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## **SELECTED DETERMINANTS OF INCOME DIFFERENTIATION IN AGRICULTURAL DAIRY FARMS OF THE MINSK COUNTY**

### *WYBRANE CZYNNIKI DETERMINUJĄCE ZRÓŻNICOWANIE DOCHODOWE GOSPODARSTW ROLNYCH POWIATU MIŃSKIEGO*

**Key words: profitability, agricultural farm, EU support**

*Słowa kluczowe: dochodowość, gospodarstwo rolne, wsparcie unijne*

**Abstract.** The aim of the study was to determine the level and reasons of income differentiation of farms located in Minsk County. The survey was conducted in 25 randomly selected farms specialized in dairy production. The study presents basic information about the volume of production, costs incurred, earned agricultural income, obtained support from the EU and non-farm income. The average level of net final production depended on the area of the farm. The highest level of production was characterized by farms with an area of over 15 hectares. The analysis of the results of study indicates that the highest non-farm income was obtained in farms with the largest area of arable land. Estimated value of correlation coefficient revealed meaningful and positive relations between the farm income and net final production, LU/100 ha, direct costs, indirect costs, obtained EU funds as well as the area of arable land the slightest.

### **Introduction**

Income in agriculture is an especially contentious issue. The subject provokes numerous disputes and evokes controversy. Politics has a significant impact on the revenue of particular social groups, including farmers. The very concept of agricultural income is a complex notion, both in terms of methodology and interpretation. Farmers are not required to keep comprehensive records of income, therefore its actual level is estimated on the basis of sample households, or on financial estimates based on balancing the activities of a particular farm. Thus, only certain accepted values regarding income from agriculture can be used.

Polish accession to the European Union (EU) was preceded by a long period of preparation, which, in the case of agriculture, was particularly intense and required the implementation of a number of changes [Ginter, Niewęglowski 2009]. Before Polish accession to the EU, the main instrument supporting the Polish agricultural sector had been policies of market intervention and protection against excessive imports. Tariff barriers had been one of the most important instruments used to protect domestic markets against competitive imported goods.

Joining the EU has created new ways of financial support for agricultural activities conducted on private farms. After accession, Polish agricultural producers have been subjected to new regulations. To give an example, EU regulations have affected the size and shape of the potato starch market (amongst others) [Ginter et al. 2004].

Traditional instruments used in agricultural policy to support agriculture and rural development were divided into two categories: market and non-market. Non-market instruments of agricultural support include subsidies and direct payments to income, production, the area of crops and to animals [Adamowicz 2009]. The EU's Common Agricultural Policy has changed significantly. Up until the end of the 80's, the primary source of its objectives was to support agricultural prices using market-based instruments and direct market intervention [Czyżewski et al. 2009].

Intervention is carried out with the use of various methods, which create an internally coherent system of impact on agriculture, where particular measures are complementary and supportive. In general, instruments for the agricultural sector can be divided into three groups. The first group includes measures helping to maintain agricultural prices, the second – direct payments (compensation) and the third group is related to the control of supply of agricultural products [Stańko 2009]. EU membership provides financial support for the agricultural sector and the acceleration of economic development [Poczta et al. 2009]. Common Agricultural Policy (CAP) has resulted in a significant improvement of the financial situation of rural families and the improvement of the competitiveness of agricultural holdings [Bórawski 2009]. Poland's presence in the European Union has shown what an important co-management role is played by CAP [Bisaga 2009].

Income as a means of meeting the needs and fundamental motive of economic activity of the population is invariably of public interest. Frequent income inefficiency in agriculture has a significant impact on the agricultural population. This negative tendency is a result of natural and economic determinants, based on the allocation of factors of production and the depreciation of agriculture caused by market mechanisms. This means that actual agricultural incomes are lower than those written on paper. Hence, there is a great need for external support [Bear-Nawrocka 2009].

The aim of the study was to determine the level and reasons of income differentiation of farms located in Minsk County.

### Material and methods

The survey was conducted in 25 individual farms located in 14 villages of the Minsk County. The main research tool was an interview questionnaire carried out directly in selected farms. Data on production and economic results were from 2010.

Surveyed farms can be classified as family farms as the main source of labor was the farmer's own labor and the members of his family one. Farms were selected at random from the dairy farms of Minsk County. Due to the relatively small size of the sample the study are exploratory in nature. The analysis of the results of the conducted research was done with the use of tabular – descriptive method and the significance of the relationship between farm income generated on the surveyed farms and selected factors characterizing economic results of these farms was analysed with the use of Spearman correlation.

### Research results

The investigated farms were characterized by an area of arable land ranging from 5.6 ha to 100 ha. The average size of a farm in the study group was 19 hectares. The farms were divided into groups according to the area of arable land. In the study groups, there were no farms of less than 5 hectares. Therefore, the first group included farms with an arable land ranging from 5.5 ha to 10 ha. The second, farms with an area ranging from 10.2 to 14.8 ha. The third group consisted of farms with an area of 5.1 ha to 18.0 ha. The fourth group was farms with an area of 20.7 ha to

Table 1. Basic data about the surveyed farms related to the area of arable land  
*Tabela 1. Podstawowe dane o badanych gospodarstwach ze względu na powierzchnię UR*

Group of farms/ <i>Grupa gospodarstw</i>	Number of farms/ <i>Liczba gospodarstw</i>	Average farm area/ <i>Średnia powierzchnia gospodarstwa</i>	LU/100 ha/ <i>SD/100 ha</i>	Average age of owner/ <i>Średni wiek właściciela</i>
1	9	6.86	39	51
2	14	12.40	99	48
3	2	15.51	86	37
Total/ <i>Ogółem</i>	25	10.60	77	49

Source: own calculations

*Źródło: obliczenia własne*

25.3 ha, and the fifth group had an area of 30.5 ha to 100 ha. The highest number of Large Units (LU) per 100 hectares were observed in farms with an area of arable land between 10 ha and 15 ha. However, the oldest group of farmers made up owners of agricultural farms with an area of less than 10 hectares. It can be concluded that younger farmers are more likely to take action resulting in the enlargement of farms.

According to data from the Central Statistical Office [www.stat.gov.pl] in 2007, on farms smaller than 10 hectares predominated farmers aged over 50 years, and on the other farms the average age of farmers exceeded 40 years. In 2011, the largest group constituted farmers aged 45-54 years, and the following one farmers aged 35-44 years.

The average level of net final production depended on the area of the farm. The highest level of production was characterized by farms with an area of over 15 hectares. In the investigated farms, the minimum net final production was PLN 3980, and the maximum – PLN 58910. Similar results can be observed for other economic indicators (Tab. 2). However, the scale of the observed variability within the surveyed farms is noteworthy. Especially distinguishing are the differences in the average value of studied ratios found between group 1 and group 2 of the investigated farms. The average value of net final production and the direct and indirect costs recorded in farms of the second group was more than 2-fold higher in relation to the value of these indicators in the first group. Moreover, the average farm income in farms of the second group was up to 18 times higher than in the first group of farms.

The analysis of the results shown in table 3 indicates that the highest non-farm income was obtained in farms with the largest area of arable land. Detailed analysis of these indicators reveals that: salaries accounted for 65% (group 1) and 26% (group 2) of the funds obtained from off-farm resources; pensions accounted for 14% (group 1), 31% (group 2) and 43% (group 3) of all farm external funds; social assistance accounted for 6%, 3% and 8%, respectively, and EU funds 15%, 40% and 50%, respectively.

Table 2. The level of production, costs and farm income in surveyed farms according to the area of arable land  
*Tabela 2. Poziom produkcji, kosztów i dochodu rolniczego w badanych gospodarstwach ze względu na powierzchnię UR*

Group of farms/ <i>Grupa gospodarstw</i>	Net final production/ <i>Produkcja końcowa netto</i>	Total costs/ <i>Koszty całkowite</i>	Direct costs/ <i>Koszty bezpośrednie</i>	Indirect costs/ <i>Koszty pośrednie</i>	Farm income/ <i>Dochód rolniczy</i>
1	14 404	22 368	13 322	9 045	1 196
2	45 726	50 996	28 989	21 653	21 725
3	48 645	64 498	41 773	22 725	21 891
Total/ <i>Ogółem</i>	34 684	41 770	24 372	17 200	14 348

Source: own calculations

*Źródło: obliczenia własne*

Table 3. The level of off-farm resources according to arable land area  
*Tabela 3. Poziom środków finansowych spoza gospodarstwa ze względu na powierzchnię UR*

Group of farms/ <i>Grupa gospodarstw</i>	Non-farm income/ <i>Dochody spoza gospodarstwa</i>	Wages/ <i>Wynagrodzenia</i>	Pensions/ <i>Emerytury i renty</i>	Social assistance/ <i>Pomoc socjalna</i>	Union funds/ <i>Środki unijne</i>
1	32 413	21 133	4 480	2 067	4 733
2	28 137	7 314	8 846	712	11 264
3	37 280	0.00	15 900	2 880	18 500
Total/ <i>Razem</i>	30 408	11 704	7 838	1 373	9 492

Source: own calculations

*Źródło: obliczenia własne*

Table 4. Spearman correlation coefficients between selected variables and the value of agricultural income in the surveyed farms

Tabela 4. Wartości współczynników korelacji Spearmana pomiędzy wybranymi zmiennymi a wartością dochodu rolniczego w badanych gospodarstwach

Area of arable land/Powierzchnia UR	LU/100 ha/SD/100 ha	Net final production/Produkcja końcowa netto	Direct costs/Koszty bezpośrednie	Indirect costs/Koszty pośrednie	EU funds/Środki unijne
		PLN/zł			
0.51	0.76	0.93	0.74	0.65	0.60

Correlation coefficient significant at  $p \leq 0,05$ /Współczynnik korelacji dla poziomu istotności  $p \leq 0,05$

Source: own calculation

Źródło: obliczenia własne

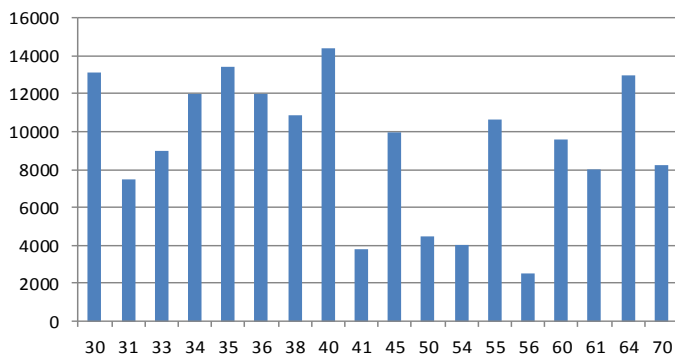


Figure 1. The value of obtained EU funds depending on the age of the farmer in the surveyed farms  
Rysunek 1. Wartość pozyskanych środków UE w zależności od wieku rolnika w badanych gospodarstwach

Source: own calculation

Źródło: obliczenia własne

Off-farm wages in group 1 of farms and pensions and EU funds in group 3 of farms had the most significant share of external funds. By comparing the indicators presented in table 2 and table 3, it can be concluded that in all the studied groups of farms, average farm income was lower than average non-farm income.

Analyzing the graph (Fig. 1), we can conclude that the highest EU funds were obtained by farmers aged from 30 to 40 years and 64 years.

The values of correlation coefficients indicate significant and positive relations between agricultural income and all the included indicators (Tab. 4). The strongest relation was noticed in regard to net final production. A further correlation, in terms of size, was between agricultural income and livestock intensity in LU/100 ha, while the lowest was observed in relation to arable land area. However due to relatively small size of the sample the results of the survey cannot be taken as general.

## Summary

In 2010, the profitability of dairy farmers in Minsk County varied. The average level of net final production depended, among others, on the area of the farm. The largest net final production was characterized by farms with an area of over 15 hectares. Similarly, farms in this group had the highest level of income gained from outside the farm. Wages in the group of farms with an area of up to 10 ha of arable land and pensions and EU funds in the group of farms of over 15 ha had the most significant share in off-farm funds. Simultaneously, the level of direct impact of arable land area on the value of agricultural income was positive and significant but nonetheless medium.

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### Streszczenie

Celem badań było określenie wielkości i przyczyn zróżnicowania dochodowego gospodarstw rolnych położonych na terenie powiatu mińskiego. Badania ankietowe przeprowadzono w 25 losowo wybranych gospodarstwach specjalizujących się w produkcji bydła mlecznego. W pracy przedstawiono podstawowe informacje o wielkości produkcji, ponoszonych kosztach, osiągniętych dochodach rolniczych, uzyskiwanym wsparciu z UE oraz dochodach spoza gospodarstwa.

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