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This publication was prepared as a contribution to the research on the following subject **Regional differentation of agricultural development and its impact upon economic and social problems of rural areas** within the framework of the research task *Highly commercial farms in peasant farming*.

The purpose of the study was to analyse the formation of the large-scale commercial segment under the conditions of increasing competition and to identify features which affected and determined the economic strength and market position of this group of entities.

Reviewer
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Introduction

The issues related to agricultural production may be considered in terms of satisfying the demand for food products *(overall productive function of agriculture)*, or from the point of view of individual farms, where the scale of agricultural activity largely determines farming efficiency and agricultural income [74]. At the same time, the level of output affects their position in the agricultural market [14]. Simultaneously, the scale of commercial production indicates the degree of adaptation by particular holdings to market mechanisms, as well as their competitiveness.

Experience related to the process of adjusting Polish agriculture to functioning in the market economy suggests that one of the main causes of difficulties and barriers to the development of Polish agriculture [30] is the relatively high dispersion of agricultural producers, as the scale of agricultural production of individual farms[1] determines the possibilities for increased labour productivity, the efficiency of agricultural inputs [43] and for using economic and organisational advantages of agricultural production space [63].

Market mechanisms stimulate the concentration of agricultural commercial production in a decreasing number of units, an increase in sales often being accompanied by greater economic strength of farms [80]. However, the economic strength of most Polish farms is limited and insufficient for agricultural investment to be financed from own funds. Development constraints also concern a relatively significant group of market-oriented farms. Such units, for the most part, shape the present condition as well as future competitiveness of Polish agriculture and largely determine the quantity, product range and quality of market supply. Financial assistance for agricultural development

[1] In the text, instead of the expression *farm*, the names *unit* and *entity* are also used interchangeably.

is therefore needed, but it should be coupled with a diversification of support measures targeted at individual units in order to achieve the desired structure of holdings.

Increased market orientation of farms as well as the development of agri-food processing industry and market institutions (commodity exchanges and wholesale markets, the system of long-term contracts) is accompanied by greater expectations on the part of purchasers of agricultural output in terms of volume, quality and homogeneity of deliveries [66]. Basically, such demands can only be satisfied by farms producing on an adequate scale, particularly as meeting the requirements set by agricultural produce purchasing centres involves constant modernisation of the production potential of farms. In principle, only holdings engaged in agricultural activities on an appropriately large scale are likely to be capable of financing such projects [18] as the capacity for and scope of investment are primarily correlated with the farm income level [72]. However, it should be emphasised that output determines the prospects of advancement, particularly of technological progress, for both financial and technical reasons [74]. And due to the general technological backwardness of most farms, increased investment activity, including progress absorption capacity, represents a prerequisite for the improvement of their competitive position in the global market.

A family farm[2] is a specific economic entity as it combines productive and social functions. This means that the family and the farm have joint interests and there is no clear division between the sphere of the household and that of the farm [64]. It does not change the fact that economic factors, ever more important due to economic development and technological progress, have always played a significant role in the relations between the farm and the peasant family. Furthermore, the transition to the market economy as well as greater competition have increased the importance of economic conditions in the determination of the main functions of peasant farms [47].

Regardless of a number of functions a farm fulfils for the farming family, the basic purpose of agricultural activities is to provide economic and financial living conditions [62]. And even though one effect of changes in the social and economic system was to speed up the diversification of economic activities

[2] Despite certain conceptual differences, a *peasant farm* and a *private farm* are also common expressions identifying a family farm. Throughout the paper, these expressions will be used interchangeably.

by the farming population [39], and the role of income from the sale of agricultural products in total budgets of farming families has diminished [77], for a considerable share of such families agricultural activities remain a dominant source of income [52]. The financial situation of this group is mainly determined by sales of agricultural products.

An important issue related to the development of agriculture is improving its competitiveness and providing fair income from agricultural activities. One way to achieve these goals is to increase the scale of agricultural commercial production [1]. This is particularly significant with regard to private farms, which are in fact family farms [80]. Such entities are invariably a dominant organisational form of agricultural production in Poland [79, 47], but during economic transition their position was strengthened even more [79].

The importance of the family farming model in the agricultural sector is emphasised in the context of social and political stability of the state, as well as of economic justice. In many countries, the structural policy sees family farms as basic production units functioning in agricultural structures, and legislation is aimed to support the strengthening of the market position of this group [10, 5]. The best example of a holding which combines social values stemming from a family nature of such an entity with economic characteristics allowing to build a strong competitive position in Poland and abroad is a highly commercial farm.

On account of all the above-mentioned factors, systematic observation of the progress in agricultural production concentration and of the formation of market-oriented farms whose scale of agricultural activities provides fair income represents an essential issue in analysing the development of agriculture. Data on the number and place of highly commercial units in rural structures not only have information value with regard to the identification of patterns in the evolution of Polish agriculture, but they also provide important guidelines on support measures for the restructuring and modernisation of agriculture as well as for the improvement of its competitiveness. Furthermore, such insights play a vital role in both forecasting future rural structures and predicting changes in the organisation of the agricultural sector.

Highly commercial farms – overview

Depending on the needs, the classification of agricultural holdings is based on various criteria (related to the legal form, ownership, income, production, market, the farmer's characteristics etc.). Broken down by degree of market orientation, one of the most important indicators of general economic development, the types of farms are as follows [2]:

1. **Subsistence farms** (semi-subsistence farms) – this group comprises units exclusively or mainly oriented towards subsistence production for the farmer's family. Market transactions by such entities are incidental or do not occur at all.
2. **Small-scale commercial farms** – these farms are characterised by very limited market orientation, both as sellers of agricultural products and purchasers of agricultural inputs and services. The scale of their commercial production is small, usually lower than food purchases (in terms of agricultural products) by the farmer and family members, who mainly have non-agricultural sources of income.
3. **Medium-scale commercial farms** – these are units strongly oriented towards the market as purchasers and sellers, producing mainly for the market on the basis of family labour. Hired labour in such farms is rare and limited to periods of intensive field work. Some holdings from this group are characterised by a larger scale of commercial production, greater demand for paid labour and more modern farming methods (modern technologies and production organisation, the farm being separate from the household, different rules of property succession etc.). Unlike traditional peasant farms, such entities are referred to as family business farms.
4. **Highly (large-scale) commercial farms –** this group includes units exclusively oriented towards market output and aimed at the maximisation of profit (income). Such entities produce agricultural products mainly on the basis of hired labour. They are managed by a hired manager or directly by the owner, who usually does not engage in manual agricultural work. In this group, the household is kept completely separate from production activity, and output depends on capital invested and management efficiency rather than on the family size (family labour).

The definition and classification of specific types of agricultural holdings was also based on commercial production (sales) as the only criterion, with the value determined arbitrarily in absolute figures [16, 34]. Nevertheless, the scale of agricultural production is closely related to economic and production characteristics of farms as well as to social and demographic features of farmers and members of their families, and also to the main purposes of agricultural activities.

W. Orłowski [34] distinguishes four types of Polish farms: **social farms**, i.e. subsistence or semi-subsistence farms, **small-scale commercial farms** – selling agricultural products of less than PLN 15,000 in 1996, **commercial farms** – declaring sales of PLN 15,000 to PLN 25,000, and **highly commercial farms** – with commercial production exceeding PLN 25,000.

T. Hunek [16] applies similar rules to the classification of Polish farms. Based on the criterion of the value of commercial production in 1996, he divides the total number of agricultural holdings in Poland into three groups called subsectors: **I – the subsector of farms** described as **"farmers in name**" – those producing exclusively or mainly for own use (with sales of less than PLN 2,500, or not cultivating owned agricultural land; **II – the subsector of small-scale commercial farms** – with commercial production of PLN 2,501 to PLN 14,999; **III – the subsector of highly (large-scale) commercial farms** – with sales exceeding PLN 15,000, described as the Polish agri-business.

For analysing the structure of farms by value of sales, as the criterion of classification under the above-mentioned groups, relative measures were also applied, taking into consideration the value of commercial production of particular entities in relation to the average output placed in the market by the total surveyed group. In order to categorise holdings as **small-scale, medium-scale and highly commercial farms,** the criterion of classification into one of the two extreme groups was a 50% deviation from the average value of sales of agricultural products per ha of agricultural land [59] or per farm, calculated for the relevant group of agricultural units[3] [60; 23], or for all the surveyed entities [24].

The criterion of sales as the basis for the breakdown of agricultural producers for the purpose of supporting the sector is also applied by the United States Department of Agriculture (USDA). Before 1950, the area was the main indicator of farm diversity in agricultural censuses. However, due to high (much higher than in Poland) diversity of soil quality and farming conditions, by 1950

[3] Broken down by area of agricultural land (size groups).

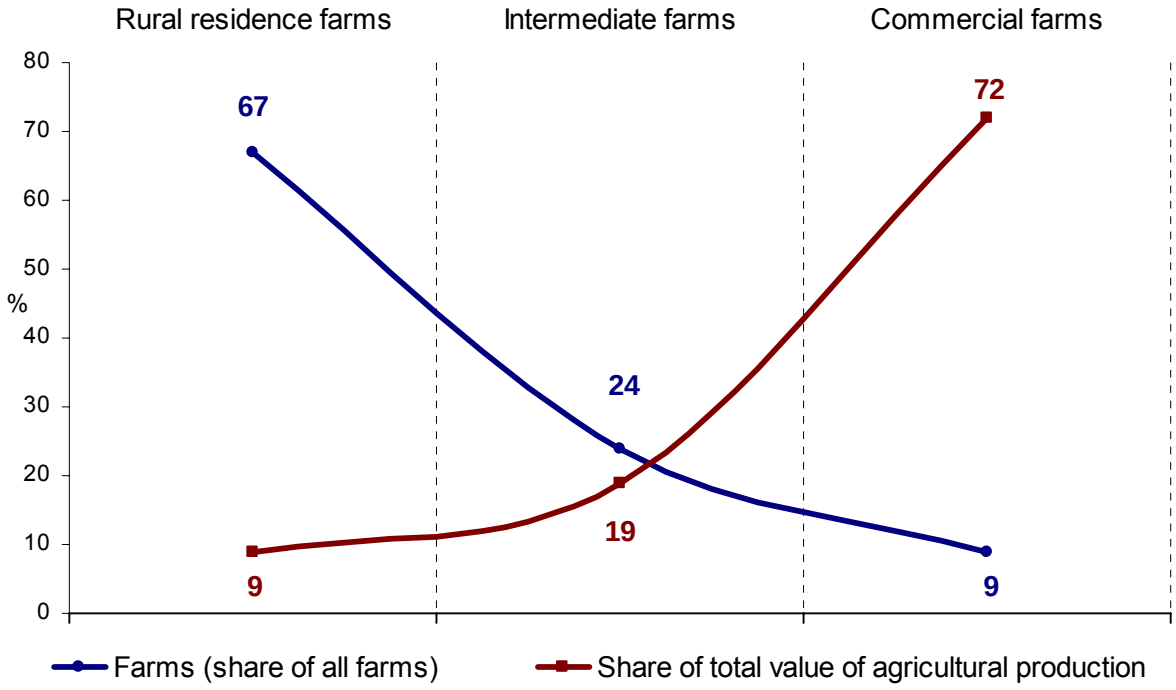
an additional measure of the farm size was introduced: agricultural sales. A monetary measure facilitates the determination and evaluation of changes in the system of agricultural prices, technology and farm organisation [65]. According to the USDA Farm Size Classification, farms are divided into [13]:

Rural residence farms. Small farms with agricultural sales less than USD 250,000 – whose operators report they are retired or have a major occupation other than farming. Rural residence farms also include limited-resource farms, regardless of the occupation of their operator. (Limited-resource farms have sales less than USD 100,000 and are also operated by households with low household income during the two previous years.)

Intermediate farms. Small farms with sales less than USD 250,000 – whose operators report farming as their major occupation. This category excludes farms classified as limited-resource farms, even if their operators report farming as their major occupation.

Commercial farms. These comprise farms with annual sales of USD 250,000 or more.

Figure 1. Number of farms and value of agricultural production in the USA according to the Farm Size Classification, 2003



Source: USDA Agricultural Resource Management Survey, [13].

At present, modern technology and market forces in the US economy have resulted in two complementary patterns and forces in agriculture: the tendency to concentrate production assets (to increase the farm size) or the tendency to switch to non-agricultural sources of income or to combine on-farm work with off-farm occupation (part-time farming) [65]. In this process, the number of intermediate farms decreases as they become rural residence farms or large-scale commercial farms. The structure of US agriculture, according to the Farm Size Classification, is presented in Figure 1.

Relative measures are also used for the classification of farms by purpose of agricultural activity or market activity. However, **market inactive units included both entities without commercial production and those with sales not exceeding 20% of average sales per farm** [46]. Such entities are also described as subsistence farms, social farms or farms producing exclusively or mainly for own use.

The above-mentioned main types of private farms reflect general trends observed with regard to family farms. In general, the development of market relations is accompanied by intensified stratification of farms into non-commercial or small-scale commercial units, fulfilling the function of an extended household for the farming family, or into commercial holdings, gradually increasing the scale of production and strengthening their market position, improving and modernising their production potential, thus evolving towards family business farms [47].

Object of the study and research method

Taking into consideration structural characteristics of Polish agriculture, the group of large-scale commercial units was distinguished from the total number of the monitored private farms mainly on the basis of sales of agricultural products. The analysis covered not only the increase in market orientation, but also the nature of market transactions, as well as the functions determined by farmers for their farms and relevant adaptation strategies. Other factors were not taken into accout, e.g. labour/employment, as agricultural activity on farms managed by natural persons is still largely based on work performed by the farmer and the members of his family [55, 56, 26]. The use of hired labour in family farming is very limited and mostly serves to supplement family labour in periods of intensified on-farm work [55, 56, 26]. The main form of paid

labour is hiring day-workers, but it is quite rare for holdings to regularly employ hired workers, whereas paid work performed on a permanent full-time basis is even less frequent[4]. Moreover, it should be added that even in the case of large-scale employment of paid labour for agricultural activities family labour usually played a dominant role in total labour input. The opposite situation, i.e. when hired labour dominated in total labour input, occurred very seldom [55, 56, 26]. In 1992-2005, it mainly concerned slightly over 1% of all family farms engaged in agricultural activities.

It should be also emphasised that for the selection of large-scale commercial units no account was taken of the character of the farm manager's work[5]. Cases where the manager was only involved in the management of agricultural activities were as rare as those of agricultural production being based on mainly on the employment of hired labour[6]. Moreover, there were no cases of a non-family person to be the farm manager.

Therefore, **highly commercial farms are considered to be all private units where the annual market output is sufficient to obtain income from agricultural activities at least comparable with income obtained from non-agricultural activities. Large-scale commercial production as specified above was usually at least double the average sales of agricultural products by all the analysed market-oriented farms. This indicator reached a minimum of PLN 10,000 in 1992, PLN 38,000 in 1996, PLN 50,000 in 2000, and PLN 70,000 in 2005.**

At the same time, managers of farms meeting the criterion of sales actively adapted their farms to market requirements, i.e. they took measures aimed to increase and modernise the production potential of farms providing the main source of income for the farmers. Moreover, they carried out regular

[4]According to the data of the 2002 Agricultural Census and empirical surveys conducted by GUS in 2005 (covering a representative sample of approx. 200,000 farms), a permanent worker employed in agricultural activities was only found in 0.5% of family farms of over 1 ha of agricultural land engaged in production. Limited permanent (all-year) employment of hired labour was also reflected in the field survey by IAFE-NRI. According to the survey, in 1992-2005 entities employing non-family labour in agricultural activity on a permanent basis accounted for 0.6% to 1.5% of private farms engaged in production.

[5] The manager of a farm is usually its owner; throughout the paper, the two expressions, along with a *user, farmer, manager, agricultural producer*, are used interchangeably.

[6] According to estimates based on surveys, in 1992-2005 a mere 1.1% to 1.3% of private farmers (i.e. those in family farming) engaged in agricultural activities only performed management tasks.

transactions with purchasers of agricultural products, even though such cooperation was not always formal.

The name of highly commercial farms, referring to the scale of market output, is also meant to suggest a distinct market orientation of agricultural activities by such holdings, and to distinguish those from other units whose market position gradually diminishes under conditions of increasing competition. At the same time, it emphasises that substantial sales of agricultural products providing fair income from on-farm work are not exclusively determined by a large area of agricultural land. **Throughout the paper, the terms "highly commercial farms" and "large-scale commercial farms" are used interchangeably.**

The basic empirical material used for the implementation of the task represented the results of field surveys by the Institute of Agricultural and Food Economics – National Research Institute (IAFE-NRI). These are multiannual surveys, conducted periodically in the same villages[7], in all local farms owned by natural persons, with an area of more than 1 ha of agricultural land. The villages were specially selected so that the area of the analysed units would reflect the actual area structure of family farms, both at the national and macroregional level [48, 51]. In such surveys, information from respondents is obtained on the basis of questionnaires by interviewers, whose function is reduced to simply conveying the questions and registering the answers as faithfully and literally as possible. This means that the interviewer in fact serves as a research instrument of great sensitivity and precision. In addition, the questionnaire is always completed in the presence of the interviewee so as to limit the influence of the interviewer on the answers as much as possible.

Such completed questionnaires provide very detailed and diverse information on family farms, and particularly on their area and the equipment with fixed technological production assets, the scale of production, market and investment activity as well as on the sources of financing activities aimed at the reconstruction, enhancement and modernisation of the production potential of agricultural holdings. It also contains data on demographic characteristics, the educational level and on the working life of farm managers and of their family members.

Highly commercial farms were selected from a relatively large sample. Each time, the surveyed units accounted for one five-hundredth of the total number of private farms, and their number in subsequent surveys was as follows: 4,385

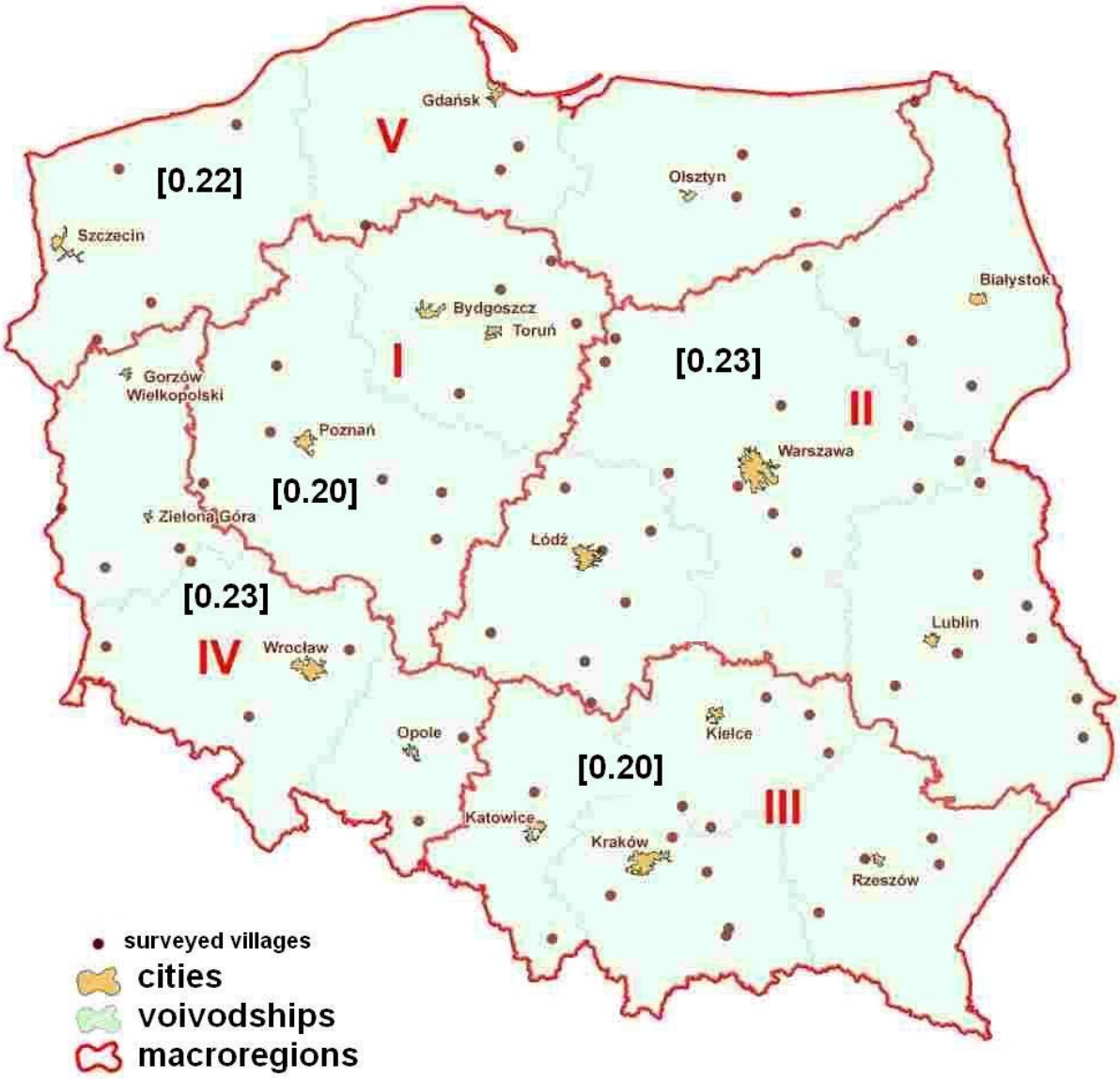
[7] The surveys have been conducted since 1947 at several years' intervals.

in 1992, 4,122 in 1996, 3,927 in 2000, and 3,705 in 2005. They were located in 76 villages included in a fixed sample from different regions of Poland (Map 1).

A large sample size, a wide range of collected materials and applying the same survey method, a prerequisite for the continuity and comparability of data, enabled to analyse multiple processes within family farms over long periods of time. At the same time, on account of the panel character of the survey, it was possible to determine trends and rates of change observed in family farming, as well as to identify relevant relationships and mechanisms. It should be also emphasised that representative sampling allowed to maintain the reliability of the processes in question.

In addition to the basic source material, i.e. survey findings, parts of the paper related to the distribution of large-scale commercial farms and regional differences refer to general statistics. Furthermore, information provided by the Agency for Restructuring and Modernisation of Agriculture (*Agencja Restrukturyzacji i Modernizacji Rolnictwa* – ARiMR), which serves as a paying agency and an implementing authority for the distribution of financial resources from the structural funds under the common agricultural policy, was used to analyse the actual absorption of financial support under CAP measures aimed at strengthening the economic potential of farms in Poland.

Map 1. Location of villages and the size of the sample in IAFE-NRI surveys by macroregion in 2005



The bold line marks the borders of selected macroregions, which include the following voivodships:

I Central-Western – the Kujawsko-Pomorskie and Wielkopolskie voivodships;

II Central-Eastern – the Łódzkie, Mazowieckie, Lubelskie and Podlaskie voivodships;

III South-Eastern – the Świętokrzyskie, Małopolskie, Podkarpackie and Śląskie voivodships;

IV South-Western – the Opolskie, Lubuskie and Dolnośląskie voivodships;

V Northern – the Zachodniopomorskie, Pomorskie and Warmińsko-Mazurskie voivodships.

[ ] size of the sample (a percentage share of the actual number of family farms in each region).

The distribution of large-scale commercial units, as well as trends observed in the formation of this group of holdings, were described in terms of basic determinants of the economic diversity of farms. Therefore, the formation of the large-scale commercial segment in family farming was presented across five macroregions (Map 1) specified for the surveys, and according to selected structural features. Agricultural holdings were mainly broken down by area structure and by social and demographic characteristics of farmers. Moreover, the level of technical equipment, the character of market transactions, investment activity and financing sources were considered as well. The analysis covered the period of 1992 to 2005, but due to Poland's integration into the European Union structures, a special emphasis was placed on the five-year 2000-2005 period.

The empirical data used in the analysis each time concerned the relevant marketing year or year-end figures. These were as follows: 1991/1992, 1995/1996, 1999/2000 and 2004/2005, in the paper referred to as: 1992, 1996, 2000 and 2005 respectively, for the sake of simplification. It should be also emphasised that information concerning investment activity and area changes covered events between particular surveys.

The purpose of the paper was to analyse the formation of the large-scale commercial segment under the conditions of increasing competition and to identify features which affected and determined the economic strength and market position of this group of entities.

This paper presents the following issues in detail:

- the distribution of large-scale commercial units in family farming together with the development of market orientation of farms,
- the concentration of production assets in the group of highly commercial farms,
- the place of large-scale commercial units in basic agricultural structures,
- characteristics of large-scale commercial farms,
- regional differences with regard to the formation of the large-scale commercial segment in family farming and the relevant determinants.

This paper consists of two main parts, largely based on available source materials. The **first** part presents the distribution of highly commercial farms in family farming. The distribution of such entities was characterised in detail in the aforementioned periods (1992, 1996, 2000 and 2005). The place of highly commercial farms in basic agricultural structures was also described. The analysis of the number and share of highly commercial holdings in the

group of private farms also covered regional differences and social background affecting the formation of large-scale commercial units. These mainly included demographic characteristics, abilities and skills of farm managers. Furthermore, the paper presents the observed concentration of agricultural production potential in the group of large-scale commercial farms, and describes changes in the features of this group of units as they adjusted to increasing competition in the agricultural market. The **second** part concerns the utilisation of financial support from the European Union funds in the development of Polish agriculture and their role in the formation of the large-scale commercial segment.

1. The distribution of highly commercial farms

According to the survey, the number of highly commercial farms continued to gradually increase, but their share remained relatively small (Figure 1). In 1992-2005, the number of large-scale commercial units went up by approximately 59% (net change), whereas their share in the whole group of the analysed entities nearly doubled, from slightly over 6% to 12%. It should be emphasised that significant growth mostly occurred in the 1990s as in 2005 the number of large-scale commercial farms was only slightly over 2% higher than five years before, and their share in the total number of the analysed unit, increased from over 11% in 2000 to 12% in 2005. Therefore, it follows that after 2000 the growth rate of the number of large-scale commercial holdings in family farming went down considerably.

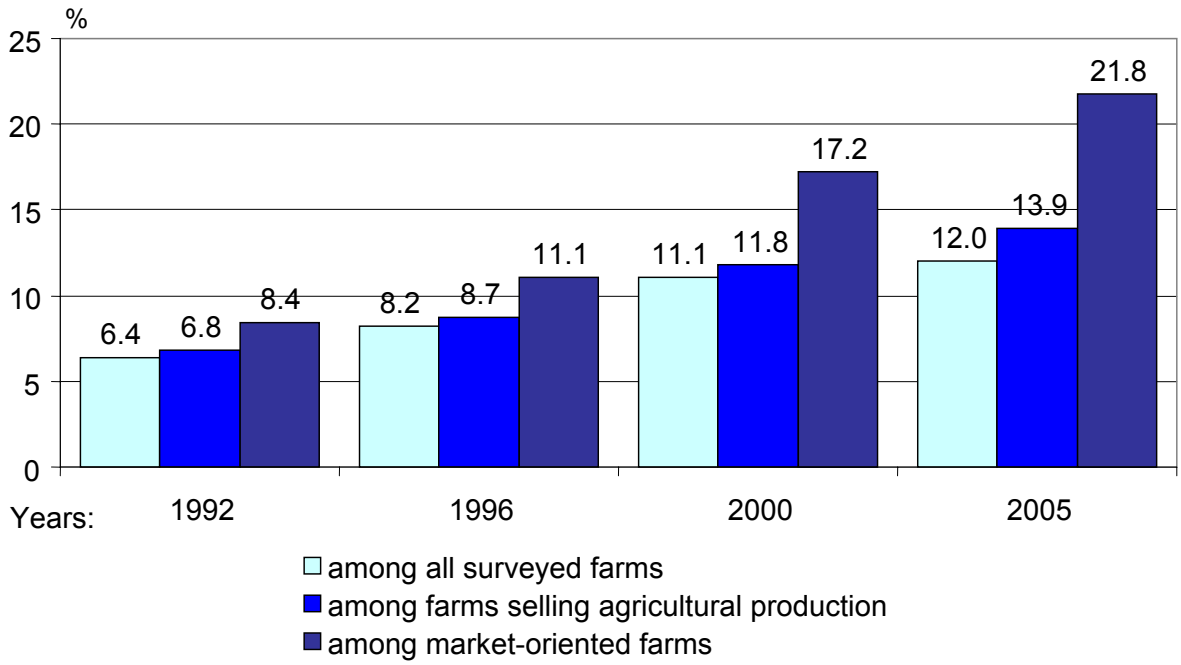
It should be added that a limited share was also found in the case of farms selling agricultural production. Nevertheless, in 1992-2005 the share of large-scale commercial units in the group of farms selling agricultural production more than doubled (from 6.8% to 13.9%).

From the point of view of market supply and development possibilities of agriculture, it is essential to increase the share of large-scale commercial units among commercial farms, particularly those market-oriented[8]. Although market mechanisms stimulate production concentration, market output of most entities

[8] Market-oriented farms were exclusively distinguished on the basis of market output of individual holdings relative to average sales of all the surveyed units. This group included all holdings where annual agricultural commercial production accounted for a minimum of 20% of average sales. The threshold was PLN 1,000 in 1992, PLN 4,000 in 1996, PLN 5,000 in 2000, and PLN 7,000 in 2005.

remains relatively small. Even in the group of market-oriented units the concentration of production continued to be rather limited and in a relatively large group of farms sales were below the threshold for large-scale commercial units.

Figure 1. Share of highly commercial farms, 1992-2005



Source: IAFE-NRI surveys 1992, 1996, 2000, 2005.

According to the surveys by IAFE-NRI, in 2005 only ca. 22% of market-oriented farms represented large-scale commercial units, although this share was over 2.5 times higher than in 1992 when units classified as large-scale commercial holdings only accounted for slightly over 8% of the total number of market-oriented farms.

In order to interpret the above differences in changes in the share of large-scale commercial units in specific groups of private farms, it is necessary to take account of the situation they had to face under the growing competition in the agricultural market. In such circumstances, maintaining the market position and obtaining fair income from agricultural activity involved significant activation with regard to adjusting the quality, quantity and structure of commercial production to effective demand. Meeting those requirements usually entailed a number of changes in production assets. For the majority of farm users this

task proved to be too difficult due to financial constraints, as well as on account of limited skills of farm managers, particularly in management and marketing.

Table 1. Selected economic characteristics of the farm groups under comparison

Specification	Farms which in 2005		
	for the first time obtained	lost	were market-oriented
	the status of a highly commercial unit		
Average area */ha of agricultural land*	30.2	22.1	14.0
Commercial production (in PLN thousand):			
- per ha of agricultural land	7.1	4.9	3.9
- per annual work unit	118.9	84.9	39.8
Percentage share of farms selling agricultural production:			
- to regular purchasers	40.1	31.8	24.8
- under a system of contract deliveries	89.6	58.4	39.1
- in commodity exchanges or wholesale markets	28.3	16.1	12.9
Percentage share of farms with agricultural investments	90.3	65.3	56.1
Agricultural investments *(in PLN thousand per investing farm)*	150.4	75.6	49.7
Percentage share of farms with sufficient technical equipment (machinery)*	64.1	49.4	29.2
Percentage share of farms with fully mechanised production of **:			
- cereals	55.2	25.4	21.7
- potatoes	50.3	31.8	32.2
- sugar beet	62.5	20.5	19.3
- hay and hay silage	46.4	22.9	23.4
- milk	10.5	3.5	1.5
- cattle for slaughter	11.5	4.2	1.9
- pigs for slaughter	11.6	4.5	2.3

** Applies exclusively to farms with a tractor.*

*** 100 was only given to farms whose commercial production type corresponded to machinery and equipment owned.*

Source: IAFE-NRI survey 2005.

Therefore, an increasing number of farmers tended to reduce market transactions[9]. As a result, the period of 1992-2005 saw a marked fall in the share of market-oriented holdings (from 75.8% to 55.4%). This development suggests increasing market polarisation of family farms into business entities or subsistence units.

Table 2. Selected social and demographic characteristics of the population from the farm groups under comparison

Specification	Farms which in 2005		
	for the first time obtained the status of a large -scale commercial unit	lost	were market-oriented
Share of farm managers with relevant education			
- primary	8.2	22.3	25.0
- vocational	26.4	38.8	47.1
- secondary or post-secondary	31.8	22.5	23.2
- higher	33.6	16.4	4.7
Share of farm managers with vocational education			
- agricultural	73.6	51.3	34.6
- non-agricultural	20.4	19.6	39.7
Share of farm managers by age*			
- working age	100.0	96.1	95.6
of mobility	62.5	51.4	47.9
of non-mobility	37.5	44.7	47.7
- post-working age	-	3.9	4.4

** Economic age groups according to the Central Statistical Office (GUS): **the pre-working age population** – persons aged 17 or under; **the working age population** – women aged 18-59 and men aged 18-64; **the post-working age population** – women aged 60 or over and men aged 65 or over. The **working age population** was subdivided into two groups: the **mobility age population** (younger working age population) – persons aged 18-44 – and the **non-mobility age population** (older working age population) – women aged 45-59 and men aged 45-64. This breakdown is applied throughout the paper.*
Source: IAFE-NRI surveys 1992, 1996, 2000, 2005.

The limited share of large-scale commercial units in the total number of farms owned by natural persons was also reflected in the results of the Agricultural Census. In 2002, as few as 115,800 family farms sold agricultural products

[9] According to the survey, in 1992-2005 the net number of subsistence or semi-subsistence farms increased nearly by 56%, whereas their share rose from 24% to 45%.

worth over PLN 50,000 [42]. Farms characterised by such market output accounted for less than 6% of all private farms, for slightly over 8% of commercial holdings, and for nearly 13% of market-oriented farms. The respective shares were found definitely lower than in the sample surveyed by IAFE-NRI in both 2000 and 2005.

Such differences mainly resulted from the rules of selecting villages by the Institute, due to the main goal of the survey, i.e. to describe the social and economic diversity in the structure of family farming and relevant changes. Therefore, the survey included typical agricultural villages, generally characterised by a relatively high share of families with mainly agriculture-based income sources. As a consequence, farmers were usually more interested in increasing the scale of agricultural activities.

The surveys demonstrated that the growing market orientation of holdings was accompanied by greater difficulties of commercial farm users with achieving a competitive position in the agricultural market. This was reflected, among other things, in a relatively low and gradually decreasing number of entities which were classified as highly commercial farms for the first time in relevant survey years. The share of such entities in the total number of large-scale commercial units in family farming in a given year was as follows: nearly 24% in 1996, ca. 20% in 2000, and only less than 4% in 2005. At the same time it should be added that in the whole period in question the percentage share of entities which lost the status of a large-scale commercial unit in the period between the surveys was relatively low and stable, at approx. 3-4%.

The difficulties with achieving the status of a large-scale commercial unit are best reflected in the growing gap between entities which joined the group of farms in question and those which lost their status in subsequent periods as compared to all market-oriented units.

Entities not classified as large-scale commercial group until 2005 were characterised by the following (Tables 1 and 2):

- Large area of agricultural land. In this group, the average farm size was 30.2 ha of agricultural land, approx. 40% more than the average size of a unit which lost this status (i.e. 22.1 ha of agricultural land). At the same time, it was nearly 116% higher than the average area of market-oriented farms, i.e. 14.0 ha of agricultural land.

- Considerable progress in the simplification and specialisation of production, which was reflected in reducing the range of market output.

In all farms which obtained the status of a large-scale commercial unit for the first time in 2005, sales of one product type[10] accounted for at least 30% of total commercial production, and nearly 55% could be considered to be specialised units, i.e. those where the share of one product type represented at least 50%. In the group of farms which lost the position of a large-scale commercial unit in the period in question, specialised entities accounted for 42%, whereas the respective share with regard to all market-oriented holdings was 35%.

- Relative stability of market transactions. It was reflected in relatively high turnover in formal markets and rather significant sales on a regular basis (permanent cooperation). In 2005, as compared to holdings which lost the status of a large-scale commercial unit, it was more frequent for farms which strengthened their competitive position to have a regular purchaser of agricultural products (40% against 32%), and nearly double the number sold their production under a system of contract deliveries (90% against 58%) or in commodity exchanges and wholesale markets (28% against 16%).

- Relatively high productivity of production factors[11]. In 2005, the average sales of agricultural production per ha of agricultural land in farms which strengthened their competitive position amounted to approx. PLN 7,100. The figure was nearly 45% higher than in holdings which left the group of large-scale commercial entities, i.e. almost PLN 4,900. At the same time, it should be emphasised that it exceeded by 82% the productivity of land in all market-oriented agricultural holdings. In this group, the average sales per ha of cultivated land amounted to PLN 3,900. Even greater disproportions were observed with regard to labour productivity. In 2005, the average commercial production per full-time

[10] On the basis of similarities in the production process, products sold by farms were divided into the following groups: cereals, potatoes, industrial crops, seed crops, field vegetables, fruit, crops grown under protection, horses, pigs, cattle and milk, poultry for slaughter, eggs, and other (sheep and wool, goats and milk, apiculture products, fur animals, herbs, etc.).

[11] Due to the character of survey data, it was only possible to conduct a partial analysis of efficiency of using production factors and exclusively in the relation of the value of commercial production to the resources of land and labour. The adopted measures not always fully reflect the productivity of such production factors, particularly labour productivity in economic terms. However, the selected indicators allow to evaluate farming efficiency, and particularly to determine differences in this respect.

worker[12] in farms which were classified as large-scale commercial units for the first time amounted to PLN 118,900. It was 40% higher than the respective figure for holdings which left the group of highly commercial farms (i.e. PLN 84,900 per full-time worker), and exceeded the comparable level for all market-oriented entities by as much as almost 200%. In this group, sales per AWU amounted to PLN 39,800.

- Considerable investment activity, particularly with regard to undertakings primarily aimed to create the conditions for increasing the scale and improving the quality of production, which was reflected in greater farming efficiency and competitiveness. In 2000-2005, agricultural holdings which strengthened their competitive position implemented investment projects more often than those which lost their status of a highly commercial farm (90% against 65%). Such differences were even more evident in terms of investment spending. The average investment in the former group amounted to PLN 150,400 per investing holding. It was three times higher than the respective expenditure for market-oriented farms and almost double the figure for holdings which failed to maintain their competitive position. The respective amounts were PLN 49,700 and PLN,75 600 per investing farm.

- Better technical equipment, which usually allowed to fully mechanise farm work. In the group of farms classified as large-scale commercial units for the first time in 2005, machinery and equipment enabling full mechanisation of the technical production process was found in farms as follows (broken down by type of agricultural products): over 55% of producers of cereals and other crops characterised by similar production technology, over 50% of potato growers, almost 63% of sugar beet farmers, and 46% of producers of hay and hay silage. As regards farms which lost the status of a large-scale commercial unit in 2005, the respective share ranged from 21% to 32%, depending on the product. This level of mechanisation of crop production was roughly average for all market-oriented farms. Similar tendencies were also observed with regard to animal production, but to a clearly lesser extent than in case of field work. Fully mechanised livestock buildings, even in the group of farms which strengthened their market position, were rarely found

[12] Labour inputs were expressed in full-time equivalent employment, i.e. full-time workers, which corresponds with a situation where one person works on the farm 2,120 hours a year, i.e. 265 working days, eight hours a day, the so-called annual work unit (AWU).

(it concerned approx. 12% of piggeries and 11% of cowsheds), still accounting for double the share for entities which lost the status of a large-scale commercial unit. As regards all market-oriented holdings, the difference was even greater (fourfold).

- A relatively more favourable demographic structure, and above all, a higher level of general and vocational education of the population from units classified as large-scale commercial entities after 2000. This primarily concerned farm managers and agricultural workers. Such positive characteristics were mostly found among farm managers, particularly in terms of skills, reflected in their educational level. This was observed with regard to all levels of general education, being the most evident at the level of higher education. Within the group of managers of farms categorised as large-scale commercial units for the first time in 2005, holders of a university degree accounted for the highest share, ca. 34%. It was double the figure for managers of units deteriorated their competitive position in the agricultural market, and seven times higher than the respective share for all managers of market-oriented farms.

It should be concluded that the presented differences between farms under comparison, their farming efficiency as well as social and demographic characteristics of farmers, demonstrate that it is extremely difficult to achieve and maintain a competitive position in the agricultural market. Therefore, desired structural changes in Polish agriculture should be primarily aimed to increase the economic strength of individual market-oriented units.

2. Distribution of highly commercial farms according to social and demographic characteristics of farm managers

Many years of research have shown that the production and economic performance of agricultural holdings largely depends on qualifications of their users. Social and demographic characteristics of farmers not only enhance or reduce the possibilities of generating a financial surplus, but also determine the inclination and the necessary skills to introduce market-oriented changes on their farms. As a consequence, they represent an essential factor of increasing and modernising the production potential of holdings, improving farming efficiency and competitiveness of their products in the agricultural market. The characteristics of farm managers, particularly their skills and ability to recognise

factors affecting farm performance, the accuracy of such evaluations and responses to changes in farming conditions determine the future of individual units in the agricultural market [28].

2.1. The distribution of large-scale commercial units according to demographic characteristics of farm managers

In order to develop a strong position of particular farms in the agricultural market and to cope with competitive pressure, farmers need to permanently adapt agricultural holdings to constantly changing external conditions. It is a widespread belief that relatively young persons are generally more open to changes. They tend to adopt active strategies in order to adjust the farms to current farming conditions. In this connection, they regularly make efforts and take the risk of activities aimed to modernise the production potential, improve farming efficiency and increase the competitiveness of their products in the agricultural market and, as a result, to obtaining fair income from agricultural activities. Such patterns were confirmed by the collected empirical material. It follows that the distribution of large-scale commercial farms was interrelated to the age structure of farm managers (Table 3).

In all the years covered by the survey, highly commercial farms were concentrated in a group of units managed by relatively young persons, i.e. at the younger working age, and particularly by young farmers, under 35 years of age. It was much less frequent for such holdings to be managed by people at the non-mobility working age, and very rare in the case of farmers at the retirement age. Furthermore, it should be emphasised that all managers of large-scale commercial units at the post-working age had a successor, engaged not only in farm work, but also in strategic decision making with regard to agricultural activities. Presumably, the formal taking over of the farm by a younger farmer was only a matter of time, and the successor's participation in farm management relatively often slowed down the fall in output in holdings managed by older persons [76].

Table 3. Share of highly commercial farms by age of the manager

Specification	Share of highly-commercial farms:			
	1992	1996	2000	2005
Total	6.4	8.2	11.1	12.0
Share of managers of highly-commercial farms in each age group				
working age (total)*	6.7	8.8	11.7	12.9
- of mobility	7.8	9.9	13.4	13.3
of which under 35	8.0	10.2	14.9	15.1
- of non-mobility	5.2	7.4	10.5	12.4
post-working age	4.9	4.2	2.2	2.1

* Economic age groups according to Central Statistical Office: the pre-working age population – persons aged 17 or under; **the working age population** (women aged 18-59 and men aged 18-64) was subdivided into two groups: **the age of mobility population** – persons aged 18-44 – and **age of non-mobility population** – women aged 45-59 and men aged 45-64; **the post-working age population** – women aged 60 or over and men aged 65 or over.

Source: IAFE-NRI survey *2005.*

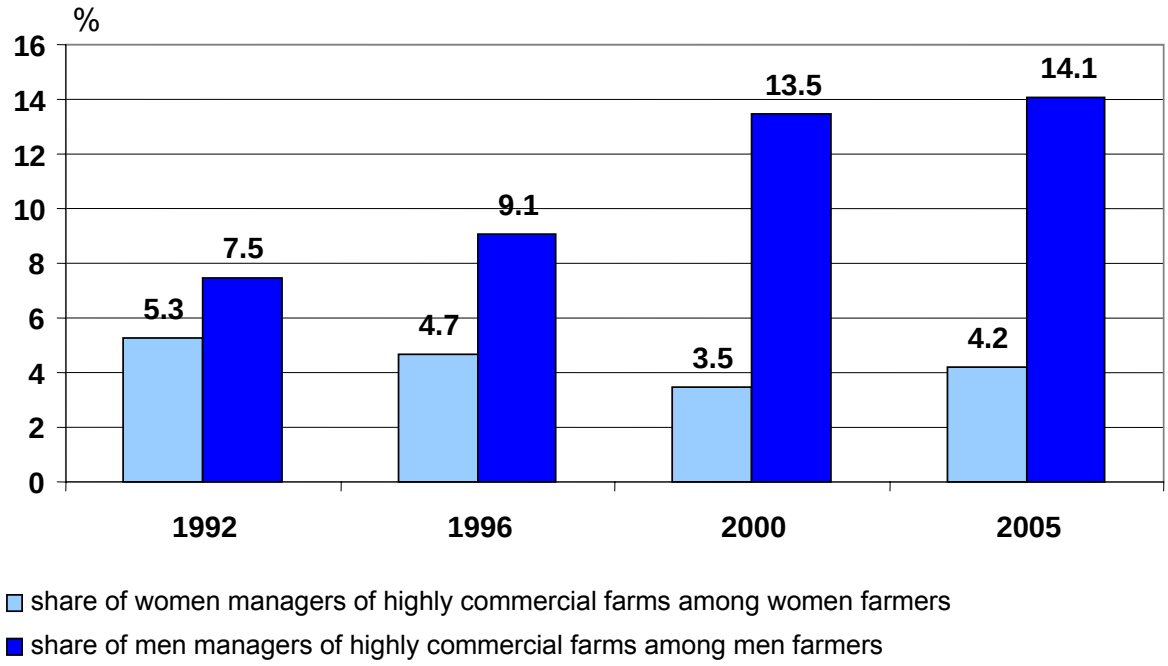
In the analysis of the share of large-scale commercial units by the manager's age, the pace of change in the group of persons at post-working age deserves attention. In 1992-2005, only in this age group the share of large-scale commercial farms showed a dramatic drop (from ca. 5% to slightly over 2%). Such a marked fall in the proportion of large-scale commercial units managed by persons at the retirement age also indicates that maintaining the position in agri-business requires ever-greater involvement, information and skills, related not only to the production process, but primarily adequate background to cope with market conditions, particularly marketing knowledge.

Farm management is usually considered to be the task of a man. It results from the specific character of agricultural work, which requires a number of skills related to "male" activities and still relatively significant physical effort despite a considerable progress in mechanisation. Therefore, a woman performs the function of a farm manager in exceptional cases, basically when there is no man to take over, for various reasons [6].

Many years of research conducted by IAFE-NRI has shown that women account for a stable and relatively small group among farm managers. In 1992-2005, women performed this function in about one-fifth of family farms. However, they usually managed units with relatively limited area, characterised

by rather minor agricultural production, which usually represented an additional source of income [75].

Figure 2. Share of highly commercial farms by sex of the manager



Source: IAFE-NRI surveys 1992, 1996, 2000, 2005.

The above-mentioned patterns are also reflected in the distribution of large-scale commercial units in groups of farms according to the manager's sex. In all the periods in question, highly commercial entities were found in groups of farms managed by both men and women (Figure 2). However, the highest number of large-scale commercial farms was observed in the group of holding with a man manager. At the same time, large-scale commercial units managed by women were not only relatively rare, but along with the increase in market orientation their share showed a marked decline relative to that of such farms managed by men. In 1992, the respective shares of large-scale commercial units in the groups of farms managed by women and by men were rather similar, at approx. 5 and 8%, but in both 2000 and 2005 the proportion of large-scale commercial units among entities managed by men was over three times higher than in the group managed by women (14% against 4%).

2.2. The distribution of large-scale commercial units according to the educational level of farm managers

Economic growth, also the development of agriculture, is primarily connected with changes in the relations between capital, land and labour, i.e. speficic production factors. However, efficient use of all production resources increasingly depends on people, their qualifications, creativity, entrepreneurship and skills in obtaining, processing and using information [29]. This means that knowledge becomes ever more important in the production process [67]. Therefore, skills of persons working on the farm play an increasingly significant role.

However, from the point of view of agricultural activity, the educational level of farm managers is of particular importance since those are the people who take strategic economic and production decisions. The differences in the level of managers' knowledge considerably diversify the economic and production situation of farms [17] and possibilities for improvement [74].

Table 4. Share of highly commercial farms by education of the manager

Level of general education	Share of highly-commercial farms:			
	1992	1996	2000	2005
Total	**6.4**	**8.2**	**11.1**	**12.0**
Share of managers of highly-commercial farms with relevant education:				
- primary	5.1	5.5	6.2	6.0
- vocational	7.9	9.2	12.9	12.1
- secondary or post-secondary	8.4	12.8	16.4	16.5
- higher	10.0	13.6	19.4	19.3

Source: IAFE-NRI surveys 1992, 1996, 2000, 2005.

The relationship, emphasised in a number of analyses, between the economic and production performance of agricultural holdings and the level of the farmers' knowledge [41, 42, 29, 31] is also reflected in the distribution of large-scale commercial units in specific groups of farms broken down by both general (table 5) and agricultural (table 4) education of managers.

In 1992-2005, as well as in specific selected periods, the highest share of large-scale commercial units was found in the group of holdings managed by people with a university degree or with agricultural education. A relatively

significant proportion of large-scale commercial farms was also noted in the group of units managed by persons with secondary or post-secondary education.

Table 5. Share of highly commercial farms by agricultural education of the manager

Level of agricultural education	Share of highly-commercial farms:			
	1992	1996	2000	2005
Total	**6.4**	**8.2**	**11.1**	**12.0**
Share of managers of highly-commercial units with agricultural education obtained:				
- without agricultural education	4.3	4.9	5.5	5.4
- at training courses	7.0	11.2	8.5	11.5
- at school	9.8	12.6	26.1	25.9

Source: IAFE-NRI surveys 1992, 1996, 2000, 2005.

Definitely the lowest share of large-scale commercial units was found among farms managed by persons without theoretical preparation for the functions performed, or those with only primary education.

3. The distribution of highly commercial farms in size groups

One of the simplest and most frequent criteria differentiating agricultural holdings is the area. However, due to technological development, modernisation and intensification of production in agriculture, land has been relatively diminishing in importance in favour of other factors such as capital, the quality of labour and management skills [71], whose correlation with the area is not always linear. Nevertheless, on account of the double role of agricultural land in the production of agricultural products, as a production factor and production space, the use of land is still limited by other production factors. As a result, particularly in Poland, the area still largely determines potential output of a farm [44, 21], limits the scale of production and further growth possibilities [77]. Therefore, a large area of agricultural land facilitates an increase in commercial production of holdings and sales [38].

The area of a family farm is usually positively correlated with the structural distribution of technical production assets [61]. Furthermore, all analyses

suggest that the area of a farm is closely related to social and demographic characteristics of farmers [55, 56]. In addition, managers of larger units usually have a higher level of qualifications and tend to be more inclined to introduce changes [78]. They are more effective in the creation of regular relations with the buyers of agricultural products [23, 25], which enables greater farming efficiency [72] and fair income from work in agriculture [74].

The notion that the area of agricultural land affects agricultural production and income from work on family farms was also validated by data on the distribution of large-scale commercial units across size groups (Table 6).

It follows that although large-scale commercial units were found in all the size groups, their share in the total number of holdings in question was related to the area of agricultural land. Such relations were not only observed throughout the period covered by the analysis, but they markedly strengthened as competition in the agricultural market increased.

Table 6. Share of highly commercial farms in specific size groups

Size groups (ha of agricultural land)	Share of highly commercial farms:			
	1992	1996	2000	2005
Total	**6.4**	**8.2**	**11.1**	**12.0**
Each size group = 100				
1-5	2.1	1.9	2.1	1.2
5-10	4.2	3.8	5.4	10.2
10-15	9.3	10.5	14.7	10.9
15-20	21.0	25.0	26.5	29.4
20-30	22.3	47.5	53.2	41.0
30-50	23.0	52.9	75.3	78.7
50 or more	33.3	57.8	93.5	96.1

Source: IAFE-NRI surveys 1992, 1996, 2000, 2005.

The scale of increasing interrelations between achieving the status of a large-scale commercial unit and the area of a farm was best reflected in the fact that in 2005, among farms with the area of 1 to 5 ha of agricultural land, there were only slightly over 1% of such holdings, whereas in the group of units of 50 ha or more the respective share exceeded 96%. Therefore, the lowest share accounted for a mere one-eightieth of the highest proportion. In previous years,

such differences had been significant as well, but still considerably less dramatic. In 1992, the share of large-scale commercial units in the smallest and in the largest agricultural holdings was 2% and 33% respectively, i.e. the latter was only about sixteen times higher.

The growing relation between the area and the proportion of large-scale commercial units, observed in 1992-2005, resulted from two opposite processes, i.e. an increase in the share of such entities among the largest farms (from 33% to 96%) and a fall in the share in the group of relatively small units, up to 5 ha of agricultural land (from 2% to 1%). It should be also pointed out that the decline in the proportion of highly commercial farms among the smallest entities occurred after 2000. In 1992-2000, the share of large-scale commercial units among farms of 1 to 5 ha of agricultural land was relatively stable, at approx. 2%.

In conclusion, the distribution of large-scale commercial units across size groups as well as further widening of the relevant gap between small, medium-sized and large farms indicates that sales on a large scale continue to be related to a considerable area of agricultural land used.

The significance of the agricultural land factor in the formation of the large-scale commercial segment in family farming can also be seen in greater increases in the land area, reflected not only in the growing share of units increasing their area, but also in the scale of such changes. In 1992-1996, in approx. 22% of large-scale commercial farms the utilised land area went up by approx. 6.9 ha of agricultural land. Between 2000 and 2005, the corresponding indicators were nearly 43% and 10.9 ha of agricultural land. As a consequence, in 2000-2005 area increases involved five times more land than in 1992-1996.

Nevertheless, the land area of a farm is not the only determinant of the scale of agricultural production. This is reflected in the distribution of large-scale commercial units according to social and demographic characteristics of farmers and the significant group of small highly commercial units (up to 5 ha of agricultural land). However, it should be emphasised that the growing competition in the agricultural market was accompanied by a gradual decline in their number, and the downward trend was further intensified by the ongoing integration of the Polish economy into the EU structures. In 1992-2005, the share of units of 1 to 5 ha of agricultural land in the group of highly commercial farms dropped from 13% to 5%, i.e. over 2.5 times, the decrease being mostly observed between 2000 and 2005. The proportion of such small

entities then fell from 10% to 5%, whereas in 1992-2000 the corresponding figure only decreased from 13% to 10%.

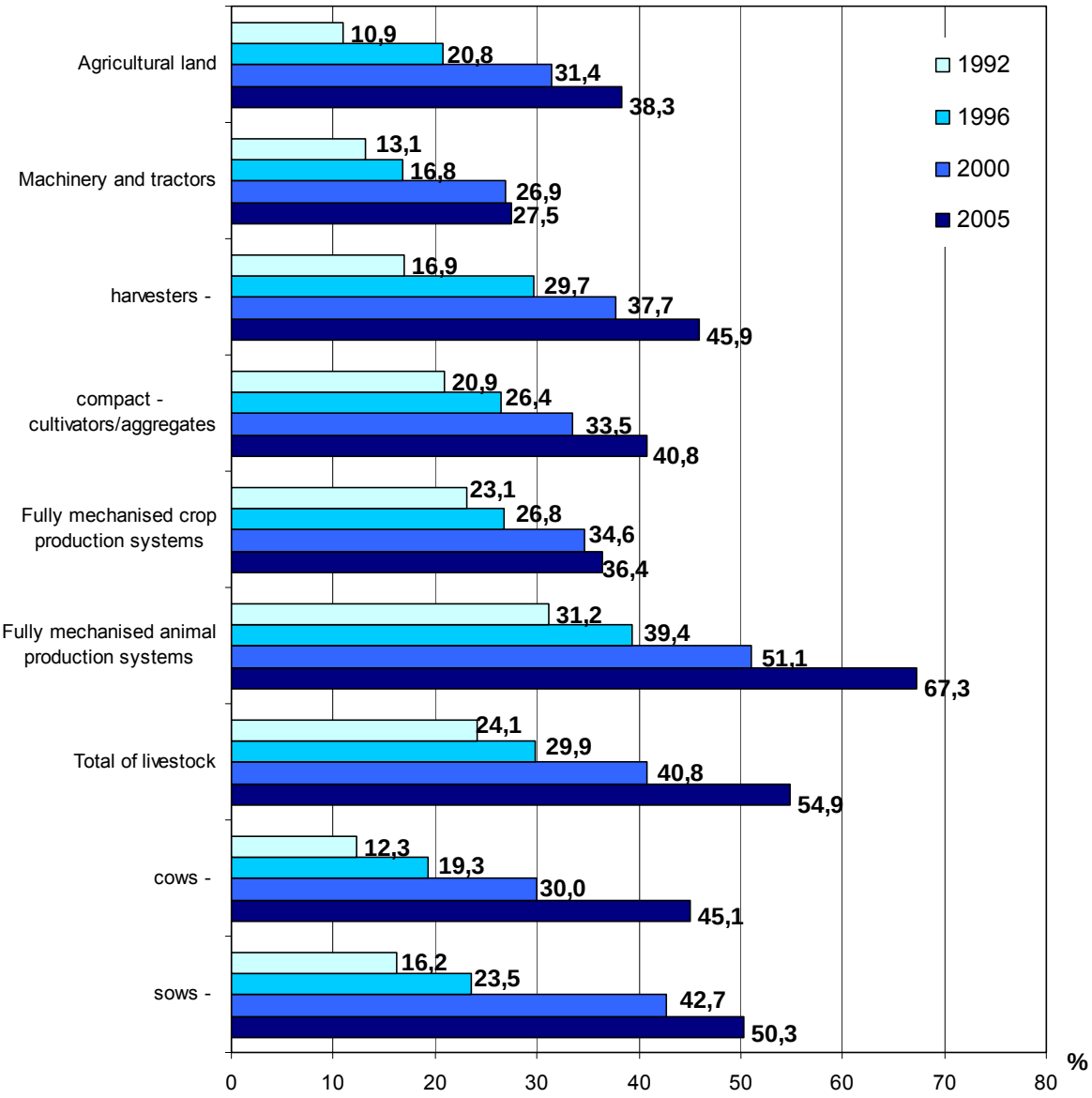
4. Highly commercial farms in agricultural structures

From the point of view of the quantity and quality of market output and ensuring the security of food supply, it is not only the number of highly commercial farms that matters, but primarily their share in commercial production as well as the degree of concentration of production assets in this group of units. Highly commercial farms represent holdings which determine favourable changes in the agricultural sector in Poland, and as the dominant group in terms of owned production assets and economic performance, they affect the general picture of agriculture.

According to the surveys, the position of large-scale commercial units in the structures of family farming and agri-business showed gradual improvement. A significant increase in the degree of concentration of production assets in large-scale commercial units was also observed even if the number of such holdings remained unchanged, i.e. in the five-year period of 2000-2005 (Figure 3). The most significant indicator of changes is the area of utilised agricultural land, due to the significance of land in the production of agricultural products and its non-multipliable character.

According to the surveys, in 1992-2005 the degree of concentration of agricultural land in the group of highly commercial farms increased more than 3.5 times (from less than 11% to over 38%). However, the share of land cultivated by large-scale commercial units remains relatively too low for them to play a dominant role in the market of agricultural products. However, on the basis of declarations by managers of highly commercial farms and by other farmers with regard to future agricultural projects, it may be estimated that approx. 44% of agricultural land will be utilised by large-scale commercial units by 2010.

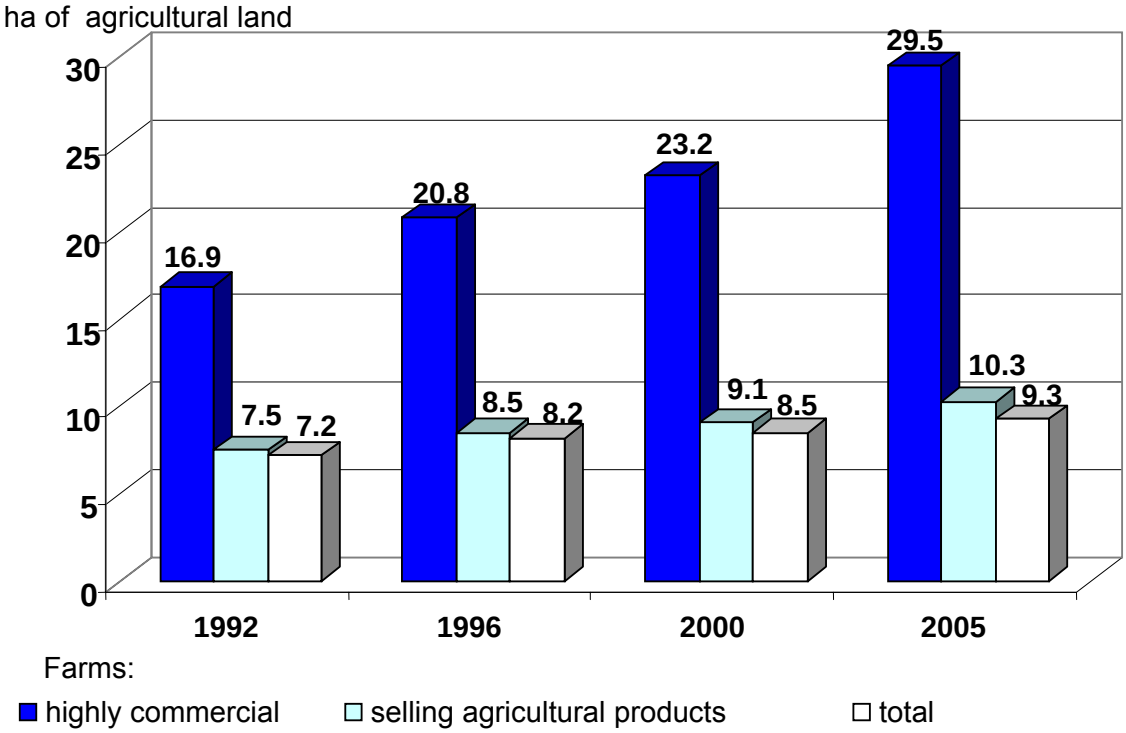
Figure 3. Highly commercial farms in selected agricultural structures



Source: IAFE-NRI surveys 1992, 1996, 2000, 2005.

In 2005, the average area of agricultural land in the group of large-scale commercial units reached a relatively high level and amounted to 29.5 ha per farm (in 2000 – 23.2 ha, in 1996 – 20.8 ha, in 1992 – 16.9 ha). For comparison, the average area of all the analysed farms in specific periods was as follows: in 2005 – 9.3 ha of agricultural land, in 2000 – 8.5 ha of agricultural land, in 1996 – 8.2 ha of agricultural land, and in 1992 – 7.2 ha of agricultural land. The figures also reflect the degree of agricultural land concentration in large-scale commercial holdings, generally through commercial transactions and largely between farmers (natural persons) [22].

Figure 4. Average area of a highly commercial farm as compared to other surveyed farms

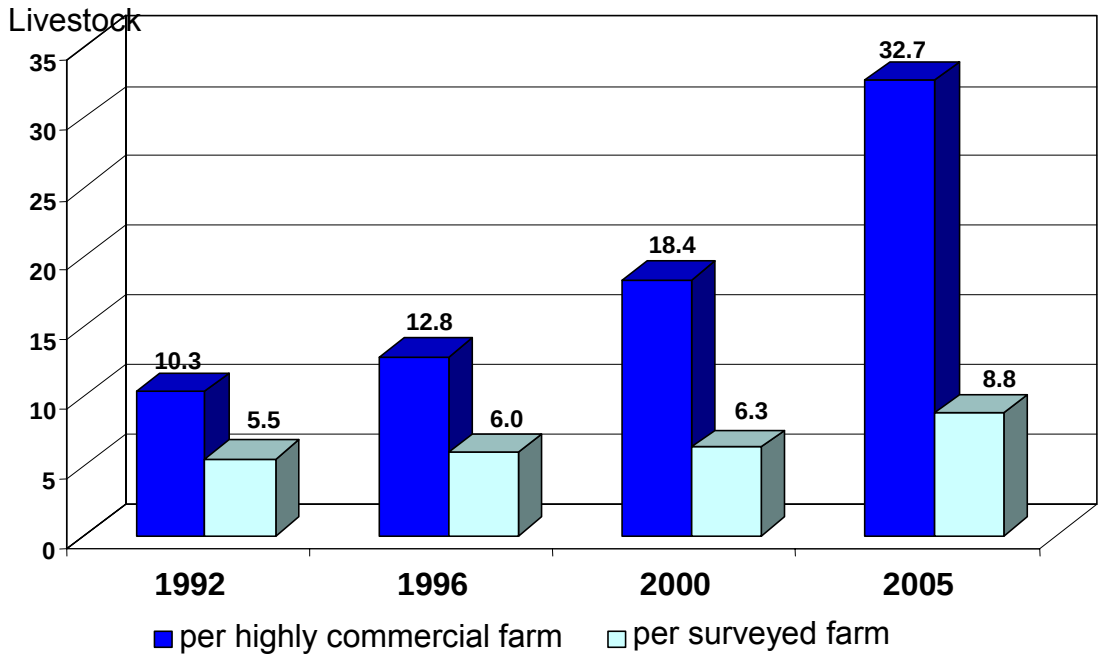


Source: IAFE-NRI surveys 1992, 1996, 2000, 2005.

The concentration of agricultural land in highly commercial farms was accompanied by its intensive utilisation. It is the most evident in the scope of set-aside of agricultural land. The set-aside of land among farmers with highly commercial holdings has always been very limited, and it was virtually eliminated in 2000-2005. In 1992-2000m, such land only accounted for ca. 2% of agricultural land utilised by this category of farms, and in 2005 the share was ten times smaller, having fallen below 0.2%.

As regards all the analysed farms, the scale of non-cultivated agricultural land was much higher. It was particularly significant in 1992 and 1996, when the share of set-aside land in the total area of agricultural land utilised by private farmers amounted to approx. 11% – 13%. In the four-year period of 1996-2000, the proportion of non-cultivated agricultural land decreased over three times and showed only minor changes after 2000 as the share of set-aside land went down from approx. 4% in 2000 to slightly over 3% in 2005. As a consequence, in 2005 the group of large-scale commercial farms only accounted for less than 3% of the total area of agricultural land set aside by private farmers.

Figure 5. Livestock per farm with animal production



Source: IAFE-NRI surveys 1992, 1996, 2000, 2005.

The increase in the number of large-scale commercial units and the concentration of land in this category of farms was related to a rise in the share (from over 24% in 1992 to approx. 55% in 2005) of this group in total livestock owned by all the surveyed family farms. The concentration trend was observed in all groups of animals, but it was particularly significant in the case of cows. In 2005, large-scale commercial holdings had over 45% of the total stock of cows kept by all family farms. In 1992, the corresponding figure amounted to slightly over 12%. It resulted from the discontinuation of animal production[13] by many entities as well as by large-scale commercial holdings. The decrease in the number of highly commercial farms engaged in animal production slowed down considerably between 2000 and 2005. The proportion of highly commercial units with livestock then dropped from approx. 79% to almost 75%, i.e. by an annual average of 0.8%, whereas in 1992-2000 the corresponding rate was 1.9%. At the same time, entities which continued animal production increased the number of livestock units. As a result, between 1992 and 2005

[13] In 2005, farms with livestock accounted for 66% of all the surveyed units, while in 1992 their share was 89%.

the average livestock per farm engaged in animal production went up by 217% (from 10.3 to 32.7 livestock units – LSU)[14]. The concentration of animal production were also noted with regard to all the analysed farms. In 1992-2005, the average livestock in this group increased from 5.5 to 8.8 LSU, i.e. by 60%. As a result, the gap between the group of highly commercial farms and all the surveyed units in terms of number of livestock considerably widened. In 2005, the average livestock in highly commercial farms, in LSU per 100 ha of agricultural land, amounted to 102.5, i.e. 29% higher than the figure for all the surveyed units, while in 1992 the relevant difference was only 7%.

According to the surveys, the number of farms having relatively large herds of livestock showed particularly robust growth. This is well illustrated by an increase in the concentration of cows and sows. In 1992-2005, the share of large-scale commercial units with 21 and more cows went up from less than 3% to 27%, whereas the proportion of large-scale commercial farms with a herd of a minimum of 20 sows increased from approx. 4% to 22%. This increase was mainly observed in the five-year period of 2000-2005. The share of large-scale commercial units with 21 and more cows then jumped from 6% to 27%, and those owning a herd of at least 20 sows grew from 9% to 22%. It should be emphasised, however, that such numerous herds of cows and sows remained relatively rare; nevertheless, it was nearly seven times more frequently found in large-scale commercial entities than in all the surveyed family farms (where the respective shares were 4% in the case of cows and 3% for sows). At the same time, it should be added that in 2005 almost 96% of all large herds of cows and sows were owned by highly commercial farms.

The increased degree of concentration of animal production was also accompanied by improved quality of livestock. This was mostly reflected in a nearly 50% increase in purchases of certified breeding material in 2000-2005 as compared to 1992-1996. Those trends were particularly observed in the group of large-scale commercial units. As a consequence, this group accounted for over 85% of all acquired breeding sows, breeding and commercial sows, as well as for approx. 74% of all purchased breeding heifers. In 1992-1996, the corresponding shares were 52% and 39% respectively. Such activities indicated more widespread utilisation of biological progress in the development

[14] The process took place mainly in the five-year period of 2000-2005, when the average livestock in highly commercial farms rose from 18.4 to 32.7 of livestock units (LSU), i.e., by an annual average of 15.5%, while in 1992-2000 the corresponding growth rate was 9.8%.

of agricultural activities and strengthening the competitive position of holdings forming the large-scale commercial segment in family farming.

Another determinant of progress in agricultural activities is the improvement of the stock and quality of technical equipment of the farm. According to the surveys conducted in 1992-2005, there were considerable changes in the equipment of highly commercial farms with tractors and machinery as compared to all the units in question.

In 1992-2005, the share of machinery and equipment used by large-scale commercial units in the total number of machinery and tractors owned by family farms increased from 13% to 28%. Quantitative changes were accompanied by significant quality changes with regard to agricultural equipment utilised by large-scale commercial entities. As a consequence, they strengthened their dominant position in the sphere of technical equipment. It is reflected in the equipment with modern and highly productivity machinery, as well as in the scope of full mechanisation of agricultural work. For instance, in 2005 large-scale commercial units, which accounted for 12% of all the surveyed farms, accounted for approx. 46% of harvesters, nearly 41% of cultivators and all the sprinklers used in peasant agriculture. A set of machinery and equipment enabling full mechanisation of the technological process of producing specific agricultural products was found with the following farms: 64% of producers of cereals, grain maize and rape, 72% of potato growers, 75% of sugar beet farmers, and 82% of producers of hay and hay silage. As regards all the surveyed entities, the corresponding shares, depending on the products, ranged from 12% to 25%. Furthermore, machinery and equipment owned by large-scale commercial units was characterised by a relatively lower degree of wear and tear than all tractors and machinery used by the surveyed farms. This is reflected, for example, in the fact that the share of new equipment (used for less than four years) owned by large-scale commercial units is double the figure for all the surveyed units (over 7% against ca. 3%).

In terms of farm buildings and structures, in the the period in question large-scale commercial units maintained the level characteristic of all the analysed family farms. In both cases and throughout the analysed period, livestock buildings represented the most common type. In 2005, for example, this type of buildings was found in 85% of large-scale commercial units, while the respective share for all the surveyed units was 88%. This was also the case with regard to the possession of barns, reported by 81% of large-scale commercial

entities and 80% of all the family farms. Both in 2000 and 2005, large-scale commercial units were characterised by distinctly better equipment with garages and sheds than all the surveyed units. They were found in 85% of large-scale commercial units and in 60% of all the surveyed holdings.

According to the surveys, in 2005, as in previous years, it was relatively the least frequent for highly commercial farms to utilise specialised buildings (glasshouses, tunnels, mushroom-growing cellars, drying houses and storing houses for fruit and vegetables) in agricultural production. This type of buildings was only found in 22% of large-scale commercial units. It should be stressed that the utilisation of such buildings and structures was reported by four times more highly commercial holdings than in the case of all the family farms. As a consequence, large-scale commercial units accounted for 46% of all farms with specialised buildings.

The building stock of large-scale commercial units were characterised by definitely better technical condition than those owned by all the farms. According to the owners, in 63% of such farms the condition of livestock buildings could be evaluated as good, and only 3% assessed it as poor. The relevant shares in the whole group of analysed family farms were 36% and 12% respectively. A similar situation could be observed with regard to the technical condition of barns used by both groups of holdings. The technical condition of barns was evaluated as good in 62% of large-scale commercial units, whereas only slightly over 4% of the respondents considered it to be bad (in the whole group of private farms the relevant proportions were 36% and 15% respectively). Taking into account the condition of garages and sheds, the distribution of units broken down by technical condition was as follows: 72% of large-scale commercial holdings and 50% of all the farms reported good technical condition of such buildings, whereas 3% and 7%, respectively, assessed it as unsatisfactory. The most favourable situation was found with regard to specialised buildings; 95% of large-scale commercial units evaluated their technical condition as good, and there were no negative assessments. Among all the farms, less than 84% of specialised buildings were considered to be in good condition, whereas 1% of the stock was assessed as poor.

According to the surveys, highly commercial farms are primarily distinguished by their equipment of farm buildings with technical facilities

enabling work mechanisation[15]. Although this group is characterised by relatively better equipment with farm buildings than all the family farms, in terms of both number and technical condition, still very few apply more advanced technological solutions. The use of facilities for mechanical supply of fodder in a cowshed and piggery may serve as an example. In 2005, such equipment was only found in slightly over 11% of cowsheds and almost 21% of piggeries included in production assets of large-scale commercial units. They accounted for 56% and 45%, respectively, of such technological solutions utilised by all the farms. At the same time, the share of highly commercial units equipped with facilities for mechanical removal of cow manure was nearly 29% in the case of cowsheds, and almost 20% with reference to piggeries. The relevant proportions for all the holdings were several times lower, approx. 8% and almost 4% respectively.

Relatively the highest degree of mechanisation was found with regard to animal watering. Running water was supplied to all livestock buildings owned of both highly commercial farms and all the surveyed units engaged in animal commercial production. Almost 82% of cowsheds and slightly over 73% of piggeries utilised by large-scale commercial units were equipped with automatic watering troughs. The relevant figures for all the surveyed units were 39% and 28%, respectively.

The most widespread mechanised activity was the milk production process. In 2005, all milk producers in the group of large-scale commercial holdings had facilities for mechanical milking and for proper cooling and storage of milk. Such technological solutions among all the surveyed units were slightly less frequent. In the group of milk producers, 81% had milking machines, 64% – cooling tanks, and 53% – both types of equipment.

However, the main differences between highly commercial farms and family farms as a whole concerned technical equipment enabling full mechanisation of specific stages of the production process[16] rather than only certain phases thereof. Even minor shortcomings in such machinery and equipment considerably reduce economic efficiency and productivity of the solutions applied. Therefore, investment in the building stock of large-scale commercial units focused rather on increasing the level of technical equipment of livestock

[15] It only concerns agricultural holdings engaged in commercial production corresponding to the type of buildings.
[16] In the case of cowsheds for milk cows, it also concerns obtaining, cooling and storage of milk.

buildings, particularly in terms of full mechanisation of production. In the five-year period of 2000-2005, approx. 51% of highly commercial farms invested in the building stock, with nearly 20% also investing increased technical standard of livestock buildings. At the same time, it should be emphasised that in the group of highly commercial farms increasing the degree of mechanisation of animal production, 75% implemented projects aimed at more comprehensive mechanisation of livestock breeding. Despite relatively large-scale investment activity in this regard, such equipment was rather rarely found in farm buildings. In 2005, only 9% of cowsheds and 10% of piggeries had fully mechanised production systems, but the situation was still much more favourable than in the case of all farms selling milk, pigs and cows for slaughter, where fully mechanised barns and piggeries accounted for less than 2%.

The description of the equipment of livestock buildings should also include an analysis of the scale of environment-friendly solutions applied with regard to storage of solid and liquid manure. In 2005, the use of solid manure storage facilities and tight storage tanks for liquid manure was reported by over 33% of highly commercial farms selling animal products, whereas respective share among all the holdings oriented towards animal production was 14%.

It should be mentioned that in 2005 nearly 35% of all the surveyed large-scale commercial farms utilised livestock buildings assessed by the owners as too small for current needs. To a lesser extent, this problem also concerned barns, garages and sheds (16% and 17% of farms respectively). It means that the current or planned production requires increasing the capacity of the relevant buildings. This is reflected in investment plans revealed by owners of highly commercial farms. Among those, the intention of construction, renovation or modernisation of livestock buildings was declared by over 40% of farmers, nearly 22% of which plan to modernise technical equipment.

The description of the place of highly commercial farms in agricultural structures should also portray them as market players. Under growing competition, the creation of stable relations with purchasers of agricultural production and joint economic undertakings are increasingly significant. It should be emphasised that all users of large-scale commercial units managed to build relatively stable market relations. Even if those were not always formal, in 2005 the share of highly commercial holdings selling in formal markets exceeded 85%. Within this group, nearly 74% of farm managers had entered into agreements for contract deliveries, about 20% declared selling their output

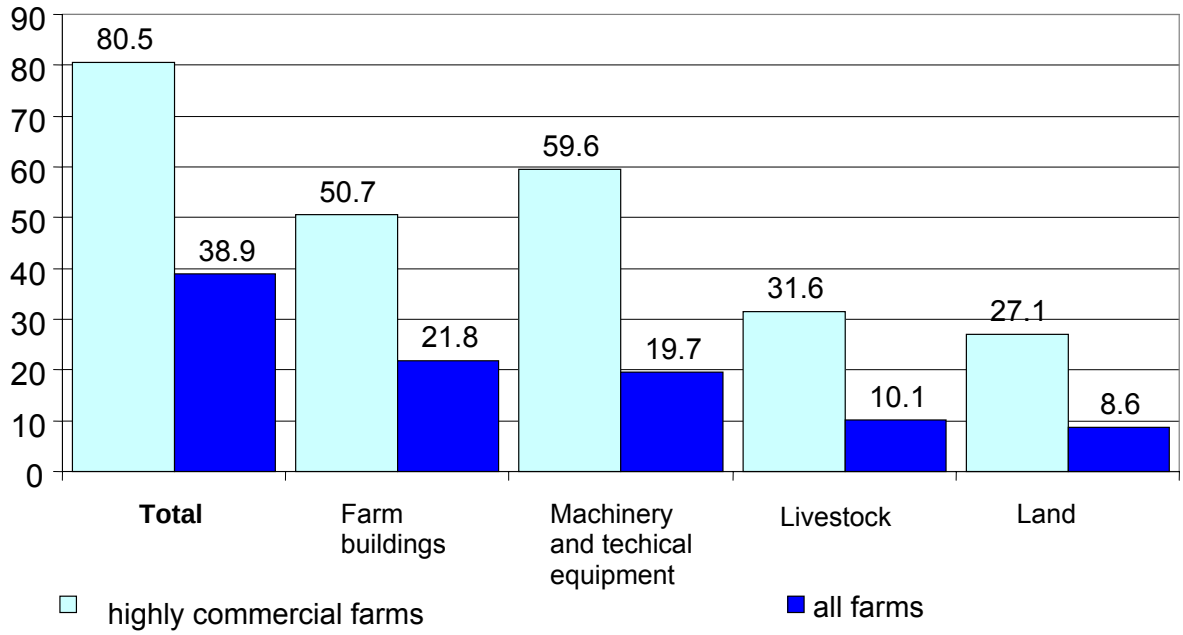
in commodity exchanges and wholesale markets, slightly over 6% reported sales under a system of contract deliveries as well as through commodity exchanges and in wholesale markets. The above-mentioned types of market transactions accounted for the vast majority of agricultural market output of highly commercial farms, i.e. 81%. At the same time, approx. 17% of commercial production was sold to regular purchasers, whereas only slightly more than 2% through direct sale, i.e. at the marketplace or to the neighbours. Among all the farms selling their production, in 2005 41% were engaged in formal market transactions, with such sales of agricultural products accounting for nearly 40% of total sales. At the same time, over 52% of commercial production was sold within informal, but regular relations, and approx. 8% – to the neighbours and at the marketplace.

The differences in the scope and type of market relations indicate growing polarisation of family farms into business entities or subsistence units. Such tendencies were also reflected in greater activity among managers of large-scale commercial holdings than in the case of all farm managers with regard to activities aimed to increase the production potential. Although users of family farms are rather attached to established farming methods and relatively low openness to changes [27], under growing competition risk-taking and overcoming the difficulties involved in investment activity is not only a necessary precondition for maintaining the position in the market and a development factor, but it also indicates farmers' attitudes towards owned agricultural property and agricultural activity [74].

The analysis of data on investment activity by private farmers showed that users of highly commercial farms were distinguished by greater activity aimed to increase their production assets. In 2000-2005, nearly 81% of large-scale commercial farms invested in the replacement, enlargement or modernisation of production fixed assets[17]. An average amount of PLN 121,400 per investing farm was spent for such purposes. The most popular investment was in machinery (60% of large-scale commercial holdings) and the building stock (almost 51%). Investment in livestock was less frequent (nearly 32%), as in the case of land (slightly over 27%).

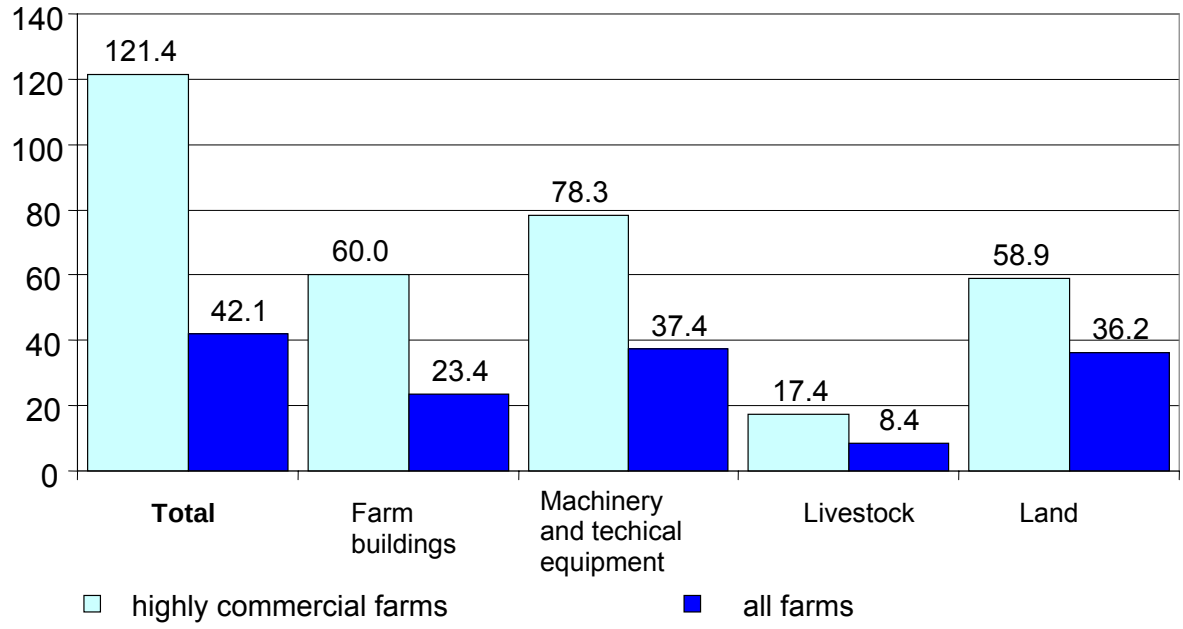
[17] In the paper, investing farms refer to all units which purchased fixed assets for production and engaged in construction works. In order to exclude entities only performing minor repairs from the analysis, a certain threshold was set for expenditure on repair and modernisation in specific types of farm buildings. For years 1992-1996 and 1996-2000 it was at least PLN 1,000 each, and in 2000-2005 – PLN 1,500.

Figure 6. Share of entities investing in production fixed assets in the selected groups of farms in 2000-2005 (in %)



Source: IAFE-NRI survey 2005.

Figure 7. Average agricultural investment in the selected groups of farms in 2000-2005 (in PLN thousand per farm making agricultural investment)



Source: IAFE-NRI survey 2005.

For comparison, agricultural investments by all the farms were reported by less than 39% of units, of which almost 22% invested in farm buildings, nearly 20% – in traction and machinery, 10% – in livestock, and approx. 9% – in land. Within this group, average expenditure per investing farm amounted to PLN 42,100.

Different patterns with regard to activities aimed at the replacement, enlargement and modernisation of production fixed assets between large-scale commercial units and all farms were observed throughout the period in question (i.e. in 1992-2005). It should be also emphasised that the gap between the groups of farms under comparison in terms of investment activity gradually widened.

According to the survey, in 1992-1996 the share of farms investing in fixed assets for production in the group of highly commercial farms was 25 percentage points higher than among all the surveyed units (62% against 37%), and in the five-year period of 2000-2005, the difference was as many as 42 percentage points (81% against 39%). This mostly stemmed from increased investment activities by farms categorised as large-scale commercial entities.

There were even greater disproportions in favour of highly commercial units in terms of production investment. In 1992-1996, the average amount of production investment per large-scale commercial farm in the group of holdings implementing such projects was 43% higher than relevant expenditure in all the analysed farms engaged in production investment. In 2000-2005, the advantage of the former increased to as much as 188%.

Farmers representing large-scale commercial entities not only invested in fixed assets for productionmore often than farm managers as a whole, but at the same time implemented a higher number of investment projects. In 2000-2005, each farm engaged in agricultural investment implemented an average of 2.1 investment projects[18] of various types. This figure was 40% higher than in the case of all the holdings, which implemented 1.5 investment projects per farm with agricultural investments. In the four-year period of 1992-1996, the difference was also considerable, but did not exceed 25%.

As a result of rather significant activity with regard to the replacement, enlargement or modernisation of production fixed assets by farmers from highly commercial holdings, in 2000-2005 such units accounted for 40% of all farms

[18] The following types of investment projects in agriculture were distinguished: construction and modernisation of farm buildings, purchase of machinery and tractors, purchase of land and purchase of livestock.

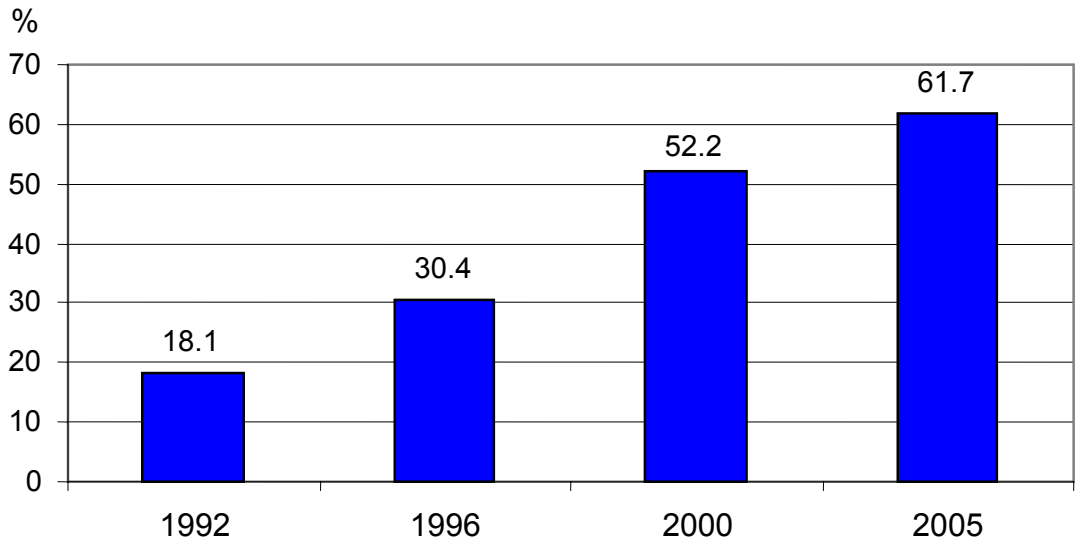
engaged in agricultural investments. Moreover, the share of funds spent on production-oriented investment in highly commercial entities represented approx. 72% of total expenditure on such projects in family farming. It should be noted that in 2005 large-scale commercial units only accounted for 12% of the total number of family farms.

Under the current macroeconomic conditions, maintaining the market position and obtaining fair income from economic activity requires constant changes in the stock and structure of production assets. Farmers' inclination to make investment efforts represents one of the most important prerequisites for increasing the economic power of their farms [69]. The prospects for further strengthening of the competitive position of large-scale commercial holdings were reflected in data on the number of units which planned agricultural investments in the coming years, i.e. by 2010. The share of users of highly commercial farms declaring such intentions was more than double the figure for all the analysed private farmers (77% against 38%), and the planning of investment activities was mainly driven by their expected effects on the scale and quality of production. Such motivation of managers of large-scale commercial units was reflected in the type of planned investments, mostly related to the purchase of agricultural land or livestock. In the group of highly commercial entities, intentions to increase the area of agricultural land or to purchase livestock were four times more frequent than among all the farms[19].

Nevertheless, the most significant indicator of the dominant role of highly commercial farms in agricultural structures is their share in satisfying the demand for agricultural products. According to the surveys, in the period in question the selected group of farms strengthened its position as agri-business partners, while their output accounted for an ever higher share of the agricultural market. In 2005, almost 62% of total sales by the surveyed private farmers represented the production of large-scale commercial units, while it was approx. 18% in 1992. It should be noted that in 2005 the share of large-scale commercial units was less than double the 1992 figure (over 6% against 12%).

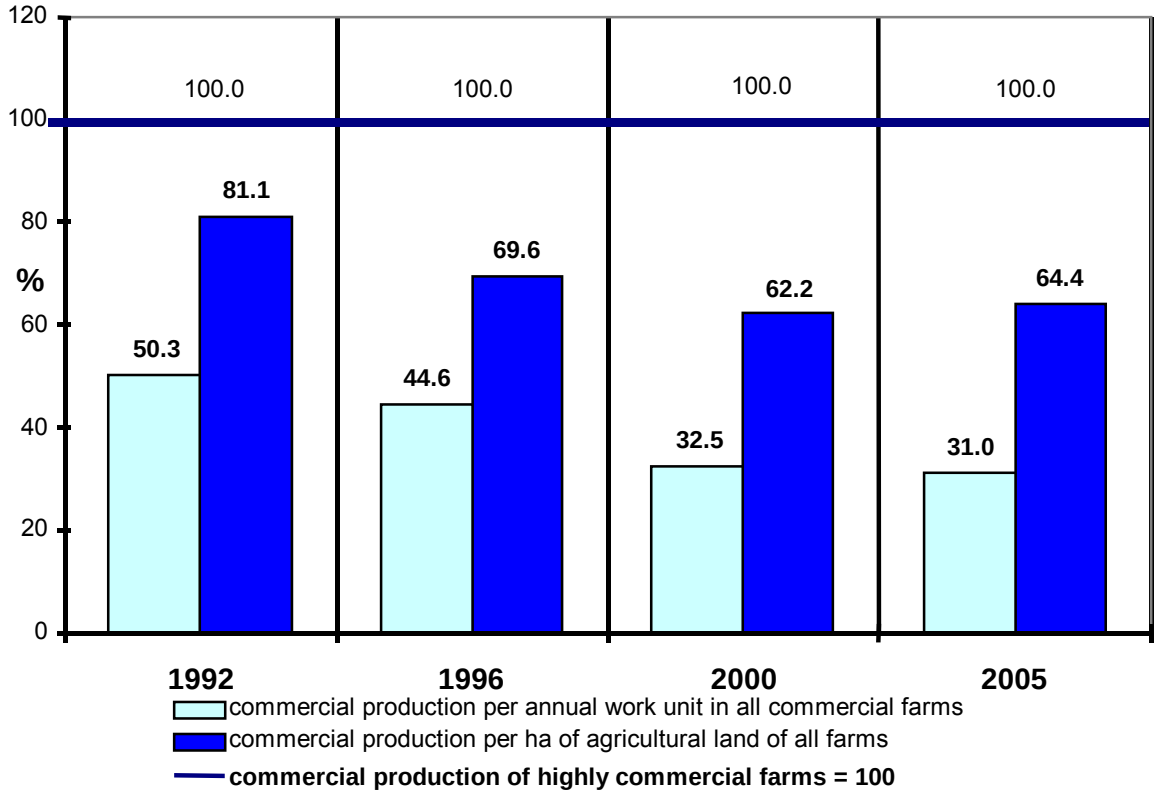
[19] In 2005, slightly over 24% of persons managing large scale commercial farms planned investments in a basic herd until 2010, while 38% – in land. A corresponding indicator among total farmers equalled to 6 and 10%, respectively.

Figure 8. Share of market output by highly commercial units in total sales by family farms



Source: IAFE-NRI surveys 1992, 1996, 2000, 2005.

Figure 9. Relations between large-scale commercial units and all market-oriented farms in relation to commercial production per ha of agricultural land and per AWU



Source: IAFE-NRI surveys 1992, 1996, 2000, 2005.

The growing domination of large-scale commercial units in the agricultural market stemmed not only from the increased production potential of this group of holdings, but also from the improved farming efficiency. As has already been mentioned, the nature of survey findings only allows a partial analysis of the actual productivity of production factors, and exclusively in the relation of agricultural sales to the resources of land and labour. Although the adopted measures fail to fully reflect the efficiency of utilisation of these production factors, particularly in terms of labour productivity, the selected indicators enable an evaluation of farming efficiency and of the related differences.

The comparison of sales of agricultural products per ha of agricultural land and per AWU in highly commercial farms and in all market-oriented holdings demonstrated that the former group of entities was distinguished by land and labour productivity (Figure 9). Furthermore, the gap generally widened in subsequent analysed periods[20].

The above differences in commercial production per ha of agricultural land and per full-time worker not only indicated generally more efficient use of land and labour in large-scale commercial units as compared to all commercial farms, but to some extent also reflected relatively higher effectiveness of production technology applied by users of large-scale commercial entities. They also suggested better adjustment of production factors to the type of agricultural activities resulting in greater farming efficiency, as it depends not only on the quantity and quality of production factors used in the production process, but also on the proportions. The highest productivity of production factors is achieved when they are utilised in optimal (or nearly optimal) proportions, i.e. corresponding with the requirements of relevant production processes [40]. At the same time, more efficient use of production factors usually brings about increased capacity for generating capital, thus facilitating further development.

It should be concluded that the presented survey data on selected elements of production assets of large-scale commercial units demonstrated that this group of farms had relatively significant and rather modern production assets.

[20] Only between 2000 and 2005 there was a slight narrowing of the gap (by 2.2 percentage point) in commercial production per ha of agricultural land between the group of large-scale commercial units and all the surveyed holdings. Any attempt to identify the reasons of such changes should take account of the fact that in the five-year period of 2000-2005 the group of highly commercial farms experienced intensive land concentration. The increase in the area of owned agricultural land, by an average of approx. 11 ha of agricultural land, was observed in 43% of large-scale commercial units. Therefore, it should be remembered that at least in some cases full production effects of such changes have not achieved yet.

Considering such a combination of equipment, characteristics of managers of large-scale commercial units as well as of their attitudes towards agricultural activities and production performance, it may be presumed that their relatively strong position in agri-business structures will be even stronger in the future.

5. Regional differences in the formation of the group of highly commercial farms

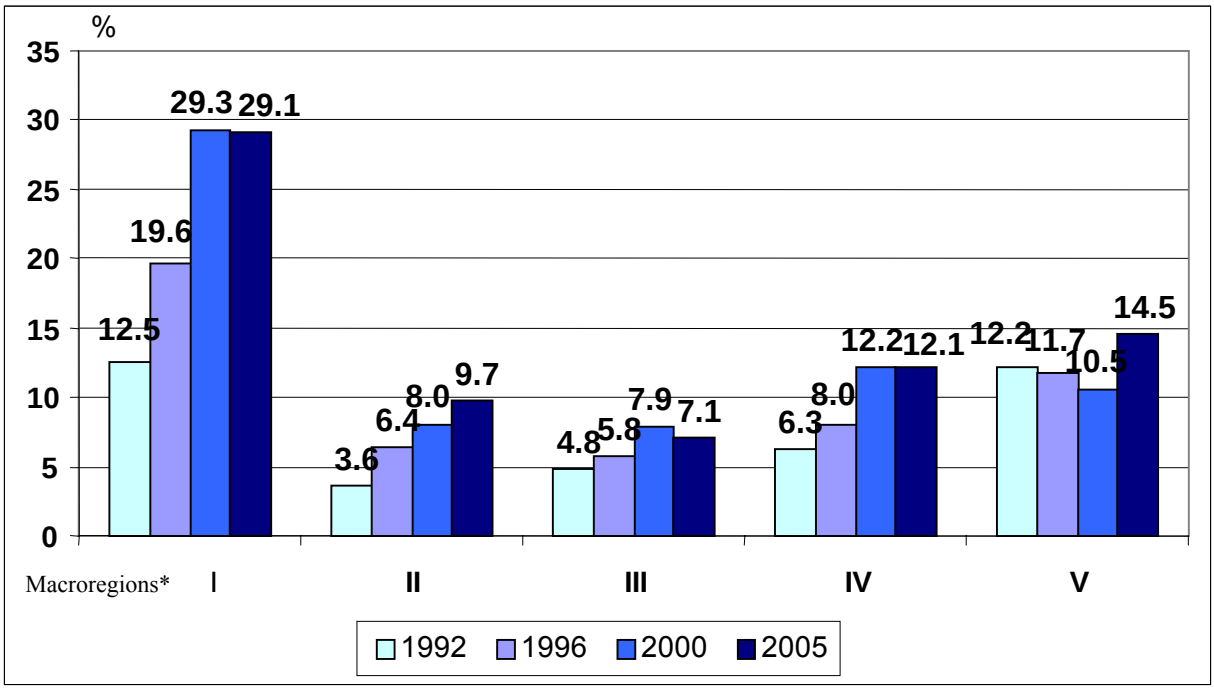
A characteristic feature of Polish agriculture is significant spatial diversity of its social and economic structures. Such historically embedded differences in agricultural development across Poland have become even more distinct on account of mechanisms of the market economy [80]. Although all regions of Poland experienced difficulties in the adjustment of farms to effective functioning under competition, such problems were experienced with varying intensity in specific areas [23, 25]. Such differences were also reflected in considerable disproportions in the formation of the large-scale commercial segment in the agricultural market across Poland. It should be also pointed out that due to disparities in the formation of this group of farms in specific years and Poland's integration into the EU structures, it was considered useful to present the summary of changes in the number of highly commercial units over two periods, namely 1992-2000 and 2000-2005.

According to the surveys, the years 1992-2000 were characterised by an increased share of large-scale commercial units in most regions of Poland, i.e. in the Central-Western, South-Western, Central-Eastern and South-Eastern macroregions. This process was particularly observed in the first of the above-mentioned macroregions, for years characterised by a relatively good area structure, but primarily distinguishing by agricultural condition, farming skills and farmers' activity in modernising the production potential of holdings [4, 35]. In the Central-Western macroregion, including the Wielkopolskie and Kujawsko-Pomorskie voivodships, the share of large-scale commercial units went up from approx. 13% in 1992 to over 29% in 2000.

The least significant growth in the share of highly commercial farms was recorded in the South-Eastern macroregion. In this macroregion, covering the Świętokrzyskie, Małopolskie, Podkarpackie and Śląskie voivodships, the proportion of large-scale commercial holdings among all family farms rose from approx. 5% in 1992 to almost 8% in 2000. Such a minor increase in the share

of highly commercial entities should be mostly attributed to climatic and natural factors (farming in mountain areas), which largely determine the possibilities and character of agricultural activities. Due to unfavourable conditions for the development of agricultural production, this macroregion is characterised by widespread off-farm employment, the smallest average farm size in Poland and basically subsistence production [47].

Figure 10. Changes in the share of highly commercial units among all family farms across macroregions



**Names, designations and voivodships covered by specific macroregions as shown in Map 1, p. 16.*

Source: IAFE-NRI survey 2005.

In the analysis of regional distribution of large-scale commercial family farms in 1992-2000, the situation in the Northern macroregion deserves notice. It covers the Pomorskie, Warmińsko-Mazurskie and Zachodniopomorskie voivodships and, unlike other macroregions, showed a relatively minor but steady fall (from 12.2% to 10.4%, i.e. by 1.7 percentage points) in the share of large-scale commercial units. For years agriculture in the macroregion had been dominated by large farms [49, 51, 58, 35], but characterised by traditional, extensive production, underdeveloped and underinvested. Moreover, their development had been slowed down by agriculture-related production, largely unadjusted to the needs needs of family farms.

According to the surveys, in 2000-2005 spatial changes in the number of highly commercial farms were slightly different than before 2000. The monitored group of holdings was relatively the most stable (in terms of number) in the Central-Western and South-Western macroregions. In the five-year the period in question, the distribution of large-scale commercial units in those areas remained virtually unchanged. The share of such farms, both in 2005 and five years before, was practically identical, i.e. as follows: in the Central-Western macroregion – approx. 29%, and in the South-Western macroregion – approx. 12%.

An increase in the proportion of large-scale commercial units in family farming was noted in the Northern macroregion (from less than 11% to approx. 15%) and in the Central-Eastern macroregion (from 8% to nearly 10%). The situation in the former deserves notice, not only due to the four times higher growth rate of the share of highly commercial farms as compared to all the holdings in question, but primarily owing to a reversal of the downward trend which had started before 2000. As has already been mentioned, in 1992-2000 only the Northern macroregion, despite the most favourable agrarian structure, experienced a relatively minor but steady decrease (from 12.2% to 10.5%, i.e. by 1.7 percentage points) in the share of large-scale commercial units among all family farms, whereas across Poland the number of highly commercial farms nearly doubled (from 6 to 11%).

The opposite was the case in the South-Eastern macroregion, where the proportion of large-scale commercial units slightly decreased (from less than 8% in 2000 to approx. 7% in 2005). This situation was very different from previous trends observed in that area with regard to the distribution of highly commercial farms. In 1992-2000, the share of such agricultural holdings gradually increased (from less than 4% to approx. 8%). A fall in the number of large-scale commercial units recorded in 2000-2005, even if rather minor, demonstrates that Poland's joining the EU further increased the difficulties with maintaining the market position and economic performance of family farms located in southern regions, characterised by significantly fragmented agriculture.

Any interpretation of the above-mentioned changes in the distribution of highly commercial farms noted in 2000-2005 should take account of the fact that factors shaping the mobility of such units largely varied between macroregions. For instance, in the south of Poland the fall in the share of highly

commercial farms in family farming should be attributed, at least in part, to the diminishing interest of users of private farms in agricultural activities as the main source of income[21]. At the same time, it should be emphasised that there is a relatively small and gradually decreasing group of mostly market-oriented holdings[22], and due to rather limited land area such entities engage in unusual types of agricultural production, frequently requiring significant capital and skills. The prospects of increasing the scale of production scale in such small units were limited not only on account of the lack of funds and the low level of farmers' qualifications, but also due to the insufficiently absorptive market (especially the domestic market). Moreover, after a maximum level of production intensification has been reached, maintaining the market position and further growth in agricultural production requires an increase in the area of cropland. Such possibilities, due to very low supply of agricultural land in the market of agricultural property in the South-Eastern macroregion are strongly limited [50].

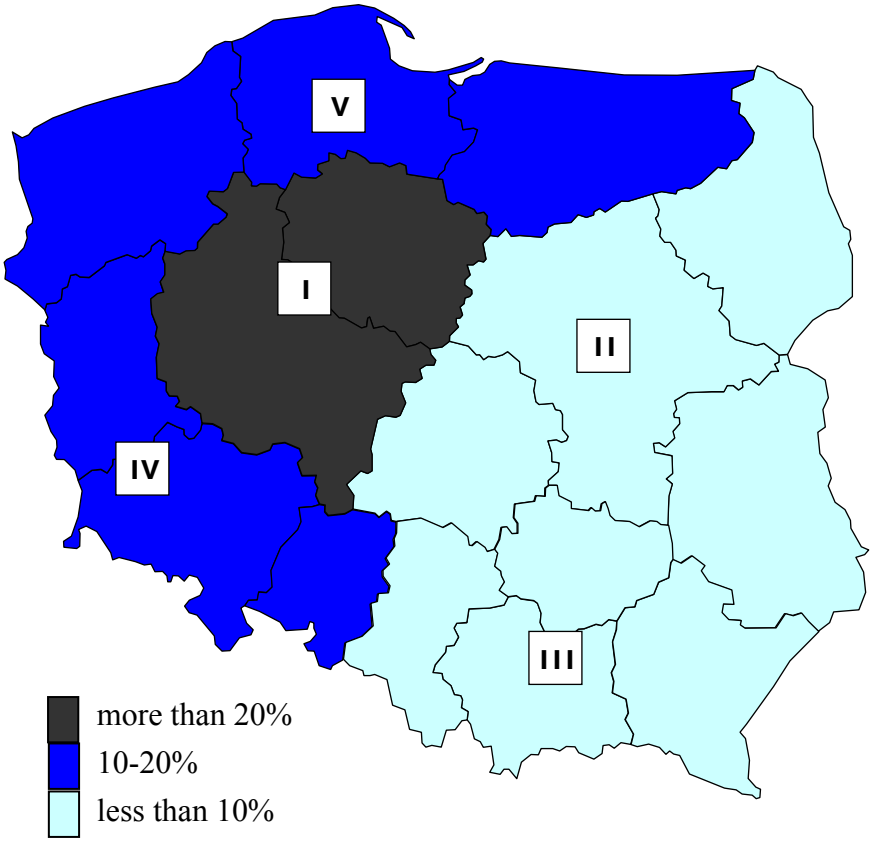
It should be also emphasised that the example of the South-Eastern macroregion with regard to changes in the distribution of large-scale commercial units in family farming shows that the land factor continues to play a relatively major role in the development of agriculture in Poland.

The increase in the number of large-scale commercial family farms in the Central-Eastern and Northern macroregions, recorded in 2000-2005, should be attributed primarily to the catching up on the level of agricultural development and adjustment to efficient functioning in the market conditions, with the regions where such processes were already advanced previously. Measures taken in the Northern and Central-Eastern macroregions aimed at enlargement and modernisation ofn production assets as well as overcoming barriers to the functioning of agricultural holdings under competition conditions [24, 20], even if slightly different in character, helped initiate (the Northern macroregion) or strengthen (the Central-Eastern macroregion) the development processes in groups of farms capable of coping with the competitive pressure in the global market.

[21] According to field surveys in the South-Eastern macroregion, the share of families where the farm provided the main activity and source of income for the farmer decreased from 27% in 2000 to less than 23% fives years later.

[22] According to field surveys, in 2005 only 39% of agricultural holdings located in the South-Eastern macroregion were engaged mostly in commercial agricultural production. The share was lower than in 2000, when the corresponding figure reached approx. 50%. Moreover, it should be also emphasised that the proportion of market-oriented farms was the lowest among all the macroregions in question.

Map 2. Regional distribution of highly commercial farms
(in % of all the surveyed farms in the relevant macroregion *)



**Names, designations and voivodships covered by specific macroregions as shown in Map 1, p. 16.*

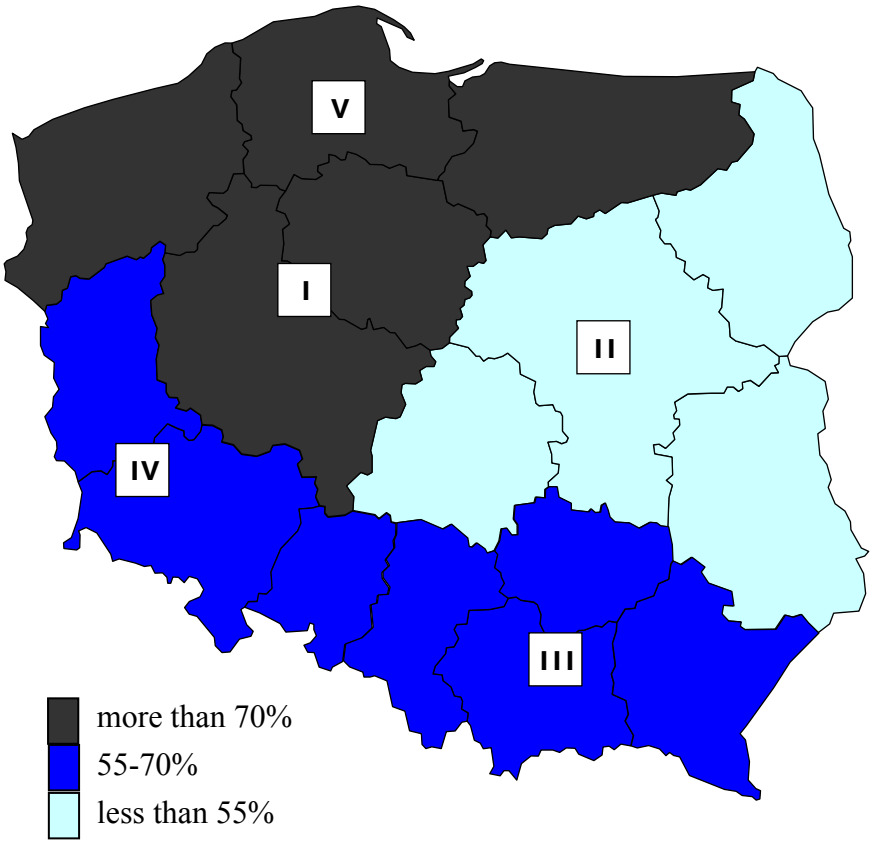
Source: IAFE-NRI survey 2005.

According to the surveys, despite certain spatial differences in the formation of the large-scale commercial sector in family farming in 2000-2005, the previously observed macroregional diversity in the distribution of large-scale commercial units continued (Map 2). It stemmed not only from historically embedded regional disparities in economic development and growth in specific macroregions in Poland (particularly with regard to agriculture), but also from spatial differences in the progress in the adjustment of family farms to effective functioning in conditions of competition.

This means that in 2005, as in previous years, the highest share of large-scale commercial units in family farming was found in the Central-Western macroregion, i.e. in areas traditionally not only characterised by a relatively

favourable area structure [*50*], but primarily distinguished by the relatively high level of agricultural condition, farmers' skills and qualifications, as well as by their active approach to the modernisation of the production potential and strengthening of the market position of farms. In 2005, large-scale commercial units in those areas accounted for slightly over 29% of the total number of family farms.

Map 3. Regional distribution of commercial production by highly commercial units in total sales by all family farms



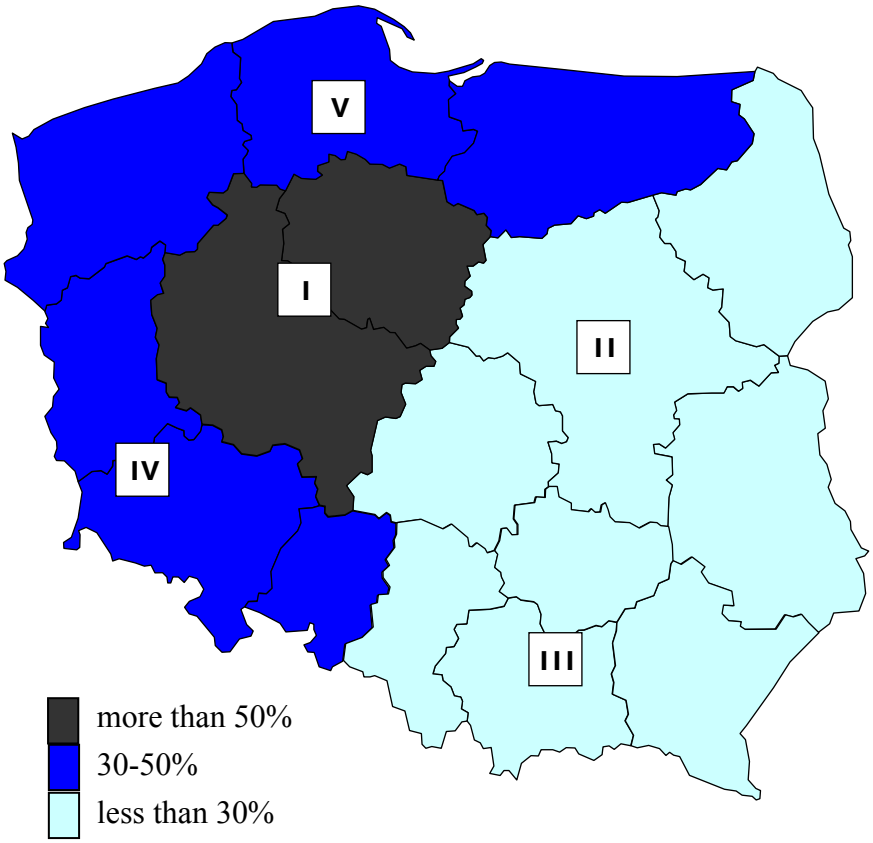
**Names, designations and voivodships covered by specific macroregions as shown in Map 1, p. 16.*

Source: IAFE-NRI survey 2005.

At the same time, it should be emphasised that this macroregion was characterised by the lowest share of social farms, despite a certain rise in the proportion. In 2000-2005, the share of subsistence or semi-subsistence farms went up from 17% to 22%, but it was still less than half the national average. Furthermore, in the Central-Western macroregion, family farms provided the

main activity and income source for the farmers. In 2005, as in previous years, the share of permanent full-time workers in total agricultural employment was the highest in Poland, exceeding 51%, whereas the respective share for the entire surveyed sample was less than 35%.

Map 4. Regional distribution of agricultural land utilised by highly commercial farms



**Names, designations and voivodships covered by specific macroregions as shown in Map 1, p. 16.*

Source: IAFE-NRI survey 2005.

The concentration of highly commercial farms in family farming is also confirmed by the distribution of agricultural sales by such holdings (Map 3), as well as of utilised agricultural land. In 2005, in the macroregion in question large-scale commercial units cultivated 58% of the total area of agricultural land used by family farms and accounted for over 74% of total agricultural production in the region.

At the other extreme, the Central-Eastern macroregion was characterised by the lowest share of commercial production by large-scale commercial holdings and of utilised agricultural land. In 2005, highly commercial units located in the macroregion only represented 26% of agricultural land and provided 53% of market output.

In the analysis of the regional distribution of the large-scale commercial segment in family farming, the situation in the South-Eastern macroregion deserves notice. These areas are commonly known for the most fragmented area structure [49] and the highest number of social farms in Poland [46]. According to IAFE-NRI surveys, in 2005 subsistence or semi-subsistence units accounted for nearly 62% of agricultural holdings and for approx. 37% of agricultural land in the macroregion. At the same time, market-oriented farms providing the main activity for farming families were relatively specialised units characterised by rather high production intensity, thus obtaining higher sales per ha of agricultural land[23]. As a result, in 2005 approx. 7% of farms utilised 28% of agricultural land and accounted for over 57% of market output in the macroregion.

6. Prospects of speeding up the development of highly commercial farms and strengthening their position in agriculture

On the basis of the conducted surveys, the number of large-scale commercial entities in the group of family farms may be estimated to have been ca. 220,000. However, on account of their role in agricultural market supply in terms of quantity and range of products, as well as of their importance in determining the competitive position of Polish agriculture, the number should be assumed to have been much higher. Presumably, from the point of view of food supply security, and in the future also energy security in Poland, they should generate approx. 80% of agricultural market output and cultivate the majority

[23] According to the surveys, in 2005 the average agricultural sales per ha of agricultural land in the group of farms providing the main source of income for farmers and farming families in the South-Eastern macroregion reached PLN 7,286. It was the highest figure among all the analysed macroregions. At the same time, it should be emphasised that the value was approx. 74% higher than the average value of commercial production per ha of agricultural land in the whole group of farms providing the main activity for farming families, i.e. PLN 4,195.

of agricultural land. For the above conditions to be satisfied, the number of highly commercial farms should also increase.

The possibilities for buoyant growth of large-scale commercial family farms should be seen mostly in the reduction of barriers to market-oriented changes in family farming and in the creation favourable conditions stimulating the development of agricultural businesses, increasing their economic strength as well as their competitiveness.

The position of farms in agri-business is largely determined by their role in ensuring income for the farmer and his family. Where agricultural holdings provide the basic source of income for the farming family, the farmers engage in agricultural activities as their main occupation. Consequently, they usually represent a higher level of knowledge and skills and are increasingly market-oriented. Moreover, they tend to adopt an active approach and make efforts to expand production and strengthen the market position of their farms. Such attitudes are necessary not only for rapid adjustment of agricultural production to market needs, but also allow to apply for EU funds and consequently derive measurable benefits.

At present, obtaining satisfactory income from agricultural activities requires growing involvement in this process, especially from farm managers. This relation was confirmed, *inter alia*, by differences in the structure of labour input in farms with various scale of production. According to the conducted survey, the rise in sales was accompanied by a decreasing share of seasonal and casual labour or part-time work performed every day (from over 44% in subsistence or semi-subsistence farms to 14% in the group of entities with commercial production exceeding PLN 100,000). Furthermore, persons from farming families taking up off-farm employment increasingly treated non-agricultural jobs as the main occupation in the future. Between 2000 and 2005, there was more than twofold increase (from about 4% to almost 10%) in the share of members of farming families working exclusively outside the family farm. Compared to the whole farming population, such persons were characterised by a higher educational level [26]. Therefore, it is important to create favourable conditions for persons from farming families to obtain and improve qualifications, and primarily for the outflow of the rural population from agriculture to non-agricultural activities through measures aimed at fostering entrepreneurship and multifunctional rural development. It is more likely if EU funds are reasonably and efficiently utilised.

The role determined by the farmers for agricultural holdings significantly depends on actual production assets. The majority of family farms have limited production potential, particularly on account of the area of agricultural land. Although at present the land area is not a single determinant of output, for the majority of agricultural products the possibility to increase the scale of production involves an increase in the area. In 1992-2005, the most robust growth in agricultural investments made by highly commercial units was observed with regard to the purchase of land. In the period in question, the increase in the number of entities investing in the purchase of agricultural land was more than threefold. Between 2000 and 2005, over one-third of farmers from large-scale commercial entities bought land, and the value of purchased land accounted for more than one-sixth of total investment over this five-year period. The size of purchased land is determined by available financial resources, and the lack of own funds can be compensated with external funding to a certain extent. The possibility to increase the area was also limited due to the situation on the agricultural land market. In some regions of Poland the lack of available agricultural land presented a significant limitation onexpanding production and joining the group of highly commercial farms. This was the case, for example, in the Central-Western macroregion. Furthermore, an increase in farm size usually entails necessary changes in other production factors, which requires further investment and makes the lack of capital more relevant. The absence of funds for investment significantly hampers the formation of the group of highly commercial farms, especially in areas characterised by higher supply of land (e.g. in the South-Western macroregion).

The prospects for the improvement of the production situation of agricultural holdings should also be seen in the context of more widespread introduction of biological progress, which enables an increase in output by entities with various economic characteristics. At present, it remains one of the most cost-effective and important determinants of development, due to the possibility of shaping product quality relatively easily and effectively as well as of cutting production costs to a significant extent. It helps agricultural producers adapt to market requirements and conditions. However, for most farmers the relatively low level of skills and qualifications and insufficient access to agricultural advisory services present a significant barrier slowing down desirable changes. Therefore, it is necessary to develop a multifunctional system of agri-business advisory services and to create the conditions for improving the educational level of farmers, especially in respect of professional training for various functions

to be performed and the scope of such courses should go beyond traditional agricultural qualifications.

The market position may also be strengthened through activities within producer groups, which increase the joint market offer of a homogeneous product (in terms of variety and quality), thus facilitating the creation of regular market relations, usually more favourable than the sale of limited quantities of goods. Moreover, group action helps reduce operating costs in individual farms, creates the possibilities for obtaining funds for investment more quickly and facilitates the introduction of broader technological and biological progress. Activities within producer groups, despite a number of benefits, still attract relatively little interest among farmers. In the sample surveyed in 2005 less than 2% of farmers declared to be members of producer groups. Within this group, managers of large-scale commercial farms accounted for almost 80%.

The development of large-scale commercial family farming is usually stimulated by measures aimed at improved organisation and stabilisation of agricultural markets, as the Polish agricultural market remains relatively unstable (therefore unpredictable), which is unfavourable for obtaining target income from agricultural activities, a basis for the necessary modernisation of farms and adjustment to changing market demands. One way to stabilise the agricultural market and to stimulate the formation of the large-scale commercial sector in family farming is closer cooperation between individual commercial farms and the purchasers of their products. All forms of vertical integration in agriculture encourage and even require, *inter alia*, an increase in market output. According to the surveys, in 2005 the managers of farms characterised by good production performance declared sales of agricultural products under permanent cooperation or formal contracts almost three times more frequently than all users of commercial farms (87% against 29%). Agricultural policy measures aimed increase the predictability of the situation in agricultural markets is likely to further stimulate the growth rate and share of large-scale commercial entities in family farming.

In conclusion, it should be emphasised that a reduction in existing limitations could significantly encourage the development and push up the number of highly commercial farms and, consequently, strengthen the competitive position of Polish agriculture in the European Union markets. According to the collected data, there is still scope for improvement and growth.

7. The determinants of the economic potential of family farms

The economic potential, also defined as economic strength, may be defined as a set of resources available to individual economic entities, allowing to maintain the market position and to compete successfully. This also means potential for particular efficiency in a given activity, which may be triggered in specific conditions or by a particular factor. Therefore, it determines not only the current situation of a farm, but also its future opportunities. Such a definition of the economic potential comprises not only tangible elements of production resources, or the location in relation to outlets and the supply market, but also non-quantifiable factors such as personal traits of persons engaged in a given undertaking, particularly the managers and decision-makers (management and marketing skills, risk taking, perceptiveness, quick decision making etc.). Furthermore, especially in the case of an agricultural holding, the family situation of the farmer should also be taken in consideration. Therefore, the economic potential is a dynamic category, not easily or unambiguously described, both in microeconomic and macroeconomic terms.

On account of all the aforementioned factors, the notion of the economic potential is very complex and difficult to define (measure) with precision as it depends on a number of very diverse parameters, some of which are hardly measurable or even unmeasurable. As a consequence, the determination of the economic potential of family farms becomes a deductive exercise based on the general situation of particular groups of agricultural holdings. However, it is possible to specify a number of economic parameters representing the most important determinants of the economic potential of the farm. These include the farm's assets, own capital, financial performance, sales, the liquidity ratio etc.

In the case of agricultural holdings, the economic strength may be described as the farmer's capacity for capital formation, adaptability to changing external conditions and maintaining the market position [71]. One popular measure of economic strength is the economic size of a farm, which is the sum of Standard Gross Margins (SGM) of all agricultural activities on the farm. The SGM is the value of production corresponding to a given agricultural activity less related direct costs. In order to eliminate the effect of seasonal changes in production conditions, calculations are based on the average value for three subsequent years. It is calculated for a relevant period and region, taking into account local farming

conditions (prices, yields, animal production efficiency, costs). Therefore, it allows comparisons of the production potential of farms.

Table 7. Classes of farms by economic size

Class (ES6)	Size		Size class
	ESU	PLN thousand	
I	up to 4	up to 19.0	very small (XS)
II	4 – 8	19.0 – 38.1	small (S)
III	8 – 16	38.1 – 76.3	medium-small (MS)
IV	16 – 40	76.3 – 190.7	medium-large (ML)
V	40 – 100	190.7 – 476.9	large (L)
VI	100 or more	476.9 or more	very large (XL)

Source: On the basis of [7].

The use of the economic size to measure the economic strength of a farm allows taking into consideration not only the scale of agricultural activities, but also all tangible elements of the production capacity of the holding, i.e. land, capital and labour [19]. Therefore, it determines the development potential with significant accuracy. The economic size is expressed in European size units (ESU). Since 1984, 1 ESU has been EUR 1,200. For comparability with Polish conditions, it should be converted into PLN. The farm sizes for 2002 were established at an average EUR exchange rate at PLN 3.974 (for 2001, 2002 and 2003) [7]. The group of Polish family farms with the area exceeding 1 ha of agricultural land was divided into six economic size classes (ES6) used in the Community typology of agricultural holdings under Regulation 2003/369/EC (Table 7).

Table 8. Groups of agricultural holdings by area of agricultural land (AAL)

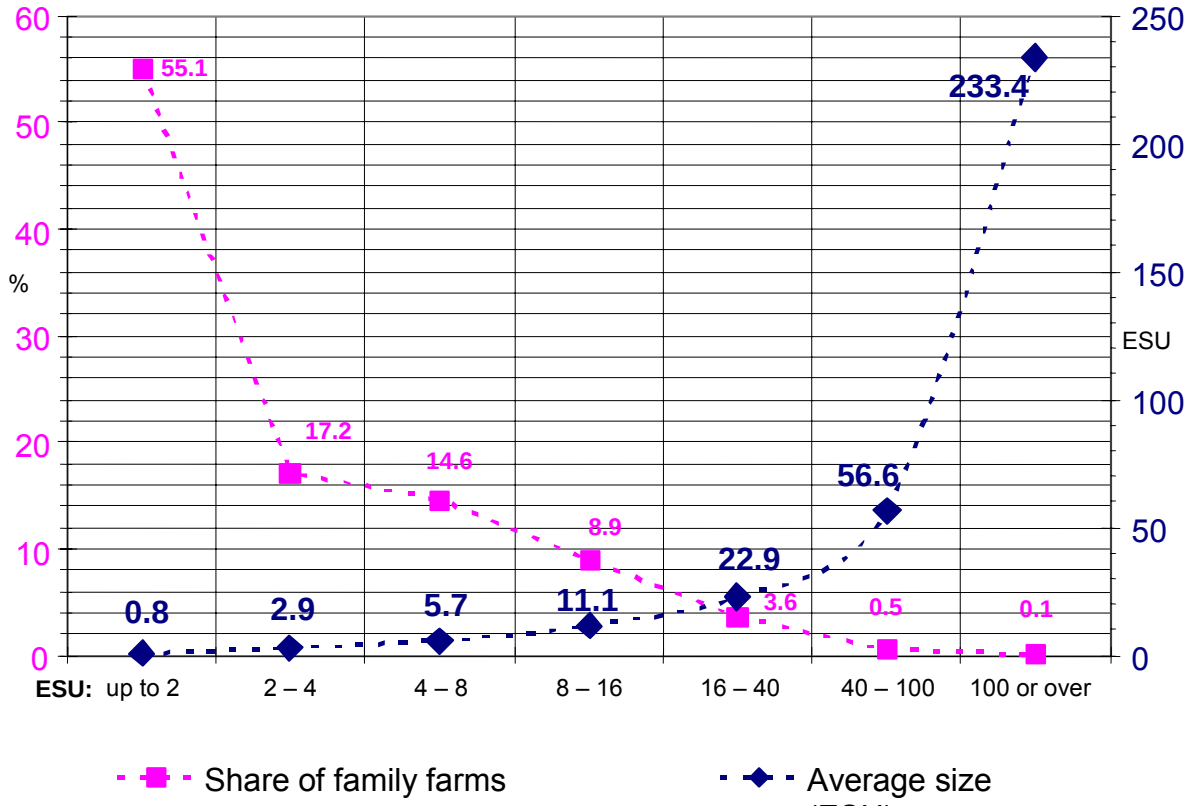
Utilised agricultural area in ha	**Description**
AAL < 5	very small (AXS)
5 ≤ AAL < 10	small (AS)
10 ≤ AAL < 20	medium-small (AMS)
20 ≤ AAL < 30	medium-large (AML)
30 ≤ AAL < 50	large (AL)
AAL ≥ 50	very large (AXL)

Source: [15].

The classification of farms by area of agricultural land expressed in ha is less frequently applied in EU typology (Regulation 99/725/EEC). Neither is it This grouping is neither used in the FADN Standard Results. In publications by the EU Commission it was replaced with the breakdown by economic parameters, established in the Community typology of agricultural holdings [15].

According to the 2002 Agricultural Census, there were 1,951,700 family farms with the area exceeding 1 ha of agricultural land. Among this group, 1,615,000[24] pursued agricultural activities, i.e. 82.7% of the total number of agricultural holdings. The average economic size in this group of farms was 4.2 ESU, which suggests a major share of small entities in the total number of family farms in Poland.

Figure 11. Family farms by economic size



Source: [7].

[24] All figures in this part of the paper concern this groups of farms, i.e. family farms with the area exceeding 1.00 ha of agricultural land, actively pursuing agricultural activities.

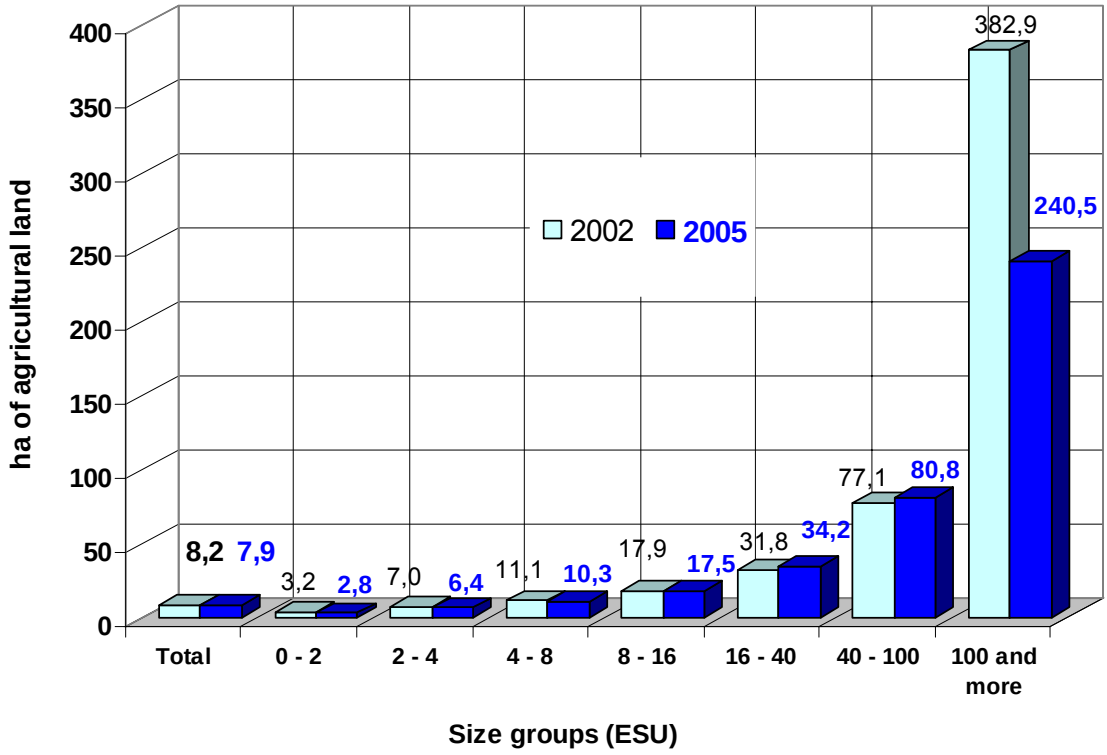
According to the above data, the group of family farms in question was dominated by small entities. In terms of economic size (strength), the vast majority (72.3%) were holdings not exceeding 4 ESU, 55.1% of which were farms of up to 2 ESU, i.e. the threshold established for commercial farm surveys (2 ESU) [37]. A mere 0.1% of all family farms with the area exceeding 1 ha of agricultural land were characterised by the economic size of more than 100 ESU (Figure 11).

The role of farms with limited economic strength is also reflected in the fact that if entities with the economic size not exceeding 2 ESU were excluded from the analysis, the average economic size would nearly double, to 8.3 ESU. Nevertheless, it would remain relatively low, markedly lower than the relevant figure for agricultural holdings in other countries, Polish farmers' competitors.

7.1. The area and economic size of a farm

As has already been mentioned, the economic potential of a farm is determined by a number of factors. One of those is the area of cultivated land, a major determinant of various economic and production relations in family farms. Although at present technological development of production processes in agriculture and widely available know-how reduced the importance of the area of agricultural land and its effect on the production and economic performance of individual farms, the traditional model of agriculture continues to prevail in Polish agriculture despite the progress, and the area structure of farms remains a crucial indicator of the production capacity and further development of this section of the national economy. Even though the modernisation and intensification of production may result in increased production capacity of small holdings, in Polish agriculture such solutions are limited due to the lack of capital and the low level of farmers' qualifications. Moreover, after a certain production intensification threshold has been reached, maintaining the market position and further growth in output requires an increase in the area of cropland. Therefore, the area of agricultural land represents an important factor determining the economic potential. This was confirmed in the relation between the area of a farm and its economic size.

Figure 12. Average area of agricultural land in specific economic size groups of farms in 2002 and 2005



Source: Own calculations based on unpublished GUS data.

With regard to agricultural holdings, the most comprehensive measure allowing relatively composite determination and assessment of the economic potential of particular entities is their economic size, the sum of standard gross margins expressed in European size units (ESU), as it takes into account not only the scale of agricultural activity, but also a rather wide range of production and cost parameters and local farming conditions.

In 2005, an average family farm engaged in agricultural activities had over 7.9 ha of agricultural land, and its economic size was 4.3 ESU, the two figures being closely interrelated (Figure 12). The average area of a holding increased from 2.8 ha of agricultural land in the size class of up to 2 ESU (3.2 ha of agricultural land in 2002) to approx. 240.5 ha of agricultural land in the size class of 100 ESU or more (382.9 ha of agricultural land in 2002). This means that the gap between the smallest and the largest farms in terms of average area of agricultural land fell by almost 40% between 2002 and 2005, but it remained

relatively significant. In 2005, the average area of farms in the size class of 100 ESU or more was nearly eighty times larger than the respective figure for entities of up to 2 ESU.

Table 9. Family farms by economic size and area in 2002 and 2005

Size groups (ha of agricultural land)	Year	Size groups (European Size Units)						
		up to 2	2-4	4-8	8-16	16-40	40-100	100 or more
		Figures in a row add up to 100						
Total	2002	55.1	17.2	14.6	8.9	3.6	0.5	0.1
	2005	56.6	16.8	13.1	8.5	4.2	0.7	0.1
1-2	2002	96.1	2.2	0.8	0.5	0.3	0.1	-
	2005	96.4	2.0	0.7	0.6	0.2	0.1	(·)
2-5	2002	80.2	15.9	2.9	0.6	0.3	0.1	(·)
	2005	79.3	16.2	3.4	0.6	0.4	0.1	(·)
5-10	2002	32.4	37.2	25.2	4.4	0.7	0.1	(·)
	2005	31.1	36.7	25.6	5.4	0.9	0.2	(·)
10-15	2002	8.4	19.7	44.7	23.7	3.2	0.3	(·)
	2005	6.1	22.8	40.7	26.1	3.9	0.3	0.1
15-20	2002	3.5	8.5	32.9	44.1	10.4	0.5	0.1
	2005	2.2	8.6	30.3	44.3	13.8	0.7	0.1
20-30	2002	1.9	3.6	18.2	49.2	25.7	1.3	0.1
	2005	1.4	2.7	17.4	45.4	31.0	1.9	0.2
30-50	2002	1.4	1.4	7.3	35.3	49.0	5.2	0.4
	2005	0.7	0.9	5.7	30.8	53.7	7.7	0.5
50 or more	2002	1.2	0.8	2.1	13.2	50.1	23.6	9.0
	2005	0.4	0.7	1.5	10.6	49.7	29.8	7.3

Source: Own calculations based on GUS data.

The notion that the area of a farm and its economic size are closely related is also confirmed by the structure of farms by area and economic strength (Table 9). Even though the analysis of the distribution of agricultural holdings by economic size in specific size groups demonstrated the non-linear character of the relation and showed that entities with the same area may differ in the economic potential, the majority of small farms represented entities with limited economic size, whereas economically stronger farms were usually larger. Both in 2002 and 2005, over 96% of the smallest farms, i.e. those with 1 to 2 ha

of agricultural land, were holdings with less than 2 ESU, whereas the potential of a further 2% ranged between 2 and 4 ESU. The economic size of over 4 ESU, i.e. above average for all family farms, was only found in 2% of such small farms, and there were practically no entities of more than 40 ESU.

At the same time, larger farms were mostly entities characterised by significant economic strength. If we consider 16 ESU to be a major economic size, then in both years in question entities with such economic strength accounted for a marginal share of farms of 1 to 2 ha of agricultural land, a mere 0.3-0.4% of this size group. As regards holdings of 50 ha or more, farms of over 16 ESU represented the largest group, i.e. about 83% in 2002 and almost 87% in 2005. This fact also points to the relation between the economic strength of an agricultural holding and its area.

7.2. Commercial production and the size of a farm

Another source of insights into the economic potential of farms and its relations with the area of utilised agricultural land is also information on commercial production by entities with different area, especially that under growing competition the position of farms in an unstable environment increasingly depends on output sold by particular entities. Therefore, the value of commercial production represents a specific "test" of production capacities of individual holdings, and differences in this respect reflect disparities in the economic power and funds available to farmers for the restructuring and modernisation of their farms.

According to the analysis of data collected during IAFE-NRI field surveys in 1996, 2000 and 2005, with a sample of ca. 4,000 family farms surveyed each time, commercial production in particular entities largely depended on the area of agricultural land. Such relations are reflected in the coefficient of correlation between sales of agricultural output and the area of holdings, the value of which was positive and ranged between 0.6464 and 0.7114 in the surveyed group of entities.

The clear relation between sales of agricultural products and the area of the farm was not only observed throughout the period of 1996-2005, but also markedly strengthened. This is reflected not only in the coefficient of correlation between sales of agricultural production and the area of farms,

but also in a widening gap between average sales by the group of farms of 1 to 5 ha and the respective figure for entities of 50 ha of more (Table 10). In 1992, the ratio of average sales by the smallest entities to those by the largest farms was 1:22, and in 2000 – 1:40.

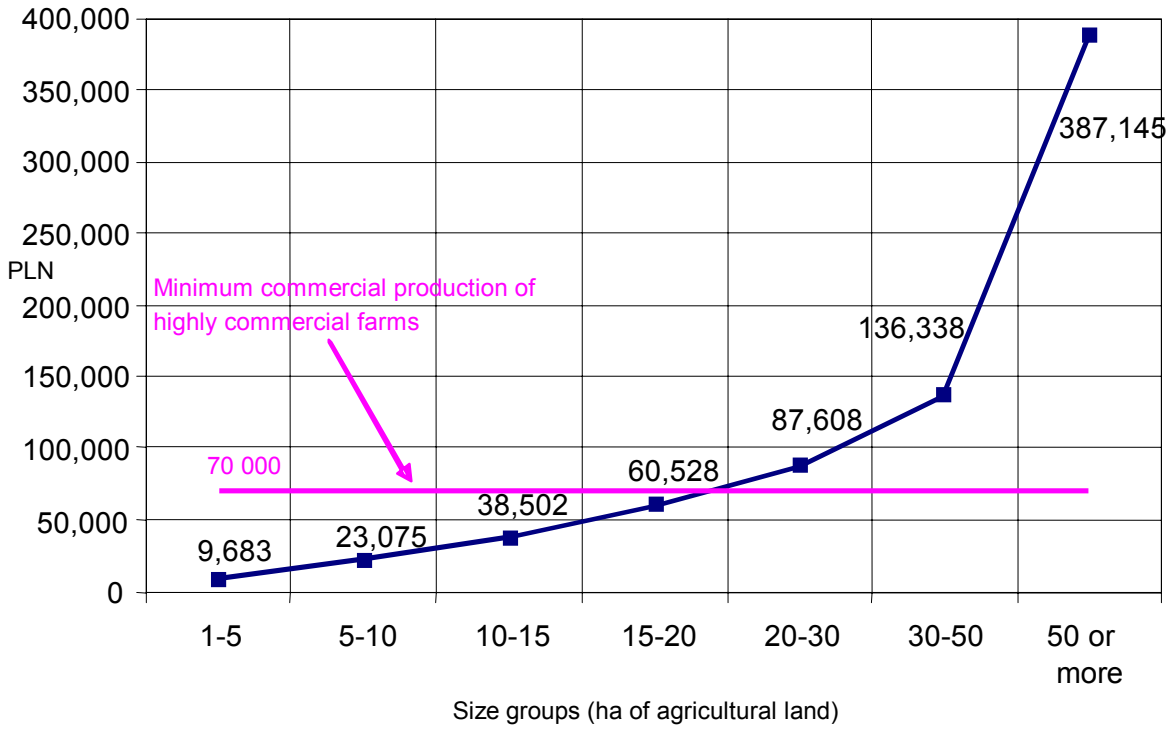
Table 10. Commercial production by farm size (current prices)

Specification	Average sales of agricultural production (in PLN)					
	in 1996		in 2000		in 2005	
	per farm	per ha of agricultural land	per farm	per ha of agricultural land	per farm	per ha of agricultural land
Total	18,245	2,190	25,100	2,746	36,457	3,546
Size groups (ha of agricultural land)						
1-5	6,924	2,556	8,912	3,297	9,683	3,601
5-10	16,707	2,351	20,719	2,982	23,075	3,277
10-15	26,054	2,177	31,164	2,615	38,502	3,245
15-20	37,820	2,039	41,222	2,413	60,528	3,556
20-30	55,032	1,999	69,002	2,877	87,608	3,650
30-50	84,471	1,796	100,561	2,676	136,338	3,648
50 or more	150,521	1,558	207,339	2,149	387,145	3,970
Sales of agricultural production by farms of 50 of more ha relative to:						
farms of 1-5 ha	2,174	61	2,327	65	3 998	110
all farms	825	71	826	78	1 062	112

Source: IAFE-NRI surveys 1996, 2000, 2005.

At the same time, it should be emphasised that increased market output of relatively large farms was accompanied by growing sales of agricultural production per area unit. As a consequence, there was an improvement in commercial production per ha of agricultural land obtained in larger farms relative to respective indicators for all farms and for the smallest entities. In 1996, sales of agricultural products per area unit in farms of 50 ha or more accounted for 61% of the value of commercial production in the group of entities of 1 to 5 ha of agricultural land and for 71% of market output by all the surveyed entities. In 2005, the respective shares were 110% and 112%.

Figure 13. Commercial production in particular size groups of farms in 2005



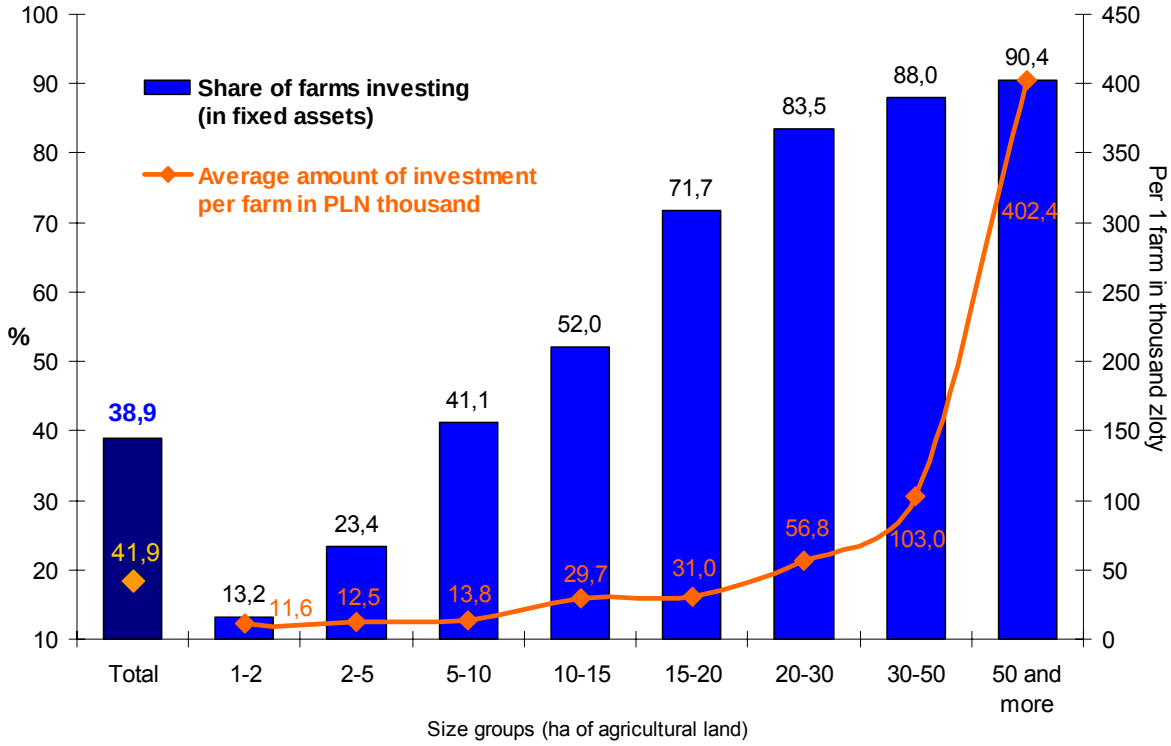
Source: IAFE-NRI survey 2005.

7.3. Investment activity and the economic potential of family farms

Another factor allowing to draw conclusions on the economic potential of a farm is investment activity. Undertakings aimed at the replacement, enlargement and modernisation of production assets indicate that the farm is successful in pursuing agricultural activities and capital formation provides funds for investment, thus increasing the future potential of the holding.

The analysis of the overall activity aimed at the replacement, enlargement and modernisation of production assets of family farms, as well as of the share of specific types of investment directly related to agricultural activity indicated significant disproportions in this respect between small, medium-sized and large farms (Figure 14 and Table 10.).

Figure 14. Farms investing in production fixed assets



Source: IAFE-NRI survey 2005.

According to the surveys, in the period of 2000-2005 the share of entities with production investments increased from 13% in the group of the smallest farms (of 1 to 2 ha of agricultural land) to as much as 90% for the largest farms (of 50 ha or over), i.e. the gap in the proportion of investing entities between the smallest and the largest farms was almost sevenfold. Moreover, an increase in the farm size was accompanied by a rise in the number of different investment projects implemented (from an average of 1.1 projects in farms of 1 to 2 ha of agricultural land to 2.4 projects in the group of the largest entities).

Thus, disproportions in investment activity between farms of 1 to 2 ha of agricultural land and holdings of 50 ha or over with regard to specific types of investment were much greater. In the case of the following investment types:

- construction, modernisation and renovation of farm buildings – almost tenfold (6% against 58%),
- purchase of livestock – also tenfold (4% against 39%),
- replacement, enlargement and modernisation of machinery and equipment – 24-fold (3% against 73%),
- purchase of land – 26-fold (2% against 52%).

Table 10. Production investment in agricultural holdings by area in 2000-2005

Size groups (ha of agricultural land)	Share of farms investing in fixed assets				
	Total	of which:			
		Buildings	Machinery	Livestock	Land
Total	38.9	21.8	19.8	10.2	8.3
1-2	13.2	5.8	3.1	3.6	2.4
2-5	23.4	12.2	7.0	4.2	4.9
5-10	41.1	22.0	18.2	8.3	5.7
10-15	52.0	31.2	33.0	12.1	7.0
15-20	71.7	41.2	40.9	20.1	15.8
20-30	83.5	45.5	53.5	33.0	25.0
30-50	88.0	63.9	65.7	36.1	35.2
50 or more	90.4	57.7	73.1	38.5	51.9

Source: IAFE-NRI surveys 1992, 1996, 2000, 2005.

Production investment showed an even stronger relation to the area of farms than similar activities concerning replacement, enlargement and modernisation of production fixed assets. This relation was observed irrespective of the survey period. In 1992-2005, the coefficient of correlation between the farm size and agricultural investment was 0.6287.

In 2000-2005, the gap between the average expenditure by investing farms from the extreme size groups was almost 35-fold (PLN 11,600 against PLN 402,400 per farm). At the same time, it should be emphasised that in previous periods the difference was much less significant. The maximum gap between the average production investment in the smallest and the largest farms was as follows: in 1992-1996 – 27-fold (PLN 3,500 against PLN 95,300), in 1996-2000 – 33-fold (PLN 6,600 against PLN 219,600 per farm).

The patterns described in this section confirm the relation between the economic potential, sales, the scale of investment and the area of agricultural land cultivated by specific groups of farms, although it is not linear. A positive and significant effect of the farm size was observed in respect of the economic size, commercial production, as well as in investment activity and funds for the modernisation of production assets. Therefore, favourable changes in the area structure of agricultural holdings should still

be seen as a major determinant of the competitive position of farms and significantly affect the economic potential of Polish agriculture and its development prospects.

8. Support measures for increasing the economic potential of farms under the common agricultural policy

The implementation of the state policy for agriculture and rural areas is aimed at improving competitiveness and ensuring sustainable growth of the agricultural sector, as well as at fostering multifunctional rural development. The activity of the population in seeking both external sources of support for agricultural activities and alternative opportunities for improving the economic situation determines future rural development in particular regions. On the one hand, the state decides the flow of national and EU funds to stimulate the development of individual regions, and on the other hand, voivodships witness a growing activity of farmers wishing to obtain funds for the modernisation and development of their farms, local governments looking for support for infrastructural investment and of the rural population. Analyses of demand for structural funds and of the characteristics of beneficiaries help describe the flow of support funds to specific types of agricultural holdings, leading regions with regard to agricultural changes and identify areas where state aid is particularly necessary. Furthermore, analyses of farmers' absorption of such funds allow to indirectly assess the quality of information and advisory services for agriculture provided by public and private institutions (such as regional offices of ARiMR and various agricultural advisory centres) [9].

The socio-economic development of agriculture and rural areas is shaped in two dimensions. It includes activities aimed at eliminating disparities resulting from different conditions for agricultural development across Poland. Support funds primarily facilitate the improvement of technical equipment of farms, the modernisation and construction of production facilities[25], which will be reflected mostly in better working conditions for farmers and increased

[25] For example, investment co-financed from support funds, in terms of the total value of approved projects concerning the purchase of machinery and movable equipment for agricultural production in 2005 accounted for nearly 88% of total appropriations for Measure 1.1. "Investments in agricultural holdings", whereas the value of investment projects aiming at the construction/renovation of buildings used for agricultural production represented another 6% of available funds [3, 9].

animal welfare, the development of environmental awareness and environment-oriented changes in production technology. This is important in the adjustment of agricultural holdings to the European Union standards and may satisfy the most pressing current needs related to this process, which only has an indirect impact on the competitiveness of farms. Challenges of the global market require a more comprehensive structural policy: improving the competitiveness of the agricultural sector in the Single European Market and external markets. Relevant policy measures include the consolidation of production by increasing the economic strength of farms and supporting agricultural producer groups, changes in the agricultural structure, reducing the number of holdings, stimulating generational changes in the group of farm managers. The dilemma facing agricultural policy makers in Poland concerns the general character of support measures. On the one hand, it is necessary to support agriculture in regions characterised by the lowest level of development in order for ensure equal terms of competition in the domestic market and the Single European Market. Such an approach would require establishing limits of support for particular voivodships on the basis of previously identified problems of specific regions and directing support funds to farms in less developed areas with the aim of reducing regional disparities. On the other hand, membership in the European Union involves Poland's adoption of sanitary and quality standards as conditions for trade with other EU Member States. In this regard, farmers successfully bring their holdings into compliance with such requirements, supported by current agricultural policy measures.

Finally, there is a strategic dilemma calling for a sectoral approach, i.e. the question of competitiveness of the food economy in the European and external markets. Such an approach requires providing assistance mostly to economically strong farms, or to those with significant growth potential, and increasing the potential at the expense of an intensive policy of reducing regional differences in agricultural development [9]. In the future, such dilemmas may be solved by an approach favouring economically strong farms, capable of building a competitive position in respect of production and marketing of agricultural products. Providing the best possible information on support measures and technical assistance during the application process may prove to be the most effective in encouraging the economic development of farms, irrespective of their specific location in Poland. At the same time, the promotion of non-agricultural activities and organic farming would allow small family farms to diversify the sources of income and reduce the importance of their

agricultural production. The assessment of the implementation of particular support programmes for agriculture and rural areas shows the degree of actual adjustment of farms to EU requirements and desirable future measures to support the agricultural sector [8].

8.1. Sectoral Operational Programme for the "Restructuring and modernisation of the food sector and rural development 2004-2006"

The Sectoral Operational Programme (SOP) for the "Restructuring and modernisation of the food sector and rural development" specifies the national strategy and support measures for agriculture and rural development in 2004-2006. The programme is financed from public funds: the state budget, budgets of regional and local governments and the European Agricultural Guidance and Guarantee Fund (EAGGF), the Guidance Section, as well as from own funds of private investors. From the launch of the programme to 31 December 2006, the number of applications for project co-financing submitted under the Sectoral Operational Programme was 66,870, and total requested support amounted to PLN 10 billion. The SOP measures are implemented under the following two main priorities and one technical and organisational priority (the appropriations available for 2004-2006 are presented in brackets) [32]:

Priority 1. Support for changes and adjustment in the agri-food sector (PLN 5,143 million),

The measures implemented under this priority are as follows:

Measure 1.1. Investments in agricultural holdings (PLN 2,370 million),

Measure 1.2. Setting up of young farmers (PLN 709 million),

Measure 1.3. Training (PLN 74 million),

Measure 1.4. Support for agricultural advisory services (PLN 164 million),

Measure 1.5. Improving the processing and marketing of agricultural products (PLN 1,825 million),

Priority 2. Sustainable rural development (PLN 1,577 million),

Measure 2.1. Restoring forestry production potential damaged by natural disasters and fire and introducing appropriate prevention instruments (PLN 47 million),

Measure 2.2. Land consolidation (PLN 81 million),

Measure 2.3. Rural renewal and the conservation and protection of cultural heritage (PLN 345 million),
Measure 2.4. Diversification of agricultural activities and activities close to agriculture to provide multiple activities or alternative incomes (PLN 344 million),
Measure 2.5. Agricultural water resources management (PLN 506 million),
Measure 2.6. Development and improvement of agriculture-related technical infrastructure (PLN 181 million),
Measure 2.7. Leader+ pilot programme (PLN 72 million).

Priority 3. Technical assistance (PLN 92 million).

Under the SOP, two measures are primarily oriented towards increasing the economic potential of Polish farms:

Measure 1.1. "Investments in agricultural holdings", providing support for projects aimed at the modernisation of farms through investments aimed at improving profitability and competitiveness, adjusting the range, scale and quality of production to market requirements, increasing food safety, improving animal welfare, the environmental protection as well as health and safety at work. This measure is mainly targeted at economically viable farms[26] or at holdings which may become economically viable after the project has been implemented, managed by persons with appropriate agricultural qualifications (agricultural education or experience in farm work). Since the launch of the programme, 29,224 applications for a total of PLN 3.06 billion have been submitted under measure 1.1 "Investments in agricultural holdings". By 31 December 2006, 21,969 contracts for the amount of PLN 2.25 billion (almost 97% of the appropriations available under measure 1.1) were signed with programme beneficiaries. Among investment projects completed by the end of 2006, about 27% concerned holdings oriented towards cereal production, 23% were implemented by entities engaged in dairy cattle farming, whereas 15% represented pig farming. About 15% of all the investment projects were implemented in farms managed by young farmers. The majority of investment projects completed by the end of 2006 (90%) concerned the purchase of movable equipment. The purchase, construction or renovation of farm

[26] Economic viability is determined by the economic size of the farm, calculated on the basis of the production structure by type of activity and gross margins of all agricultural activities pursued (standard gross margins or individual margins calculated for the relevant farm), see [33].

buildings or structures used for agricultural production accounted for 4% of investment projects, whereas over 3% were aimed at starting perennial plantations.

Measure 1.2. "Setting up of young farmers" was aimed at the provision of funds to help young farmers start agricultural activities and modernise farms after the takeover. As a result, it should contribute to the improvement of the economic situation of such farms, particularly due to the adjustment of production to market requirements, increased quality of output and the application of cost-effective technologies. This measure is oriented towards persons with agricultural qualifications aged under 40, taking up farming for the first time and declaring the continuation of agricultural activities for a minimum of five years. Positive changes in the socio-demographic situation are reflected in farming efficiency, which is confirmed by analyses presented in previous sections. Therefore, the measure may be deemed as beneficial for developing the competitive position of family farms and increasing the number of economically strong holdings. The receipt of applications under measure 1.2, "Setting up of young farmers", began in mid-September 2004 and different deadlines were established in particular voivodships (from February and August 2005), due to the system of distribution of the available funds between voivodships. As at 31 December 2006, there were 18,856 applications submitted under measure 1.2 "Setting up of young farmers" for a total of PLN 942.8 million, i.e. 133% of support funds. By 31 December 2006, 14,151 contracts were signed and payments amounted to PLN 707.55 million, thus exhausting the appropriations for this measure.

8.2. Rural Development Plan

Another programme document, independent of the SOP, is the Rural Development Plan (*Plan Rozwoju Obszarów Wiejskich* – PROW), co-financed by the Guarantee Section of the European Agricultural Guidance and Guarantee Fund (EAGGF) from the part of the EU budget supporting rural development. The aim of the programme is to promote sustainable rural development by means of ensuring equal opportunities, the environmental protection, afforestation and the preservation of the rural landscape, as well as improving the competitiveness of Polish farms as a result of increased economic efficiency. The Rural Development Plan specifies two strategic objectives: sustainable rural

development and improving the competitiveness of the agri-food sector. For the years 2004-2006, seven measures were adopted under two priorities and three other measures were financed from the available appropriations:

Priority A. Improving the competitiveness of farms:

Measure 1. Early retirement

Measure 2. Support for semi-subsistence farms undergoing restructuring,

Measure 7. Agricultural producer groups

Priority B. Sustainable rural development:

Measure 3. Support for farming in less-favoured areas,

Measure 4. Support for agri-environmental undertakings and the improvement of animal welfare,

Measure 5. Afforestation of agricultural land,

Measure 6. Adjustment of agricultural holdings to EU standards.

Other measures: Technical assistance; complementary area payments; projects under Regulation No 1268/1999 (funds transferred from the PROW to the financing of SAPARD measures).

Three of the listed PROW measures may be considered to contribute, directly or indirectly, to the improvement of the competitive position and to the strengthening of the economic potential of Polish farms:

Measure 1. Early retirement (also referred to as structural pensions) should provide income to farmers who decide to retire from farming. As has been mentioned in previous sections, positive socio-demographic changes contribute to the improvement of farm management and result in better production performance. This is mostly driven by generational change. Structural pensions range from 210% to 440% of the lowest old-age pension. The basic amount of a structural pension (210%) may be increased by the following elements:

- Allowance for the spouse (a rise by 60% of the basic amount);
- Permanent transfer of a minimum of 3 ha of agricultural land (an increase by 50% of the basic amount);
- 3% of the lowest old-age pension per hectare, for permanent transfer of agricultural land over 3 ha aimed at increasing the existing farm, but for no more than 20 ha;
- 3% of the lowest old-age pension per hectare, for permanent transfer of agricultural land over 3 ha aimed at increasing the existing farm managed by a farmer aged up to 40, but for no more than 20 ha.

The measure is oriented towards persons at the pre-retirement age, aged 55 or over, covered by the Agricultural Social Insurance Fund (KRUS), engaged in agricultural activities in farms of at least 1 ha for a minimum of 10 years (and covered by the KRUS for a minimum of five years), who decide to transfer the farm to a successor or in order to improve the economic viability of another farmer's holding. Furthermore, the farm may be transferred to the Agricultural Property Agency (State Treasury), as well as for the purpose of the environmental protection or afforestation. Structural pensions will be paid on a monthly basis for 10 years. The pensioner is obliged to pay contributions to the Agricultural Social Insurance Fund, and to pay relevant contributions for the spouse if receiving allowance for the spouse.

From 1 August 2004, i.e. the launch of the measure, to 22 September 2006, 56,303 persons applied for structural pensions. By the end of December 2006, 51,512 applications were approved. From the beginning of the programme, the number of farms transferred under this measure totalled 52,125 (approx. 456,000 ha of agricultural land), of which ca. 53.66% of agricultural land was transferred for the purpose of increasing the area of other holdings and about 46.30% of agricultural land was taken over by successors. Agricultural land taken over by persons under 40 years of age accounted for a major share in transferred land. This tendency indicates that the measure contributed to the improvement of the competitiveness of Polish farms.

Measure 6. Adjustment of agricultural holdings to European Union standards. This measure is aimed at bringing Polish farms into compliance with the European Union standards on the environmental protection, public health and animal welfare.

Projects eligible under this measure include activities concerning three standards:

- The equipment of farms with manure storage facilities. Co-financing is granted to projects aimed at the construction, reconstruction or modernisation of solid and liquid manure tanks.
- The adjustment of dairy farms to EU standards in respect of public health. Financial aid is available in the form of co-financing investment in the modernisation of farms specialising in the production of milk. Support is targeted at holdings which have a maximum of 30 dairy cows and were ordered to adjust by the veterinary surveillance authorities. Eligible project costs include expenditure on the modernisation of walls and floors

in milking stands and milk storage rooms, as well as on the modernisation of milking systems, milk cooling tanks and water intakes.

- The adjustment of laying hen farms. The scheme applies to the group of 44 farms which were granted transitional periods for using the existing battery cages. Financial support includes the purchase of cages with relevant equipment for laying hens.

Support is available in the form of annual payments covering eligible costs of investment aimed at adjusting the farms to EU standards and it may not exceed EUR 25,000 per farm annually. Lump-sum payments are calculated on the basis of standard costs specified for particular undertakings. Financial aid under this measure is available to agricultural producers whose holdings are economically viable or will be economically viable by the end of the co-financing period, have a minimum of 5 livestock units and their production of nitrogen in manure does not exceed 170 kg per ha.

In accordance with a decision of the Ministry of Agriculture and Rural Development, on 15 March 2005 the Agency suspended the receipt of applications under this measure. The decision was dictated by a very large number of applications submitted (73,412) and the resulting risk of exhaustion of the appropriations for the measure. Based on the applications submitted under measure 6, the total amount of assistance requested was estimated at EUR 612 million, i.e. 251% of the available appropriations for 2004-2006. By 31 December 2006, 70,381 farms were granted co-financing for adjustment to the European Union standards.

Measure 7. “Agricultural producer groups”. This is aimed at increasing agricultural income through the reduction of marketing costs, as well as at improving the quality of output through the application of uniform technologies of production and product packaging. Support is available for the formation and administration costs of a producer group, paid in the form of annual payments for the period of five years from the date of establishing such a group. The amount of financial assistance will be individually established for each group on the basis of net annual sales. The maximum amounts of support are as follows:

- in the first and second year – EUR 100,000;
- in the third year – EUR 80,000;
- in the fourth year – EUR 60,000;
- in the fifth year – EUR 50,000.

Financial assistance under this measure was available to agricultural producer groups officially acknowledged by regional authorities from 1 May 2004 to 31 December 2006, formed with a view to:

- adjusting the production and products of group members to market requirements;
- joint supply of products to the market and preparation thereof for sale;
- adopting common rules concerning information on production, particularly on its availability.

From 15 December 2004, i.e. the launch of the measure, to 31 December 2006, 80 applications were submitted, requesting financial support for groups including 139 agricultural producers. At the same time, 51 decisions were issued in this respect by 31 December 2006. It should be emphasised that after the launch of the PROW the number of agricultural producer groups showed a significant increase. From 1 May 2004 until the end of 2006 there were 95 new producer groups (the corresponding number was 18 in 2004, 32 in 2005 and 45 in 2006), particularly engaged in the production of the following: pigs, cereal grain, cereal grain and oil seeds, oil seeds, tobacco, poultry, milk and birds' eggs. The rise in the number of new producer groups is significant in comparison with the corresponding figures for 2001-2004, when a similar instrument was financed from national funds. In 2001-2004 (by 30 April 2004), 73 new groups were entered in the registers of agricultural producer groups kept by regional governments (at the voivodship level); in 2001 the respective number was 10, in 2002 – 18, in 2003 – 34, and in 2004 – 11.

8.3. The participation of family farms in the programmes co-financed from EU funds according to IAFE-NRI surveys

The capacity for the replacement and enlargement of production assets is one of the most important elements in developing the competitive advantage of a farm. A major factor affecting the investment capacity of an entity is the ability to obtain external sources of financing. Membership in the European Union has created new opportunities to obtain capital for the modernisation of equipment, especially for managers of farms with limited economic potential, where own funds are insufficient to make investments facilitating the organisation of agricultural production.

According to the IAFE-NRI survey conducted in 2005, highly commercial farms, despite the fact that they only represented 12% of the surveyed family farms, accounted for the dominant share of beneficiaries of support programmes implemented under the common agricultural policy. In the first year of EU membership, 60% of holdings where support for agricultural investments had been granted were large-scale commercial entities, accounting for nearly 85% of the total amount of financial assistance obtained by family farms. It should be emphasised that in the early period of the implementation of support programmes managers of the surveyed entities showed limited activity in applying for funds within the framework of the CAP. Only less than 1% of the total of 4,000 surveyed farms obtained support from EU funds (other than direct payments). The situation was slightly more favourable in large-scale commercial entities, with the relevant share at ca. 4.3%. Such relations are necessarily reflected in the absorption of funds under specific measures of the programmes. Half of all the recorded cases of benefiting from support for young farmers concerned large-scale commercial entities. A similar situation was observed with regard to measures aimed at the adjustment of farms to EU standards as well as at agri-environmental undertakings. This reflects definitely greater determination of managers of economically stronger farms to modernise production assets, thus to benefit from measures available to the agricultural sector under the common agricultural policy.

The IAFE-NRI survey conducted in 2005 also allows to assess the effect of structural programmes on the scale of investment in agricultural holdings in the first year of membership. In 2000-2005, almost 39% of all farms invested in modernisation, but a mere 1.4% of investing farms applied for CAP funds. Consequently, only 3% of total investment represented financial resources from support programmes. The situation was slightly more favourable in large-scale commercial entities, with more than 80% making agricultural investments, of which almost 4% benefited from EU funds. According to the survey, despite the fact that highly commercial farms accounted for 65% of all the investing farms and obtained 85% of all funds from EU programmes, their share in total investment was still limited, only slightly over 3%.

Considering that large-scale commercial farms only account for slightly over one-eighth of the total number of family farms, it may be concluded that the activity of economically stronger entities in obtaining support funds is significantly greater and, as a result, they absorb the majority of funds available under the CAP. A more detailed analysis, based on ARiMR data on the

implementation of the measure aimed at the co-financing of agricultural investments, is presented in the next section.

9. Intervention area of structural funds – measure 1.1: Investments in agricultural holdings

For the purposes of this paper, the analysis included agricultural producers benefiting from measure 1.1 "Investments in agricultural holdings" implemented under the SOP in 2004-2006. The measure was selected since it is strictly investment-oriented, and the scale of investment largely determines the quality of technical equipment of farms, the improvement of working conditions for farmers, animal welfare and, consequently, the increase in farming efficiency and the competitiveness of the whole agricultural sector. It should be also added that the appropriations for the implementation of this measure accounted for almost 35% of the total funds available under the programme for 2004-2006.

Measure 1.1 is co-financed from the state budget and from the Guidance Section of the EAGGF – up to 35% of total eligible costs. Support granted to the beneficiary amounts to a maximum of 50% or – for holdings located in less-favoured areas – a maximum of 60% of eligible project costs. In the case of young farmers, the respective limits of available financial assistance are 55% or 65% of eligible costs. The amount of financial aid per beneficiary and per farm under this measure in the period of programme implementation may not exceed PLN 300,000. This means that during the implementation of the programme one beneficiary may only obtain up to PLN 300,000, and in the case of projects implemented in farms owned by two or more persons, the total amount of assistance granted one or more co-owners in the period of programme implementation may not exceed PLN 300,000.

Financial aid available under this measure will contribute to the following:

1. increase in agricultural income;
2. improved competitiveness of the farms;
3. reduction in production costs;
4. improved production organisation;
5. adjustment of the product range of the farms to market requirements;
6. increase in the value added of agricultural products;
7. improved quality of agricultural products;

8. better working conditions and increased safety at work;
9. protection and improvement of the environment, the rural landscape, the conservation and promotion of cultural heritage of rural areas and regional culture;
10. improved sanitary and hygiene conditions of production;
11. improved animal welfare.

Supported projects concern the modernisation of farms resulting in their adjustment to the conditions in the Single European Market. Projects eligible under this measure should contribute to the improvement of competitiveness of the assisted farms through better quality of output, increased scale of production and improved product range, reduced costs and compliance with EU standards concerning the environmental protection, hygiene and animal welfare.

The list of eligible projects includes:

1. purchase, construction or renovation aimed at the modernisation of buildings or constructions used for agricultural production;
2. purchase or installation of machinery, equipment or tools for agricultural production;
3. purchase of livestock;
4. starting orchards or perennial plantations;
5. investment in pasture;
6. purchase, installation or construction of crop irrigation equipment;
7. purchase, installation or construction of environment-friendly equipment;

The beneficiaries of this measure are natural persons engaged in agricultural activities as autonomous or dependent possessors of farms, or pursuing special agricultural activities, as well as legal persons registered in the National Court Register, which according to the entry in this register pursue agricultural activities or special agricultural activities on land used as autonomous or dependent possessors.

Financial assistance is not available to entities not having a farm and engaged in agricultural activities reduced to the following types of agricultural production: laboratory animals, entomophaga culture or off-farm breeding of other animals. Support is not granted to natural persons obtaining a disability pension on account of cerfified full and permanent incapacity to work, a permanent agricultural pension due to incapacity to work, or an old-age pension.

Under Measure 1.1 funding may be granted if the following conditions are met [32]:

1. The farm concerned is managed by a person with adequate qualifications. For applicants who are natural persons, it is necessary to fulfill one of the following conditions: higher or secondary agricultural education, agricultural education at the level of vocational school or a vocational qualification certificate suitable for agricultural activity and a minimum of 3 years of work experience in an agricultural holding, or (in the case of holders of a university degree) the completion of post-graduate courses related to agriculture, primary education or vocational non-agricultural education and a minimum of five years of work experience in an agricultural holding. As regards applicants who are legal persons, it is required that at the moment of application and for the period of five years from the date of the last payment under the project the beneficiary employs a manager for the assisted holding with the following qualifications: higher or secondary agricultural education, or higher or secondary non-agricultural education and a minimum of three years of work experience as a manager in agricultural production or special agricultural production. In the case of non-resident applicants, nationals of other EU Member States, financial assistance is only available under the measure if they have agricultural qualifications as required from farmers applying for support (under a similar measure co-financed by the EAGGF) in their country of origin.

2. The agricultural holding concerned fulfils the condition of economic viability or will become economically viable after the completion of the investment project. Economic viability is determined on the basis of the economic size of an agricultural holding and defined as the sum of gross margins of all agricultural activities pursued by this farm. The gross margins are calculated on the basis of standard gross margins for specific types of agricultural production and regions. In order to meet the criterion of economic viability the applicant concerned may also present relevant calculations based on actual farm-specific data if the holding is engaged in a type of agricultural production for which no SGM was determined, or if aggregated data for a given type of agricultural activity result in a gross margin lower than the value calculated on the basis of actual farm-specific data. An economically viable agricultural holding is a farm of the economic size of at least 4 ESU. Where an agricultural holding fails to meet the criterion of economic viability at the moment of application for support, the beneficiary is obligated to provide a plan describing the target range and scale production (achieved after the project has been completed). The total gross margin must reach the required level of 4 ESU. If the project concerns an agricultural holding

used, either in whole or in part, by a dependent possessor (the beneficiary is not the owner) and the gross margin generated by this agricultural holding or by its part is essential for the criterion of economic viability to be met, it is necessary to provide a written agreement which specifies that the beneficiary will remain the possessor of the relevant agricultural property for a minimum five years from the scheduled date of the last payment under the project and the owner of the property must approve the investment project in writing.

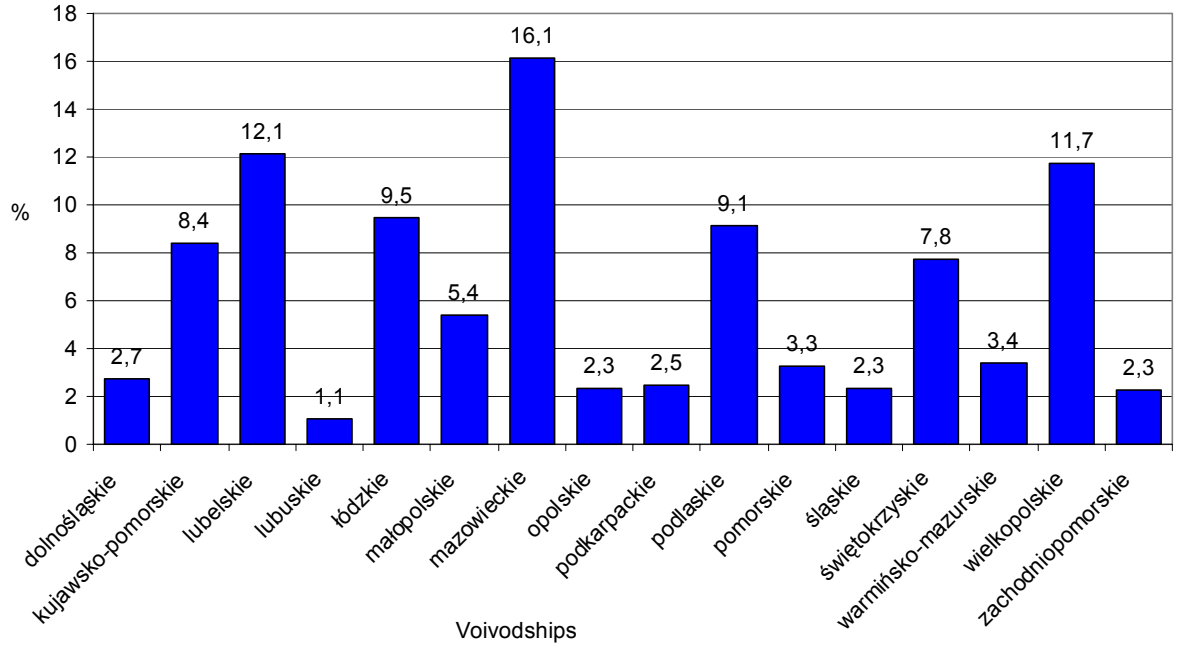
3. Depending on the type of agricultural production, the assisted agricultural holding complies with minimum standards concerning sanitary conditions, the environmental protection and animal welfare, or will comply at the moment of submitting the final payment claim. Support may also be granted to a farm which fails to comply with standards concerning hygiene, the environmental protection or animal welfare, provided that such standards are newly introduced, i.e. applicable for no more than 36 months. In such cases, the agricultural holding should meet the newly introduced standards at the moment of submitting the final payment claim under the project and not later than 36 months from the day when such standards became applicable. At the moment of submitting the final payment claim, the assisted holdings must fully comply with relevant regulations concerning hygiene, the environmental protection and animal welfare, even those entering into force after the scheduled date of the project completion.

The Agency for Restructuring and Modernisation of Agriculture received applications for support under measure 1.1 from 16 August 2004 to 31 March 2006. By 31 October 2006, 27,657 applications for a total amount exceeding PLN 2.85 billion were formally approved. They accounted for 120% of the appropriations for measure 1.1 [45].

Characteristics of the beneficiaries of support for investments in agricultural holdings

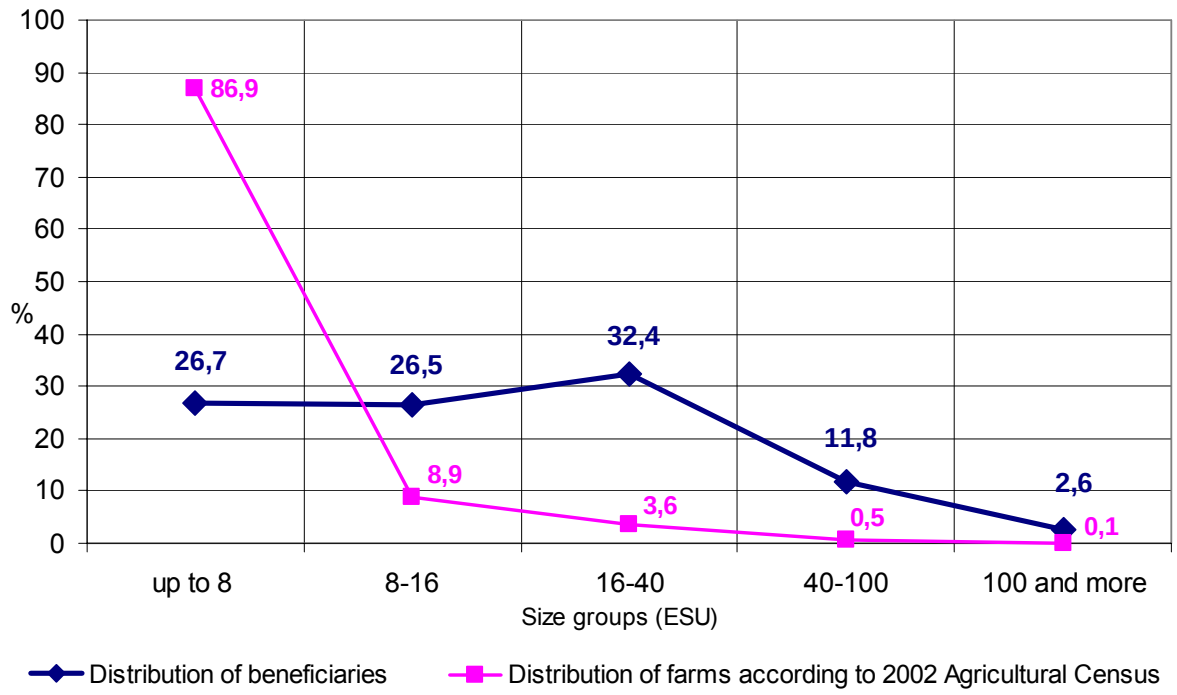
As at 23 October 2006, the Agency for Restructuring and Modernisation of Agriculture recorded more than 21,000 beneficiaries under measure 1.1 (Investments in agricultural holdings). Natural persons accounted for 97% of farms (20,500). The focus of this section is on analysing the group with regard to using the financial assistance for the modernisation of their holdings. Units of the economic size exceeding 8 ESU represented more than 73% of the group, which confirms the findings from IAFE-NRI surveys, demonstrating that support programmes mostly attract agricultural holdings economically stronger than all family farms. This is also reflected in data on gross annual sales of agricultural products by holdings in the year before submitting the application.

Figure 15. Projects implemented under measure 1.1 by voivodship



Source: Own calculations based on unpublished ARiMR data.

Figure 16. Distribution of projects in specific economic size groups of family farms



Source: Own calculations based on unpublished ARiMR data and 2002 Agricultural Census.

More than 70% of all family farms where the owners applied for support are large-scale commercial farms with sales exceeding PLN 70,000. Taking into account both indicators of economic strength (ESU and sales), in the group of farms with the economic size of more than 8 ESU almost 96% reported sales of at least PLN 70,000. It is also worth noting that farms supported under measure 1.1 were characterised by a relatively significant economic size – an average of 42 ESU, whereas in the group of entities exceeding 8 ESU the average economic size was 56 ESU.

Information provided by the Agency for Restructuring and Modernisation of Agriculture allows to assess farmers' activity in obtaining funds for investment in particular regions of Poland. The highest share of beneficiaries was found in regions where agriculture plays a relatively important role in the local economy: the Mazowieckie, Wielkopolskie and Lubelskie voivodships. Private farmers from those regions accounted for 16%, 12% and 12%, respectively, of the total number of the applications in Poland. At the other extreme, in the Lubuskie voivodship only slightly more than 1% of the total number of applications were submitted. Regional differences in this regard should be attributed to general development of agriculture in a given area, land fragmentation, the share of non-agricultural sources of income in farm budgets as well as Poland's historical borders. Similar patterns are also observed in the EU-15 countries (e.g. social and economic differences between the North and the South of Italy, different characteristics and development level in north-eastern and southern Finland, regional disparities resulting from post-war development conditions in eastern and western Germany). Such differences continue to affect the development level of specific areas despite the fact that structural policy instruments aimed at reducing regional disparities have been applied for years [9].

As has already been demonstrated, an increase in the economic strength of an agricultural is accompanied by a growing scale of investment aimed at farm modernisation. This pattern is confirmed by an analysis of the distribution of family farms in Poland and beneficiaries of measure 1.1 in specific economic size groups. The ratio of the share of relatively economically weaker entities (up to 8 ESU) in the analysed group of beneficiaries to the share of such agricultural holdings in the total number for Poland is 1:3. In other economic size groups, the ratio was found as follows: 8-16 ESU – 3:1; 16-40 ESU – 9:1; 40-100 ESU – 24:1, and for farms of over 100 ESU – as much as 26:1.

The above relations allow to draw the conclusion that the modernisation of economically stronger farms will result in further development of their

competitive advantage, thus leading to increased polarisation of agricultural holdings in terms of economic strength in the future. The process is also stimulated by the rules of granting support under measure 1.1 (the criterion of the beneficiary's own funds). According to ARiMR data, the average amount of own funds of applicants was approx. PLN 90,000. As regards entities of 8 ESU or more, the respective figure was slightly more than PLN 100,000. A similar pattern was observed in the case of the average amount of investment support requested – PLN 98,000 and PLN 110,000 respectively. This proves relatively greater capacity of applicants for the replacement of production assets (such farms have own funds or access to borrowing facilities). On the other hand, for economically weak agricultural holdings the criterion of own funds remains a major barrier to obtaining financial assistance, as reflected in the distribution of the number of beneficiaries in particular economic size groups.

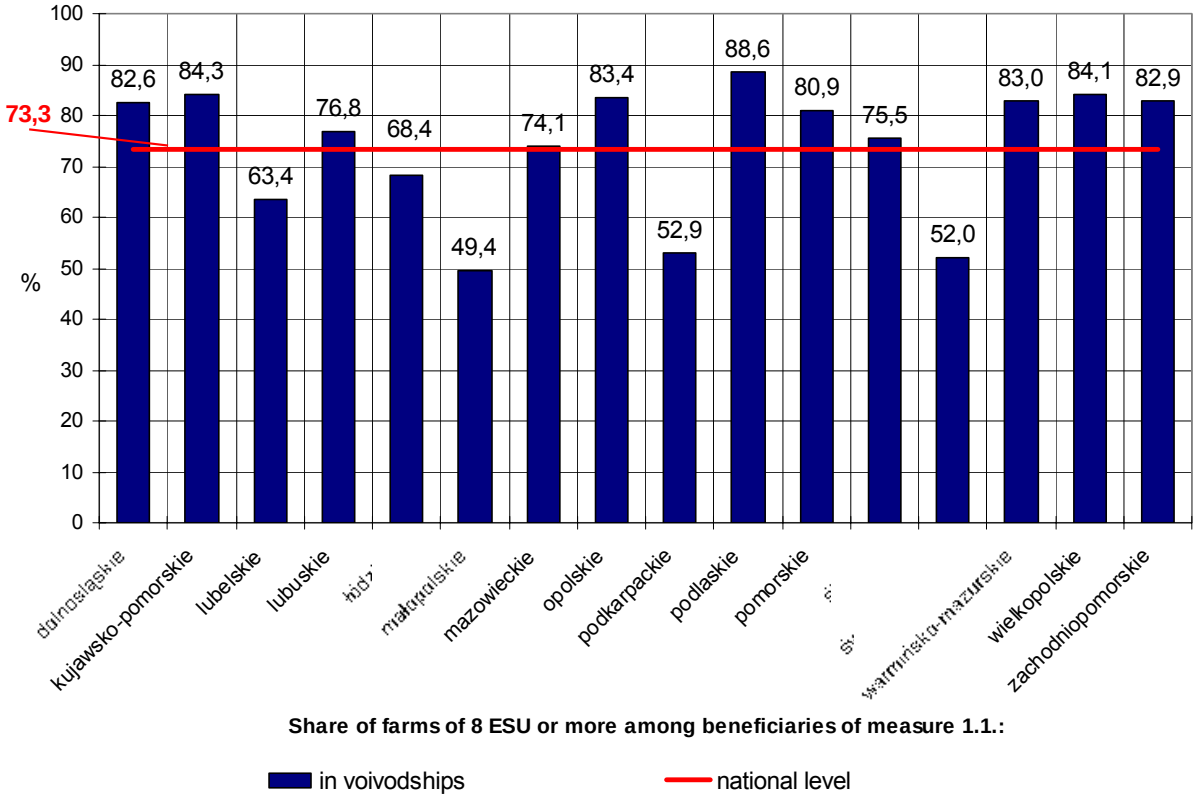
Table 11. Distribution of projects under measure 1.1. by voivodship and economic size group

Voivodship	Size group (European Size Units)				
	up to 8	8-16	16-40	40-100	100 or more
	Figures in a row add up to 100				
Dolnośląskie	17.4	24.6	38.1	15.8	4.1
Kujawsko-Pomorskie	15.7	20.4	37.8	21.2	4.9
Lubelskie	36.6	30.5	25.4	6.0	1.5
Lubuskie	23.2	25.5	30.9	12.3	8.2
Łódzkie	31.6	31.3	28.2	7.3	1.5
Małopolskie	50.6	28.1	16.5	4.5	0.4
Mazowieckie	25.9	32.2	33.1	7.7	1.1
Opolskie	16.6	22.9	40.3	15.1	5.1
Podkarpackie	47.1	28.0	17.3	4.6	3.0
Podlaskie	11.4	22.5	51.6	13.3	1.2
Pomorskie	19.1	27.3	34.9	13.7	4.9
Śląskie	24.5	26.2	34.9	12.1	2.3
Świętokrzyskie	48.0	33.6	15.4	2.4	0.5
Warmińsko-Mazurskie	17.0	17.3	33.7	22.6	9.4
Wielkopolskie	15.9	16.0	39.4	24.2	4.5
Zachodniopomorskie	17.1	27.6	36.9	15.1	3.2

Source: Own calculations based on unpublished ARiMR data.

Similar tendencies are observed across Poland. Differences in the number of beneficiaries in specific economic size groups largely depend on the level of agricultural development in the region and on the degree of land fragmentation. For instance, beneficiaries whose farms do not exceed 8 ESU accounted for a major share in the Małopolskie, Podkarpackie and Świętokrzyskie voivodships, a macroregion characterised by relatively the smallest average area of agricultural holdings in Poland. On the other hand, in regions with a high share of large farms, in terms of both agricultural land and economic size, a relatively high number of beneficiaries had farms of the economic size exceeding 40 ESU (e.g. the Warmińsko-Mazurskie and Wielkopolskie voivodships). This is reflected, especially, in the share of farms of 8 ESU or more in the total number of beneficiaries under measure 1.1. Such agricultural holdings accounted for almost 75% of beneficiaries in Poland, whereas in south-eastern voivodships the respective share was one-third lower (approx. 50%).

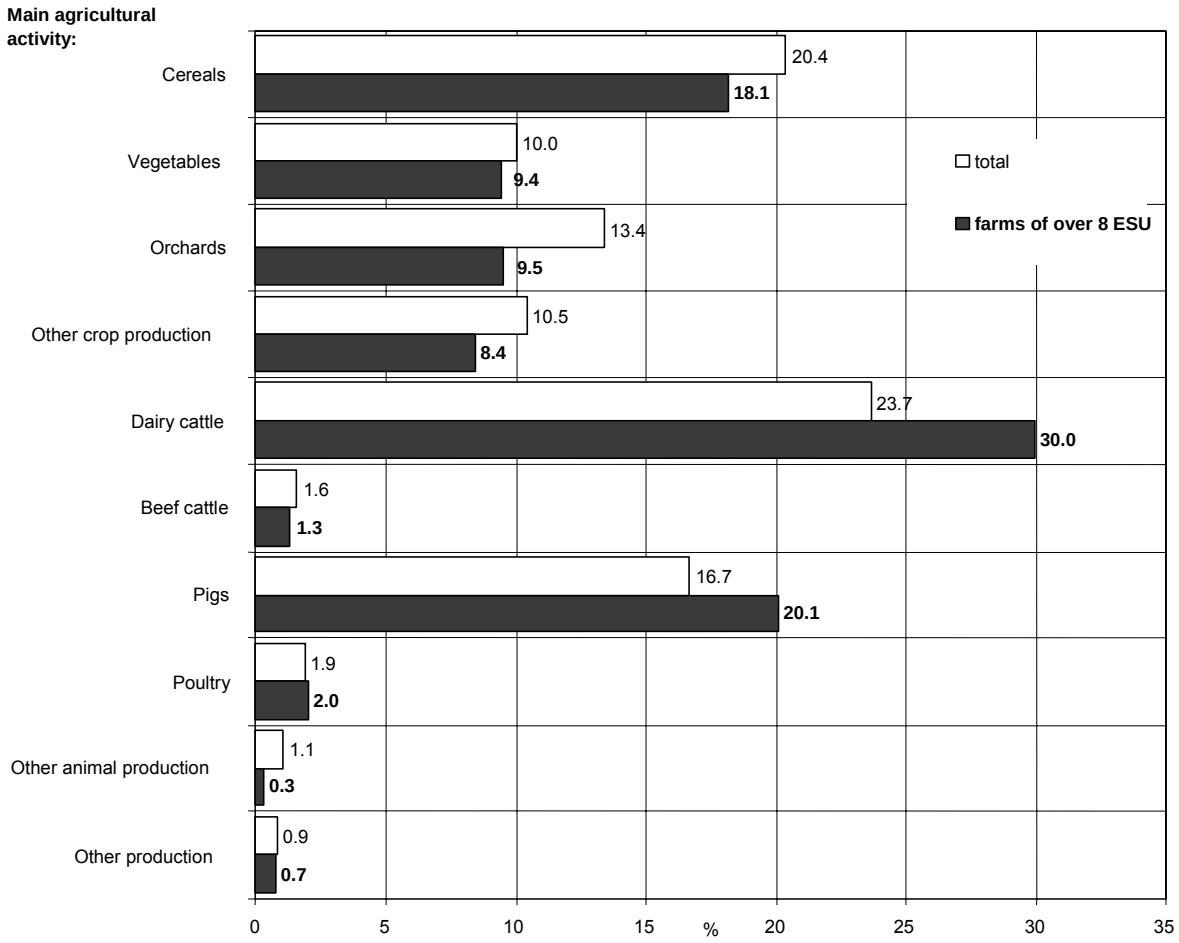
Figure 17. Distribution of agricultural holdings of 8 ESU or more in the total number of beneficiaries under measure 1.1 by region



Source: Own calculations based on unpublished ARiMR data.

An important part of the analysis of beneficiaries of support under this investment-oriented measure is the main agricultural activity of assisted farms. According to ARiMR data, the group of more than 20,000 agricultural holdings benefiting from financial aid was dominated by farms engaged in animal production (44% of the total number of the group in question and 50% of assisted farms of 8 ESU or more), mostly dairy cattle farming and pig farming. Entities specialised in arable crops also represented a major group (in both cases accounting for approx. one-fifth of the analysed holdings).

Figure 18. Beneficiaries under measure 1.1. by main agricultural activity



Source: Own calculations based on unpublished ARiMR data.

The type of agricultural production was related to the main goal of planned investment. In the case of both all beneficiaries and the group of economically stronger agricultural holdings, the aim of investment projects corresponded to the SOP objective: improving the organisation of agricultural production. Support funds were allocated for the modernisation of farm buildings, the purchase of tractors, harvesters as well as of agricultural machinery and equipment. Moreover, financial assistance under measure 1.1 was used to purchase or install machinery, equipment and tools for agricultural production, storage and the preparation of agricultural products for sale.

Table 12. Projects under measure 1.1. by SOP objective

Investment activities of beneficiaries under measure 1.1 corresponding to specific SOP objectives	**all family farms**	**over 8 ESU**
Increasing agricultural income	12.8	10.2
Improving the competitiveness of the agricultural holding	14.4	14.9
Reducing agricultural production costs	9.0	9.1
Improving the organisation of agricultural production	**53.6**	**56.2**
Adjusting the product range of the farm to market requirements	1.5	1.3
Increasing the value added of agricultural products	0.2	0.2
Improving the quality of agricultural products	4.2	3.9
Improving working conditions and safety at work	2.9	2.6
Protection and improvement of the environment, the rural landscape, the conservation and promotion of cultural heritage of rural areas and regional culture	0.2	0.2
Improving sanitary and hygiene conditions of production	0.3	0.4
Improving animal welfare	0.9	1.1

Source: Own calculations based on unpublished ARiRM data.

Faced with the ongoing trade liberalisation in the European and other agricultural markets (as pressed for by the World Trade Organisation), Poland's policy for agriculture should focus not only on the adaptation of agricultural holdings to the EU technical standards and improving the competitiveness of agriculture in the Single European Market, but also on preparing the sector for participation in the global food market. Therefore, support measures should be more oriented towards the development of economically strong agricultural holdings. Other entities should be encouraged to engage in non-agricultural

activities or specialised agricultural activities (such as organic farming or region-specific production). The best possible information on support measures as well as advisory services and technical assistance during the application process should create favourable development conditions for agricultural holdings and stimulate changes in rural areas, thus effectively reducing the differences in economic and social development of rural areas in Poland.

Summary

The presented analysis has shown that in family farming there is a group of market-oriented, economically strong agricultural holdings, with stable and close market relations, i.e. highly commercial farms. Due to significant commercial production combined with high farming efficiency, income from the sale of agricultural products of such entities becomes increasingly attractive compared to income from off-farm employment. The formation of the large-scale segment in family farming, characterised by technical and social efficiency comparable to that of non-agricultural sectors (therefore competitive both in the domestic and international markets) is basically evolutionary in nature.

In 1992-2005, the number of large-scale commercial family farms increased by almost 60%, and their share in the total number of family holdings doubled (from 6% to 12%). At present, the highly commercial sector in family farming includes approx. 220,000 farms. A significant rise in their number was observed particularly prior to 2000. In 2005, the share of large-scale commercial units in family farming was only slightly higher than five years before (12% as compared to 11%), whereas in 1992-2000 the respective proportion nearly doubled (from slightly above 6% to more than 11%).

The analysis of the distribution of highly commercial holdings according to the farm size and social and demographic characteristics of farmers confirmed the relation between the number of large-scale commercial entities and the features of agricultural structures. Throughout the period in question, highly commercial units were mainly found among relatively large farms providing the main activity for the farmers and the most important source of income for the farming families. As regards persons working in such agricultural holdings, particularly those who wish to continue agricultural activities or farm managers, were distinguished by relatively young age as well as by definitely better general education and agricultural qualifications, skills and know-how. Furthermore, for persons employed in large-scale commercial farms agricultural activities in the family farm represented the main occupation and source of income.

The analysis has shown significant regional differences with regard to the distribution of highly commercial agricultural holdings. Such historically embedded disparities in the level of economic development of specific regions

of Poland (particularly in agriculture) also resulted in different processes of adaptation of family farms to effective functioning under competitive pressure. As a consequence, highly commercial units were mainly found in areas characterised by a relatively favourable agricultural structure as well as distinguished by significant agricultural condition, production intensity and farmers' qualifications. It mostly concerned the Central-Western macroregion, including the Kujawsko-Pomorskie and Wielkopolskie voivodships, with the highest share of large-scale commercial farms throughout the period in question; such entities accounted for slightly more than 29% of the total number of private farms in 2005. The opposite was the case in central-eastern and southern Poland where the proportion of highly commercial holdings was relatively the lowest throughout the analysed period. It was particularly low in the South-Eastern macroregion, which should be attributed primarily to widespread off-farm employment, the highest land fragmentation in Poland and basically subsistence agricultural production. In this macroregion, covering the Świętokrzyskie, Małopolskie, Podkarpackie and Śląskie voivodships, large-scale commercial holdings accounted for 7% of the total number of family farms in 2005. It should be emphasised, however, that even in areas where highly commercial entities play a minor role some farms invest in modernisation, become more market-oriented and increase agricultural sales. This tendency is exemplified by changes observed in the Central-Eastern macroregion.

One general conclusion should be that there are two opposite trends observed in rural areas. On the one hand, increasingly efficient land management is reflected in the growing concentration of agricultural land in development-oriented farms; on the other hand, direct payments and cultural conditions reinforce the existing agricultural structures.

Analyses have demonstrated that Poland's accession to the European Union and the inclusion of Polish agriculture in the common agricultural policy has had no major effect on the number of large-scale commercial farms, but it has encouraged farmers to increase and modernize the production potential of their holdings. Particular growth in investment activity was observed among managers of highly commercial entities. In 2000-2005, agricultural investment by highly commercial holdings accounted for almost 40% of total investment by all family farms and represented 72% of total funds allocated for the replacement, enlargement and modernisation of the production potential

in family farming. For comparison, in the period of 1996-2000 those shares were 30% and 62% respectively, whereas between 1992 and 1996 – 18% and 45% respectively.

As a result of greater activity of managers of highly commercial farms aimed to increase the production capacity, increasing concentration of production factors in this group of entities could be observed. It was mostly reflected in a rise in the share of agricultural land owned by large-scale units. In 1992-2005, it jumped from 11% to more than 38%. The share of this group showed even more buoyant growth with regard to livestock (from 24% to 55%). But the most significant progress was observed in the concentration of production assets. It was primarily reflected in improved technical condition of assets, more modern machinery, equipment and farm buildings as well as more comprehensive mechanisation of production.

The stock and quality of production assets combined with personal traits of users of highly commercial farms and their attitudes towards agricultural activity improved the competitive position of this group of entities. Such tendencies were reflected in increased sales of agricultural products by large-scale commercial holdings. In 2005, sales of agricultural products by highly commercial entities accounted for 62% of total market output in family farming. The proportion went up more than three times compared to 1992 when it reached approx. 20%.

The analysis indicates close relations between the economic potential, sales, investment and the area of agricultural land owned by particular groups of farms. A positive and significant effect of the area of agricultural land was observed with regard to the economic size, market output, investment activity as well as funds allocated the replacement and modernisation of production assets.

As regards the surveyed group of beneficiaries of the SOP measure "Investments in agricultural holdings", entities of the economic size exceeding 8 ESU accounted for more than 73%, which is confirmed by the analysis of survey findings. According to the IAFE-NRI survey, the support programmes for agriculture mostly attract agricultural holdings economically stronger than all family farms. This is also reflected in data on gross annual sales of agricultural products by holdings in the year before submitting the application. More than 70% of all family farms where the owners applied

for support are large-scale commercial farms with sales exceeding PLN 70,000. Taking into account both indicators of economic strength (ESU and sales), in the group of farms with the economic size of more than 8 ESU almost 96% reported sales of at least PLN 70,000. It is also worth noting that farms assisted under measure 1.1 were characterised by a relatively significant economic size – an average of 42 ESU, whereas in the group of entities exceeding 8 ESU the average economic size was 56 ESU.

According to both data of the Agency for Restructuring and Modernisation of Agriculture and surveys conducted by the Institute of Agricultural and Food Economics – National Research Institute, despite the fact that large-scale commercial holdings only account for slightly over one-eighth of the total number of family farms, their activity in obtaining support funds is significantly greater and, as a result, they absorb the majority of financial resources available under the CAP.

The results of the surveys indicate significant growth potential of large-scale commercial holdings, although the number of such entities will go up relatively slowly. However, a stronger upward trend will be observed with regard to production assets and the economic size of existing highly commercial units. The possibilities for buoyant growth of large-scale commercial family farms should be seen mostly in the reduction of barriers to market-oriented changes in family farming and in the creation of favourable conditions stimulating the development of agricultural businesses, increasing their economic strength as well as their competitiveness. Considering the trends and rates of change within this group of entities, their number may be forecasted to increase nearly by one-third up to approx. 280,000-300,000 farms by 2015 [53]. Highly commercial holdings will account for 20% of the total number of family farms, almost 50% of agricultural land and ca. 80% of market output in family farming.

The formation of the highly commercial sector in peasant agriculture in Poland depends on a number of factors. The analysis has confirmed the importance of the following:

- improvement of the level of general and agricultural education in farming families,
- development of rural infrastructure and multifunctional rural development,

- increasing capital formation in agriculture (also through support programmes aimed at the modernisation of agricultural holdings),
- intensification of measures for better organisation and stabilisation of agricultural markets and the flow of agricultural land to market-oriented agricultural holdings,
- promotion of agricultural advisory services, particularly with regard to more widespread introduction of technological and, especially, biological progress to agricultural production.

It should be emphasised that the fulfilment of the above conditions depends not only on macroeconomic factors and agricultural policy, but also on farmers' attitudes, their active approach and determination in achieving optimal conditions for agricultural production.

From the point of view of Poland's interests, a growing number of highly commercial farms and the concentration of production factors (particularly of land) in such units is very important for Polish agriculture faced with competition in the global market. An appropriate number of large-scale commercial holdings accounting for a major share of agricultural land will not only ensure the security of market supply in terms of both quantity and quality, but also contribute to the social and economic balance. A viable sector of large-scale commercial farms is a precondition for Polish agriculture to develop a strong position within the European agricultural model as well as for sustainable rural development. Furthermore, it should be emphasised that the agricultural development strategy should include support measures aimed, on the one hand, to strengthen and increase the number of highly commercial units, and on the other hand, to create conditions for the development of non-agricultural activities for the farming population, particularly for families living on semi-subsistence farms.

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