (Table IV.1.8):

- From 2005 to 2007, there was a marked gradual fall in the selling price for pigs for slaughter, and the trend was reversed in 2008, with a 20.1% rise in price.
- In the survey years (2005–2008), the share of specific costs in total costs of the production of pigs for slaughter was approx. 80%, thus they largely determined the level of total costs. There is a very strong correlation between

the two cost categories, which is clearly observable in annual changes in the period in question.

- In 2005–2006, total production costs per 100 kg of live weight were similar, whereas they showed a steady increase in the subsequent two years analysed – by 11.5% in 2007 and by 16.9% in 2008. In 2007 the growth was determined by higher prices for feedingstuffs (mainly cereal middlings), and in 2008 by the cost of livestock replacement.
- In the period in question the production of pigs for slaughter was not profitable, taking account (according to the methodology adopted) of total costs, i.e. specific costs, actual indirect costs, the cost of external factors and depreciation, or the cost (value) of wear and tear of fixed assets used in the production process.

  It should be added that costs such as depreciation do not involve annual monetary expenditure, but merely reflect an amount of capital which should be invested in the replacement of fixed assets used in the production process. Naturally, farmers may continue production without covering such costs, but they will not be able to replace own fixed assets once they wear out.
- In 2005 the value of production per 100 kg of live weight compensated for the costs incurred, but in the following years the costs exceeded the value of output, by 5.2% in 2006, by 20.7% in 2007, and by 17.5% in 2008. As a consequence, income from activity was negative, with a downward trend in subsequent years, farmers suffered a loss.
- In the period in question, the profitability of pig farming was significantly influenced by relative prices between crop products and pigs as well as by prices for production inputs.

The pigmeat market is the largest and very important meat market in Poland, to both producers and consumers. Characteristically, pigmeat production and prices tend to fluctuate in cycles. A rising output and supply is more frequently accompanied by a fall in prices for pigs for slaughter. At the same time, a large pig population pushes up the demand for cereals and animal feedingstuffs, which results in higher prices for those products. Such a situation is particularly unfavourable for pig producers since it entails a deterioration of production profitability, such conditions have been observed recently.

In 2007 the economic conditions for pig farming were even worse than a year before. As compared to 2006, the purchasing price of pigs for slaughter went down, whereas production costs showed an increase. First of all, there was a dramatic rise in prices for feedingstuffs, particularly cereals. In the second half

of the year, despite significant cereal production, grain prices continued to be very high. Thus, they considerably drove up the costs of pig farming and contributed to a further drop in its profitability. It is assessed that it hit the most pig farms using farm-produced feedingstuffs, whereas pig producers purchasing industrial compound feedingstuffs were affected to a lesser degree.

Despite increased production costs, in 2008 a significant rise in the selling price (by 20.1%) brought about a reversal of the trend unfavourable for farmers, the gap between costs and the value of production decreased by 3.2 percentage points. An improvement was also observed with regard to the ratio of the selling price to the unit production cost – 1:0.85 against 1:0.83 in 2007. Between 2005 and 2008, the farmer's labour input in pig production was not remunerated – Table IV.1.9.

Table IV.1.9

Indicators of economic efficiency of pig farming in 2005–2008

Specification		Year			
		2005	**2006**	**2007**	**2008**
Specific costs/kg of live weight	[PLN]	3.14	**3.05**	3.45	4.02
Total costs/kg of live weight	[PLN]	3.89	**3.82**	4.26	4.98
Ratio of selling price to total unit cost		**1.00**	0.95	0.83	0.85
Income from activity/kg of live weight	[PLN]	0.01	x	x	x
Ratio of total costs to total production		**1.0**	1.1	1.2	1.2
Ratio of total costs to income from activity		598.8	x	x	x
Income from activity/PLN of total production	[PLN]	0.00	x	x	x
Total labour input/kg of live weight	[hour]	0.03	0.03	0.03	**0.02**
Income from activity/hour of family labour	[PLN]	0.32	x	x	x
Ratio of income from activity/hour of family labour to the parity rate of labour remuneration		0.04	x	x	x

[x] - means that performing calculations was not justified.

The most favourable values of the indicators are in bold.

It should be highlighted that since Poland's inclusion in the single European market the supply and demand situation in other Member States has had a crucial influence on agricultural prices in Poland. Therefore, in 2008 the free movement of goods within the EU territory significantly undermined the correlation between domestic prices for pigs for slaughter and pigmeat and their production/supply in Poland. On account of the openness of the market, particularly with the appreciation of the zloty and different phases of the production cycle of other leading pig producers (Denmark, the Netherlands, Germany), imports compensated for the decline in domestic output and counteracted a rise in pig prices in Poland.

The results of the estimation account indicate that in 2009 pig farmers were in a slightly better situation that a year before. Thanks to over 18% higher selling prices and production costs remaining at the 2008 level, in the surveyed holdings the value of production per 100 kg of live weight covered the costs incurred. It means that the fall in income observed in 2006–2008 stopped, and pig producers did not suffer losses. Assuming that the depreciation of fixed assets used in production was only covered in part, we may also consider a certain level of income. In 2006–2008 the production cost per kg of live weight considerably exceeded the selling price (by 5.2% in 2006, by 20.7% in 2007, and by 17.5% in 2008), but in 2009 the situation improved and the selling price covered the unit production cost of pig farming.

Spring wheat

The cost and income accounts for spring wheat were calculated on the basis of source data from 10 family farms. Unfortunately, only this number of holdings were identified in the sample as recurring in both survey years, i.e. in 2005 and 2008.

It should be noted that those were large farms, with 96.6 ha of utilised agricultural area (UAA) in 2005, and even more in 2008 (up by 14.3 ha of UAA). There was also an increase in area under wheat (twofold), its share in harvested area (up by 7.1 percentage points) and its share in the value of crop production (up by 9.1 percentage points), which distinctly dominated in the structure of the value of farm production in both years. Over three years, i.e. from 2005 to 2008, the value of main groups of fixed assets in the surveyed holdings rose by an average of 15.5%, but their value per ha of UAA remained basically unchanged – Table IV.1.10.

The analysis of the production and price results for spring wheat, as compared to GUS data, demonstrates its yields were significantly higher, with the difference ranging from 43.3% in 2007 to 95.8% in 2008. At the same time, the selling price for wheat grain remained similar to average domestic prices in the first three years, but it was 24.2% lower in 2008.

Data on average domestic purchasing prices for cereals published by GUS suggest considerable price differentiation in the first and second halves of 2008. In the first six months of the year, prices were very high with minor fluctuations, but after the harvest there was a dramatic drop in prices, resulting in a much lower price level at the end of the year than at the beginning. According to the survey methodology adopted, in the AGROKOSZTY system only prices for

grain sold in the survey year are recorded, i.e. in the case in question only those quoted in transactions from the second half of 2008. This is precisely the reason why, in the light of a significant fall in domestic cereal price observed in that period, the selling prices for cereal grain covered (i.e. spring wheat, oats, winter wheat and winter rye) were lower than annual average public statistics.

Table IV.1.10

Selected information on holdings growing spring wheat and oats recurring in the survey years (actual data)

Specification			Spring wheat		Oats	
			Survey year			
			2005	**2008**	**2005**	**2008**
Number of farms surveyed			10	10	23	23
Area of agricultural land		[ha]	96.59	110.85	52.12	64.01
Area of arable land		[ha]	94.11	106.63	48.00	60.12
Soil valuation index		[point]	1.01	1.04	0.83	0.83
Area under cultivation		**[ha]**	**12.49**	**24.48**	**5.49**	**8.58**
Share in the structure of total harvested area		[%]	13.6	20.7	11.8	11.4
Total labour input into the surveyed activity		[h/ha]	9.8	10.9	11.5	8.1
of which: family labour input			8.0	10.1	10.4	6.6
Total NPK used for the surveyed activity		[kg/ha]	245	246	160	139
Structure of the value of farm production		[%]	100.0	100.0	100.0	100.0
of which:	crop production		67.0	68.1	43.1	58.0
	of which: surveyed activity		7.1	16.2	8.1	6.3
	livestock production		30.1	30.7	51.1	37.7
Value of selected fixed assets		[PLN/farm]	419 304	484 343	291 180	381 023
		[PLN/ha of UAA]	4 341	4 369	5 587	5 953
of which:	buildings and fixed equipment	[PLN/farm]	195 084	190 182	151 845	172 394
		[PLN/ha of UAA]	2 020	1 716	2 914	2 693
	tractors	[PLN/farm]	84 810	105 436	57 601	74 253
		[PLN/ha of UAA]	878	951	1 105	1 160
	lorries, vans and other vehicles	[PLN/farm]	12 960	11 994	9 117	9 206
		[PLN/ha of UAA]	134	108	175	144
	machinery, tools and equipment for crop production	[PLN/farm]	126 450	176 731	72 617	125 170
		[PLN/ha of UAA]	1 309	1 594	1 393	1 955

In 2008 the downward trend of prices was caused by good cereal yields in Poland as well as much higher, compared to the previous year, cereal production in Europe and in the world. It should be noted, however, that prices fell from a high level since 2007 witnessed record-high cereal prices, not only in Poland, but worldwide as well, primarily due to growing demand. Limited supply of cereal grain in the EU's main producers (Germany, France), owing to poor yields and low stocks, pushed up import demand for cereals from cheaper European markets, also from Poland. Consequently, in spite of significant domestic cereal

production, there was a rapid rise for cereal prices. This situation proves that after Poland's accession to the European Union the opening-up of the market represents an important factor weakening the relationship between agricultural prices and agricultural output.

The findings of the surveys and analyses allow to draw the following general conclusions (Table IV.1.11):

- In 2006–2008 there was a gradual increase in the production of spring wheat, and in 2005–2007 in the selling price for grain. 2008 saw the best production results, whereas prices were the most favourable in 2007, which is confirmed by annual change indexes.
- In the period in question (2005–2008), there was a distinct upward trend of specific costs and total costs per ha of agricultural land under spring wheat. The two cost categories are very strongly correlated.
- Furthermore, the results obtained also show identical annual trends of the gross margin and income from activity (without subsidies) per ha of agricultural land under spring wheat.
- In 2005–2008 the growing of spring wheat was a profitable activity, but there were considerable disparities in income per ha. Between 2005 and 2006 income from activity hovered at PLN 600/ha, in 2007 it exceeded this level nearly 3.4 times, whereas in 2008 it decreases by 34.6% on 2007, but it was still higher than (more than double) the 2005–2006 figure.

The results presented in Table IV.1.11 illustrate changes in the production, cost and economic situation of the growers of spring wheat observed in 2005–2008 in the sample of holdings engaged in this activity every year. According to the findings, in 2007–2008 the economic results of spring wheat were relatively the best, mainly due to favourable production and price conditions.

The analysis of relationships between partial indicators confirms previous findings. In 2007–2008 the difference between the selling price for grain and the unit production cost was relatively the highest (2.2- and 1.6-fold respectively), much above the level recorded in the previous two years in question. The profitability of production was also the highest, the evaluation was based on the ratio of costs to the value of production.

Table IV.1.11

Production, costs and income from the growing of spring wheat in farms recurring in the surveys in 2005–2008

(for 2005 and 2008 – actual data, for 2005–2007 – estimated data)

Specification		Year			
		2005	**2006**	**2007**	**2008**
Area under cultivation	[ha]	12.49	12.49	12.49	24.48
Grain yield	[dt/ha]	44.0	35.4	44.7	56.0
Selling price for grain	[PLN/dt]	36.27	44.25	69.87	48.71
		Per ha of area under cultivation			
Total production	**[PLN]**	**1596**	**1564**	**3124**	**2728**
of which: grain		1596	1564	3124	2728
Total specific costs	**[PLN]**	**690**	**709**	**808**	**925**
of which: seed		125	138	207	192
mineral fertilisers, total		428	435	466	543
organic fertilisers, purchased		-	-	-	-
crop protection products		124	123	123	177
growth regulators		7	7	7	14
other		5	5	6	-
Gross margin without subsidies	**[PLN]**	**907**	**855**	**2316**	**1804**
Actual indirect costs[a]	[PLN]	276	285	297	365
Gross value added from activity	**[PLN]**	**631**	**570**	**2019**	**1439**
Depreciation	[PLN]	163	167	178	250
of which: of buildings and fixed equipment		40	40	45	51
of machinery and tools		63	66	69	138
of vehicles		56	57	60	57
Net value added from activity	**[PLN]**	**469**	**404**	**1842**	**1189**
Cost of external factors	[PLN]	121	121	133	149
Income from activity without subsidies	**[PLN]**	**347**	**283**	**1709**	**1040**
Subsidies[b]	[PLN]	281	312	293	269
Income from activity	**[PLN]**	**628**	**594**	**2002**	**1309**
TOTAL COSTS	**[PLN]**	***1249***	***1282***	***1415***	***1689***
Annual change		**previous year = 100**			
Grain yield		-	80.5	126.3	125.3
Selling price for grain		-	122.0	157.9	69.7
Total production		-	98.0	199.7	87.3
Total specific costs		-	102.8	114.0	114.5
Total costs		-	102.6	110.4	119.4
Income from activity		-	94.6	337.0	65.4

[a] Actual indirect costs without the cost of external factors.

[b] Subsidies only include the supplementary payment.

[-] - means "not observed".

The analysis of the economic side was based on the cost of obtaining PLN 1 of income from activity without subsidies; in 2005–2006 this ratio was 1:3.6 and 1:4.5 respectively, whereas in 2007 and in 2008 1:0.8 and 1:1.6 respectively. It is worth mentioning the role of subsidies, those represented the greatest support in 2006 when farmers received PLN 1.10 per PLN of income from activity without subsidies. This factor was the least significant in 2007, the ratio of income to subsidies was then 1:0.17.

With regard to the economic results of spring wheat, the best performance was observed in 2007, which is also proven by the highest level of income per dt of grain (PLN 44.77) and per hour of family labour (PLN 250.63) – Table IV.1.12.

Table IV.1.12

Indicators of economic efficiency of the growing of spring wheat in 2005–2008

Specification		Year			
		2005	**2006**	**2007**	**2008**
Specific costs/dt of grain	[PLN]	**15.67**	20.05	18.08	16.51
Total costs/dt of grain	[PLN]	**28.38**	36.26	31.65	30.20
Ratio of selling price to total unit cost		1.3	1.2	**2.2**	1.6
Income from activity/dt of grain	[PLN]	14.26	16.80	**44.77**	23.37
Ratio of total costs to total production		0.8	0.8	**0.5**	0.6
Ratio of total costs to income from activity without subsidies		3.6	4.5	**0.8**	1.6
Income from activity without subsidies/PLN of total	[PLN]	0.22	0.18	**0.55**	0.38
Share of subsidies in income from activity	[%]	44.7	52.4	14.6	20.6
Subsidies/PLN of income from activity without subsidies	[PLN]	0.81	1.10	0.17	0.26
Total labour input/dt of grain	[hour]	0.22	0.28	0.22	**0.19**
Income from activity/hour of family labour	[PLN]	78.59	74.35	**250.63**	130.29
Ratio of income from activity/hour of family labour to the parity rate of labour remuneration		9.1	8.2	**25.6**	12.1

The most favourable values of the indicators are in bold.

In the period in question (2005–2008), the growing of spring wheat ensured full remuneration of the farmer's work. It would have been possible even without the aid in the form of the supplementary payment, but the ratio of income from activity per hour of family labour to the parity rate of labour remuneration adopted for the calculations would be much lower.

It is assessed that in 2009 the income situation of growers of spring wheat was worse than in 2007–2008, but more advantageous than in 2005 and 2006. As compared to 2008, the development to determine this unfavourable situation was the decrease in the selling price for grain (by ca. 20%). The role of a higher unit production cost was rather minor as the cultivation costs per ha only rose by

approx. 5%. In 2009 income from activity per ha is evaluated to account for 60% of the 2008 level. It should be also added that in 2009 the rate of the supplementary payment (included in the accounts) per ha was PLN 356.47, PLN 87.15 higher on 2008, owing to a favourable exchange rate. In 2009 the payment rate was the highest in Poland's membership of the European Union, thus the role of this factor cannot be overlooked.

Oats

Empirical data for oats, as in the case of spring wheat discussed above, were collected in 2005 and 2008, and the sample included 23 holdings engaged in the growing of oats in both survey years. In the period in question (2005–2008), the area of agricultural land of those farms increased by 22.8% (i.e. by 11.9 ha). Changes were also observed in the structure of the value of production of those holdings; livestock production prevailed in the first survey year, whereas crop production – in the second. The share of oats in harvested area was similar in both years, more than 11%.

It should be noted that for the last few decades there has been a marked decline in the share of oats in sown area in Poland. In 2008 the total area under oats only accounted for 6.4% of the area under cereals[7].

Data contained in Table IV.1.10 indicate development-oriented changes in those holdings. Apart from an increase in agricultural area, significant capital was invested in fixed assets, in 2008 their value was as much as 30.9% higher than in 2005 (i.e. approx. PLN 90,000). The most impressive changes were observed in the item of machinery and tools for crop production – a rise in value by 72.4% (per ha – by 40.3%).

The oats yield in the surveyed holdings, as compared to GUS data for family farms, was ca. 52% higher in 2005–2007, whereas in 2008 a lower yield was recorded – by 7.0%. It was attributable to an extremely unfavourable combination of temperature and humidity conditions as certain regions suffered drought, particularly affecting spring crops.

In the first three years in question, the price situation was similar to the level of purchasing prices for oats together with mixed grains (according to GUS), whereas in 2008 the selling price was approx. 10% lower.

[7] *Wyniki produkcji roślinnej w 2008 r.*, GUS, Warsaw 2009.

Table IV.1.13

Production, costs and income from the growing of oats in farms recurring in the surveys in 2005–2008

(for 2005 and 2008 – actual data, for 2006–2007 – estimated data)

Specification		Year			
		2005	**2006**	**2007**	**2008**
Area under cultivation	[ha]	5.49	5.49	5.49	8.58
Grain yield	[dt/ha]	37.3	29.1	38.1	21.4
Selling price for grain	[PLN/dt]	29.64	33.80	52.77	45.23
Selling price for straw	[PLN/dt]	3.81	3.57	5.30	-
		Per ha of area under cultivation			
Total production	**[PLN]**	**1108**	**986**	**2012**	**966**
of which: grain		1106	985	2010	966
marketable straw		2	2	3	-
Total specific costs	**[PLN]**	**429**	**438**	**517**	**502**
of which: seed		91	96	153	89
mineral fertilisers, total		282	286	307	364
organic fertilisers, purchased		-	-	-	-
crop protection products		54	54	54	47
growth regulators		3	3	3	1
other		-	-	-	0
Gross margin without subsidies	**[PLN]**	**679**	**549**	**1496**	**465**
Actual indirect costs[a]	[PLN]	203	209	218	278
Gross value added from activity	**[PLN]**	**476**	**339**	**1278**	**187**
Depreciation	[PLN]	136	139	149	140
of which: of buildings and fixed equipment		33	33	37	27
of machinery and tools		55	57	59	62
of vehicles		45	46	48	50
Net value added from activity	**[PLN]**	**340**	**200**	**1129**	**47**
Cost of external factors	[PLN]	69	68	74	91
Income from activity without subsidies	**[PLN]**	**271**	**132**	**1056**	**-44**
Subsidies[b]	[PLN]	279	310	291	258
Income from activity	**[PLN]**	**550**	**442**	**1347**	**214**
TOTAL COSTS	**[PLN]**	***837***	***855***	***957***	***1010***
Annual change		**previous year = 100**			
Grain yield		-	78.0	130.9	56.2
Selling price for grain		-	114.0	156.1	85.7
Total production		-	89.0	204.1	48.0
Total specific costs		-	102.1	118.0	97.1
Total costs		-	102.2	111.9	105.5
Income from activity		-	80.4	304.8	15.9

[a] Actual indirect costs without the cost of external factors.

[b] Subsidies only include the supplementary payment.

[-] - means "not observed".

The analysis of the growing of oats conducted in 2005–2008 leads to the following conclusions (Table IV.1.13):

- As regards yields, no distinct trend (whether downward or upward) was observed, whereas the price for oats grain showed a steady increase in 2005–2007, with the highest growth rate noted in 2007 (56.1%).
- Specific costs per ha of area under oats were similar, the difference between the highest and the lowest levels were a mere PLN 88 in the period in question. Their effect on total costs was significant.
- In the period in question, the growing of oats was profitable, but the least favourable situation was noted in 2008, without support in the form of the supplementary payment farmers would have suffered losses – the value of production per ha covered total costs in 96%.

  However, the farmers' losses were compensated by the supplementary payment received, its surplus also represented income from activity, with the lowest level in 2008 (PLN 214 per ha); it only accounted for 15.9% of the 2007 figure.
- Oats, as other cereals, provided the best results for growers in 2007, income from activity exceeded the previous year's level more than three times. It was determined by exceptionally favourable production and price results (yield – 38.1 dt/ha, price for grain – PLN 52.77/dt).

The indicators applied in the evaluation confirm the above conclusions, in 2007 all of them had the most favourable values, with the only exception of those describing costs per dt of grain. It should be added that it was the same situation as in the case of spring wheat. The calculations also point to an unfavourable situation of the growers of oats in 2008, which is reflected in the ratio of the selling price for 1 dt of grain per unit production cost (1:0.96) or the ratio of subsidies to income from activity (1:1.2) – Table IV.1.14.

In 2007 technical productivity determined the highest profitability of producing oats grain. The evaluation was based on the ratio of costs to the value of production, the most favourable in 2007. The calculations revealed that the cost per production unit was much lower compared to the other years in question, with the difference ranging from 37.5% to 54.5% (in comparison with 2005 and 2008 respectively). As regards the economic side, the analysis focused on the cost of obtaining a unit of income without subsidies, the difference in favour of 2007 is obvious – 3.4-fold compared to 2005, and even 7.2-fold compared to 2006.

Table IV.1.14

Indicators of economic efficiency of the growing of oats in 2005–2008

Specification		Year			
		2005	**2006**	**2007**	**2008**
Specific costs/dt of grain	[PLN]	**11.50**	15.03	13.57	23.49
Total costs/dt of grain	[PLN]	**22.42**	29.33	25.12	47.27
Ratio of selling price to total unit cost		1.3	1.2	**2.1**	0.96
Income from activity/dt of grain	[PLN]	14.73	15.15	**35.36**	10.03
Ratio of total costs to total production		0.8	0.9	**0.5**	1.1
Ratio of total costs to income from activity without subsidies		3.1	6.5	**0.9**	x
Income from activity without subsidies/PLN of total	[PLN]	0.25	0.13	**0.53**	x
Ratio of subsidies to income from activity		0.5	0.7	0.2	1.2
Subsidies/PLN of income from activity without subsidies	[PLN]	1.03	2.35	0.28	x
Total labour input/dt of grain	[hour]	0.31	0.40	**0.30**	0.38
Income from activity/hour of family labour	[PLN]	53.05	42.59	**129.93**	32.53
Ratio of income from activity per hour of family labour to the parity rate of labour remuneration		6.1	4.7	**13.3**	3.0

[x] - means that performing calculations was not justified.

The most favourable values of the indicators are in bold.

In 2007 income from activity per dt of grain was PLN 35.36, and that per hour of family labour – PLN 129.93; those amounts should be assessed as very favourable, in comparison with the other analysed years they were several times higher. In the period in question (2005–2008), the growing of oats ensured full remuneration of the farmer's work, but in 2008 it was only possible thanks to subsidies.

Between 2005 and 2009, the income situation of growers of oats may be described as very different. The growers obtained the highest income from activity in 2007 – PLN 1,347/ha, whereas a year before it accounted for a mere 16% of this amount and could only be achieved thanks to subsidies. Without support in the form of subsidies, farmers growing oats would also have suffered losses in 2009. Income from activity without subsidies was negative, but its fall was much more dramatic than a year before. It was mostly due to the lower selling price for grain (by ca. 27%), higher cultivation costs per ha (by approx. 5%) also had a certain effect. An increase in yield by over 17% could not compensate for the negative impact of those factors. It is assessed that the cultivation costs per ha exceeded the value of production by ca. 27% (in 2008 – by approx. 5%). The loss was ultimately compensated by the supplementary payment, which also generated income from activity, but in 2009 it only accounted for ca. 50% of the 2008 level.

Winter wheat

The schedule of work under the research topic also included the assessment of the income situation in winter wheat growing. In terms of economic significance, it represents one of the most important cereals in Poland. In 2008 the share of winter wheat in the area under basic cereals was 28.6%, and in the total area under wheat – 84.9%[8].

In the AGROKOSZTY system the surveys of the production, cost and income side of growing winter wheat were conducted in 2006 and 2008. This analysis covered 26 holdings engaged in this activity in both years.

Table IV.1.15

Selected information on holdings growing wheat, rye and rape recurring in the survey years (actual data)

Specification			Winter wheat		Winter rye		Winter rape	
			Survey year					
			2006	**2008**	**2006**	**2008**	**2006**	**2008**
Number of farms surveyed			26	26	21	21	19	19
Area of agricultural land		[ha]	58.49	64.62	116.79	125.65	88.83	93.20
Area of arable land		[ha]	56.66	62.13	102.75	111.84	87.35	90.86
Soil valuation index		[point]	1.11	1.15	0.77	0.78	1.13	1.14
Area under cultivation		**[ha]**	**21.18**	**23.73**	**16.05**	**12.91**	**20.41**	**21.49**
Share in the structure of total harvested area		[%]	36.8	37.6	14.3	9.9	23.3	23.1
Total labour input into the surveyed activity		[h/ha]	12.1	9.6	9.0	10.3	7.7	10.1
of which: family labour input			11.0	9.2	5.7	8.8	6.6	9.3
Total NPK used for the surveyed activity		[kg/ha]	246	245	183	185	295	378
Structure of the value of farm production		[%]	100.0	100.0	100.0	100.0	100.0	100.0
of which:	crop production		65.1	72.7	56.5	71.0	74.7	73.4
	of which: surveyed activity		31.5	40.1	12.5	12.3	21.3	31.5
	livestock production		34.1	26.4	40.0	27.9	23.9	25.3
Value of selected fixed assets		[PLN/farm]	329 318	378 911	353 619	407 495	510 659	601 184
		[PLN/ha of UAA]	5 631	5 864	3 028	3 243	5 749	6 450
of which:	buildings and fixed equipment	[PLN/farm]	140 357	155 051	177 178	186 100	227 131	226 095
		[PLN/ha of UAA]	2 400	2 399	1 518	1 481	2 557	2 426
	tractors	[PLN/farm]	79 254	88 073	62 632	90 719	132 603	160 103
		[PLN/ha of UAA]	1 355	1 363	536	722	1 493	1 718
	lorries, vans and other vehicles	[PLN/farm]	10 796	15 063	10 528	8 254	10 637	17 050
		[PLN/ha of UAA]	185	233	90	66	120	183
	machinery, tools and equipment for crop production	[PLN/farm]	98 911	120 723	103 281	122 422	140 288	197 936
		[PLN/ha of UAA]	1 691	1 868	884	974	1 579	2 124

According to data presented in Table IV.1.15, those were farms specialising in crop production, with a major share of winter wheat, both in production and in harvested area. The group included large holdings which in

[8] *Użytkowanie gruntów, powierzchnia zasiewów i pogłowie zwierząt gospodarskich w 2008 r.*, GUS, Warsaw 2008.

the second year of the period further increased their area by 6.13 ha or agricultural land (of which arable land represented 5.47 ha).

Data from the database of the Polish FADN indicate that within three years (in 2006–2008) there were also changes in fixed assets of those holdings. In 2008 their value rose by 15.1%, and that per ha of agricultural land – by 4.1%. The farmers invested in vans and other vehicles, machinery and tools for crop production as well as in tractors.

Winter wheat was grown in an area of over 20 ha (in 2006 – 21.18 ha, in 2008 – 23.73 ha). The yield significantly exceeded the national average for family farms, with the difference ranging between 30.1% in 2007 and 53.9% in 2008. As regards the selling price for grain, in 2005–2007 it was similar to the national average purchasing price according to GUS (a rise by a mere 2.5%), whereas in 2008 it was 16.2% lower.

The results for the surveys and analyses of winter wheat conducted in 2006–2008 allow the following observations and conclusions (Table IV.1.16):

- In the subsequent years, there was a gradual rise in the yield of winter wheat, by over 20% (to 8.5 dt in 2007 and 10.9 dt in 2008). The increase in yield was significant, which indicates the farmers' efforts to this end. In 2008 61.1 dt of grain was obtained from 1 ha of area under cultivation, as much as 53.9% more than the national average yield in family farms.
- The selling price for grain in the survey sample of holdings reflected national trends, the highest price was obtained by the farmers in 2007. After a year a considerable fall in price was noted (by 25.7%), but from the high 2007 level, therefore in 2008 the price for wheat grain continued to be higher than in 2006 – by 17.3% (i.e. by PLN 7.94 per dt).
- In the period in question, a gradual decline in the unit production cost of 1 dt of grain was noted. In 2008, although the cultivation costs per ha were the highest, the unit cost was the lowest. It was determined by a higher growth rate of yield than that of cultivation costs, resulting in a decrease in production costs per dt. As compared to 2007, there was a rise in yield by 21.8%, whereas cultivation costs per ha went up by 20.6%; as a result, unit production cost of 1 dt fell by ca. 1%. The comparison of 2006 and 2008 shows that the growth rate of yield exceeded that of costs by 15.9 percentage points, which pushed down production costs per dt by 10.8%.

Table IV.1.16

Production, costs and income from the growing of winter wheat in farms recurring in the surveys in 2006–2008

(for 2006 and 2008 – actual data, for 2007 – estimated data)

Specification			Year		
			2006	**2007**	**2008**
Area under cultivation		[ha]	21.18	21.18	23.73
Grain yield		[dt/ha]	41.7	50.2	61.1
Selling price for grain		[PLN/dt]	45.86	72.42	53.80
Selling price for straw		[PLN/dt]	-	-	10.00
			Per ha of area under cultivation		
Total production		**[PLN]**	**1913**	**3633**	**3291**
of which:	grain		1913	3633	3286
	marketable straw		-	-	5
Total specific costs		**[PLN]**	**843**	**939**	**1065**
of which:	seed		109	157	205
	mineral fertilisers, total		476	512	542
	organic fertilisers, purchased		26	39	-
	crop protection products		209	208	284
	growth regulators		21	21	33
	other		3	3	1
Gross margin without subsidies		**[PLN]**	**1070**	**2694**	**2225**
Actual indirect costs[a]		[PLN]	384	401	546
Gross value added from activity		**[PLN]**	**686**	**2293**	**1680**
Depreciation		[PLN]	253	268	337
of which:	of buildings and fixed equipment		38	42	48
	of machinery and tools		118	123	168
	of vehicles		94	99	118
Net value added from activity		**[PLN]**	**433**	**2026**	**1343**
Cost of external factors		[PLN]	126	132	151
Income from activity without subsidies		**[PLN]**	**307**	**1893**	**1193**
Subsidies[b]		[PLN]	296	278	269
Income from activity		**[PLN]**	**603**	**2172**	**1462**
TOTAL COSTS		**[PLN]**	***1606***	***1740***	***2098***
Annual change			**previous year = 100**		
Grain yield			-	120.3	121.8
Selling price for grain			-	157.9	74.3
Total production			-	189.9	90.6
Total specific costs			-	111.4	113.4
Total costs			-	108.3	120.6
Income from activity			-	360.2	67.3

[a] Actual indirect costs without the cost of external factors.

[b] Subsidies only include the supplementary payment.

[-] - means "not observed".

- In 2006–2008 there was a distinct upward trend of specific costs and of total costs per ha of area under winter wheat. A higher growth rate was noted in 2008, due to a faster increase in prices for agricultural inputs.
- Between 2006 and 2008 the growing of winter wheat was profitable. In comparison with the results of spring wheat, income from activity was slightly higher for winter wheat, by 1.5% in 2006, and by 8.5% and 11.7%, respectively, in subsequent years.
- As a consequence of significant differences in the production and price results of winter wheat between the analysed years, there were major disparities income from activity per ha of area under cultivation. Definitely the most favourable year was 2007 when this income exceeded the 2006 level 3.6 times. Although in 2008 it dropped by 32.7%, it was still higher than in 2006 – over 2.4 times.
- Identical annual trends were found with regard to specific costs and total costs as well as the gross margin and income from activity (without subsidies).

According to the findings, in 2007–2008 the economic results of the growing of winter wheat were much better than in 2006. It was determined exclusively by production and price conditions since cultivation costs increased every year – Table IV.1.16.

The indicators used for the assessment of the production process serve as confirmation of the above. Apart from the unit cost and the labour intensity of production, the most favourable in 2008, all the other measures should be seen as relatively the most advantageous in 2007.

For instance, in 2007 the selling price for grain exceeded the unit production cost 2.1 times, whereas in 2006 and 2008 it was 1.2 and 1.6 times respectively. The ratio of total costs to the value of production was adopted to evaluate the profitability of production, the most favourable in 2007. The analysis of the economic side included the cost of obtaining a unit of income from activity without subsidies; in 2007 the ratio amounted to 1:0.9, whereas in 2008 it was double the figure, and 5.8 times as high in 2006. The best economic performance in 2007 is also evident in terms of income per dt of grain (PLN 43.29) and per hour of family labour (PLN 197.96) – Table IV.1.17.

Table IV.1.17

Indicators of economic efficiency of the growing of winter wheat in 2006–2008

Specification		Year		
		2006	**2007**	**2008**
Specific costs/dt of grain	[PLN]	20.21	18.71	**17.44**
Total costs/dt of grain	[PLN]	38.50	34.66	**34.35**
Ratio of selling price to total unit cost		1.2	**2.1**	1.6
Income from activity/dt of grain	[PLN]	14.46	**43.29**	23.93
Ratio of total costs to total production		0.8	**0.5**	0.6
Ratio of total costs to income from activity without subsidies		5.2	**0.9**	1.8
Income from activity without subsidies/PLN of total	[PLN]	0.16	**0.52**	0.36
Share of subsidies in income from activity		49.1	12.8	18.4
Subsidies/PLN of income from activity without subsidies	[PLN]	0.96	0.15	0.23
Total labour input/dt of grain	[hour]	0.29	0.24	**0.16**
Income from activity/hour of family labour	[PLN]	54.96	**197.96**	159.65
Ratio of income from activity per hour of family labour to the parity rate of labour remuneration		6.1	**20.2**	14.9

The most favourable values of the indicators are in bold.

In the years in question (2006–2008), despite varying economic performance, the growing of winter wheat allowed full remuneration of family labour input. But the ratio of income from activity per hour of family labour to the parity rate of labour remuneration adopted for the calculations was the highest in 2007. The findings indicate that the income situation in winter wheat growing was sufficiently favourable the ensure the remuneration of the farmers' work even without the support in the form of the supplementary payment.

Between 2006 and 2008, income from the growing of winter wheat was subject to major fluctuations, largely due to movements in the selling price for grain. The estimation account performed suggests that in 2009 the income situation of wheat growers was much worse than in 2007–2008. Most importantly, there was a dramatic drop in grain price (by approx. 20%) and a rise in the unit production cost (by ca. 6%). A minor increase in yield (by approx. 1%) could not compensate for the adverse influence of the above-mentioned factors. As a result, income from activity per ha under winter wheat was ca. 45% lower in comparison with 2008. Considering the cultivation conditions, it should be noted that in 2009 the ratio of the selling price for grain to the unit production cost was also less favourable than a year before.

Winter rye

According to the schedule for subsequent years of the implementation of the research topic, the production and economic results of the growing of winter rye were evaluated as well. The relevant surveys were carried out in 2006 and 2008. For the purposes of this analysis, 21 holdings participating in both survey years were selected from the sample.

It should be highlighted that those were the largest agricultural holdings to have been surveyed in terms of production performance in the AGROKOSZTY system in the years in question. In 2006 the area of agricultural land was 116.8 ha, and in 2008 – 125.7 ha, with arable area accounting for 88% and 89% respectively. It was, however, agricultural land characterised by rather poor soil, with the soil valuation index of 0.77 and 0.78 respectively. Crop production dominated in the structure of the production value in the holdings in question, with a 56.5% share in the first survey year, and as much as 71.0% in the second. As a consequence of this growth, there was a fall in the share of livestock production (from 40.0% to 27.9%). Rye accounted for a very similar share in the value of crop production in both survey years, over 12%.

Between 2006 and 2008, the value of the most important groups of farm fixed assets rose by 15.2%, and per ha of agricultural land – by 7.1%. Definitely the highest growth rate was recorded in the case of tractors, their value in the holdings in question jumped by 44.8%, and per ha of agricultural land by 34.7% – Table IV.1.15.

In 2006 the area under rye was 16.05 ha, whereas in 2008 it was 3.14 ha smaller, there was also a decline in the share of rye in harvested area – by 4.4 percentage points. In the group of holdings in question rye yield was distinctly above the national average for family farms, the difference ranging from 32.1% in 2007 to 57.3% in 2008. At the same time, the selling price for grain was below the average purchasing price according to GUS data, by 3.7% to 12.0%.

The analysis of the growing of winter rye in 2006–2008 and the survey results allow to draw the following general conclusions (Table IV.1.18):

- The analysis of rye yield and the selling price for grain shows the same annual trends as in the case of the cereals discussed above. It is consistent with the average trend observed in family farms in Poland (according to GUS data).

Table IV.1.18

Production, costs and income from the growing of winter rye in farms recurring in the surveys in 2006–2008

(for 2006 and 2008 – actual data, for 2007 – estimated data)

Specification			Year		
			2006	**2007**	**2008**
Area under cultivation		[ha]	16.05	16.05	12.91
Grain yield		[dt/ha]	26.3	31.3	37.6
Selling price for grain		[PLN/dt]	37.09	57.98	45.47
Selling price for straw		[PLN/dt]	2.07	3.07	1.70
			Per ha of area under cultivation		
Total production		**[PLN]**	**979**	**1821**	**1713**
of which:	grain		976	1817	1708
	marketable straw		3	5	4
Total specific costs		**[PLN]**	**517**	**580**	**679**
of which:	seed		71	106	113
	mineral fertilisers, total		364	392	476
	organic fertilisers, purchased		-	-	-
	crop protection products		75	75	75
	growth regulators		8	8	13
	other		-	-	2
Gross margin without subsidies		**[PLN]**	**462**	**1241**	**1033**
Actual indirect costs[a]		[PLN]	215	225	431
Gross value added from activity		**[PLN]**	**248**	**1016**	**602**
Depreciation		[PLN]	110	117	218
of which:	of buildings and fixed equipment		21	24	29
	of machinery and tools		51	53	97
	of vehicles		37	39	91
Net value added from activity		**[PLN]**	**138**	**900**	**384**
Cost of external factors		[PLN]	133	146	189
Income from activity without subsidies		**[PLN]**	**5**	**754**	**196**
Subsidies[b]		[PLN]	313	295	269
Income from activity		**[PLN]**	**318**	**1049**	**465**
TOTAL COSTS		**[PLN]**	***974***	***1067***	***1517***
Annual change			**previous year = 100**		
Grain yield			-	119.1	120.0
Selling price for grain			-	156.3	78.4
Total production			-	186.0	94.1
Total specific costs			-	112.2	117.1
Total costs			-	109.5	142.2
Income from activity			-	329.9	44.3

[a] Actual indirect costs without the cost of external factors.

[b] Subsidies only include the supplementary payment.

[-] - means "not observed".

- In the group of holdings in question the production results of the growing of rye improved every year and were much better than the national average. As far as the price conditions are concerned, those were the most favourable in 2007, in 2008 the selling price for grain was lower (by 21.6%), but still considerably exceeded the 2006 level (by 22.6%).
- Higher yield involved increased costs; the highest growth rate of the latter was recorded in 2008, particularly with regard to indirect costs. To a certain extent, it was connected with changes in fixed assets in the farms in question, a rise in their value also resulted in significantly increased depreciation.
- In 2006–2008 trends for specific costs and total costs were the same, as in the case of the gross margin and income from activity (without subsidies). There is a clear relationship between those cost and income categories.
- In the years in question, winter rye ensured income from activity, but its level was largely determined by subsidies. It was particularly evident in 2006 – income from activity without subsidies only amounted to PLN 5/ha.
- It should be pointed out that the annual trends of income from activity per ha of area under cultivation were identical for all the cereals in question (i.e. spring wheat, oats, winter wheat and winter rye). It increased several times in 2007, whereas 2008 witnessed a considerable decline, but it continued to exceed the 2006 level (with the exception of oats).

The results presented in Table IV.1.18 illustrate changes in the income situation of growers of winter rye, stemming from fluctuations in production and costs. In 2007, as compared to 2006, the growth rate of the value of production per ha of area under cultivation was much higher than that of costs incurred (by 76.5 percentage points), which resulted in a major increase in income (3.3-fold). But in 2008 the situation was very different, the level of production showed a decrease (by 5.9%), whereas total costs went up (by 42.2%), thus deteriorating the income situation of rye growers.

Almost all the indicators had the most favourable values in 2007, with the exception of two, but the difference to the disadvantage of 2007 was minor – Table IV.1.19.

Table IV.1.19

Indicators of economic efficiency of the growing of winter rye in 2006–2008

Specification		Year		
		2006	**2007**	**2008**
Specific costs/dt of grain	[PLN]	19.64	18.51	**18.01**
Total costs/dt of grain	[PLN]	37.03	**34.07**	40.37
Ratio of selling price to total unit cost		1.0	**1.7**	1.1
Income from activity/dt of grain	[PLN]	12.09	**33.47**	12.38
Ratio of total costs to total production		1.0	**0.6**	0.9
Ratio of total costs to income from activity without subsidies		204.7	**1.4**	7.8
Income from activity without subsidies/PLN of total	[PLN]	0.01	**0.41**	0.11
Share of subsidies in income from activity	[%]	98.5	28.1	57.9
Subsidies/PLN of income from activity without subsidies	[PLN]	62.60	0.39	1.37
Total labour input/dt of grain	[hour]	0.34	0.29	**0.27**
Income from activity/hour of family labour	[PLN]	56.21	**185.38**	52.58
Ratio of income from activity per hour of family labour to the parity rate of labour remuneration		6.2	**18.9**	4.9

The most favourable values of the indicators are in bold.

When analysing the figures in Table IV.1.19, it is worth noting income from activity per dt of grain; in 2006 and 2008 it was nearly identical, whereas in 2007 it was almost 3 times higher. A similar trend could also be observed in the case of income from activity per hour of family labour. Its level compensated for labour input, but in 2006 it was only possible thanks to subsidies – their share in income from activity per ha of area under cultivation was as high as 98.5%. With regard to the economic side of rye production, the cost of obtaining a unit of income from activity without subsidies was taken into account, which was PLN 1.4 in the most favourable 2007, as much as PLN 204.7 in 2006, and PLN 7.8 in 2008.

In 2009 the production results of rye were much better than a year before, according to GUS the yield increased by approx. 8%. Nevertheless, the price conditions appeared to be much worse – the selling price for grain fell by over 28%. Another factor with an adverse effect on the income situation of rye growers were cultivation costs per ha, more than 8% higher than in 2008. Consequently, the value of production covered the costs incurred only in part – in ca. 80%. Income from activity without subsidies was negative, but the supplementary payment compensated for the farmers' losses. However, income from activity generated by the supplementary payment exceeding production costs was 13 times lower against 2008. It is assessed that in 2009 the economic results of the growing of rye were the worst in the four years in question (2006–2009).

Winter rape

Winter rape was covered by surveys under the AGROKOSZTY system in 2006 and 2008, in the survey sample there were 19 holdings surveyed in both years. It should be stressed that over three years (2006–2008) those farms slightly increased their area of agricultural land (by 4.4 ha) and in 2008 had 93.20 ha, approx. 98% of which represented arable land. The group specialised in crop production, with ca. 74% share in the value of total production. The share of rape in the value of crop production was 21.3% in the first survey year, and 31.5% in the second. As regards the structure of harvested area, in both survey years rape accounted for approx. 23%.

According to the findings, in the period in question there were changes in fixed assets of the farms surveyed, the farmers invested in tractors, vehicles and machinery, whereas no changes were recorded in the value of buildings and fixed equipment. In 2008 the value of the main items of fixed assets per ha of agricultural land went up by 12.2% against 2006 – Table IV.1.15.

In the period in question, the area of winter rape plantations was similar – ca. 21 ha. In 2006 the yield exceeded the national average for family farms by 3.2%, in 2007 – by 1.9%, whereas in 2008 it was as much as 19.1% higher. At the same time, the selling price for seed was approx. 3-4% lower.

It should be added that the results of crop production, including the growing of rape, are influenced by a number of factors such as soil quality or fertilisation. In Polish agriculture they also depend on climatic conditions, and rape is a plant particularly sensitive to changing weather. In 2008, in most regions of Poland the weather conditions were rather favourable for rape; according to GUS, the average yield in family farms was 26.2 dt/ha, the highest level in four years, i.e. from 2004. Not surprisingly, the holdings included in the survey sample of the AGROKOSZTY system, more viable economically, the production performance was above the national average.

The findings from the surveys of winter rape conducted in 2006–2008 allow to present the following observations and conclusions (Table IV.1.20):

- There was a gradual rise in yield, the selling price for seed and the value of production per ha of area under cultivation, but in 2008 the growth rate recorded was the highest. In comparison with 2007, yield went up by 19.1%, price for seed – by 33.4%, and production per ha of area under rape was as much as 58.6% higher, and thus determined the level of income from activity.

Table IV.1.20

Production, costs and income from the growing of winter rape in farms recurring in the surveys in 2006–2008

(for 2006 and 2008 – actual data, for 2007 – estimated data)

Specification		Year		
		2006	**2007**	**2008**
Area under cultivation	[ha]	20.41	20.41	21.49
Seed yield	[dt/ha]	26.0	26.2	31.2
Selling price for seed	[PLN/dt]	89.94	92.07	122.80
		Per ha of area under cultivation		
Total production	**[PLN]**	**2339**	**2413**	**3827**
of which: seed		2339	2413	3827
Total specific costs	**[PLN]**	**1276**	**1340**	**1412**
of which: seed		126	128	152
mineral fertilisers, total		733	795	915
organic fertilisers, purchased		-	-	-
crop protection products		379	378	311
growth regulators		25	24	19
other		14	14	15
Gross margin without subsidies	**[PLN]**	**1063**	**1073**	**2415**
Actual indirect costs[a]	[PLN]	424	442	745
Gross value added from activity	**[PLN]**	**638**	**631**	**1670**
Depreciation	[PLN]	277	296	462
of which: of buildings and fixed equipment		70	79	75
of machinery and tools		106	111	241
of vehicles		101	106	146
Net value added from activity	**[PLN]**	**361**	**335**	**1208**
Cost of external factors	[PLN]	101	106	307
Income from activity without subsidies	**[PLN]**	**260**	**229**	**901**
Subsidies[b]	[PLN]	312	293	302
Income from activity	**[PLN]**	**572**	**522**	**1203**
TOTAL COSTS	**[PLN]**	***2079***	***2184***	***2925***
Annual change		**previous year = 100**		
Seed yield		-	100.8	119.1
Selling price for seed		-	102.4	133.4
Total production		-	103.2	158.6
Total specific costs		-	105.0	105.4
Total costs		-	105.1	133.9
Income from activity		-	91.3	230.5

[a] Actual indirect costs without the cost of external factors.

[b] Subsidies include the supplementary payment, and in 2007-2008 also aid for energy crops and the *de minimis* aid for rape (if granted).

[-] - means "not observed".

- The selling price for seed and rape yield in the surveyed holdings reflected national trends.
- The years in question witnessed a distinct upward trend of specific costs and total costs per ha of area under rape.

  In 2007 the growth rate of both cost categories was roughly the same (ca. 5%), but in 2008 total costs went up at a much faster pace (by 33.9%), pushed up by rising indirect costs, including increased depreciation of fixed assets involved in production. It was connected with investments made by the farmers, thus with a rise in the value of fixed assets.
- The survey findings prove that in the period in question the growing of winter rape was a profitable activity. The best economic performance was recorded in 2008, even though the external conditions for agricultural production were not very favourable (according to GUS, prices for goods and services used in current production increased by as much as 12.8%), due to relatively high yield and an advantageous selling price for seed. Income from activity per ha of area under cultivation exceeded the 2007 level nearly by 131% (at PLN 1,203, whereas it was PLN 522 in the previous year).

The survey findings indicate a positive correlation between the production and price results of particular products and the level of income obtained. As a matter of fact, farmers have little scope for manipulating the selling prices for their products, but they may attempt to make more efficient use of inputs, and consequently to improve production performance. According to the surveys, this course of action is the most advantageous with regard to the improvement of the income situation.

The analysis of relationships between partial indicators for the growing of winter rape indicates a distinctly more favourable situation in 2008. Although the production cost per dt of seed was the highest (PLN 93.87), income from activity per dt of seed exceeded the 2006 level by 75.6%, and the 2007 figure by 93.8%. Between 2006 and 2008 the ratio of costs incurred to the value of production was advantageous for rape producers, as the ratio of the selling price to the production cost per dt. Nevertheless, in 2008 the values of those indicators should be regarded as definitely the most favourable. In the years in question, income from activity per hour of family labour ensured full remuneration of the farmer's labour, it was possible even without support in the form of supplementary payments. The results obtained suggests that the income situation of rape growers is sufficiently favourable to also ensure the remuneration of other production factors (i.e. land and capital) – Table IV.1.21.

Table IV.1.21

Indicators of economic efficiency of the growing of winter rape in 2006–2008

Specification		Year		
		2006	**2007**	**2008**
Specific costs/dt of seed	[PLN]	49.08	51.12	**45.31**
Total costs/dt of seed	[PLN]	**79.93**	83.35	93.87
Ratio of selling price to total unit cost		1.1	1.1	**1.3**
Income from activity/dt of seed	[PLN]	21.99	19.92	**38.61**
Ratio of total costs to total production		0.9	0.9	**0.8**
Ratio of total costs to income from activity without subsidies		8.0	9.6	**3.2**
Income from activity without subsidies/PLN of total	[PLN]	0.11	0.10	**0.24**
Share of subsidies to income from activity		54.5	56.2	25.1
Subsidies/PLN of income from activity without subsidies	[PLN]	1.20	1.28	0.34
Total labour input/dt of seed	[hour]	**0.29**	**0.29**	0.33
Income from activity/hour of family labour	[PLN]	86.22	78.69	**129.78**
Ratio of income from activity per hour of family labour to the parity rate of labour remuneration		9.6	8.0	**12.1**

The most favourable values of the indicators are in bold.

According to GUS data, 2007 saw a deterioration in the profitability of rape production relative to wheat, on account of much higher growth rates of both wheat selling prices and yields as compared to those for rape. However, in 2008 the selling price for rape was higher than a year before (by 32.5%), which accompanied by falling wheat prices suggests improved relative prices between rape and wheat. The survey findings confirm the observed national trends, in 2007 the ratio of rape and wheat prices was 1:1.27, whereas in 2008 it was 1:2.28.

In 2009 rape yield was higher than in the previous year, by approx. 12% according to GUS, but there was a drop in the selling price for seed – by over 15%, which in the surveyed holding meant a fall in price by more than PLN 19 per dt of seed. Due to increased prices for production inputs, the cultivation costs per ha of area under rape rose by ca. 9%. As a result of such developments, income from activity dropped considerably, it is estimated to have only accounted for 60% of the 2008 level in 2009. Nevertheless, it still exceeded the 2005–2007 figures. The production costs per dt of seed was higher than in the previous year, which – coupled with a fall in the selling price for seed – notably deteriorated the ratio of seed price to unit production cost.

Dairy cows

Milk production is a significant agricultural activity determining the level of livestock production in Poland. This section of the report contains a comparative analysis of output, production inputs and costs and the profitability of milk production in 2006–2008. The results are presented in a different manner than in the case of the activities discussed above. It is due to the fact that the survey of milk cows was only carried out in 2006, therefore there are no data for holdings recurring in the surveys. The analysis was performed on the basis of data on 158 farms which were engaged in dairy cattle farming in 2006. Those were holding specialising in livestock production, clearly dominated by dairy cows; their annual average number was 20 – Table IV.1.22.

Table IV.1.22

Selected information on holdings with dairy cows in 2006 (actual data)

Specification			**Dairy cows**
			Survey year - 2006
Number of farms surveyed			158
Area of agricultural land		[ha]	33.88
Area of arable land		[ha]	25.22
Area of permanent pasture		[ha]	8.62
Soil valuation index		[point]	0.88
Annual average number of dairy cows		**[head]**	**20.0**
Milk yield of cows		[litre]	5474
Forage area per dairy cow		[ha]	0.62
Total labour input per dairy cow		[hour]	138.4
of which: family labour input			126.4
Structure of the value of production		[%]	100.0
of which:	crop production		22.1
	livestock production		76.6
	of which: dairy cows		82.8
Value of selected fixed assets		[PLN/farm]	349 799
		[PLN/ha of UAA]	10 326
of which:	buildings and fixed equipment	[PLN/farm]	189 105
		[PLN/ha of UAA]	5 582
	tractors	[PLN/farm]	58 827
		[PLN/ha of UAA]	1 737
	lorries, vans and other vehicles	[PLN/farm]	6 483
		[PLN/ha of UAA]	191
	machinery, tools and equipment for crop production	[PLN/farm]	65 007
		[PLN/ha of UAA]	1 919
	machinery, tools and equipment for livestock production	[PLN/farm]	30 377
		[PLN/ha of UAA]	897

For comparison, according to GUS data, in 2005 the number of dairy cows per dairy farm was 3.9, whereas in 2007 it was 4.3[9]. These figures reflect the growing concentration of milk production, but the difference in herd size in comparison with the survey sample of the AGROKOSZTY system is still very significant. The milk yield of cows in the years in question ranged from 5,400 to 5,700 litres, above the national average for milk yield by approx. 1,200 litres. The selling price for milk was also higher – by ca. 7%.

The findings from the survey of dairy cows carried out in 2006–2008 allow to draw the following general conclusions (Table IV.1.23):

- As regards the value of production per dairy cows, in 2007 it rose by 15.3% on the previous year (owing to an increase in milk yield and milk price), whereas in 2008 it declined by 2.6% (only due to a fall in milk price as milk yield per cow went up).
- Total costs of dairy farming showed a steady growth every year – by approx. 10%, largely pushed up by specific costs, mainly related to the feeding method.
- According to the calculations, there is a correlation between specific costs/total costs and the gross margin/income from activity (without subsidies).
- Income from activity per dairy cow was largely determined by two factors, i.e. milk yield and the selling price for milk, or components of the value of production.
- In 2006–2008 milk production was profitable, but farmers had the best results in 2007, income from activity per dairy cow exceeded the 2006 figure by 24.2%. But 2008 saw a considerable decline, on both 2007 and 2006 (by 25.0% and 6.9% respectively).

Considering the economic side of milk production, it should be noted that in 2008 milk was one of agricultural products whose prices dropped the most dramatically. Following a rapid increase in 2007 (due to a reduced supply of milk and a significant rise in prices in the world market), in 2008 (in December-on-December terms) its price went down by 32.7%. In annual terms it was PLN 1.02 per litre, i.e. 4.5% less than a year before (according to GUS). The decrease in price was caused by an increase in milk supply and deteriorated conditions in the world market.

[9] *Charakterystyka gospodarstw rolnych w 2005 r.*, GUS, Warsaw 2006; *Charakterystyka gospodarstw rolnych w 2007 r.*, GUS, Warsaw 2008.

Table IV.1.23

Production, costs and income from milk production in 2006–2008

(for 2006 – actual data, for 2007–2008 – estimated data)

Specification			Year		
			2006	**2007**	**2008**
Annual average number of dairy cows		[head]	20.0	20.0	20.0
Milk yield per cow		[litre]	5474	5603	5719
Selling price for milk		[PLN/litre]	0.99	1.15	1.09
			Per dairy cow		
Total production		**[PLN]**	**6116**	**7052**	**6868**
of which: milk			5425	6405	6240
	calf weaned		455	414	381
	cull dairy cow		235	233	247
Total specific costs		**[PLN]**	**2286**	**2586**	**2898**
of which:	livestock replacement		403	429	438
	purchased feedingstuffs		756	895	1005
	farm-produced marketable		505	698	765
	farm-produced unmarketable		315	245	346
	other		308	319	345
Gross margin without subsidies		**[PLN]**	**3830**	**4466**	**3971**
Actual indirect costs[a]		[PLN]	864	899	1013
Gross value added from activity		**[PLN]**	**2965**	**3567**	**2958**
Depreciation		[PLN]	788	845	863
of which:	of buildings and fixed equipment		263	295	288
	of machinery and tools		331	346	367
	of vehicles		186	197	200
Net value added from activity		**[PLN]**	**2177**	**2722**	**2095**
Cost of external factors		[PLN]	215	230	258
Income from activity without subsidies		**[PLN]**	**1962**	**2493**	**1837**
Subsidies[b]		[PLN]	194	185	171
Income from activity		**[PLN]**	**2156**	**2677**	**2008**
TOTAL COSTS		**[PLN]**	***4153***	***4560***	***5031***
Annual change			**previous year = 100**		
Milk yield per cow			-	102.4	102.1
Selling price for milk			-	116.2	94.8
Total production			-	115.3	97.4
Total specific costs			-	113.1	112.1
Total costs			-	109.8	110.3
Income from activity			-	124.2	75.0

[a] Actual indirect costs without the cost of external factors.

[b] Subsidies include the supplementary payment relative to forage area per dairy cow, from 2007 the account also included the livestock payment.

[-] - means "not observed".

An important element in the income account for milk production is the unit production cost. According to the survey findings, the concentration of dairy cattle farming represents a major factor to reduce unit costs as well as improving the profitability and competitiveness of milk production.

Between 2006 and 2008 the unit cost of milk production increased every year. But the ratio of the selling price for milk to production costs was favourable in all the years in question, although the results obtained in 2007 should be regarded as the best (1:1.4). Production inputs were also used most efficiently, the evaluation was based on the ratio of costs to the value of production. These positive conditions were reflected in the highest income per litre of milk (PLN 0.48). In the period in question, milk production ensured full remuneration of family labour, but the ratio of income from activity per hour of family labour to the parity rate of labour remuneration adopted for the calculations was also the highest in 2007 – Table IV.1.24.

Table IV.1.24

Indicators of economic efficiency of milk production in 2006–2008

Specification		Year		
		2006	**2007**	**2008**
Specific costs/litre of milk	[PLN]	**0.42**	0.46	0.51
Total costs/litre of milk	[PLN]	**0.76**	0.81	0.88
Ratio of selling price to total unit cost		1.3	**1.4**	1.2
Income from activity/litre of milk	[PLN]	0.39	**0.48**	0.35
Ratio of total costs to total production		0.68	**0.65**	0.73
Ratio of total costs to income from activity without subsidies		2.1	**1.8**	2.7
Income from activity without subsidies/PLN of total	[PLN]	0.32	**0.35**	0.27
Share of subsidies in income from activity	[%]	9,0	6.9	8.5
Subsidies/PLN of income from activity without subsidies	[PLN]	0.10	0.07	0.09
Total labour input/litre of milk	[hour]	0.03	**0.02**	**0.02**
Income from activity/hour of family labour	[PLN]	17.06	**21.68**	16.20
Ratio of income from activity per hour of family labour to the parity rate of labour remuneration		1.9	**2.2**	1.5

The most favourable values of the indicators are in bold.

It is assessed that in 2009 income from milk production per cow was the lowest in the four years in question (2006–2009). In comparison with 2008, in the surveyed farms there was a fall by approx. 29%, and against the favourable 2007 – by as much as 47%. Those adverse changes for farmers were only determined by the decrease in milk price (by ca. 15%) since milk yield per cow showed a slight rise (by 2.6%), and total costs per cow declined by over 2%. The fall in costs resulted from lower prices for feedingstuffs, mostly cereals; the cost of purchased and farm-produced marketable feedingstuffs dropped by approx. 12% on 2008.

2. Activity results in the best, the average and the weakest holdings

The criterion for categorising the surveyed farms as the best, the average and the weakest holdings was the level of the gross margin without subsidies from a given production activity. The gross margin accounts include the value of production and well-defined specific costs. The applied criterion ensured full comparability at this level, thus eliminating the effect of the method for breaking down indirect costs on the categorisation of holdings.

Besides the information value of the presented data and describing certain developments and trends observed in the surveyed farms in the period in question (2005–2008), this grouping primarily showed the scale of differentiation of results obtained from particular production activities. It also allowed to identify determinants of production and the analysed income categories, as well as the degree of the relationship between specific costs and total costs, and between the gross margin and income from activity.

Sugar beet

In the farms included in the survey samples of sugar beet in 2005 and 2007 the structure of total production was unquestionably dominated by crop production. But the survey results revealed certain trends, in both years the share of crop production was higher in the best holdings than in the weakest farms (by 10.3 percentage points in 2005 and by 5.3 percentage points in 2007). As a consequence, an opposite trend was observed in the case of livestock production, with a much higher share in the weakest holdings (by 10.7 percentage points in 2005 and by 5.5 percentage points in 2007). It reflects a particular organisation and specialisation of production, it is assessed that in farms categorised – in terms of results from the growing of sugar beet – as the best, livestock production only accounted for a minor share, whereas in the weakest farms it played a more significant role.

In 2005 the value of fixed assets per ha of agricultural land was similar in the groups of holdings, but in 2007 in the best farms the ratio was distinctly higher than in the weakest units, by as much as 33.5% – Table IV.2.1.

It should be stressed that in 2007 in the surveyed farms the area of sugar beet plantations was much smaller, farmers reduced the area under sugar beet. Most probably, it was connected with a marked fall in the profitability of the growing of sugar beet, due to the reform of the sugar market organisation.

Table IV.2.1

Selected information on groups of farms growing sugar beet in 2005 and 2007 (actual data)

Specification			2005			2007		
			25% best	50% average	25% weakest	25% best	50% average	25% weakest
Number of farms surveyed			25	49	25	46	93	46
Area of agricultural land		[ha]	85.43	75.33	74.70	62.67	59.80	64.13
Area of arable land		[ha]	83.85	72.82	72.79	58.84	55.12	60.88
Soil valuation index		[point]	1.36	1.30	1.14	1.17	1.19	1.14
Area under cultivation		**[ha]**	**12.58**	**9.78**	**12.86**	**7.12**	**8.11**	**8.00**
Share in total harvested area		[%]	15.2	13.5	17.2	11.4	14.0	12.6
Total labour input into the growing of sugar beet		[hour/ha]	48.3	58.1	52.7	37.7	32.9	27.6
of which: family labour input			28.2	40.1	24.5	25.5	24.6	19.6
Total NPK fertilisers used for the growing of sugar beet		[kg/ha]	428	368	431	374	392	406
Structure of the value of farm production		[%]	100.0	100.0	100.0	100.0	100.0	100.0
of which:	crop production		81.6	80.1	71.3	64.6	70.9	59.3
	of which: sugar beet		35.2	34.3	37.2	19.3	21.4	19.8
	livestock production		17.2	19.0	27.9	34.7	28.5	40.2
Value of selected fixed assets		[PLN/farm]	431 303	421 368	432 182	484 598	447 491	371 445
		[PLN/ha of UAA]	5 049	5 594	5 786	7 733	7 483	5 792
of which:	buildings and fixed equipment	[PLN/farm]	164 113	186 907	187 782	235 085	194 577	181 005
		[PLN/ha of UAA]	1 921	2 481	2 514	3 751	3 254	2 822
	tractors	[PLN/farm]	106 701	82 595	96 178	108 050	106 307	68 398
		[PLN/ha of UAA]	1 249	1 096	1 288	1 724	1 778	1 067
	lorries, vans and other vehicles	[PLN/farm]	15 846	14 698	12 625	12 890	14 849	9 194
		[PLN/ha of UAA]	185	195	169	206	248	143
	machinery, tools and equipment for crop production	[PLN/farm]	144 643	137 167	135 596	128 573	131 759	112 847
		[PLN/ha of UAA]	1 693	1 821	1 815	2 052	2 203	1 760

The criterion adopted for the categorisation of agricultural holdings as the best, the average and the weakest was the gross margin without subsidies per ha of area under the crop in question.

The surveys of the growing of sugar beet conducted in 2005 and 2007 showed certain relationships and trends presented below (Table IV.2.2):

- In the best farms, as compared to the weakest units, sugar beet yield was higher, even though the amount of NPK fertilisers per ha was lower, with a particularly significant difference noted in 2007 – 32 kg.
- There were considerable disparities between the defined groups of holdings in terms of production results, whereas differences in price results were much lesser. The comparison of the best and the weakest units showed – to the advantage of the former – that in 2005 the difference in yield was 168 dt (i.e. 45.3%) and in 2007 – 192 dt (43.0%), whereas the respective differences in the selling price for roots were as follows: PLN 1.03 per dt and PLN 0.51 per dt (i.e. 6.4% and 4.8%).
- In 2005 production costs followed different patterns in groups of farms, but 2007 witnessed a distinct upward trend of both specific and total costs. It was

determined by the level of direct costs as indirect costs showed a gradual decline in the subsequent groups of holdings.

Thus, the effect of direct costs on total costs proved to be essential. In the two survey years, their share in the cost structure ranged from 42% to 59%.

- When analysing particular cost categories, it should be emphasised that in both survey years depreciation of fixed assets involved in production was higher in the best farms than in the weakest holdings, by 48.5% in 2005 and by 23.8% in 2007.

Table IV.2.2

Production, costs and income from the growing of sugar beet by group of farms in 2005 and 2007 (actual data)

Specification		2005			2007		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Area under cultivation	[ha]	12.58	9.78	12.86	7.12	8.11	8.00
Root yield	[dt/ha]	539	454	371	639	558	447
Selling price for roots	[PLN/dt]	17.05	16.78	16.02	11.13	10.51	10.62
Selling price for leaves	[PLN/dt]	1.53	2.14	-	2.04	1.54	-
		Per ha of area under cultivation					
Total production	**[PLN]**	**9237**	**7631**	**5933**	**7184**	**5878**	**4748**
of which: roots		9189	7617	5933	7112	5865	4748
marketable leaves		49	14	-	72	13	-
Total specific costs	**[PLN]**	**2182**	**2119**	**2133**	**1877**	**2083**	**2515**
of which: seed		617	625	602	592	709	776
mineral fertilisers, total		800	742	843	738	773	857
organic fertilisers, purchased		-	-	-	-	7	14
crop protection products		668	697	635	532	570	805
growth regulators		8	9	8	7	4	6
other		89	46	46	7	21	58
Gross margin without subsidies	**[PLN]**	**7056**	**5512**	**3800**	**5307**	**3795**	**2233**
Actual indirect costs[a]	[PLN]	1452	1430	1572	1056	1093	894
Gross value added from activity	**[PLN]**	**5604**	**4082**	**2228**	**4251**	**2702**	**1340**
Depreciation	[PLN]	876	951	590	640	657	517
of which: of buildings and fixed equipment		161	176	103	136	107	93
of machinery and equipment		417	409	260	265	289	257
of vehicles		282	317	220	229	233	160
Net value added from activity	**[PLN]**	**4728**	**3131**	**1638**	**3611**	**2045**	**823**
Cost of external factors	[PLN]	374	500	455	494	355	339
Income from activity without subsidies	**[PLN]**	**4354**	**2632**	**1182**	**3117**	**1690**	**483**
Subsidies[b]	[PLN]	-	-	-	1605	1471	1248
Income from activity	**[PLN]**	**4354**	**2632**	**1182**	**4721**	**3162**	**1731**
TOTAL COSTS	**[PLN]**	***4883***	***4999***	***4751***	***4067***	***4188***	***4265***

[a] Actual indirect costs without the cost of external factors

[b] Subsidies include the sugar payment.

[-] - means "not observed".

- In both survey years there was a distinct relationship between the gross margin and income from activity. In holdings categorised as the best, the gross margin without subsidies was the highest (since it was the criterion of categorisation), therefore it contributed the most to the generation of income from activity. The difference in its level between the best and the weakest units, to the advantage of the former, was 3.7-fold in 2005 and 2.7-fold in 2007.
- In the surveyed holdings the growing of sugar beet was profitable, but in the subsequent groups, i.e. in the best, the average and the weakest farms, there was a downward trend of the value of production, the gross margin without subsidies and income from activity.

When analysing the 2005 and 2007 production and economic results of the growing of sugar beet obtained by the best and the weakest farms, as compared to the average holdings, certain percentage changes were found; those are presented below (per ha of area under cultivation).

	On average in holdings					
	best			weakest		
	2005	**2007**		**2005**	**2007**	
Root yield	higher by -	18.7	14.5	lower by -	18.3	19.9
Price for roots	higher by -	1.6	5.9	lower by -	4.5	higher by - 1.1
Total production	higher by -	21.0	22.2	lower by -	22.3	19.2
GM without subsidies	higher by -	28.0	39.8	lower by -	31.1	41.2
Total costs	lower by -	2.3	2.9	lower by -	5.0	higher by - 1.8
Income from activity	higher by -	65.4	49.3	lower by -	55.1	45.3

GM = Gross margin

The presented calculations indicate the same trends of the variables in question in both survey years (with the exception of two in 2007 in the weakest units), they also reveal considerable differentiation of results in the groups of holdings. The average farms reflect the results of 50% of holdings with medium gross margins without subsidies per ha of area under sugar beet, therefore their results serve as reference values for the remaining two groups, i.e. the best farms (25% of the top gross margins without subsidies) and the weakest units (25% of the bottom gross margins without subsidies).

The survey findings demonstrated that the profitability of the growing of sugar beet was determined by the value of production, which in turn depended on yield. The effect of the selling price was basically marginal. As a result, there were significant differences in the gross margin. Income from activity per ha,

in the best farms as compared to the average holdings, was 65.4% higher in 2005 and 49.3% higher in 2007, whereas in the weakest units it was 55.1% and 45.3% lower respectively.

The profitability of the growing of sugar beet is described in more detail by relationships between selected variables. To begin with, it is clear that in both survey years, irrespective of cultivation costs per ha, costs per dt of roots (specific and total) showed a steady increase in the subsequent groups of holdings. It was primarily determined by yield. Consequently, there was considerable differentiation, to the disadvantage of the weakest farms, in the ratio of the selling price for roots to the unit production cost; it was also reflected in much lower level of income per dt of roots – Table IV.2.3.

Table IV.2.3

Indicators of economic efficiency of the growing of sugar beet in 2005 and 2007

Specification		2005			2007		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Specific costs/dt of roots	[PLN]	4.05	4.67	5.76	2.94	3.73	5.62
Total costs/dt of roots	[PLN]	9.06	11.01	12.82	6.37	7.51	9.54
Ratio of selling price to total unit cost		1.9	1.5	1.3	1.8	1.4	1.1
Income from activity/dt of roots	[PLN]	8.08	5.80	3.19	7.39	5.67	3.87
Ratio of total costs to total production		0.5	0.7	0.8	0.6	0.7	0.9
Ratio of total costs to income from activity without subsidies		1.1	1.9	4.0	1.3	2.5	8.8
Income from activity without subsidies/PLN of total production	[PLN]	0.47	0.35	0.20	0.43	0.29	0.10
Share of subsidies in income from activity		-	-	-	34.0	46.5	72.1
Subsidies/PLN of income from activity without subsidies	[PLN]	-	-	-	0.52	0.87	2.58
Total labour input/dt of roots	[hour]	0.09	0.13	0.14	0.06	0.06	0.06
Income from activity/hour of family labour	[PLN]	154.32	65.56	48.28	185.18	128.78	88.45
Ratio of income from activity/hour of family labour to the parity rate of labour remuneration		17.8	7.6	5.6	18.9	13.1	9.0

[-] - means "not observed".

Due to worse results obtained from the growing of sugar beet by the weakest holdings, in 2007 the sugar payment played a much more important role; sugar beet planters received PLN 2.58 per PLN of income from activity without subsidies, whereas in the best farms the payment was nearly 5 times lower (PLN 0.52). Such payments improved the ratio of income from activity per hour of family labour to the parity rate of labour remuneration (PLN 9.81/hour), which also increased the possibility for the remuneration of other production factors (i.e. land and capital).

Potatoes for human consumption

When analysing the structure of total production in farms growing potatoes for human consumption in 2005 and 2008, a similar trend was found to that observed in the case of sugar beet discussed above. In both years in the best farms – as compared to the weakest units – the share of crop production was much higher (by 11.3 percentage points in 2005, by 13.4 percentage points in 2008), whereas that of livestock production was lower (by 10.1 percentage points in 2005, by 2.0 percentage points in 2008). The fact is that the former group of holdings had soil of better quality (as reflected in a higher soil valuation index), hence this factor may have contributed to the situation. In the weakest farms, with agricultural land of lower quality, livestock production played a more important role – Table IV.2.4.

Table IV.2.4

Selected information on groups of farms growing potatoes for human consumption in 2005 and 2008 (actual data)

Specification		2005			2008		
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Number of farms surveyed		32	62	32	23	46	23
Area of agricultural land	[ha]	30.18	44.28	40.64	33.93	34.23	57.44
Area of arable land	[ha]	28.17	40.68	36.80	31.54	31.70	52.42
Soil valuation index	[point]	1.11	0.94	0.85	1.14	0.96	0.89
Area under cultivation	**[ha]**	**2.51**	**5.03**	**3.67**	**3.04**	**5.30**	**6.71**
Share in total harvested area	[%]	8.5	12.2	9.9	8.0	15.5	11.9
Total labour input into the growing of potatoes for human consumption	[hour/ha]	138.4	98.6	124.1	118.7	77.2	112.0
of which: family labour input		107.9	67.0	101.6	89.3	57.0	63.9
Total NPK fertilisers used for the growing of potatoes for human consumption	[kg/ha]	283	383	321	306	371	287
Structure of the value of farm production	[%]	100.0	100.0	100.0	100.0	100.0	100.0
of which: crop production		69.1	69.9	57.8	72.9	70.8	59.5
of which: potatoes for human consumption		36.2	35.8	22.8	32.2	44.9	37.4
livestock production		30.5	28.2	40.6	26.3	27.5	28.3
Value of selected fixed assets	[PLN/farm]	308 369	381 513	359 592	332 661	345 615	340 305
	[PLN/ha of UAA]	10 218	8 616	8 848	9 804	10 097	5 925
of which: buildings and fixed equipment	[PLN/farm]	165 933	193 925	213 101	193 322	170 630	183 737
	[PLN/ha of UAA]	5 498	4 380	5 244	5 698	4 985	3 199
tractors	[PLN/farm]	57 616	74 953	59 922	60 229	72 727	46 293
	[PLN/ha of UAA]	1 909	1 693	1 474	1 775	2 125	806
lorries, vans and other vehicles	[PLN/farm]	13 858	17 430	10 443	14 818	14 818	11 362
	[PLN/ha of UAA]	459	394	257	437	433	198
machinery, tools and equipment for crop production	[PLN/farm]	70 962	95 205	76 126	64 291	87 441	98 913
	[PLN/ha of UAA]	2 351	2 150	1 873	1 895	2 555	1 722

The criterion adopted for the categorisation of agricultural holdings as the best, the average and the weakest was the gross margin without subsidies per ha of area under the crop in question.

The best farms were much better equipped with modern means of work (tractors, machinery). In terms of value of the selected items of fixed assets per ha of agricultural land, they were markedly superior to the other extreme group of holdings (i.e. the weakest units), with a gap of 15.5% in 2005 and as much as 65.5% in 2008. The considerable increase observed in 2008 was largely determined by a rise – assessed to be very rapid – in the value of buildings and fixed equipment (by 78.1%). It was also reflected in depreciation per ha of area under potatoes – Table IV.2.5.

Table IV.2.5

Production, costs and income from the growing of potatoes for human consumption by group of farms in 2005 and 2008 (actual data)

Specification		2005			2008		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Area under cultivation	[ha]	2.51	5.03	3.67	3.04	5.30	6.71
Potatoe yield	[dt/ha]	286	263	194	272	274	235
Selling price	[PLN/dt]	48.38	36.45	30.11	60.22	37.22	24.76
		Per ha of area under cultivation					
Total production	**[PLN]**	**13826**	**9574**	**5825**	**16361**	**10194**	**5820**
of which: potatoes		13826	9574	5825	16361	10194	5820
Total specific costs	**[PLN]**	**2442**	**3044**	**2615**	**2878**	**3154**	**2974**
of which: seed		1243	1377	1275	1466	1400	1531
mineral fertilisers, total		499	782	647	724	918	781
organic fertilisers, purchased		-	10	12	-	12	66
crop protection products		422	675	470	434	617	489
growth regulators		20	24	23	7	6	28
other		258	175	188	246	201	79
Gross margin without subsidies	**[PLN]**	**11383**	**6530**	**3210**	**13483**	**7040**	**2847**
Actual indirect costs[a]	[PLN]	2132	1453	1249	2405	1791	1290
Gross value added from activity	**[PLN]**	**9252**	**5077**	**1962**	**11078**	**5249**	**1557**
Depreciation	[PLN]	2065	1126	1234	2057	1451	713
of which: of buildings and fixed equipment		516	249	353	666	387	191
of machinery and equipment		752	460	488	704	566	306
of vehicles		722	385	360	655	483	213
Net value added from activity	**[PLN]**	**7186**	**3951**	**728**	**9021**	**3798**	**844**
Cost of external factors	[PLN]	743	658	235	926	402	895
Income from activity without subsidies	**[PLN]**	**6444**	**3293**	**492**	**8094**	**3396**	**-51**
Subsidies[b]	[PLN]	-	-	-	-	-	-
Income from activity	**[PLN]**	**6444**	**3293**	**492**	**8094**	**3396**	**-51**
TOTAL COSTS	**[PLN]**	***7382***	***6281***	***5333***	***8266***	***6798***	***5871***

[a] Actual indirect costs without the cost of external factors

[-] - means "not observed".

The surveys of potatoes for human consumption conducted in 2005 and 2008 revealed the following trends and patterns (Table IV.2.5):

- Between the best and the weakest holdings there were particularly significant differences in the selling price for potatoes: 1.6-fold in 2005 and as high as 2.4-fold in 2008. Yield differentiation was lesser, 1.5-fold and 1.2-fold respectively. As a consequence, the value of production considerably varied, in 2005 and 2008 it was a 2.4-fold and 2.8-fold difference respectively (to the advantage of the best holdings).
- In 2005 the best farms, characterised by a relatively lower farming intensity with a simplified measure of the use of mineral fertilisers in kg of NPK per ha of area under potatoes, recorded yields 92 dt higher than the weakest holdings, although the NPK rate was 38 kg lower. Most probably, it should be attributed to the quality of soil and its agricultural usability.
- Total costs per ha of area under potatoes for human consumption in the subsequent groups of holdings (i.e. the best, the average and the weakest farms) showed a steady decline. The difference between the extreme groups in the two survey years was 1.4-fold. It was solely determined by indirect costs, showing a 1.8-fold and 1.9-fold difference in 2005 and 2008 respectively.
- In the case of potatoes, as compared to other surveyed activities, specific costs had a lesser effect on total costs. They also accounted for a lower share in the cost structure, ranging from 33% to 51%.
- In subsequent defined groups of farms there was a clear downward trend of the value of production, the gross margin and income from activity. The correlation between these indicators was evident.

When evaluating the 2005 and 2008 profitability of the growing of potatoes for human consumption in the best and the weakest holdings, as compared to the average farms, certain developments were observed. Those are presented below, as percentage change or ratios (per ha of area under cultivation).

		On average in holdings				
		best			weakest	
		2005	**2008**		**2005**	**2008**
Potato yield	higher by -	8.7	lower by - 0.7	lower by -	26.2	14.2
Price for potatoes	higher by -	32.7	61.8	lower by -	17.4	33.5
Total production	higher by -	44.4	60.5	lower by -	39.2	42.9
GM without subsidies	higher by -	74.3	91.5	lower	2.0 times	2.5 times
Total costs	higher by -	17.5	21.6	lower by -	15.1	13.6
Income from activity	higher by -	95.7	138.3	lower	6.7 times	x

[x] – In 2008 income from activity was negative in the weakest farms.

In 2005 potatoes for human consumption were a profitable activity in all the groups of holdings, but in 2008 farmers in the weakest units suffered a loss. It was due to an extremely low level of production. Even though total cultivation costs per ha under potatoes – as compared to the remaining two groups of holdings – were also lower, the value of production decreased at a faster pace than costs. In comparison with the best farms, the fall in production and cultivation costs was 2.8-fold and 1.4-fold respectively, whereas compared to the average units the decline was 1.8-fold and 1.2-fold respectively.

According to the survey findings, in the case of potatoes for human consumption the selling price was the main determinant of the value of production, which in turn had a crucial effect on economic results. The impact of yield was much lesser, as reflected in the above comparison. The percentage change of the selling price was much higher than that of yield, with the sole exception of the weakest farms in 2005. But also in this case, assuming that yield remained at the level obtained by the average holdings, the result would not affect the categorisation of those units as the weakest, and income from activity would still be the lowest.

Furthermore, the calculations of ratios between partial indicators also point to major disproportions in the profitability of the growing of potatoes for human consumption in the groups of farms in question – Table IV.2.6.

Table IV.2.6

Indicators of economic efficiency of the growing of potatoes for human consumption in 2005 and 2008

Specification		2005			2008		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Specific costs/dt of potatoes	[PLN]	8.55	11.59	13.52	10.59	11.51	12.65
Total costs/dt of potatoes	[PLN]	25.83	23.91	27.56	30.42	24.82	24.98
Ratio of selling price to total unit cost		1.9	1.5	1.1	2.0	1.5	0.99
Income from activity/dt of potatoes	[PLN]	22.55	12.54	2.54	29.79	12.40	x
Ratio of total costs to total production		0.5	0.7	0.9	0.5	0.7	1.0
Ratio of total costs to income from activity		1.2	1.9	10.8	1.0	2.0	x
Income from activity/PLN of total production	[PLN]	0.47	0.34	0.08	0.50	0.33	x
Total labour input/1 dt of potatoes	[hour]	0.48	0.38	0.64	0.44	0.28	0.48
Income from activity/hour of family labour	[PLN]	59.74	49.15	4.85	90.62	59.59	x
Ratio of income from activity/hour of family labour to the parity rate of labour remuneration		6.9	5.7	0.6	8.4	5.6	x

[x] - means that performing calculations was not justified.

In general, potatoes for human consumption should be assessed as a profitable crop in recent years (which is reflected in the results obtained by the average farms and in the data contained in Table IV.1.5), but the survey findings demonstrate that this was not the case in all holdings engaged in potato growing. Therefore, for both informative purposes and practical application, it is vital to identify the factors stimulating or hampering the economic performance. Considering the specific characteristics of particular production activities, however, the combination of such factors may significantly vary between them.

Data on the income situation of agricultural production activities should also be interpreted in the context of the remuneration of production factors. In this respect, the report focuses exclusively on the remuneration of family labour, with a parity rate adopted for the calculations. It was PLN 8.66 per hour in 2005 and PLN 10.74 per hour in 2008. As follows from the data presented in Table IV.2.6, the growing of potatoes for human consumption ensured full remuneration of labour input in the best and the average farms in both survey years. As regards holdings characterised by the poorest cultivation results, in 2005 the farmer's labour was only remunerated in 56%, whereas no labour remuneration was possible in 2008.

Pigs for slaughter

The pigmeat market is an important meat market in Poland. Producers of pigs for slaughter included in the survey sample of the AGROKOSZTY system in 2005 and 2008 were characterised by the level of production considerably above the national average for family farms. Moreover, those units specialised in livestock production, in the two survey years it accounted for 66% to 71% of total production. Livestock production was almost exclusively generated by pigs for slaughter, with a share ranging between 80% and 99%. A certain development observed in the weakest holdings in 2005 deserves explanation, namely the production of pigs for slaughter exceeded the value of total livestock production by 20.7%. That situation was caused by a negative value of production, generated in those farms by other groups of pigs (piglets, sows).

The holdings from the survey sample of pigs for slaughter were not very large; according to the data collected in both survey years, the area of agricultural land ranged from 26.5 to 40.4 ha. Neither was the soil of good quality (which is reflected in the soil valuation index: 0.83 to 0.97 point), therefore crop production played a lesser role in the structure of total production.

Machinery and equipment at the disposal of the farms was similar, judging by its value per ha of agricultural land. It is different from the situation observed in the case of crop production. Most probably, it is attributable to the fact that the production of pigs for slaughter in all the groups of holdings was relatively large, which involved appropriate equipment with modern means of work – Table IV.2.7.

Table IV.2.7

Selected information on groups of farms producing pigs for slaughter in 2005 and 2008 (actual data)

Specification		2005			2008		
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Number of farms surveyed		29	56	29	36	70	36
Area of agricultural land	[ha]	29.19	39.81	27.89	30.90	40.43	26.49
Area of arable land	[ha]	26.17	37.53	25.56	28.64	38.69	24.64
Soil valuation index	[point]	0.93	0.96	0.88	0.83	0.97	0.85
Production of pigs for slaughter, gross	**[dt/farm]**	**330.70**	**439.49**	**373.92**	**327.66**	**403.35**	**266.61**
Production of pigs for slaughter, net	[dt/farm]	167.24	221.00	235.84	164.95	216.24	144.40
Average weight of fattening pigs sold	[kg/head]	101	106	103	100	107	108
Consumption of concentrated feedingstuffs per kg of weight increase	[kg]	2.96	3.90	4.12	3.04	3.99	4.86
of which: concentrates and industrial compound feed		0.40	0.66	1.81	0.67	0.47	0.90
cereal grain and middlings		2.34	2.94	2.10	2.12	3.17	3.60
Total labour input per 100 kg of gross live weight	[hour]	2.9	2.8	3.6	2.0	2.9	3.7
of which: family labour input		2.5	2.4	2.7	2.0	2.4	3.3
Structure of farm production	[%]	100.0	100.0	100.0	100.0	100.0	100.0
of which: crop production		28.7	28.3	29.9	27.4	33.8	29.7
livestock production		71.1	71.0	69.5	71.3	65.5	69.4
of which: pigs for slaughter		89.4	85.8	120.7	98.5	93.8	79.6
Value of selected fixed assets	[PLN/farm]	314 916	385 518	332 345	385 126	429 957	350 218
	[PLN/ha of UAA]	10 788	9 684	11 916	12 464	10 635	13 221
of which: buildings and fixed equipment	[PLN/farm]	188 020	238 547	216 504	217 123	252 124	215 197
	[PLN/ha of UAA]	6 441	5 992	7 763	7 027	6 236	8 124
tractors	[PLN/farm]	49 126	55 631	43 784	71 363	74 664	59 594
	[PLN/ha of UAA]	1 683	1 397	1 570	2 309	1 847	2 250
lorries, vans and other vehicles	[PLN/farm]	7 440	10 683	6 850	12 225	9 738	8 017
	[PLN/ha of UAA]	255	268	246	396	241	303
Machinery, tools and equipment for crop production	[PLN/farm]	55 267	63 063	54 366	67 088	74 661	49 493
	[PLN/ha of UAA]	1 893	1 584	1 949	2 171	1 847	1 868
Machinery, tools and equipment for livestock production	[PLN/farm]	15 062	17 595	10 841	17 328	18 770	17 917
	[PLN/ha of UAA]	516	442	389	561	464	676

The criterion adopted for the categorisation of agricultural holdings as the best, the average and the weakest was the gross margin per 100 kg of gross live weight.

[a] Increases + weight of purchased animals

The findings from the surveys of the production of pigs for slaughter conducted in 2005 and 2008 allow to describe the following trends and draw certain conclusions (Tables IV.2.7 and IV.2.8):

- In both survey years, in the subsequent groups of holdings, i.e. the best, the average and the weakest farms, the consumption of concentrated feedingstuffs

per kg of weight increase of pigs showed a steady rise. It means that those holdings which reported the highest losses in the production of pigs for slaughter (i.e. the weakest units) also recorded the highest consumption of concentrated feedingstuffs per kg of weight increase; as compared to the best holdings, it was 39.2% (i.e. by 1.16 kg) higher in 2005 and by as much as 59.9% (i.e. by 1.82 kg) higher in 2008.

Table IV.2.8

Production, costs and income from pig farming by group of farms in 2005 and 2008 (actual data)

Speficication		2005			2008		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Gross production of pigs for slaughter	[dt/farm]	330.70	439.49	373.92	327.66	403.35	266.61
Selling price for pigs for slaughter	[PLN/kg]	4.20	3.85	3.95	4.52	4.18	4.06
		Per 100 kg of gross live weight					
Total production	**[PLN]**	**420**	**385**	**395**	**452**	**418**	**406**
of which: pigs for slaughter (fattening pigs)		420	385	395	452	418	406
Total specific costs	**[PLN]**	**262**	**322**	**403**	**336**	**395**	**468**
of which: livestock replacement		167	214	202	217	225	248
purchased feedingstuffs		58	65	157	72	92	125
farm-produced marketable		31	38	33	44	69	85
other		7	6	12	2	9	10
Gross margin without subsidies	**[PLN]**	**158**	**63**	**-8**	**117**	**23**	**-62**
Actual indirect costs[a]	[PLN]	45	40	48	51	53	48
Gross value added from activity	**[PLN]**	**113**	**23**	**-56**	**65**	**-30**	**-111**
Depreciation	[PLN]	34	31	31	47	40	44
of which: of buildings and fixed equipment		12	11	11	12	12	17
of machinery and equipment		12	11	10	18	15	13
of vehicles		9	8	10	16	12	14
Net value added from activity	**[PLN]**	**79**	**-7**	**-88**	**19**	**-70**	**-155**
Cost of external factors	[PLN]	11	13	19	10	17	9
Income from activity without subsidies	**[PLN]**	**69**	**-20**	**-107**	**8**	**-86**	**-164**
Subsidies[b]	[PLN]	-	-	-	-	-	-
Income from activity	**[PLN]**	**69**	**-20**	**-107**	**8**	**-86**	**-164**
TOTAL COSTS	**[PLN]**	***351***	***405***	***502***	***444***	***504***	***569***

[a] Actual indirect costs without the cost of external factors

[-] - means "not observed"

- In the subsequent groups of farms there was an upward trend of both specific and total costs. Total costs were primarily generated by specific costs, with a share in the cost structure ranging from 75% to 82%.

  Specific costs were, in turn, determined by two components, i.e. the cost of livestock replacement and of feedingstuffs.

Apart from fluctuations in prices for feedingstuffs (mainly cereals), the differences in the costs of feedingstuffs between the groups of holdings in question resulted from significant differences in quantity (as reflected in the consumption of feedingstuffs per kg of weight increase).

- In the best, the average and the weakest farms there was a downward trend of the selling price for pigs for slaughter, the gross margin and income from activity, whereas production costs (both specific and total) increased.
- It follows from the surveys that costs represent the main determinant of the profitability of pig farming. The difference in total costs between the extreme groups of holdings, to the disadvantage of the weakest units, was 1.4-fold in 2005 and 1.3-fold in 2008.

  The selling price for pigs for slaughter had a lesser effect, although in the weakest farms, as compared to the best performers, it was lower as well: by 5.9% in 2005 and by 10.2% in 2008 (a 1.1-fold difference).
- In both survey years, in the analysed groups of farms there was a very clear correlation between the gross margin and income from activity.

The analysis of the economic situation of pig farming in the best and the weakest holdings in 2005 and 2008, as compared to the average performers, indicated certain developments presented below, as percentage change or ratios (per 100 kg of gross live weight).

		On average in holdings				
		best			weakest	
		2005	**2008**		**2005**	**2008**
Price for pigs for slaughter	higher by -	9.1	8.1	higher by -	2.6	lower by - 2.9
GM without subsidies	higher	2.5 times	5.1 times		x	x
Total costs	lower by -	13.3	11.9	higher by -	24.0	12.9
Income from activity		x	x		x	x

[x] – in 2005 and 2008 in the average farms income from activity was a negative value, whereas in the weakest holdings both the gross margin without subsidies and income from activity were negative.

In both survey years, pig farming was only profitable in the best holdings. Those were units where farmers obtained relatively the highest price for pigs for slaughter and incurred the lowest costs. At the same time, in the groups of the average and the weakest farms pig producers suffered a loss, the value of production covered the costs only in part, in 95% and 79% respectively in 2005 and in 83% and 71% respectively in 2008. As a consequence, income from activity was negative, and it dropped even further in 2008.

It should be highlighted that in 2008, as compared to 2005, the selling price for pigs for slaughter was higher, but production costs increased as well. When comparing the rates of change in the corresponding groups of farms, it is evident that the growth rate of costs significantly exceeded that of price, which brought about a fall in profitability.

It follows from the surveys that production costs represent the main factor differentiating the level of income from pig farming, they largely determine the economic power of pig producers. In this context, production technology, i.e. the feeding of animals, is of vital importance, as well as the fattening of pigs of appropriate breeds. More intensive technologies are usually applied in modern pig holdings, and the consumption of feedingstuffs per unit of weight increase is definitely lower. These are the basic factors contributing to the improvement of production profitability. Furthermore, such farms frequently have links with meat-processing plants, which results in higher selling prices.

As a consequence of the unfavourable income situation of pig farming, producers in the average and the weakest holdings could not count on the remuneration of family labour input. At the same time, in 2005 in the best farms income from activity per hour significantly exceeded (by 216%) the parity rate adopted for the calculations (PLN 8.66/hour), but in 2008 it only accounted for 39% of this rate (PLN 10.74/hour) – Table IV.2.9.

Table IV.2.9

Indicators of economic efficiency of pig farming in 2005 and 2008

Specification		2005			2008		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Specific costs/kg of live weight	[PLN]	2.62	3.22	4.03	3.36	3.95	4.68
Total costs/kg of live weight	[PLN]	3.51	4.05	5.02	4.44	5.04	5.69
Ratio of selling price to total unit cost		1.20	0.95	0.79	1.02	0.83	0.71
Income from activity/kg of live weight	[PLN]	0.69	x	x	0.08	x	x
Ratio of total costs to income from activity		5.1	x	x	53.1	x	x
Income from activity/PLN of total production	[PLN]	0.16	x	x	0.02	x	x
Total labour input/kg of live weight	[hour]	0.029	0.028	0.036	0.020	0.029	0.037
Income from activity/hour of family labour	[PLN]	27.38	x	x	4.21	x	x
Ratio of income from activity/hour of family labour to the parity rate of labour remuneration		3.2	x	x	0.4	x	x

[x] - means that performing calculations was not justified.

Spring wheat

According to the account, in farms included in the survey sample of the AGROKOSZTY system and growing spring wheat the structure of production was dominated by crop production. It was particularly evident in 2008, a similar trend was also observed to those noted in the case of sugar beet and potatoes for human consumption, i.e. a steady fall in the share of crop production in the subsequent groups of holdings. Presumably, in 2008 in farms categorised according to the performance in the growing of spring wheat as the best units, crop production played an important role, and the economic results from other crops were equally good. At the same time, the weakest farms still specialised in crop production, but the share of livestock production was slightly higher. In 2005 an opposite trend was observed, in the subsequent groups of holdings the share of crop production showed an increase, whereas that of livestock production declined – Table IV.2.10.

Table IV.2.10

Selected information on groups of farms growing spring wheat in 2005 and 2008 (actual data)

Specification			2005			2008		
			25% best	50% average	25% weakest	25% best	50% average	25% weakest
Number of farms surveyed			33	64	33	29	56	29
Area of agricultural land		[ha]	72.44	70.75	75.53	72.75	50.29	84.23
Area of arable land		[ha]	67.61	64.30	71.99	70.85	47.97	79.56
Soil valuation index		[point]	1.10	0.83	1.06	1.29	1.18	0.85
Area under cultivation		**[ha]**	**10.95**	**7.20**	**8.97**	**11.44**	**7.13**	**9.89**
Share in total harvested area		[%]	15.7	11.3	11.8	15.7	14.1	10.0
Total labour input into the growing of spring wheat		[hour/ha]	11.6	12.5	9.7	12.9	9.8	9.5
of which: family labour input			9.8	9.7	7.5	12.1	8.3	9.1
Total NPK fertilisers used for the growing of spring wheat		[kg/ha]	200	235	240	234	179	191
Structure of the value of farm production		[%]	100.0	100.0	100.0	100.0	100.0	100.0
of which:	crop production		53.5	54.6	62.6	85.7	72.2	73.5
	of which: spring wheat		10.1	7.2	7.8	11.8	10.8	8.5
	livestock production		45.3	44.8	35.6	13.6	25.9	24.9
Value of selected fixed assets		[PLN/farm]	611 724	418 942	372 181	435 494	353 384	330 629
		[PLN/ha of UAA]	8 445	5 921	4 928	5 986	7 027	3 925
of which:	buildings and fixed equipment	[PLN/farm]	285 377	224 153	212 341	168 522	157 977	163 142
		[PLN/ha of UAA]	3 940	3 168	2 811	2 316	3 141	1 937
	tractors	[PLN/farm]	117 142	79 457	59 195	105 350	80 473	67 330
		[PLN/ha of UAA]	1 617	1 123	784	1 448	1 600	799
	lorries, vans and other vehicles	[PLN/farm]	19 457	15 634	12 319	19 458	10 234	9 858
		[PLN/ha of UAA]	269	221	163	267	203	117
	machinery, tools and equipment for crop production	[PLN/farm]	189 748	99 698	88 326	142 165	104 700	90 299
		[PLN/ha of UAA]	2 619	1 409	1 169	1 954	2 082	1 072

The criterion adopted for the categorisation of agricultural holdings as the best, the average and the weakest was the gross margin without subsidies per ha of area under the crop in question.

In both survey years, in the best farms the value of fixed assets per ha of agricultural land was much higher than in the weakest units, by 71.4% in 2005 and by 52.5% in 2008. It suggests better equipment with modern means of work in those holdings, which is connected with specialisation, and undoubtedly also with the technology applied, which is in turn reflected in more favourable production and economic results.

Table IV.2.11

Production, costs and income from the growing of spring wheat by group of farms in 2005 and 2008 (actual data)

Specification		2005			2008		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Area under cultivation	[ha]	10.95	7.20	8.97	11.44	7.13	9.89
Grain yield	[dt/ha]	53,0	46.0	40.9	66.9	45.8	27.7
Selling price for grain	[PLN/dt]	38.17	35.38	34.27	50.38	47.14	43.72
Selling price for straw	[PLN/dt]	12.18	10.48	-	10.12	6.32	-
		Per ha of area under cultivation					
Total production	**[PLN]**	**2030**	**1631**	**1400**	**3386**	**2159**	**1212**
of which: grain		2022	1628	1400	3369	2158	1212
marketable straw		8	3	-	18	2	-
Total specific costs	**[PLN]**	**675**	**766**	**1013**	**979**	**857**	**811**
of which: seed		131	140	145	209	222	199
mineral fertilisers, total		353	427	678	533	444	486
organic fertilisers, purchased		-	-	-	-	10	10
crop protection products		162	183	170	219	162	101
growth regulators		14	13	16	18	18	8
other		15	3	4	1	1	7
Gross margin without subsidies	**[PLN]**	**1355**	**865**	**387**	**2407**	**1303**	**401**
Actual indirect costs[a]	[PLN]	326	305	266	591	577	319
Gross value added from activity	**[PLN]**	**1029**	**560**	**121**	**1816**	**726**	**82**
Depreciation	[PLN]	266	245	174	452	354	207
of which: of buildings and fixed equipment		51	59	32	84	74	47
of machinery and tools		127	92	79	184	170	95
of vehicles		76	85	61	173	103	54
Net value added from activity	**[PLN]**	**763**	**315**	**-52**	**1365**	**372**	**-125**
Cost of external factors	[PLN]	137	101	169	221	177	120
Income from activity without subsidies	**[PLN]**	**626**	**214**	**-221**	**1144**	**195**	**-245**
Subsidies[b]	[PLN]	282	282	266	269	269	269
Income from activity	**[PLN]**	**908**	**496**	**45**	**1413**	**464**	**25**
TOTAL COSTS	**[PLN]**	***1404***	***1417***	***1621***	***2242***	***1965***	***1456***

[a] Actual indirect costs without the cost of external factors.

[b] Subsidies only include the supplementary payment.

[-] - means "not observed".

The surveys of the growing of spring wheat conducted in 2005 and 2008 revealed the patterns and trends presented below (Table IV.2.11):

- In both survey years, in the subsequent groups of farms there was a distinct downward trend of yield and the selling price for spring wheat grain.

  The comparison of the results obtained by the weakest and the best holdings shows that in 2005 in the former group the yield and price were 22.8% and 10.2% lower respectively, whereas in 2008 the respective figures were 141.5% and 13.2%. According to the calculations, yield changed at a much faster pace than the price.

  Yield was the main factor to differentiate the value of production, and consequently to significantly influence the economic performance.
- As regards the cultivation costs per ha in the subsequent groups of farms, two trends were observed: a steady upward trend in 2005 and a downward trend in 2008. This pattern was noted in the case of both specific and total costs.

  In 2005 this situation was solely due to specific costs, an increase inevitably pushed up total costs. However, in 2008 the fall in total costs was determined by both specific and indirect costs.
- In the subsequent groups of holdings there was a marked decrease in the depreciation of fixed assets per ha of area under spring wheat.
- The growing of spring wheat in the subsequent groups of farms, i.e. in the best, the average and the weakest units, was characterised by a downward trend of the value of production, the gross margin and income from activity.
- In both survey years the growing of spring wheat was profitable, but in the weakest holdings farmers would have suffered a loss without support in the form of the supplementary payment; the value of production per ha covered total cultivation costs in 86% and 83% in 2005 and 2008 respectively.

The survey findings prove that the income situation of spring wheat, thus of spring wheat growers, considerably varied. There were major disparities in income from activity per ha. In the best farms, as compared to the average holdings, this income was 83.1% higher in 2005 and as much as 204.5% higher in 2008, whereas in the weakest units it was lower – 11 times and nearly 19 times respectively.

The analysis of the economic situation of the growing of spring wheat in the best and the weakest holdings, as compared to the average farms, in the survey years 2005 and 2008, also allowed to observe other developments which – as

percentage change or ratios – are presented below (per ha of area under cultivation).

		On average in holdings				
		best			weakest	
		2005	**2008**		**2005**	**2008**
Spring wheat yield	higher by -	15.2	46.1	lower by -	11.1	39.5
Price for grain	higher by -	7.9	6.9	lower by -	3.1	7.3
Total production	higher by -	24.5	56.8	lower by -	14.2	43.9
GM without subsidies	higher by -	56.6	84.7	lower	2.2 times	3.3 times
Total costs	lower by -	0.9	higher by - 14.1	higher by -	14.4	lower by - 25.9
Income from activity	higher by -	83.1	204.5	lower	11.0 times	18.6 times

According to the calculation results, in the groups of farms in question yield showed much stronger fluctuations than the selling price for grain. As a result, it was the main factor differentiating the value of production, which in turn determined the economic results from the growing of spring wheat.

As follows from the ratios presented in Table IV.2.12, despite different farming conditions in the survey years production costs per PLN of total production were the same in the corresponding groups of farms. It means that the cost intensity of production remained unchanged.

Table IV.2.12

Indicators of economic efficiency of the growing of spring wheat in 2005 and 2008

Specification		2005			2008		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Specific costs/dt of grain	[PLN]	12.74	16.64	24.80	14.65	18.72	29.25
Total costs/dt of grain	[PLN]	26.51	30.80	39.68	33.53	42.92	52.54
Ratio of selling price to total unit cost		1.4	1.2	0.9	1.5	1.1	0.8
Income from activity/dt of grain	[PLN]	17.14	10.78	1.11	21.14	10.14	0.89
Ratio of total costs to total production		0.7	0.9	1.2	0.7	0.9	1.2
Ratio of total costs to income from activity without subsidies		2.2	6.6	x	2.0	10.1	x
Income from activity without subsidies/PLN of total production	[PLN]	0.31	0.13	x	0.34	0.09	x
Ratio of subsidies to income from activity		0.3	0.6	5.9	0.2	0.6	10.9
Subsidies/PLN of income from activity without subsidies	[PLN]	0.45	1.32	x	0.24	1.38	x
Total labour input/dt of grain	[hour]	0.22	0.27	0.24	0.19	0.22	0.34
Income from activity/hour of family labour	[PLN]	93.00	51.26	6.05	117.22	55.78	2.72
Ratio of income from activity/hour of family labour to the parity rate of labour remuneration		10.7	5.9	0.7	10.9	5.2	0.3

[x] - means that performing calculations was not justified.

There was a slight change, however, in production profitability (income from activity without subsidies/PLN of total production), in the best farms it was higher in 2008 and in the average holdings in 2005. As regards the weakest units, in both survey years income from activity without subsidies was negative, but in 2008 it dropped even further. The resulting loss was compensated by the supplementary payment, which also enabled family labour input to be remunerated in part, in 70% and 25% in 2005 and 2008 respectively. In the remaining two groups of holdings the farmer's labour input was remunerated in full.

The situation of the weakest farms shows the role of support in the form of subsidies (in the case in question: the supplementary payment) and their effect on the results. Without this support, in both survey years the cost of external factors would not have been covered at all, and the depreciation of fixed assets involved in production would have been only covered in part, in 70% and 40% in 2005 and 2008 respectively.

Oats

In the farms growing oats, as in the case of other crop production activities discussed above, the structure of total production was dominated by crop production, with a higher share in the best holdings than in the weakest units. The share of oats in the value of crop production was not very significant, ranging from 6.0% to 9.9% (slightly below the figure for spring wheat). In such farms livestock production played a relatively important role, in connection with worse soil quality and the resulting "dual" production activities of farms. Presumably, the farmers had made the right decision on the organisation of farm production – Table IV.2.13.

Another pattern, similar to that observed before, was a higher – in the best farms as compared to the weakest holdings – value of selected items of fixed assets per ha of agricultural land, by 26.2% in 2005 and by as much as 54.9% in 2008. It is reflected in relatively high depreciation of fixed assets per ha of area under oats.

On the basis of the 2005 and 2008 survey results for the growing of oats in the best, the average and the weakest farms, the following conclusions may be drawn (Table IV.2.14):

- As in the case of the crop production activities discussed above, the growing of oats, in the subsequent groups of holdings, showed a downward trend of yield and price for grain. This situation had a crucial impact on the economic performance.

Table IV.2.13

Selected information on groups of farms growing oats in 2005 and 2008 (actual data)

Specification		2005			2008		
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Number of farms surveyed		28	55	28	27	53	27
Area of agricultural land	[ha]	78.47	62.93	90.60	67.01	56.09	79.80
Area of arable land	[ha]	72.53	55.20	79.20	61.32	51.28	75.74
Soil valuation index	[point]	0.77	0.68	0.77	1.05	0.86	0.85
Area under cultivation	**[ha]**	**9.89**	**6.62**	**9.57**	**7.02**	**4.92**	**13.04**
Share in total harvested area	[%]	12.6	12.4	12.6	11.0	8.5	14.7
Total labour input into the growing of oats	[hour/ha]	9.9	10.2	10.6	7.6	8.9	7.4
of which: family labour input		7.8	9.0	9.0	6.9	7.7	5.9
Total NPK fertilisers used for the growing of oats	[kg/ha]	190	127	147	115	147	196
Structure of the value of farm production	[%]	100.0	100.0	100.0	100.0	100.0	100.0
of which: crop production		59.0	49.3	57.9	73.0	60.5	61.8
of which: oats		9.2	6.0	7.3	8.0	6.0	9.9
livestock production		35.9	46.7	40.8	26.1	36.8	37.0
Value of selected fixed assets	[PLN/farm]	352 812	322 397	322 869	474 458	367 554	364 806
	[PLN/ha of UAA]	4 496	5 123	3 564	7 080	6 553	4 572
of which: buildings and fixed equipment	[PLN/farm]	182 957	168 260	144 746	217 381	190 582	162 559
	[PLN/ha of UAA]	2 332	2 674	1 598	3 244	3 398	2 037
tractors	[PLN/farm]	55 071	51 484	67 799	97 808	75 406	85 624
	[PLN/ha of UAA]	702	818	748	1 460	1 344	1 073
lorries, vans and other vehicles	[PLN/farm]	10 760	13 064	8 757	18 210	6 482	8 620
	[PLN/ha of UAA]	137	208	97	272	116	108
machinery, tools and equipment for crop production	[PLN/farm]	104 024	89 588	101 567	141 060	95 084	108 003
	[PLN/ha of UAA]	1 326	1 424	1 121	2 105	1 695	1 353

The criterion adopted for the categorisation of agricultural holdings as the best, the average and the weakest was the gross margin without subsidies per ha of area under the crop in question.

- Particular disparities were found with regard to yield; when comparing the results obtained by the weakest and the best farms, in 2005 and 2008 it was 31.6% and 49.2% lower respectively, whereas the selling price for grain was 23.1% and 17.4% lower respectively. As a consequence, the value of production varied considerably, the difference was 1.9-fold in 2005 and 2.4-fold in 2008 (to the disadvantage of the weakest holdings).
- In 2008, in the best farms farming intensity measured by the use of mineral fertilisers in kg of NPK per ha of area under oats (115 kg) was relatively lower than in the weakest units (196 kg), whereas oats yield was 18.8 dt higher. It is attributable to soil quality since the soil valuation index in the former group of farms was 1.05, whereas it was 0.85 in the latter.

  In 2005 soil quality was similar in the groups of holdings in question, greater use of fertilisers in the best farms resulted in yields higher by an average of 12.6 dt in comparison with the weakest farms.

Table IV.2.14

Production, costs and income from the growing of oats by group of farms in 2005 and 2008 (actual data)

Specification		2005			2008		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Area under cultivation	[ha]	9.89	6.62	9.57	7.02	4.92	13.04
Grain yield	[dt/ha]	39.9	30.4	27.3	38.2	27.7	19.4
Selling price for grain	[PLN/dt]	32.65	29.05	25.12	49.64	44.96	41.00
Selling price for straw	[PLN/dt]	3.81	7.36	2.10	-	2.36	-
		Per ha of area under cultivation					
Total production	**[PLN]**	**1311**	**889**	**687**	**1897**	**1247**	**797**
of which: grain		1303	883	686	1897	1247	797
marketable straw		7	5	1	-	0	-
Total specific costs	**[PLN]**	**460**	**398**	**480**	**484**	**556**	**826**
of which: seed		94	87	100	150	140	219
mineral fertilisers, total		318	235	295	271	359	519
organic fertilisers, purchased		-	-	-	4	4	19
crop protection products		46	60	58	53	51	57
growth regulators		1	7	18	1	0	-
other		1	10	9	5	1	13
Gross margin without subsidies	**[PLN]**	**851**	**491**	**207**	**1413**	**691**	**-30**
Actual indirect costs[a]	[PLN]	330	188	140	412	422	264
Gross value added from activity	**[PLN]**	**520**	**303**	**67**	**1001**	**269**	**-294**
Depreciation	[PLN]	159	142	108	347	205	150
of which: of buildings and fixed equipment		29	30	24	78	43	28
of machinery and tools		84	60	60	149	80	63
of vehicles		45	43	23	116	74	56
Net value added from activity	**[PLN]**	**362**	**161**	**-42**	**655**	**64**	**-444**
Cost of external factors	[PLN]	73	51	73	81	88	120
Income from activity without subsidies	**[PLN]**	**289**	**111**	**-115**	**573**	**-24**	**-564**
Subsidies[b]	[PLN]	280	282	274	269	261	269
Income from activity	**[PLN]**	**569**	**393**	**159**	**843**	**237**	**-295**
TOTAL COSTS	**[PLN]**	***1022***	***778***	***802***	***1324***	***1271***	***1361***

[a] Actual indirect costs without the cost of external factors.

[b] Subsidies only include the supplementary payment.

[-] - means "not observed".

- The analysis of total costs per ha of area under oats revealed no distinct trend in the survey years and in the groups of farms in question. However, there was a certain pattern, also observed in the case of the activities discussed above, namely the depreciation of fixed assets showed a steady decrease in the subsequent groups of holdings, being considerably lower in the weakest units than in the best farms (by 32.1% in 2005, by 131.3% in 2008). To a significant extent, it was related to production fixed assets at the disposal of farms.

- Irrespective of changes in specific and total costs in the subsequent groups of holdings, i.e. in the best, the average and the weakest units, the growing of oats was characterised by a clear downward trend of the gross margin without subsidies and of income from activity (as well as of the value of production).

The survey findings demonstrate that the income situation of oats growers significantly varied, and in 2008 in the average and weakest farms it deteriorated considerably in comparison with 2005. In the former group the value of production per ha covered total cultivation costs only in 98%, the supplementary payment compensated for the loss, and the surplus generated income from activity. At the same time, in the weakest holdings total costs were covered in 86% and a mere 59% in 2005 and 2008 respectively. In 2008 the situation was so unfavourable that even specific costs were not covered in full (97%), and as a consequence, despite the support in the form of the supplementary payment, income from activity remained negative.

In both survey years, major differences were found between the groups of farms in question in income from the growing of oats. In the best and the weakest holdings, as compared to the average units, certain developments were observed; those are presented below, as percentage change or ratios (per ha of area under cultivation).

		On average in holdings				
		best			weakest	
		2005	**2008**		**2005**	**2008**
Oats yield	higher by -	31.3	37.9	lower by -	10.2	30.0
Price for grain	higher by -	12.4	10.4	lower by -	13.5	8.8
Total production	higher by -	47.5	52.1	lower by -	22.7	36.1
GM without subsidies	higher by -	73.3	104.5	lower	2.4 times	x
Total costs	higher by -	31.4	4.2	higher by -	3.1	7.1
Income from activity	higher by -	44.8	255.7	lower	2.5 times	x

[x] – in 2008 in the weakest holdings the gross margin without subsidies and income from activity were negative.

The calculation results point to the same annual trends of the analysed variables; average values for the 50% of farms with medium gross margins without subsidies were adopted as reference values. There were significant changes in yield, total production (mainly determined by yield) and the analysed income categories.

The surveys show that, regardless of costs per ha, production costs per dt of grain (both specific and total) increased in the subsequent groups of holdings, due to falling yield. There was also a steady decline in the ratio of selling price to total unit cost, although it was influenced by two factors, i.e. the decreasing price for grain and the rising unit cost. As a result, in both survey years in the weakest farms and in 2008 in the average holdings this ratio was extremely unfavourable, i.e. the selling price for 1 dt of grain did not fully compensate the cost of its production – Table IV.2.15.

Table IV.2.15

Indicators of economic efficiency of the growing of oats in 2005 and 2008

Specification		2005			2008		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Specific costs/dt of grain	[PLN]	11.53	13.09	17.58	12.67	20.05	42.52
Total costs/dt of grain	[PLN]	25.60	25.58	29.36	34.63	45.84	70.04
Ratio of selling price to total unit cost		1.3	1.1	0.9	1.4	0.98	0.6
Income from activity/dt of grain	[PLN]	14.26	12.93	5.82	22.05	8.55	x
Ratio of total costs to total production		0.8	0.9	1.2	0.7	1.0	1.7
Ratio of total costs to income from activity without subsidies		3.5	7,0	x	1.6	5.4	x
Income from activity without subsidies/PLN of total production	[PLN]	0.22	0.13	x	0.30	x	x
Ratio of subsidies to income from activity		0.5	0.7	1.7	0.3	1.1	x
Subsidies/PLN of income from activity without subsidies	[PLN]	0.97	2.55	x	0.47	x	x
Total labour input/dt of grain	[hour]	0.25	0.34	0.39	0.20	0.32	0.38
Income from activity/hour of family labour	[PLN]	72.62	43.49	17.77	122.87	30.95	x
Ratio of income from activity/hour of family labour to the parity rate of labour remuneration		8.4	5,0	2.1	11.4	2.9	x

[x] - means that performing calculations was not justified.

When analysing the results in terms of remuneration of family labour, in the second survey year, i.e. in 2008, the labour intensity of cultivation (labour input per ha of area under oats) was distinctly lower. Considering this factor and income from activity per ha of family labour, the conclusion is that in the weakest holdings the farmer's labour remained unremunerated. In 2005 in the weakest farms and in 2008 in the average units the labour input of the farmer and his family was only remunerated thanks to aid in the form of the supplementary payment.

Winter wheat

Winter wheat was another cereal crop included in the surveys of the AGROKOSZTY system. It should be pointed out that area under winter wheat, as compared to that under spring wheat and oats discussed above, was much larger, in groups of holdings it ranged from 17 to 26 ha; the share of wheat in harvested area was also significantly higher. However, other previously observed trends were also found in the case of this activity. First of all, crop production dominated in the structure of total production (accounting for 60.1% to 71.3%), and its share in the best farms was higher than in the weakest holdings (by 1.9 percentage points in 2006 and by 1.2 percentage points in 2008). Thus, livestock production played a lesser role in such farms – Table IV.2.16.

Table IV.2.16

Selected information on groups of farms growing winter wheat in 2006 and 2008 (actual data)

Specification		2006			2008		
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Number of farms surveyed		36	73	36	38	76	38
Area of agricultural land	[ha]	102.39	59.35	65.56	76.27	67.04	73.64
Area of arable land	[ha]	94.20	54.90	62.94	74.34	62.39	68.95
Soil valuation index	[point]	1.05	1.13	0.97	1.29	1.12	1.09
Area under cultivation	**[ha]**	**20.74**	**17.10**	**17.46**	**25.83**	**19.38**	**18.32**
Share in total harvested area	[%]	20.5	30.5	27.6	33.9	29.7	25.9
Total labour input into the growing of winter wheat	[hour/ha]	9.9	13.2	12.1	9.5	10.1	10.0
of which: family labour input		8.9	11.3	9.3	7.2	8.7	9.2
Total NPK fertilisers used for the growing of winter wheat	[kg/ha]	265	237	278	315	265	239
Structure of the value of farm production	[%]	100.0	100.0	100.0	100.0	100.0	100.0
of which: crop production		70.1	60.1	68.2	70.9	71.3	69.7
of which: winter wheat		23.2	25.8	20.4	34.9	28.1	23.1
livestock production		29.1	39.2	27.6	28.5	27.9	29.6
Value of selected fixed assets	[PLN/farm]	646 510	374 077	331 959	557 785	459 373	526 445
	[PLN/ha of UAA]	6 314	6 303	5 063	7 313	6 852	7 149
of which: buildings and fixed equipment	[PLN/farm]	282 789	169 426	139 306	232 774	187 568	278 684
	[PLN/ha of UAA]	2 762	2 855	2 125	3 052	2 798	3 784
tractors	[PLN/farm]	136 540	85 970	79 322	113 793	111 470	93 668
	[PLN/ha of UAA]	1 334	1 449	1 210	1 492	1 663	1 272
lorries, vans and other vehicles	[PLN/farm]	26 336	15 240	11 042	19 731	20 161	13 542
	[PLN/ha of UAA]	257	257	168	259	301	184
machinery, tools and equipment for crop production	[PLN/farm]	200 844	103 441	102 290	191 488	140 174	140 551
	[PLN/ha of UAA]	1 962	1 743	1 560	2 511	2 091	1 909

The criterion adopted for the categorisation of agricultural holdings as the best, the average and the weakest was the gross margin without subsidies per ha of area under the crop in question.

Another pattern observed before was a higher value of fixed assets per ha of agricultural land in the best farms in comparison with the weakest holdings. In the first survey year the difference was 24.7%, and in the second year – 2.3%. It was also reflected in higher depreciation per ha of area under winter wheat in the best farms – Table IV.2.17.

Table IV.2.17

Production, costs and income from the growing of winter wheat by group of farms in 2006 and 2008 (actual data)

Specification		2006			2008		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Area under cultivation	[ha]	20.74	17.10	17.46	25.83	19.38	18.32
Grain yield	[dt/ha]	54.3	44.4	32.9	75.7	60.0	43.4
Selling price for grain	[PLN/dt]	51.06	47.36	47.42	56.55	49.97	46.39
Selling price for straw	[PLN/dt]	7.54	8.43	9.52	3.10	10.00	7.64
		Per ha of area under cultivation					
Total production	**[PLN]**	**2835**	**2105**	**1564**	**4280**	**2998**	**2017**
of which: grain		2772	2102	1561	4278	2997	2013
marketable straw		63	4	2	1	1	4
Total specific costs	**[PLN]**	**880**	**895**	**844**	**1311**	**1108**	**958**
of which: seed		105	127	109	192	190	192
mineral fertilisers, total		466	446	527	732	586	557
organic fertilisers, purchased		-	13	-	-	0	-
crop protection products		259	284	196	316	292	192
growth regulators		40	14	10	46	31	14
other		10	11	1	25	10	3
Gross margin without subsidies	**[PLN]**	**1955**	**1211**	**720**	**2969**	**1890**	**1060**
Actual indirect costs[a]	[PLN]	563	438	351	596	637	546
Gross value added from activity	**[PLN]**	**1392**	**773**	**369**	**2373**	**1254**	**514**
Depreciation	[PLN]	334	290	182	470	399	399
of which: of buildings and fixed equipment		65	59	47	70	73	78
of machinery and tools		161	127	78	243	186	183
of vehicles		107	101	56	147	128	137
Net value added from activity	**[PLN]**	**1058**	**483**	**187**	**1904**	**855**	**115**
Cost of external factors	[PLN]	175	145	120	230	319	134
Income from activity without subsidies	**[PLN]**	**884**	**337**	**67**	**1673**	**536**	**-19**
Subsidies[b]	[PLN]	304	308	292	269	269	269
Income from activity	**[PLN]**	**1187**	**645**	**359**	**1943**	**805**	**250**
TOTAL COSTS	**[PLN]**	***1951***	***1768***	***1497***	***2606***	***2463***	***2036***

[a] Actual indirect costs without the cost of external factors.

[b] Subsidies only include the supplementary payment.

[-] - means "not observed".

The surveys of the growing of winter wheat carried out in 2006 and 2008 revealed the following trends of production and economic results as well as of production costs (Table IV.2.17):

- Similarly to the crop production activities described above, also in the case of winter wheat the subsequent groups of holdings, i.e. the best, the average and the weakest units, were characterised by a downward trend of yield and price for grain.

  Particular disproportions were found in yield, the difference between the extreme groups – to the disadvantage of the weakest holdings – was 1.7-fold in both survey years. At the same time, with regard to grain price, in 2006 and 2008 the difference was 1.1-fold and 1.2-fold respectively.

  It results from the fact that farmers have more limited scope for manipulating selling prices for their products than in the case of yield. As a consequence, there was a fall in production in the subsequent groups of holdings.

- In the specified subsequent groups of farms there was a very distinct downward trend of total costs per ha of area under winter wheat; this decrease was contributed to by both specific and indirect costs.

  Indirect costs were significantly affected by the depreciation of fixed assets used in production, the surveys demonstrated that the value of fixed assets per ha of area under wheat was much lower in the weakest holdings than in the best units, by 45.5% in 2006 and by 15.1% in 2008.

- In both survey years, in the subsequent groups of farms there was a clear downward trend of the gross margin without subsidies and of income from activity.

  Income from activity varied considerably, the difference between the extreme groups of holdings was 3.3-fold 2006 and as much as 7.8-fold (to the disadvantage of the weakest units) in 2008.

- The decrease in income from activity was solely determined by the falling value of production in the subsequent groups of holdings as total cultivation costs declined as well. But total production dropped at a much higher rate than costs: in the average farms the difference was 16.4 percentage points in 2006 and 24.4 percentage points in 2008, whereas in the case of the weakest holdings – 10.4 and 15.4 percentage points respectively.

The evaluation of the 2006 and 2008 profitability of the growing of winter wheat in the best and the weakest holdings, as compared to the average farms, revealed certain developments which are presented below as percentage change (per ha of area under cultivation).

		On average in holdings				
		best			weakest	
		2006	**2008**		**2006**	**2008**
Winter wheat yield	higher by -	22.3	26.2	lower by -	25.9	27.7
Price for grain	higher by -	7.8	13.2	lower by -	x	7.2
Total production	higher by -	34.7	42.8	lower by -	25.7	32.7
GM without subsidies	higher by -	61.4	57.1	lower by -	40.5	43.9
Total costs	higher by -	10.4	5.8	lower by -	15.3	17.3
Income from activity	higher by -	84.0	141.4	lower by -	44.3	68.9

[x] – in 2006 the price for grain in the weakest and in the average farms was very similar.

The calculations presented indicate the same trends of the variables in question in the survey years and in the groups of farms. At the same time, they reflect significant differentiation of the results obtained, average values for the 50% of the average farms, i.e. those with medium gross margins without subsidies per ha of area under winter wheat, were adopted as reference values. Notably, the rates of change for yield and total production were higher than those for the price for grain and costs. It confirms the previous observations that income from activity is primarily determined by the value of production, and yield is then of crucial importance.

In both survey years, the growing of winter wheat was profitable, but in 2008 in the weakest holdings the production and price conditions were so unfavourable that the value of production did not cover total costs per ha in full (it was possible in 99%). The supplementary payment compensated for the resulting loss and generated income from activity. However, it was lower than in 2006, in contrast to the results obtained by the average and the best farms.

According to the survey findings, in spite of a downward trend of costs (specific and total) per ha of area under cultivation in the subsequent groups of holdings, costs per dt showed an upward trend. It was due to the falling level of yield. On account of the growing unit production cost of wheat grain and the decreasing selling price, the price/cost ratio deteriorated in the subsequent groups of farms – Table IV.2.18.

The values of partial indicators prove that, in spite of different production and price conditions (for agricultural products and inputs) in the survey years, the cost per PLN of total production – in the corresponding groups of the best and the average farms – basically remained unchanged (a minor difference to the advantage of 2008 was noted in the best holdings). It means that the cost intensity of production showed no changes. At the same time, in the weakest

units this ratio was worse, and unfavourable in 2008: the cost per PLN of total production was PLN 1.01, whereas it was PLN 0.96 in 2006. To a certain extent, this situation was reflected in much lower income from activity per dt of grain – Table IV.2.18.

Table IV.2.18

Indicators of economic efficiency of the growing of winter wheat in 2006 and 2008

Specification		2006			2008		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Specific costs/dt of grain	[PLN]	16.21	20.16	25.63	17.33	18.47	22.07
Total costs/dt of grain	[PLN]	35.95	39.84	45.46	34.44	41.05	46.93
Ratio of selling price to total unit cost		1.4	1.2	1.04	1.6	1.22	0.99
Income from activity/dt of grain	[PLN]	21.87	14.54	10.90	25.68	13.42	5.77
Ratio of total costs to total production		0.7	0.8	0.96	0.6	0.8	1.01
Ratio of total costs to income from activity without subsidies		2.2	5.2	22.4	1.6	4.6	x
Income from activity without subsidies/PLN of total production	[PLN]	0.31	0.16	0.04	0.39	0.18	x
Ratio of subsidies to income from activity		0.3	0.5	0.8	0.1	0.3	1.1
Subsidies/PLN of income from activity without subsidies	[PLN]	0.34	0.91	4.38	0.16	0.50	x
Total labour input/dt of grain	[hour]	0.18	0.30	0.37	0.13	0.17	0.23
Income from activity/hour of family labour	[PLN]	132.89	57.33	38.72	269.37	92.47	27.08
Ratio of income from activity/hour of family labour to the parity rate of labour remuneration		14.7	6.4	4.3	25.1	8.6	2.5

[x] - means that performing calculations was not justified.

Data on the income situation of the growing of winter wheat should also be interpreted in the context of the remuneration of production factors (i.e. labour, land and capital). In this respect, the report only focuses on the remuneration of own labour (i.e. the work of the farmer and his family), valued at the following parity rates: PLN 9.02 per hour in 2006 and PLN 10.74 per hour in 2008.

As follows from the data contained in Table IV.2.18, income from activity per hour of family labour ensured full remuneration of family labour input. The ratio of this indicator to the parity rate in the first two groups of holdings (i.e. the best and the average units) was higher in 2008, due to income per ha of area under cultivation and lower labour intensity. In the weakest farms, however, this ratio decreased, which was only caused by lower income per ha of area under winter wheat.

Winter rye

In 2006 and 2008 in holdings growing rye the quality of utilised agricultural land was not very good, with the soil valuation index ranging between 0.66 to 0.89. It is assessed that this factor had a major influence on the organisation and specialisation of production in the farms in question. When analysing the orientation of agricultural production in those units in terms of production structure, it should be noted that it somewhat differed from that characterising the survey samples of other activities. First of all, crop production accounted for more than 50% of total production only in the best and average farms, whereas livestock production dominated in the weakest holdings. It was particularly evident in 2006; livestock production represented then 70.1% of total production, whereas crop production accounted for 29.7%. In 2008 the gap narrowed and the respective shares were 50.4% and 48.4% – Table IV.2.19.

Table IV.2.19

Selected information on groups of farms growing winter rye in 2006 and 2008 (actual data)

Specification			2006			2008		
			25% best	50% average	25% weakest	25% best	50% average	25% weakest
Number of farms surveyed			31	62	31	31	61	31
Area of agricultural land		[ha]	63.77	68.68	123.64	60.05	69.54	68.90
Area of arable land		[ha]	58.92	59.94	109.45	55.32	62.11	60.98
Soil valuation index		[point]	0.88	0.83	0.66	0.89	0.79	0.87
Area under cultivation		**[ha]**	**8.37**	**10.77**	**15.44**	**10.42**	**9.14**	**14.36**
Share in total harvested area		[%]	14.1	16.4	13.4	16.4	12.9	22.3
Total labour input into the growing of winter rye		[hour/ha]	10.3	8.3	11.0	8.5	9.3	10.1
of which: family labour input			8.3	6.5	5.3	7.5	8.7	7.9
Total NPK fertilisers used for the growing of winter rye		[kg/ha]	141	118	179	163	152	174
Structure of the value of farm production		[%]	100.0	100.0	100.0	100.0	100.0	100.0
of which:	crop production		55.1	51.3	29.7	65.3	60.1	48.4
	of which: winter rye		10.7	12.7	11.2	17.6	10.7	14.1
	livestock production		41.1	47.8	70.1	32.2	39.1	50.4
Value of selected fixed assets		[PLN/farm]	356 547	262 517	714 865	367 335	351 033	343 178
		[PLN/ha of UAA]	5 591	3 822	5 782	6 117	5 048	4 981
of which:	buildings and fixed equipment	[PLN/farm]	161 476	149 055	467 107	149 583	163 696	164 961
		[PLN/ha of UAA]	2 532	2 170	3 778	2 491	2 354	2 394
	tractors	[PLN/farm]	84 218	47 188	75 417	95 163	75 221	77 744
		[PLN/ha of UAA]	1 321	687	610	1 585	1 082	1 128
	lorries, vans and other vehicles	[PLN/farm]	10 479	8 424	22 263	13 225	9 131	6 479
		[PLN/ha of UAA]	164	123	180	220	131	94
	machinery, tools and equipment for crop production	[PLN/farm]	100 374	57 851	150 077	109 364	102 985	93 993
		[PLN/ha of UAA]	1 574	842	1 214	1 821	1 481	1 364

The criterion adopted for the categorisation of agricultural holdings as the best, the average and the weakest was the gross margin without subsidies per ha of area under the crop in question.

The analysis of selected items of fixed assets per ha of area under rye revealed a similar trend to those observed in the case of other surveyed activities. It was particularly evident in 2008, in the subsequent groups of farms the value of fixed assets decreased, with a 18.6% (i.e. PLN 1,136) difference between the best and the weakest holdings. But in 2006 this value per ha of agricultural land was similar in the extreme groups of farms (it differed by a mere PLN 191).

Table IV.2.20

Production, costs and income from the growing of winter rye by group of farms in 2006 and 2008 (actual data)

Specification		2006			2008		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Area under cultivation	[ha]	8.37	10.77	15.44	10.42	9.14	14.36
Grain yield	[dt/ha]	31.5	23.6	20.8	48.7	35.3	27.9
Selling price for grain	[PLN/dt]	46.05	38.33	36.34	46.45	41.99	34.57
Selling price for straw	[PLN/dt]	8.43	6.21	4.39	2.21	11.42	9.43
		Per ha of area under cultivation					
Total production	**[PLN]**	**1485**	**912**	**755**	**2267**	**1486**	**977**
of which: grain		1451	904	754	2261	1484	966
marketable straw		35	8	1	6	2	11
Total specific costs	**[PLN]**	**404**	**382**	**496**	**631**	**567**	**704**
of which: seed		70	91	59	134	114	155
mineral fertilisers, total		264	239	360	383	383	385
organic fertilisers, purchased		-	-	5	-	3	-
crop protection products		51	40	70	96	58	109
growth regulators		15	11	1	16	8	21
other		5	1	1	1	1	35
Gross margin without subsidies	**[PLN]**	**1081**	**530**	**259**	**1636**	**920**	**273**
Actual indirect costs[a]	[PLN]	332	218	162	547	359	227
Gross value added from activity	**[PLN]**	**749**	**312**	**97**	**1089**	**561**	**45**
Depreciation	[PLN]	249	138	108	363	222	145
of which: of buildings and fixed equipment		42	31	32	61	41	24
of machinery and tools		96	59	45	164	98	64
of vehicles		107	48	30	137	77	57
Net value added from activity	**[PLN]**	**500**	**173**	**-11**	**726**	**339**	**-100**
Cost of external factors	[PLN]	95	90	90	194	105	96
Income from activity without subsidies	**[PLN]**	**406**	**83**	**-101**	**532**	**234**	**-196**
Subsidies[b]	[PLN]	313	298	305	269	269	269
Income from activity	**[PLN]**	**719**	**381**	**204**	**802**	**504**	**73**
TOTAL COSTS	**[PLN]**	***1079***	***829***	***856***	***1735***	***1252***	***1173***

[a] Actual indirect costs without the cost of external factors.

[b] Subsidies only include the supplementary payment.

[-] - means "not observed".

The findings from the 2006 and 2008 surveys of the growing of winter rye in the best, the average and the weakest holdings allow to draw the following conclusions (Table IV.2.20):

- In both survey years, in the best farms – characterised by a relatively lower farming intensity with a simplified measure of the use of mineral fertilisers in kg of NPK per ha of area under rye – yields were higher than in the weakest holdings, by 10.7 dt in 2006 and by 20.8 dt in 2008; even though the NPK rate was lower, by 38 kg and 11 kg respectively.
- In the subsequent groups of farms there was a distinct downward trend of yield and the selling price for rye grain. But the differentiation in yield was much more significant, therefore it was the primary factor determining the value of production.

  The difference in rye yield between the extreme groups of holdings was 1.5-fold in 2006 and 1.8-fold in 2008, whereas in the case of the selling price it was 1.3-fold in both survey years. As a consequence, the value of total production markedly varied, the difference (to the disadvantage of the weakest farms) was 2.0-fold in 2006 and 2.3-fold in 2008.
- In the case of specific costs, no distinct trend was observed in the groups of holdings, but total costs showed a downward trend (only in 2006 in the average and the weakest units those were similar), due to falling indirect costs in the subsequent groups of farms.
- In both survey years, the growing of rye in the subsequent groups of holdings, i.e. the best, the average and the weakest units, was characterised by a downward trend of total production, the gross margin without subsidies and income from activity. There was a very clear correlation between these categories.
- Income from activity considerably varied between the extreme groups of farms, the difference (to the disadvantage of the weakest holdings) was 3.5-fold in 2006 and even 11-fold in 2008.

  Decreasing income from activity was solely due to declining total production in the subsequent groups of holdings as cultivation costs (total) of rye in the weakest units were lower than in the best farms (1.3 times in 2006 and 1.5 times in 2008). As follows from the calculations, however, total production went down much more sharply than costs (2.0 times in 2006 and 2.3 times in 2008), which resulted in a drop in income.

When assessing the 2006 and 2008 production and economic results of the growing of winter rye in the best and the weakest holdings, as compared to the average farms, certain developments were observed. Those are presented below, as percentage change or ratios (per ha of area under cultivation).

		On average in holdings				
		best			weakest	
		2006	**2008**		**2006**	**2008**
Winter rye yield	higher by -	33.5	38.0	lower by -	11.9	21.0
Price for grain	higher by -	20.1	10.6	lower by -	5.2	17.7
Total production	higher by -	62.8	52.6	lower by -	17.2	34.3
GM without subsidies	higher by -	104.0	77.8	lower	2.1 times	3.4 times
Total costs	higher by -	30.2	38.6	higher by -	3.3	lower by - 6.3
Income from activity	higher by -	88.7	59.1	lower by -	46.5	6.9 times

The results of calculations point to distinct trends of almost all the analysed variables (with the sole exception of total costs in the weakest holdings in 2006). At the same time, the rates of change in years and in the groups of farms reflect the differentiation in farming results. They can also serve as practical indications on which factors should be taken into account in order to minimise the differences and fluctuations in income, which is the prime objective of the farmer's work.

In both survey years the growing of rye provided income from activity, but in the weakest farms it was only possible thanks to the supplementary payment. Owing to an unfavourable combination of the production and price conditions, the value of production per ha covered total cultivation costs only in part, in 88% and 83% in 2006 and 2008 respectively. It means that without the support in the form of subsidies the farmers would have suffered a loss.

In groups of holdings unit production costs (specific and total) of grain showed a similar trend to that observed in the case of other activities discussed above. In the best, the average and the weakest farms unit costs increased, mainly due to falling yield since total costs per ha of area under rye were characterised by a downward trend.

As a result, there were significant disparities – to the disadvantage of the weakest farms – in the ratio of the selling price for grain to the unit production cost. For rye grown in the weakest holdings this ratio appeared to be particularly unfavourable. It was determined by two factors: the lowest selling price for grain and the highest unit cost. Those conditions were also reflected

in income from activity per dt, relatively the lowest in the weakest farms in both years; as compared to the best holdings, the difference was 2.3-fold in 2006 and even 6.3-fold in 2008 – Table IV.2.21.

Table IV.2.21

Indicators of economic efficiency of the growing of winter rye in 2006 and 2008

Specification		2006			2008		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Specific costs/dt of grain	[PLN]	12.83	16.20	23.91	12.96	16.03	25.21
Total costs/dt of grain	[PLN]	34.26	35.15	41.26	35.65	35.43	41.98
Ratio of selling price to total unit cost		1.3	1.1	0.9	1.3	1.2	0.8
Income from activity/dt of grain	[PLN]	22.82	16.17	9.85	16.47	14.25	2.62
Ratio of total costs to total production		0.7	0.9	1.1	0.8	0.8	1.2
Ratio of total costs to income from activity without subsidies		2.7	10.0	x	3.3	5.4	x
Income from activity without subsidies/PLN of total production	[PLN]	0.27	0.09	x	0.24	0.16	x
Ratio of subsidies to income from activity		0.4	0.8	1.5	0.3	0.5	3.7
Subsidies/PLN of income from activity without subsidies	[PLN]	0.77	3.59	x	0.51	1.15	x
Total labour input/dt of grain	[hour]	0.33	0.35	0.53	0.17	0.26	0.36
Income from activity/hour of family labour	[PLN]	86.69	58.62	38.48	106.43	57.75	9.27
Ratio of income from activity/hour of family labour to the parity rate of labour remuneration		9.6	6.5	4.3	9.9	5.4	0.9

[x] - means that performing calculations was not justified.

The presented data show that efforts should be made in order to reduce differences in both production and economic results.

The differentiation in income from activity was reflected in the degree of remuneration of labour input of the farmer and his family. According to the results of calculations presented in Table IV.2.21, in 2006 family labour was fully remunerated in all the groups of holdings, whereas in the second survey year it was only possible in the best and the average farms. In the weakest units income from activity per hour of family labour only accounted for 86% of the parity rate of labour remuneration adopted for the calculations, i.e. PLN 10.74 per hour in 2008.

Winter rape

Empirical data for the growing of winter rape were collected in 2006 and 2008. In comparison with other surveyed crop production activities, area under winter rape was larger, ranging from 13 to 22 ha, slightly less than in the case of winter wheat. The analysis of the structure of production in the surveyed farms revealed an opposite trend to that observed before. In the case of rape, in both survey years, crop production accounted for a higher share in the weakest holdings than in the best farms (such a situation was also observed for spring wheat in 2005). It means that in the units which utilised agricultural land of relatively the best quality, reported the most favourable results from the growing of rape and were characterised by the largest area under rape livestock production represented a rather significant share in total production – 36.7% in 2006 and 26.6% in 2008. These figures indicate that in such farms both crop an duties livestock production played an important role, and the farmers preferred multiple production activities – Table IV.2.22.

Table IV.2.22

Selected information on groups of farms growing winter rape in 2006 and 2008 (actual data)

Specification			2006			2008		
			25% best	50% average	25% weakest	25% best	50% average	25% weakest
Number of farms surveyed			31	60	31	35	69	35
Area of agricultural land		[ha]	117.33	84.14	102.78	82.94	80.53	82.56
Area of arable land		[ha]	116.15	81.11	95.29	80.35	78.64	80.34
Soil valuation index		[point]	1.19	1.01	0.92	1.25	1.08	1.07
Area under cultivation		**[ha]**	**22.01**	**18.34**	**19.66**	**21.04**	**18.27**	**13.05**
Share in total harvested area		[%]	19.1	22.4	19.0	24.6	22.0	14.8
Total labour input into the growing of winter rape		[hour/ha]	9.9	12.2	9.1	9.3	9.2	9.6
of which: family labour input			7.0	9.8	6.6	7.2	8.1	8.6
Total NPK fertilisers used for the growing of winter rape		[kg/ha]	345	347	317	338	386	317
Structure of the value of farm production		[%]	100.0	100.0	100.0	100.0	100.0	100.0
of which:	crop production		62.1	52.6	76.1	72.0	81.5	80.4
	of which: winter rape		23.2	25.8	17.0	35.0	25.9	17.3
	livestock production		36.7	46.8	23.5	26.6	17.4	17.4
Value of selected fixed assets		[PLN/farm]	924 315	458 276	386 173	671 540	543 642	492 311
		[PLN/ha of UAA]	7 878	5 447	3 757	8 097	6 751	5 963
of which:	buildings and fixed equipment	[PLN/farm]	472 555	237 301	148 957	260 639	197 452	196 337
		[PLN/ha of UAA]	4 028	2 820	1 449	3 143	2 452	2 378
	tractors	[PLN/farm]	162 345	94 728	101 731	168 532	138 550	125 437
		[PLN/ha of UAA]	1 384	1 126	990	2 032	1 720	1 519
	lorries, vans and other vehicles	[PLN/farm]	27 659	12 194	9 803	22 173	19 681	12 584
		[PLN/ha of UAA]	236	145	95	267	244	152
	machinery, tools and equipment for crop production	[PLN/farm]	261 757	114 054	125 682	220 195	187 959	157 954
		[PLN/ha of UAA]	2 231	1 356	1 223	2 655	2 334	1 913

The criterion adopted for the categorisation of agricultural holdings as the best, the average and the weakest was the gross margin without subsidies per ha of area under the crop in question.

The best farms had much more fixed assets used in production that the weakest holdings, as reflected in the value of fixed assets per ha of agricultural land; it was 109.7% and 35.8% higher in 2006 and 2008 respectively. Changes were observed with regard to all the analysed items of fixed assets, but the difference was very distinct in the case of buildings and fixed equipment. Most probably, it was connected with larger livestock production.

Table IV.2.23

Production, costs and income from the growing of winter rape by group of farms in 2006 and 2008 (actual data)

Specification		2006			2008		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Area under cultivation	[ha]	22.01	18.34	19.66	21.04	18.27	13.05
Seed yield	[dt/ha]	38.2	32.2	19.5	39.6	33.3	19.0
Selling price for seed	[PLN/dt]	94.33	91.54	87.81	124.97	124.09	114.71
		Per ha of area under cultivation					
Total production	**[PLN]**	**3607**	**2949**	**1712**	**4953**	**4127**	**2176**
of which: seed		3607	2949	1712	4953	4127	2176
Total specific costs	**[PLN]**	**1072**	**1293**	**1290**	**1244**	**1586**	**1303**
of which: seed		74	123	106	122	164	152
mineral fertilisers, total		639	700	735	742	910	822
organic fertilisers, purchased		-	-	-	-	-	1
crop protection products		308	420	415	315	410	256
growth regulators		32	33	31	20	49	42
other		20	17	3	44	53	30
Gross margin without subsidies	**[PLN]**	**2536**	**1656**	**422**	**3710**	**2541**	**873**
Actual indirect costs[a]	[PLN]	574	517	393	908	803	637
Gross value added from activity	**[PLN]**	**1961**	**1139**	**30**	**2801**	**1738**	**236**
Depreciation	[PLN]	376	333	203	542	467	483
of which: of buildings and fixed equipment		73	78	38	105	78	78
of machinery and tools		179	136	88	247	206	228
of vehicles		124	114	77	170	182	172
Net value added from activity	**[PLN]**	**1585**	**807**	**-173**	**2259**	**1270**	**-248**
Cost of external factors	[PLN]	192	194	156	333	341	221
Income from activity without subsidies	**[PLN]**	**1393**	**612**	**-330**	**1927**	**930**	**-469**
Subsidies[b]	[PLN]	313	306	312	296	280	298
Income from activity	**[PLN]**	**1707**	**918**	**-17**	**2223**	**1210**	**-171**
TOTAL COSTS	**[PLN]**	***2214***	***2337***	***2042***	***3027***	***3197***	***2645***

[a] Actual indirect costs without the cost of external factors.

[b] Subsidies include the supplementary payment, and in 2008 also aid for energy crops and the de minimis aid for rape (if granted).

[-] - means "not observed".

The findings from the surveys of the growing of winter rape conducted in 2006 and 2008 allow to draw the following conclusions (Table IV.2.23):

- In both survey years, the best farms were characterised by much higher yield of winter rape than the weakest holdings, it is assessed that the difference was due to the best relative soil quality and a higher NPK rate per ha, by 28 kg in 2006 and by 21 kg in 2008.
- Production results significantly varied between the groups of farms in question, whereas price differences were much smaller.

  The comparison of the extreme groups of farms revealed that the difference in yield – to the advantage of the best units – was 18.7 dt (2-fold) in 2006 and 20.6 dt (2.1-fold) in 2008, whereas the gap in terms of the selling price for seed was PLN 6.52 per dt and PLN 10.26 per dt (1.1-fold in both years). This situation resulted in substantial differentiation of production, with a 2.1-fold and 2.3-fold difference in 2006 and 2008 respectively.
- Total costs per ha of area under rape were lower in the weakest farms than in the best holdings, which was solely determined by indirect costs as those showed a downward trend in the subsequent groups of farms.
- In the subsequent groups of holdings there was a distinct downward trend in the depreciation of fixed assets per ha of area under rape. The comparison of the extreme groups indicates that in the weakest farms depreciation was lower, by 46.0% in 2006 and by 10.9% in 2008. It reflected, among other things, the value of fixed assets used in production at the disposal of agricultural holdings.
- In the subsequent groups of farms, namely the best, the average and the weakest units, the growing of winter rape was characterised by a distinct downward trend of production, the gross margin without subsidies and income from activity. There is a clear correlation between these categories; in the holdings categorised as the best the value of total production, and consequently the gross margin was the highest, thus significantly contributing to the generation of income from activity, which was also the highest.

As proven by the findings from the surveys, the profitability of the growing of winter rape was determined by the value of production, which in turn was affected by yield to a much greater extent than by the selling price for seed. As a result of very low rape yield, in the weakest holdings total production was so low that it could not fully cover the cultivation costs. In 2006 total costs were covered in 84% and in 2008 – 82%. It should be emphasised that costs incurred by the weakest farms were the lowest, therefore the unfavourable situation was solely caused by the low value of production.

The analysis of the 2006 and 2008 results of growing winter rape in terms of profitability, in the best and the weakest holdings compared to the average farms, revealed certain developments. The observations are presented below, as percentage change or ratios (per ha of area under cultivation).

		On average in holdings				
		best			weakest	
		2006	**2008**		**2006**	**2008**
Winter rape yield	higher by -	18.6	18.9	lower by -	39.4	42.9
Price for seed	higher by -	3.0	0.7	lower by -	4.1	7.6
Total production	higher by -	22.3	20.0	lower by -	41.9	47.3
GM without subsidies	higher by -	53.1	46.0	lower	3.9 times	2.9 times
Total costs	lower by -	5.3	5.3	lower by -	12.6	17.3
Income from activity	higher by -	85.9	83.7		x	x

[x] – In 2006 and 2008 in the weakest farms income from activity was negative.

The comparison of the results in the extreme groups of holdings with those obtained by the average farms also indicates considerable differentiation. Furthermore, it is worth noting that the rates of change were very similar in both survey years. However, the data presented below prove that yield had a greater effect on differences in production and income than the selling price for seed.

According to the survey findings, in both survey years in the best and the average holdings the growing of winter rape was profitable, although the 2008 results were more favourable. It was mostly due to a much higher selling price for seed. At the same time, in the weakest farms winter rape producers incurred a loss despite the support in the form of the supplementary payment. However, the decrease in income was much sharper in 2008, thus the economic results of the growing of rape in such holdings, unlike in the first two groups, further deteriorated.

The profitability of the growing of winter rape is also described by ratios between selected variables. As follows from the data contained in Table IV.2.24, the (total) unit cost of producing rape seed markedly varied between the groups of farms in question. In both survey years the difference in unit cost between the best and the weakest holdings was as much as 1.8-fold. As a consequence, the price/cost ratio, i.e. the degree to which the selling price for seed covers the production cost, deteriorated in the subsequent groups of farms. In the weakest holdings it was unfavourable (1:0.8). It should be pointed out that in both survey years this ratio was the same in the corresponding groups of farms.

Table IV.2.24

Indicators of economic efficiency of the growing of winter rape in 2006 and 2008

Specification		2006			2008		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Specific costs/dt of seed	[PLN]	28.02	40.13	66.16	31.38	47.69	68.71
Total costs/dt of seed	[PLN]	57.89	72.54	104.71	76.37	96.12	139.43
Ratio of selling price to total unit cost		1.6	1.3	0.8	1.6	1.3	0.8
Income from activity/dt of seed	[PLN]	44.63	28.49	x	56.08	36.37	x
Ratio of total costs to total production		0.6	0.8	1.2	0.6	0.8	1.2
Ratio of total costs to income from activity without subsidies		1.6	3.8	x	1.6	3.4	x
Income from activity without subsidies/PLN of total production	[PLN]	0.39	0.21	x	0.39	0.23	x
Ratio of subsidies to income from activity		0.2	0.3	x	0.1	0.2	x
Subsidies/PLN of income from activity without subsidies	[PLN]	0.23	0.50	x	0.15	0.30	x
Total labour input/dt of seed	[hour]	0.26	0.38	0.47	0.23	0.28	0.51
Income from activity/hour of family labour	[PLN]	244.91	93.43	x	309.25	149.69	x
Ratio of income from activity/hour of family labour to the parity rate of labour remuneration		27.2	10.4	x	28.8	13.9	x

[x] - means that performing calculations was not justified.

In both survey years, in spite of the differences in production results and changes in prices for agricultural products and inputs, the cost of producing PLN 1 of output was the same. It means that the cost intensity of the production of rape remained unchanged. The profitability of production (income from activity without subsidies/PLN of total production) remained at the same level in the best farms, increased somewhat in the average holdings (by 9.5%), whereas it deteriorated in the weakest units (income was not realised, and in 2008 it went down even further).

When interpreting the obtained results in the context of the remuneration of family labour, it should be stressed that in both survey years it was only possible in the best and the average farms. Labour input, expressed in terms of quantity, into the production process of particular activities, is recorded in the AGROKOSZTY system, but there is no category of “wage” for the work performed. Due to the lack of data on actual remuneration, the presented account is based on the valuation of labour input at a parity rate per hour (PLN 9.02 in 2006 and PLN 10.74 in 2008). However, it should be mentioned at this point that the valuation of labour input by the farmer and his family is always a matter of convention in family farms.

Dairy cows

Between 2005 and 2008, the survey of the activity "dairy cows" was only conducted in 2006. Table IV.2.25 presents general information on the best, the average and the weakest units from the survey sample of holdings with dairy cows and participating in the survey.

Table IV.2.25

Selected information on groups of farms with dairy cows in 2006 (actual data)

Specification			2006		
			25% best	50% average	25% weakest
Number of farms surveyed			40	78	40
Area of agricultural land		[ha]	48.61	32.75	21.33
Area of arable land		[ha]	37.84	23.82	15.33
Area of permanent pasture		[ha]	10.77	8.86	5.99
Soil valuation index		[point]	0.93	0.88	0.78
Annual average number of dairy cows		**[head]**	**31.7**	**19.7**	**8.8**
Milk yield per cow		[litre]	6536	5055	3474
Forage area per dairy cow		[ha]	0.62	0.59	0.73
Total labour input per dairy cow		[hour]	121.6	141.0	187.7
of which: family labour input			105.1	130.5	184.9
Structure of the value of production		[%]	100.0	100.0	100.0
of which:	crop production		17.0	22.3	39.1
	livestock production		82.1	76.1	58.9
	of which: dairy cows		90.3	81.3	52.9
Value of selected fixed assets		[PLN/farm]	548 451	334 294	181 384
		[PLN/ha of UAA]	11 283	10 207	8 504
of which:	buildings and fixed equipment	[PLN/farm]	267 009	186 624	116 040
		[PLN/ha of UAA]	5 493	5 698	5 440
	tractors	[PLN/farm]	99 088	55 088	25 856
		[PLN/ha of UAA]	2 038	1 682	1 212
	lorries, vans and other vehicles	[PLN/farm]	8 078	6 687	4 489
		[PLN/ha of UAA]	166	204	210
	machinery, tools and equipment for crop production	[PLN/farm]	107 844	61 589	28 836
		[PLN/ha of UAA]	2 219	1 881	1 352
	machinery, tools and equipment for livestock production	[PLN/farm]	66 432	24 305	6 164
		[PLN/ha of UAA]	1 367	742	289

The criterion adopted for the categorisation of agricultural holdings as the best, the average and the weakest was the gross margin without subsidies per dairy cow.

The survey findings revealed certain patterns, namely in the subsequent groups of holdings, i.e. in the best, the average and the weakest farms, there was a downward trend of the annual average number of cows and milk yield per cow (the difference between the extreme groups was 23 cows and 3,062 litres of milk respectively). Furthermore, the best units were characterised by a larger area of

agricultural land and permanent pasture, which also showed a downward trend in the subsequent groups.

Considering the structure of total farm production and the share of dairy cows, the best holdings were clearly superior. At the same time, in the average and the weakest farms livestock production, including milk production, played a decreasingly important role, whereas crop production accounted for a growing share. There were significant differences in fixed assets at the disposal of the holdings in question, largely related to the specialisation of production. It is assessed that the best farms were also best equipped with modern means of work. But the value of fixed assets used in production per ha of agricultural land declined in the subsequent groups of holdings, in the weakest units it was 24.6% lower than in the best farms. A particularly significant difference was noted in the case of machinery and tools for livestock production – as much as 4.7-fold.

An opposite trend was observed with regard to labour intensity of production: both total labour input and family labour input per cow increased in the subsequent groups of holdings; the respective labour inputs were 54.4% and 75.9% higher in the weakest units than in the best farms.

The results of the 2006 and 2008 surveys of dairy cows in the best, the average and the weakest holdings lead to the following conclusions (Table IV.2.26):

- In the subsequent groups of farms in question there was a distinct downward trend of the number of dairy cows per holding, milk yield per cow and the selling price for milk. It is assessed that the concentration of dairy cattle farming represents an important factor related to, or even determining many other developments and relationships in the production process.

  When comparing the results in the weakest farms (herd size: 9 cows) with those obtained by the best units (32 cows), in 2006 in the former group milk yield per cow was 46.8% lower and the selling price for milk – 21.9% lower, whereas in 2008 these indicators were 44.2% and 20.9% lower respectively.

- The survey findings indicate that the fall in the number of cows per farm was accompanied by a decline in milk yield per cow and in the selling price for milk, but milk yield per cow dropped more sharply than the milk price.

  Milk yield was the main factor to differentiate the value of production; its level per cow in the extreme groups of holdings showed a 2.1-fold difference (in both survey years). As a result, it was reflected in the income situation of milk producers.

Table IV.2.26

Production, costs and income from milk production by group of farms in 2006 and 2008 (for 2006 – actual data, for 2008 – estimated data)

Specification		2006			2008		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Annual average number of dairy cows	[head]	31.7	19.7	8.8	31.7	19.7	8.8
Milk yield per cow	[litre]	6536	5055	3474	6712	5434	3745
Selling price for milk	[PLN/litre]	1.05	0.96	0.82	1.15	1.07	0.91
		Per dairy cow					
Total production	**[PLN]**	**7508**	**5561**	**3549**	**8333**	**6435**	**4048**
of which: milk		6833	4860	2821	7695	5819	3373
calf weaned		436	460	503	377	371	443
cull dairy cow		239	241	226	261	245	233
Total specific costs	**[PLN]**	**2522**	**2172**	**2022**	**2922**	**2921**	**2780**
of which: livestock replacement		480	364	385	478	435	396
purchased feedingstuffs		950	673	419	1137	997	604
farm-produced marketable		362	569	735	523	836	1238
farm-produced unmarketable		353	296	261	398	322	281
other		378	270	222	387	332	261
Gross margin without subsidies	**[PLN]**	**4987**	**3389**	**1527**	**5411**	**3514**	**1268**
Actual indirect costs[a]	[PLN]	981	824	622	1145	974	756
Gross value added from activity	**[PLN]**	**4006**	**2565**	**906**	**4265**	**2540**	**512**
Depreciation	[PLN]	1093	615	446	812	980	480
of which: of buildings and fixed equipment		418	162	145	216	365	165
of machinery and tools		451	269	172	365	407	182
of vehicles		221	173	120	226	198	124
Net value added from activity	**[PLN]**	**2913**	**1950**	**460**	**3454**	**1560**	**32**
Cost of external factors	[PLN]	268	206	65	307	264	66
Income from activity without subsidies	**[PLN]**	**2646**	**1744**	**395**	**3147**	**1297**	**-34**
Subsidies[b]	[PLN]	193	186	229	169	156	190
Income from activity	**[PLN]**	**2839**	**1930**	**624**	**3316**	**1453**	**156**
TOTAL COSTS	**[PLN]**	***4863***	***3816***	***3154***	***5186***	***5139***	***4082***

[a] Actual indirect costs without the cost of external factors.

[b] Subsidies include the supplementary payment relative to forage area per dairy cow, from 2008 the account also included the livestock payment.

- In the subsequent groups of farms there was a clear downward trend of total costs of dairy cattle farming. In terms of total costs per dairy cow, the difference between the extreme groups of holdings was 1.5-fold in 2006 and 1.3-fold in 2008. It was contributed to by both specific and indirect costs, but the latter had a greater impact.
- Lower indirect costs are connected, among other things, with barn equipment, therefore in the weakest farms, i.e. those with an average of ca. 9 cows, the depreciation of fixed assets used in production per dairy cow was much

lower than in the best units, i.e. those with approx. 32 cows; the difference was 2.5-fold in 2006 and 1.7-fold in 2008. A smaller scale of dairy cattle farming also involved lower spending on repairs and much lower costs of paid labour.

- A distinct downward trend was found in the subsequent groups of farms, i.e. in the best, the average and the weakest units, with regard to total production per dairy cow, the gross margin and income from activity. There was a very clear correlation between these categories.
- The differences in income from activity per dairy cow were very significant between the extreme groups of holdings, 4.6-fold in 2006 and as much as 21.3-fold in 2008 (to the disadvantage of the weakest units).

  The decreasing income from activity in the subsequent groups of holdings should be attributed only to the falling value of production since the costs of dairy cattle farming went down as well. However, total production dropped more sharply than total costs, thus resulting in deteriorated income.

The analysis of the economic situation in milk production in 2006 and 2008, in the best and the weakest holdings compared to the average farms, demonstrated certain developments which are presented below, as percentage change or ratios (per dairy cow).

	On average in holdings					
	best			weakest		
		2006	**2008**		**2006**	**2008**
Milk yield per cow	higher by -	29.3	23.5	lower by -	31.3	31.1
Price for milk	higher by -	9.4	7.5	lower by -	14.6	15
Total production	higher by -	35.0	29.5	lower by -	36.2	37.1
GM without subsidies	higher by -	47.2	54.0	lower	2.2 times	2.8 times
Total costs	higher by -	27.4	0.9	lower by -	17.3	20.6
Income from activity	higher by -	47.1	128.2	lower	3.1 times	9.3 times

The results of calculations indicate the same trends for all the variables in question. Particularly significant changes were noted with regard to the gross margin without subsidies and income from activity, but it should be pointed out that those indicators increased in the best farms and decreased in the weakest holdings.

In 2008 in the weakest units income was so low that the farmers did not incur a loss only thanks to subsidies; the value of production per dairy cow covered the costs involved in 99%.

Despite the falling costs per dairy cow, production costs (total) per litre of milk increased in the subsequent groups of holdings, in the weakest farms as compared to the best units they were 23.0% and 41.6% higher in 2006 and 2008 respectively. It was caused by declining milk yield per cow in the subsequent groups of farms. Due to the rising unit cost and the decreasing milk price, the cost/price ratio was unfavourable in the weakest holdings (1:0.90 in 2006 and 1:0.84 in 2008) – Table IV.2.27.

Table IV.2.27

Indicators of economic efficiency of milk production in 2006 and 2008

Specification		2006			2008		
		Average results by group of farms					
		25% best	50% average	25% weakest	25% best	50% average	25% weakest
Specific costs/litre of milk	[PLN]	0.39	0.43	0.58	0.44	0.54	0.74
Total costs/litre of milk	[PLN]	0.74	0.76	0.91	0.77	0.95	1.09
Ratio of selling price to total unit cost		1.42	1.26	0.90	1.49	1.13	0.84
Income from activity/litre of milk	[PLN]	0.43	0.38	0.18	0.49	0.27	0.04
Ratio of total costs to total production		0.65	0.69	0.89	0.62	0.80	1.01
Ratio of total costs to income from activity without subsidies		1.8	2.2	8.0	1.7	4.0	x
Income from activity without subsidies/PLN of total production	[PLN]	0.35	0.31	0.11	0.38	0.20	x
Share of subsidies in income from activity	[%]	0.07	0.10	0.37	0.05	0.11	1.22
Subsidies/PLN of income from activity without subsidies	[PLN]	0.07	0.11	0.58	0.05	0.12	x
Total labour input/litre of milk	[hour]	0.019	0.028	0.054	0.018	0.024	0.052
Income from activity/hour of family labour	[PLN]	27.01	14.79	3.38	30.20	12.13	0.82
Ratio of income from activity per hour of family labour to the parity rate of labour remuneration		3.0	1.6	0.4	2.8	1.1	0.1

[x] - means that performing calculations was not justified.

The data presented in Table IV.2.27 prove that the results obtained significantly varied between the groups of holdings in question, due to a number of factors, but the underlying reason was the concentration of production and the resulting herd size.

It was reflected in differences in income from activity per litre of milk and per hour of family labour. When interpreting the results in the context of the remuneration of labour of the farmer and his family, it should be pointed out that in the best and the average holdings (herd size: 32 and 20 cows respectively) labour inputs were fully remunerated, whereas in the weakest farms (9 cows) only in part: in 38% in 2006 and in a mere 8% in 2008.

V. Summary

The surveys whose findings were presented in this report were aimed to analyse the production and economic results of selected crop and livestock production activities in farms performing those activities. It should be emphasised, however, that the results presented do not depict the situation of all such holdings in Poland, but only of those which provided farm accountancy data.

In the period covered by the report (2005–2008) there were significant changes in external conditions, both economic and climatic. Apart from varying external conditions, the sowing structure and the number of livestock in the surveyed farms changed as well. There were also changes in the profitability of production.

The findings from the surveys of production activities were presented using two methods of selecting farms for examination. The first (Chapter IV.1) was a comparative analysis on the basis of data from the so-called "farms recurring in the survey years". Thus, the results obtained were not subject to deviations resulting from changes in the population of farms in question. The second method of grouping agricultural holdings (Chapter IV.2) was based on an economic criterion, i.e. the gross margin without subsidies from the surveyed activities. The results were presented for quartiles of farms, as average values for the selected holdings broken down into three groups: the best, the average and the weakest units.

The surveys conducted between 2005 and 2008 indicate development-oriented changes in the farms surveyed under the AGROKOSZTY system. It is assessed that decisions made by farm managers were largely influenced by the several years' period of Poland's inclusion in the EU structures and by support in the form of subsidies. First and foremost, they increased the area of utilised agricultural land as well as improving fixed assets used in production, farmers invested particularly in tractors, agricultural machinery and tools. The rise in the value of fixed assets per ha of agricultural land ranged from several to over ten percent. It frequently resulted in reduced labour input, which enhanced labour productivity.

It should be remembered, however, that the changes observed concern commercial farms achieving higher production as such was the survey sample.

The results obtained for the activities in question indicate a number of aspects of the production process as well as revealing certain trends and patterns. For instance, as far as production orientation is concerned, the production

structure of farms where crop production activities were surveyed was clearly dominated by crop production, whereas in holdings engaged in pig farming and dairy cattle farming livestock production played the most important role. This pattern was undoubtedly related to the scale of production in the surveyed activities as the size of plantations ranged from 2.77 ha in the case of potatoes for human consumption to 24.48 ha under spring wheat. As regards livestock production, the holdings from the survey sample sold an annual average of 600 to 680 fattening pigs and kept 20 dairy cows.

The production results from the activities surveyed under the AGROKOSZTY system were significantly above the national average for family farms in Poland, with the difference ranging between 3.2% for winter rape in 2006 to 95.8% in the case of spring wheat in 2008. The sole exception was oats yield, 7.0% lower in 2008, which is attributable to a specific combination of temperature and humidity conditions.

With regard to the selling price for crop products, no distinct trend was observed, although it was often similar to the national average, at times slightly above or below. But the selling price for pigs for slaughter and milk was higher, this was also the case for milk yield per cow. However, irrespective of the level recorded, annual trends of both yield and the selling price were the same as average trends observed in family farms in Poland.

In consideration of the above, the performance of the holdings participating in surveys conducted under the AGROKOSZTY system – as compared to the national average – is assessed as superior in terms of production and economic results achieved.

When analysing the cost side of the activities surveyed, it should be noted that costs per production unit result from the level of production inputs, prices for agricultural inputs and other expenses related to a particular activity, those factors combined determine the level of total costs. Considering production inputs in the survey years, it should be pointed out that in the case of cereals, i.e. spring and winter wheat and rye, the NPK rate per ha remained basically unchanged, or declined in the case of oats – by approx. 13% (in 2008 on 2005). At the same time, in the second survey year increased fertilisation was reported by producers of sugar beet – by ca. 5%, potatoes for human consumption – by approx. 15%, and winter rape – by ca. 28%. Changes were also observed with regard to the consumption of concentrated feedingstuffs per kg of weight increase in pig farming, in 2008 it went down by 15% (3.95 kg against 4.65 kg) on 2005. Although it remained rather high, this change indicates producers' decisions aimed to reduce production costs.

The economic results of the surveyed activities were also influenced by the level (scale) of production, the production and price results obtained and cost intensity. But support in the form of subsidies ultimately played a role, sometimes farmers only avoided a loss thanks to financial aid. In the years in question the economic results of the surveyed crops (i.e. sugar beet, potatoes for human consumption, spring wheat, oats, winter wheat, winter rye and winter rape) should be assessed as profitable in terms of income from activity. Nevertheless, in 2008 in the case of sugar beet and oats this income was only realised thanks to subsidies, i.e. the sugar payment and the supplementary payment, which compensated for the loss, and the surplus generated income.

In the survey years (2005–2008), on account of changing production and price conditions as well as cultivation costs, there were disproportions in income from activity per ha of area under specific crops. As regards the one exception, namely potatoes for human consumption, this income was rather stable, the years 2007–2008 were definitely the most favourable, with income per ha at PLN 3,547 and PLN 3,432 respectively, whereas it amounted to nearly PLN 14 per dt (in 2005–2006 ca. PLN 13 and PLN 11 respectively), provided that the whole output was sold. It should be noted that potatoes are excluded from support in the form of the supplementary payment, therefore income is solely determined by the market situation, weather conditions and farmers' efforts.

Rather stable income was also provided by the growing of sugar beet in 2005–2007. But the most favourable year in this respect was 2005, i.e. before the reform of the sugar market, whereas sugar beet planters reported the worst results in 2008, i.e. the third year of the reform. There were several contributory factors such as a further fall in the purchasing price for roots, a lower sugar payment and a significant rise in prices for agricultural inputs. As a consequence, a dramatic decrease in the profitability of sugar beet growing was observed, total production per ha only covered total costs in 85%. The loss was compensated by the sugar payment, which also generated income from activity – PLN 662/ha, over 5 times lower than in 2005. It should be added that income per dt of roots was a mere PLN 1.29 in 2008, whereas it amounted to PLN 6.88 in 2005, PLN 5.49 in 2006 and PLN 5.10 in 2007.

The analysis of the economic results of cereal growing demonstrated identical annual trends of income from activity per ha under all the surveyed cereals (i.e. spring wheat, oats, winter wheat and winter rye). A particularly favourable situation was observed in 2007 when, as compared to 2006, the increase in production per ha ranged between 86% for rye and 104% in the case of oats. It was mostly determined by a surge in the selling price for grain

(by ca. 56% to 58%), but also by higher yields (by approx. 19% to 31%). In 2007 total costs (specific and indirect) per ha went up by ca. 8% to 12%. Due to such conditions, income from activity was several (3 to 3.6) times higher than in 2006. The year 2008 witnessed a considerable decline in this income, but it was still above the 2006 level (with the exception of oats).

In terms of income from activity per dt of grain, the growing of spring wheat and winter wheat ensured roughly the same results, much better than in the case of rye and oats. A similar pattern was also observed with regard to cost intensity of the production of particular cereals. Furthermore, the evaluation included the cost/production ratio, which in the case of spring wheat and winter wheat was clearly narrower and the results more favourable.

Another factor to have an effect on income from activity was the supplementary payment, which proved to be the most significant support for rye of producers: it ranged from PLN 62.60 to PLN 0.39 per PLN of income from activity without subsidies in 2006 and 2007 respectively. At the same time, in the case of winter wheat this factor played relatively the least important role – ranging between PLN 0.96 in 2006 and PLN 0.15 in 2007.

The growing of winter rape – in contrast to cereals – ensured the most favourable results in 2008. It was contributed to by higher yield (by 19.1%), but even to a greater extent by a rise in the selling price for seed (by 33.4%). Consequently, the growth rate of total production exceeded that of cultivation costs by 24.7 percentage points. As compared to 2007, income from activity went up by 131%, to PLN 1,203/ha. Income per dt of seed amounted to PLN 38.61, only double the 2005–2007 figure. In 2008 the cost/production ratio and the ratio of the selling price for seed to production cost per dt were also more advantageous than in the previous two years in question. The role of the supplementary payment was also much less important as in 2006, 2007 and 2008 rape producers received PLN 1.20, PLN 1.28 and PLN 0.34, respectively, per PLN of income from activity without subsidies.

In the period in question (2005–2008), the conditions for pig farming were not very favourable. First and foremost, growing production and supply was accompanied by a fall in prices for pigs for slaughter, coupled with a dramatic rise in prices for feedingstuffs, particularly cereals. Between 2005 and 2007 the purchasing price for pigs for slaughter showed a steady decline, whereas in 2008 there was an increase by 20.1%. The survey findings indicate that in 2005 the value of production per 100 kg of live weight covered the costs incurred, but in the following years it only covered production costs in part: 95% in 2006, 83% in 2007 and 85% in 2008. As a result, income from activity was negative and it

deteriorated further in the subsequent years, the farmers suffered a loss. In 2008, owing to a considerable rise in the selling price, income declined to a much lesser extent than a year before.

Between 2006 and 2008 milk production was profitable, but in 2007 the results obtained were the most favourable; it was primarily due to a 16.2% increase in milk price. In farms with an average of 20 dairy cows income from activity per cow amounted to PLN 2,677, and income per litre of milk was PLN 0.48. In 2008, despite higher milk yield per cow (by 2.1%), a decrease in milk price (by 5.2%) had a downward effect on income. Income per cow was PLN 2,008, i.e. 25% lower than in 2007 and nearly 7% lower than in 2006. The difference between milk price and unit production cost was PLN 0.23 in 2006, PLN 0.34 in 2007 and only PLN 0.21 in 2008. Thus, the presented data point to a marked deterioration in the profitability of milk production.

In 2005–2008, in the case of all the surveyed activities except pigs for slaughter, income from activity per hour of family labour ensured full remuneration of labour input of the farmer and members of his family at the parity rate. It should be emphasised, however, that the ratio of this income to the parity rate of labour remuneration (in PLN/hour: 8.66 in 2005, 9.02 in 2006, 9.81 in 2007, 10.74 in 2008) varied between activities, there were also differences between survey years. It was influenced by two factors, namely income per ha of area under cultivation or per dairy cow and the labour intensity of production.

As far as 2009 is concerned, it was a difficult year for farmers, the results of the estimation account indicate that there was a considerable deterioration in the profitability of the surveyed cereals, rape and milk. It was primarily caused by a fall in the selling prices for the products in question. Income from the growing of potatoes for human consumption remained similar to the previous year’s level. At the same time, there was an improvement in the income situation of sugar beet growers, on account of better production and price results than those obtained in 2008 as well as a higher sugar payment (due to a more favourable exchange rate). Producers of pigs for slaughter also had reasons to be more content with the improved price situation. Provided that the depreciation of fixed assets used in production was covered (covered in part), there might be a certain level of income since the price for pigs for slaughter covered the unit production cost.

As a factor influencing income, subsidies play a prominent role; only subsidies allowed to realise income from the growing of sugar beet, oats and rye. It is assessed that in the surveyed holdings income from activity per ha under

winter wheat and spring wheat, oats and winter rape declined by 40-50% on 2008. In the case of rye it was even 13 times lower, the worst result in the four years in question (2006–2009). 2009 witnessed the lowest level of income from milk production per dairy cow recorded between 2006 and 2009. It dropped by 29% on 2008, by 47% on 2007 and by 34% on 2006.

It is assessed that in 2009 pig farming did not ensure the remuneration of family labour, the growing of rye per ha enabled family labour to be remunerated in 37% of the parity rate (PLN 11.06/hour). As regards the remaining activities surveyed (i.e. winter wheat and spring wheat, oats, winter rape, sugar beet, potatoes for human consumption and milk), labour input of the farmer and his family was remunerated in full.

The survey findings revealed a positive correlation between the production and price results of particular activities and income from activity. It is confirmed both by the analysis of the data contained in the tables and by evaluations based on statistical methods[10]. However, farmers' efforts should be aimed at improving the production performance as they have rather little scope for manipulating the selling prices for their products. It is assessed that this course of action is the most advantageous with regard to the improvement of the profitability of production.

The results obtained also show that the period in question saw the same trends of two income categories, i.e. the gross margin and income from activity. In most cases, this pattern also concerned specific costs and total costs. These data are evidence that specific costs play a vital role, thus having a significant effect on total costs, which is related to the share of this cost category in total costs. In the case of crop production, it ranged from 40% to 60%, for dairy cows it was 55-58%, whereas for pigs for slaughter it hovered at as much as 80-81%. Considering the particular characteristics of specific costs, it would be advisable to take action aimed to make the most rational possible use of production inputs and to apply their optimum levels. In the case of crop production, it mainly applies to the rate of NPK fertilisers and crop protection products, whereas for livestock production it concerns the feed ration of animals.

[10] A. Orłowski, K. Zmarzłowski, *Statystyczna analiza zróżnicowania nadwyżek bezpośrednich wybranych produktów rolniczych,* [in:] *Produkcja, koszty i nadwyżka bezpośrednia wybranych produktów rolniczych w 2007 roku* (ed. A. Skarżyńska), RAPORT PW no 100, IERiGŻ-PIB, Warsaw 2008;

A. Orłowski, K. Zmarzłowski, *Nadwyżka bezpośrednia działalności produkcji roślinnej w ujęciu gradacyjnej analizy danych,* [in:] *Produkcja, koszty i nadwyżka bezpośrednia wybranych produktów rolniczych w 2008 roku* (ed. A. Skarżyńska), RAPORT PW no 140, IERiGŻ-PIB, Warsaw 2009.

Regardless of the analysis of the production and economic performance by activity in subsequent years, the results of specific activities obtained by farms broken down into the best, the average and the weakest holdings were also evaluated. Income from activity considerably varied. In general, it stemmed from different rates of change in the production and price conditions as well as in production costs of particular agricultural products. However, the method for the categorisation of farms revealed certain trends reflected in the economic results of the surveyed activities.

The surveys demonstrated that the best units, as compared to the weakest holdings, were usually much better equipped with modern means of work (tractors, machinery). As a consequence, in such farms the depreciation of fixed assets per ha of area under the crop in question or per dairy cow was much higher. A different situation was observed in pig holdings, characterised by similar machinery and tools at their disposal (as reflected in roughly the same depreciation of fixed assets per ha of agricultural land). Most probably, it is attributable to the fact that the production of pigs for slaughter in all the groups of farms was relatively large, which entailed similar production equipment.

When considering the organisation and specialisation of production, a certain pattern should be highlighted. In holdings included in the survey sample of particular activities, a higher share of the predominant type of farming (i.e. crop or livestock production) usually characterised the best units, in contrast to the weakest farms where, as a rule, this share was lower. Furthermore, in the groups of holdings in which crop production activities were surveyed the structure of total production was almost always dominated by crop production, whereas livestock production accounted for more than 50% of output in units reporting on livestock production activities (the same average pattern as in the case of farms recurring in the survey years).

The survey results showed that in the case of all the crop production activities in question (i.e. sugar beet, potatoes for human consumption, spring and winter wheat, oats, winter rye and winter rape) in the subsequent groups of holdings, i.e. in the best, the average and the weakest units, there was a distinct downward trend of yield and the selling price for products. But production performance differed to a greater degree than the price results. Thus, yield was the main factor to determine the value of production.

Potatoes for human consumption were the only exception as the effect of the selling price was much greater than that of yield. Apparently, all farming activities cannot be compared in certain respects. It is particularly true of

comparisons between types of farming with specific characteristics. In the case of potatoes for human consumption early harvest and, most likely, the outlet (purchasing centres, marketplaces) were the main factors to differentiate the price. Such a situation hardly concerned sugar beet and rape, and cereals to a very limited extent, therefore differences in the selling price between growers were much narrower.

As a result of changes in yield and the selling price for products, the value of production per ha of area under cultivation substantially varied. When comparing the results in years and in the extreme groups of farms, the difference – to the advantage of the best units – ranged from 1.5-fold for spring wheat to 2.8-fold in the case of potatoes for human consumption and, again, spring wheat. This situation was crucial for the level of income from activity.

With regard to total costs (specific and indirect) per ha, in the survey years and in the extreme groups of holdings, in the best farms those were almost always higher than in the weakest units; the greatest difference was found in the case of rye and spring wheat in 2008 (1.5-fold).

There were, however, three exceptions: sugar beet (2007) and oats (2008), in the case of which marginal differences in total costs to the advantage of the best holdings were observed, with total costs 1.05 and 1.03 times lower respectively, and spring wheat (2005), for which the difference was nearly 1.2-fold. It was solely caused by specific costs as in the weakest units production inputs were greater, in each case the farmers applied a higher NPK rate, which failed to bring the expected results in yield. Arguably, it resulted from a particular combination of adverse weather conditions (drought, excessive rainfall).

The findings from the surveys proved that in the subsequent groups of holdings, i.e. in the best, the average and the weakest farms, characterised by decreasing production and gross margins without subsidies per ha, there was a downward trend of indirect costs of particular activities. In the case of specific costs no distinct trend was observed in the subsequent groups of holdings.

Falling indirect costs resulted from a number of factors, mostly lower depreciation of fixed assets used in production. It is related, among other things, to a lower value of modern machinery and equipment at the disposal of the weakest units, both total and per hectare.

The comparison of actual indirect costs in the extreme groups of farms shows that in the weakest holdings those were much lower in particular activities. It results from the farmers' lower expenses in items such as repairs, services and fuel.

This was also the case with regard to the cost of external factors. In the weakest farms, in contrast to the best units, the costs of paid labour, rent and interest on loans were usually lower. However, this cost category also showed an opposite trend, in the case of sugar beet and spring wheat in 2005 and oats in 2008. It means that in the weakest holdings the cost of external factors was higher than in the other extreme group of farms (i.e. the best units), due to higher costs of paid labour and rent.

The analysis of total costs per ha of area under particular crops leads to the conclusion that in the best holdings they were most frequently higher than in the weakest farms, but also accompanied by increased total production. It proves that higher costs – in comparison with the remaining groups of holdings – were justified.

In the subsequent groups of farms (i.e. the best, the average and the weakest units) total production showed a downward trend, as well as the gross margin and income from activity. The analysis of the tabular data reveals the same trends of the two income categories and a clear correlation between them. It is an interesting observation, particularly from the point of view of assessing the income situation of agricultural activities at different stages of the economic account. Therefore, it was evaluated using statistical methods; although the analyses concerned a sample of farms selected according to a different criterion, but it should be presumed that they would lead to the same conclusions. As proven by the analyses, these factors are correlated and the relationship is statistically significant. It means that there is a significant positive correlation between the gross margin and income from activity[11].

As has already been mentioned, the surveys also showed a significant positive correlation between the production and price results of particular activities and the level of income. It signifies that the downward trend of income in the subsequent groups of farms was determined by decreasing production. Income from activity varied considerably. Particularly in holdings characterised by the poorest results of a particular activity, it was sometimes negative; such

[11] A. Orłowski, K. Zmarzłowski, *Statystyczna analiza zróżnicowania wybranych kategorii kosztowych i dochodowych*, [in:] *Wyniki ekonomiczne wybranych produktów rolniczych w 2008 roku* (ed. A. Skarżyńska), IERiGŻ-PIB, Warsaw 2009.

a situation was observed for potatoes for human consumption and oats in 2008 as well as for rape in both survey years (i.e. 2006 and 2008). In several other cases, in the weakest farms income from activity was only realised thanks to support in the form of subsidies. Except for the situations where calculations could not be performed due to negative incomes, the difference in income between the extreme groups of holdings (i.e. the best and the weakest units) ranged from 2.7-fold in the case of sugar beet (2007) to 56.5-fold for spring wheat (2008), naturally to the advantage of the best farms.

The conditions for economic results from pig farming were somewhat different than in the case of crop products. Although the selling price for pigs for slaughter showed the same (i.e. downward) trend, it was not the main determinant of income. The surveys demonstrated that production costs represented the prime factor to differentiate the level of income and to determine the economic power of pig producers. In the subsequent groups of holdings production costs (specific and total) showed a decrease. Total costs primarily depended on specific costs (accounting for 75% to 82% of total costs), which in turn were mainly influenced by the cost of livestock replacement and of feedingstuffs.

The varying cost of feedingstuffs largely resulted from significant differences in the consumption of concentrated feedingstuffs per kg of weight increase. It should be pointed out that in the best, the average and the weakest farms the consumption of feedingstuffs showed an upward trend. It signifies that in holdings which incurred the highest loss on pig farming (i.e. the weakest units) the consumption of concentrated feedingstuffs per kg of weight increase was also the highest; as compared to the best farms, it was 39.2% (i.e. 1.16 kg) higher in 2005 and as much as 59.9% (i.e. 1.82 kg) higher in 2008.

The subsequent groups of holdings showed an upward trend of production costs and a downward trend of the selling price for pigs for slaughter, the gross margin and income from activity. The correlation between the gross margin and income from activity, as in the case of crop products, was very distinct.

In both survey years, pig farming was only profitable in the best farms. Those were units where farmers obtained relatively the highest price for pigs for slaughter and incurred the lowest costs. At the same time, in the groups of the average and the weakest farms pig producers suffered a loss, the value of production covered the costs only in part, in 95% and 79% respectively in 2005 and in 83% and 71% respectively in 2008. As a consequence, income from activity was negative, and it dropped even further in 2008.

It is very important to identify the factors stimulating or hampering the economic performance, for both informative purposes and practical application. However, bearing in mind the specific characteristics of particular production activities, the combination of such factors should be expected to significantly vary between them, as indicated by the data on the next activity, i.e. dairy cows.

The farms included in the survey sample, broken down by an economic criterion, i.e. the gross margin without subsidies per cow, differed primarily in the number of livestock. The best holdings had an annual average of nearly 32 cows, whereas the weakest units – a mere 9. It is assessed that the herd size represents a factor to determine other trends and relationships in the production process.

According to the survey results, a fall in the number of cows in the farm was accompanied by a decrease in milk yield per cow and in the selling price for milk. However, milk yield per cow dropped more sharply than the milk price. When comparing the results in the weakest holdings with those obtained by the best units, in 2006 in the former group milk yield per cow was 46.8% lower and the selling price for milk – 21.9% lower, whereas in 2008 these indicators were 44.2% and 20.9% lower respectively. Therefore, milk yield per cow was the main factor to differentiate the value of production.

Another trend observed in the surveys was a fall in total costs of dairy cattle farming in the subsequent groups of holdings. In terms of total costs per dairy cow, the difference between the extreme groups of farms was 1.5-fold in 2006 and 1.3-fold in 2008. It was contributed to by both specific and indirect costs, but the latter had a greater impact.

As in the case of the activities discussed above, the survey results point to the same trend, in the subsequent groups of holdings, of the gross margin and income from activity. It should be noted that the differences in income from activity per dairy cow were very significant between the extreme groups of holdings, 4.6-fold in 2006 and as much as 21.3-fold in 2008 (to the disadvantage of the weakest units).

The decreasing income from activity in the subsequent groups of holdings should be attributed only to the falling value of production since the costs of dairy cattle farming went down as well. In 2008 in the weakest units income was so low that the farmers did not incur a loss only thanks to subsidies; the value of production per dairy cow covered the costs involved in 99%.

The analysis of production activities in the best, the average and the weakest farms demonstrated significant differences in the results obtained. At a further stage of the economic account, such differentiation resulted in a varying degree (or lack) of the remuneration of production factors involved. The farmer has the right to expect obtaining not only sufficient income to cover production costs (specific and indirect), but also the remuneration of labour, land and capital as well as of his knowledge, enterprise and risk entailed in farm management.

In this respect, the report focuses solely on the remuneration of family labour and, unfortunately, the conclusions from the surveys and analyses are not always optimistic. Income from activity per hour of family labour ensured its full remuneration in both survey years and in all the groups of holdings only in the case of sugar beet and winter wheat, whereas in one survey year – in the case of oats (2005) and rye (2006).

As regards the remaining activities – with the exception of pigs for slaughter – in both survey years the farmer's labour was always remunerated in the best and the average farms. In the weakest holdings, remuneration was partial or none at all (this applied to potatoes for human consumption in 2008, oats in 2008 and winter rape in 2006 and 2008). Pig farming only ensured labour remuneration in the best units; in 100% and 39% in 2005 and 2008 respectively, whereas in the remaining groups (i.e. the average and weakest farms) is was not realised.

Under the topic of the 7th Multiannual Programme (task 4021) the following have been published in the series *Raporty PW* (MP Reports):

1. Skarżyńska A, Goraj L., Ziętek I.: *Metodologia SGM "2002" dla typologii gospodarstw rolnych w Polsce*. Raport PW/ RAPORT PW „no 4", IERiGŻ-PIB, Warsaw 2005, pp. 108.
2. Collective work, ed. Skarżyńska A. (authors: Augustyńska-Grzymek I., Cholewa M., Maciszewski P., Nachtman G., Skarżyńska A., Ziętek I.). *Produkcja, koszty i nadwyżka bezpośrednia wybranych produktów rolniczych w 2005 roku*. RAPORT PW "no 33", IERiGŻ-PIB, Warsaw 2006, pp. 242.
3. Collective work, ed. Skarżyńska A. (authors: Augustyńska-Grzymek I., Cholewa M., Mańko S., Nachtman G., Skarżyńska A., Ziętek I.). *Produkcja, koszty i nadwyżka bezpośrednia wybranych produktów rolniczych w 2006 roku*. RAPORT PW "no 60", IERiGŻ-PIB, Warsaw 2007, pp. 254.
4. Ziętek I. *Współczynniki standardowej nadwyżki bezpośredniej "2004" dla typologii gospodarstw rolnych w Polsce*. RAPORT PW "no 88", IERiGŻ-PIB, Warsaw 2008, pp. 30.
5. Collective work, ed. Skarżyńska A. (authors: Augustyńska-Grzymek I., Cholewa M., Dziwulski M., Nachtman G., Orłowski A., Skarżyńska A., Ziętek I., Zmarzłowski K., Żekało M.). *Produkcja, koszty i nadwyżka bezpośrednia wybranych produktów rolniczych w 2007 roku*. RAPORT PW "no 100", IERiGŻ-PIB, Warsaw 2008, pp. 221.
6. Collective work, ed. Skarżyńska A. (authors: Augustyńska-Grzymek I., Cholewa M., Dziwulski M., Orłowski A., Skarżyńska A., Ziętek I., Zmarzłowski K.). *Produkcja, koszty i nadwyżka bezpośrednia wybranych produktów rolniczych w 2008 roku*. RAPORT PW "no 140", IERiGŻ-PIB, Warsaw 2009, pp. 163.
7. Nachtman G., Żekało M. *Wyniki ekonomiczne wybranych ekologicznych produktów rolniczych w latach 2005–2008*. RAPORT PW "no 141", IERiGŻ-PIB, Warsaw 2009, pp. 89.
8. Skarżyńska A. *Wyniki ekonomiczne wybranych produktów rolniczych w latach 2005–2008*. RAPORT PW "no 176", IERiGŻ-PIB, Warsaw 2010, pp. 115.
9. Skarżyńska A. *Economic results of selected agricultural products in 2005-2008*. RAPORT PW "no 176.1", IERiGŻ-PIB, Warsaw 2010, pp. 115.

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