THE ECONOMIC STRENGTH OF POLISH INDIVIDUAL FARMS IN THE EUROPEAN UNION IN THE YEAR 2004

Roma Ryś-Jurek

Poznan University of Life Sciences

Abstract. The aim of this research was a presentation of the economic strength of average individual farms from EU-24 countries. The special emphasis was put on similarity of the output structure. An analysis was based on FADN data for the year 2004. Basic method of research was a descriptive and comparative analysis, as well as chosen methods of descriptive statistics – among them, so called standardization of straight characteristics. Beyond this, the hierarchical agglomeration classification was implemented. On the basis of hierarchical agglomeration classification prepared according to ESU and to structure of output, 5 classes of average individual farms from EU-24 countries were obtained. The comparison of results of Polish average farm with results obtained by the EU average farms revealed that the value of the majority of economic variables observed in Polish average farm was c.a. three times lower than the EU average. In the ranking – prepared according to the criteria of ESU – Polish average individual farm took 20th place among 24 average individual farms from the EU. The characteristic feature of the agricultural output of Polish average individual farm was the equal share of crops production, as well as livestock production in the total average farm's output. In the structure of crops production of a Polish average individual farm, the cereals, vegetables and flowers were dominant. The livestock production consisted mainly of pig meat, poultry meat and milk and milk products.

Key words: ESU, individual farm, agglomeration, agricultural output

INTRODUCTION

The economic strength of an individual farm is specified by its size, which is measured in European Size Units (1 ESU = 1200 euro). Calculation of ESU is based on the standard direct surplus of farm [Wyniki standardowe... 2006]. On the background of

Corresponding author – Adres do korespondencji: dr Roma Ryś-Jurek, Katedra Finansów i Rachunkowości w Agrobiznesie, Uniwersytet Przyrodniczy w Poznaniu, ul. Wojska Polskiego 28, 60-637 Poznań, Poland, e-mail: rys-jurek@up.poznan.pl

farms' size six different classes can be distinguished [Czyżewski and Henisz-Matusz-czak 2004][1].

Many obstacles have dumpened the economic strength of Polish individual farms. They can be referred to barriers to Polish agriculture's development. The most important constraints are: regional diversification of macro regions, voivodships, and majority of districts; unfavourable structure of farms; surplus of low-qualified labour force in the agriculture; perceptible lack of modern capital and difficult natural conditions [Strategia... 2004]. It's worth to emphasize that most countries of the European Union suffer from unfavourable natural conditions; Poland is not an exception in this respect. These climatic conditions determine the structure of agricultural output, which in turn influences incomes of farmers.

The main goal of this research is to present the economic strength of each average individual farm from the EU-24 countries in the year 2004[2], with the special consideration of Poland. A special emphasis is put on similarity of output's structures. As a result of the research, answers to the following questions were formulated:

1. Which place did the Polish average individual farm take according to ESU among average individual farms from other EU countries?
2. What was a special character of agricultural output of Polish average individual farm in comparison with other average individual farms from EU countries?
3. Was Polish average farm similar to average farms from other countries in the EU, according to the ESU and to the output's structure?

MATERIAL AND METHODS

Research was based on data from Farm Accountancy Data Network (FADN)[3]. These data include basic information about economic situation of average individual farms in the EU in the year 2004. The whole database consists of 24 countries (excluding Malta).

As noticed, the main goal of this research was to describe the economic strength of average individual farms from EU-24 countries. A special attention was paid to the structure of output in average Polish and European farms – in order to search for possible characteristic features.

Basic method of this research was a descriptive and comparative analysis, as well as chosen methods of descriptive statistics – among them, so called standardization of

---

[1] Among theses 6 classes, some further subclasses of farms can be distinguished: A (0-<4 ESU) – very small, B (4-<8 ESU) – small, C (8-<16 ESU) – medium small, D (16-<40 ESU) – medium big, E (40-<100 ESU) – big, F (≥100 ESU) – very big.

[2] In the FADN database there is no information on Malta available.

[3] According to research conducted in Poland, farms that were keeping the accounts were systematically in better situation than the rest of farms in the whole country. Hence, the results of the analysis conducted on the basis of these farms were higher by c.a. 30%, than those obtained while considering all farms in Poland. So the FADN data are burdened with measurement bias. However, data from this network are at the moment the only available serving as a source of standardized information about farms in Poland. Then, with the abovementioned reservation, they can serve as a base for a comparison of Poland with other EU countries, while pondering the situation of agriculture [Błąd 2000, Woś 2000].

straight characteristics. Apart from that, the hierarchical agglomeration classification was conducted.

Before conducting the hierarchical agglomeration classification, the data on ESU and output's structure of each average individual farm from EU-24 countries were standardized, according to the formula for standardization of straight characteristics [Wysocki and Lira 2005]:

$$z_{ij} = \frac{x_{ij} - \overline{x}_j}{s_j}, \; (i = 1, 2, ..., n, \qquad j = 1, 2, ..., m),$$

where:

$\overline{x}_j = \dfrac{1}{n}\sum\limits_{i=1}^{n} x_{ij}$ is an arithmetical mean for j's straight characteristic, and

$s_j = \left[\dfrac{1}{n-1}\left(\sum\limits_{i=1}^{n} x_{ij}^2 - \dfrac{1}{n}\left(\sum\limits_{i=1}^{n} x_{ij}\right)^2\right)\right]^{1/2}$ its standard deviation.

The hierarchical agglomeration classification is one of the methods of the concentrate analysis. It was based on central agglomeration procedure used in order to classify the average individual farms from EU-24 countries according to ESU and to output's structure. In the distance's matrix, the pair of classes of the highest similarity (with the smaller distance between them) to each other was searched. Then, the number of classes was reduced by unity, compounding existing classes in a new class. Later, distances between connected classes and other classes were converted. These steps had been repeated until every object was classified in one class [Walesiak 2004].

The algorithm of agglomeration classification determines the distance's matrix among the objects, which have to be grouped. With the raw data, distances may be calculated with the use of a few different measures. In this research, the most popular measure was used, namely the Euclidian's distance, which is a geometrical distance in a multi-dimension space.

One of the basic parameters, which is implemented in the agglomeration classification's process, is a principle of bond. This principle serves as a basis to define, whether two concentrates are connected. In this research, the Ward's method was used. The Ward's method minimalizes squares' sum of two concentrates, which can be obtained on every stage of the research. The main advantage of this method is a high effectiveness, and the characteristic feature is a formation of the concentrates of small size. This feature appeared to be very useful, as the analyzed objects were average individual farms from 24 EU countries, so the pursuit of classes' individualization was indispensable.

The results of agglomeration classification may be graphically presented in form of a dendogram (the connections tree). This hierarchy shows precisely the positioning of particular classes and objects [Walesiak 2004].

THE POSITION OF POLISH AVERAGE INDIVIDUAL FARM IN THE EU-24

In order to compare the economic strength of Polish individual farms with other farms from EU countries, the FADN data from the year 2004 were used. In order to fulfill this target, few basic economic categories, typical for individual farms, were chosen (Table 1).

Table 1. Chosen economic categories of average individual farm in the EU and in Poland in the year 2004

Tabela 1. Wybrane kategorie ekonomiczne dla przeciętnego indywidualnego gospodarstwa rolnego w UE i w Polsce w 2004 roku

Category Kategoria	EU[a] UE[a]	Poland Polska	Poland/EU Polska/UE (%)
1	2	3	4
The simplified calculation system of the family farm income (euro) Uproszczony rachunek dochodu z gospodarstwa rolnego (euro)			
1. Total output [b] 1. Produkcja ogółem[b]	61 471	21 077	34.3
2. Total intermedial consumption[c] 2. Zużycie pośrednie[c]	−35 303	−12 415	35.2
3. Balance current subsidies and taxes 3. Saldo bieżących dopłat i podatków	+10 122	+1 927	19.0
4. Gross farm income 4. Wartość dodana brutto	= 36 290	= 10 589	29.2
5. Depreciation 5. Amortyzacja	−8 383	−3 007	35.9
6. Farm net value added 6. Wartość dodana netto	= 27 907	= 7 582	27.2
7. Total external factors[d] 7. Koszt czynników zewnętrznych[d]	−9 833	−1 018	10.4
8. Balance subsidies and taxes on investments 8. Saldo dopłat i podatków na inwestycjach	+37	+(−166)	×
9. Family farm income 9. Dochód z gospodarstwa rolnego	= 18 111	= 6 398	35.3
Other economic variables Inne kategorie ekonomiczne			
10. Total agricultural area (hectares) 10. Całkowita powierzchnia UR (ha)	34.2	15.8	46.2
11. ESU[e] – ESU[e]	33.5	9.9	29.6
12. Farm net value added/AWU [f] (euro) 12. Wartość dodana netto/AWU [f] (euro)	16 894	4 211	24.9
13. Subsidies (euro) 13. Subsydia (euro)	10 405	2 066	19.9

Table 1 – cont. / Tabela 1 – cd.

1	2	3	4
14. Family farm income without current subsidies (euro) (9-13) 14. Dochód z gospodarstwa rolnego bez bieżących dopłat (euro) (9-13)	7 706	4 332	56.2
15. Family farm income without current subsidies calculated on 1 hectare (euro/1 hectare) (14/10) 15. Dochód z gospodarstwa rolnego bez bieżących dopłat w przeliczeniu na 1 ha (euro/1 ha) (14/10)	225.3	274.1	121.6

[a] Without Malta.

[b] Total output is equal to sum of total crops, crops products, livestock and livestock products and of other output.

[c] Total intermedial consumption is a value of net used materials (including fuel), raw materials of energy, technical gases and external services and costs of business trips and others costs (advertising, hire, etc.).

[d] Total external factors are a cost of hire labour, rent for hire means of production, interests of credits, etc.

[e] ESU – economic size unit.

[f] AWU – annual work unit.

Source: own preparations and calculations based on FADN [2007] data.

[a] Bez Malty.

[b] Produkcja ogółem to suma końcowej produkcji roślinnej i zwierzęcej w gospodarstwie.

[c] Zużycie pośrednie obejmuje wartość zużytych materiałów (w tym paliwa) netto, surowców energii, gazów technicznych i usług obcych oraz kosztów podróży służbowych i inne koszty (reklamy, wynajmu itp.).

[d] Koszt czynników zewnętrznych obejmuje koszt pracy najemnej, czynsze za donajem środków produkcji, odsetki od kredytów, itp.

[e] ESU – ekonomiczna jednostka wielkości.

[f] AWU – roczna jednostka pracy.

Źródło: opracowanie własne na podstawie danych FADN [2007].

The comparison of results of average individual farms from Poland and from the EU countries in the 2004 year, revealed that the majority of chosen economic categories in Polish average farm was c.a. three times lower than in the EU one. As it can be noticed, the medium value of total output of Polish average individual farm was equal to 21 077 euro, whereas value of this indicator observed in the EU was equal to 61 471 euro. The total intermedial consumption was lower in Poland (12 415 euro) than in the EU (35 303 euro), as well as the current subsidies and taxes balance in Polish average individual farm, which was c.a. five times lower than one observed in the EU farms (1927 euro). Similarly, other indicators observed in average Polish individual farm were also three times lower than EU average, namely: gross farm income, farm net value added and farm net value added/AWU[4]. Taking into consideration the presented data, it's not surprising, that family farm income in Polish average individual farm in the year 2004 was also three times lower than in the EU farm, being equal to 6398 euro (in EU-24 it was equal to 18 111 euro respectively). The situation was different, while comparing family farm income without current subsidies. In this case income of Polish average farm was only two times lower than the one observed in the EU. Taking into consideration the ESU – the size of Polish average individual farm equalled to 9.9 ESU, whereas the average calculated for the EU one accounted for 33.5 ESU (Table 1). It's noteworthy, that the total agricultural area of Polish average individual farm in analyzed year was two times lower than the EU average (15.8 hectares in Poland, 34.2 hectares in the EU).

---

[4] AWU – annual work unit.

Table 2. Ranking of average individual farms according to ESU and by country in the EU-24 in
          the year 2004[a]

Tabela 2. Ranking przeciętnych gospodarstw rolnych według ESU i kraju UE-24 w 2004 roku[a]

Place Miejsce	Average farm from country Przeciętne gospodarstwo z kraju	ESU[b] (euro)	Place Miejsce	Average farm from country Przeciętne gospodarstwo z kraju	ESU[b] (euro)
1	the Netherlands Holandia	133.4	13	Austria Austria	29.1
2	Slovakia Słowacja	125.4	14	Spain Hiszpania	24.8
3	Czech Republic Czechy	114.5	15	Hungary, Ireland Węgry, Irlandia	20.3
4	United Kingdom Wielka Brytania	110.3	16	Estonia Estonia	15.5
5	Belgium Belgia	95.9	17	Portugal Portugalia	12.7
6	Denmark Dania	95.7	18	Cyprus Cypr	11.3
7	Germany Niemcy	85.6	19	Latvia Łotwa	10.9
8	France Francja	77.8	**20**	Greece, **Poland** Grecja, **Polska**	**9.9**
9	Luxembourg Luksemburg	62.5	21	Slovenia Słowenia	7.4
10	Sweden Szwecja	46.2	22	Lithuania Litwa	7.0
11	Finland Finlandia	39.8	EU-24 UE-24		33.5
12	Italy Włochy	29.9			

[a]Without Malta.
[b]ESU – economic size unit.
Source: own preparations and calculations based on FADN [2007] data.
[a]Bez Malty.
[b]ESU – ekonomiczna jednostka wielkości.
Źródło: opracowanie własne na podstawie danych FADN [2007].

So, when the family farm income without current subsidies is calculated on 1 hectare, the relation of Polish average individual farm to the EU's farm is equalled to above 121%.

In the ranking, prepared according to ESU, the Polish average individual farm took the twentieth place (with the Greek one) among average individual farms from the EU--24 in the year 2004 (Table 2). It is worth to emphasize once again, that the Polish average individual farm's ESU was equal to 9.9 ESU, when the average individual farm from the EU obtained 33.5 ESU.

The size above 100 ESU in the year 2004 obtained only four average individual farms: the Dutch average individual farm of size equalled to 133.4 ESU (first place in the ranking), the Slovak one – 125.4 ESU (second place), the Czech one – 114.5 ESU (third place) and the British one – 110.3 ESU (fourth place). Smaller ESU than Polish average individual farm in the year 2004 was noticed only in two cases, which were an average individual farm from Slovenia (7.4 ESU – twenty first place) and from Lithuania (7.0 ESU – twenty second place – the last place in the ranking).

The total output's structure of Polish average individual farm and of chosen EU-24 country in the 2004 year, were presented in Table 3. As mentioned, total output of Polish average individual farm was three times lower than the average total output obtained in EU-24 countries. The share of crops production in total output of Polish average individual farm exceeded 50% while the respective share of livestock production was equal to 48.5%. At the same time, the share of crops production of a representative farm from the EU-24 exceeded 51%, and the share of livestock production reached almost 44% in total output. It is worth underlining that in the year 2004, the highest percentage of crops production was observed in an average individual farm in Greece (77%), while the highest percentage of livestock production was noticed in the Irish one (85%).

In the structure of crops production of Polish average individual farm in the year 2004, production of cereals (18.5%) was the dominant factor, while vegetables and flowers (14.9%) took the second place. A reverse phenomenon could be revealed, while analysing the EU average individual farm's structure of crops production: vegetables and flowers (12.6%) were of the highest share, whereas the production of cereals (12.2%) was a bit smaller. For the sake of climatic conditions in Poland, production of citrus fruits, wine and grapes, olives and olives oil was impossible to perform to the extent observed in the Southern Europe. Being negligible, it was of no use to take it into account (Table 3).

Table 3. Structure of output in the average individual farm in the EU-24 and in Poland in the year 2004 [a]

Tabela 3. Struktura produkcji ogółem przeciętnego indywidualnego gospodarstwa rolnego w UE--24 i Polsce w 2004 roku [a]

Details Wyszczególnienie	EU [a] UE [a]	Poland Polska
1	2	3
Total output (euro) Produkcja ogółem (euro)	61 471.0	21 077.0
%		
Total output, including: Produkcja ogółem, tym:	100.0	100.0
1. Total output crops and products, including: 1. Produkcja roślinna, w tym:	51.2	50.6
cereals – zboża	12.2	18.5
protein crops – uprawy na nasiona	0.4	0.3
potatoes – ziemniaki	2.3	3.8

Table 3 – cont. / Tabela 3 – cd.

1	2	3
sugar beets – buraki cukrowe	2.4	3.5
oil-seed crops – rośliny oleiste	1.9	2.5
industrial crops – rośliny przemysłowe	1.0	0.3
vegetables and flowers – warzywa i kwiaty	12.6	14.9
fruits – owoce	3.5	4.8
citrus fruits – owoce cytrusowe	0.9	0.0
wine and grapes – winogrona	7.0	0.0
olives and olive oils – oliwki i oleje	2.4	0.0
forage area – pasza	2.2	0.7
other crop output – inna produkcja roślinna	2.4	1.3
2. Total output livestock and products, including: 2. Produkcja zwierzęca, w tym:	43.7	48.5
cows milk and milk products – krowie mleko i produkty mleczne	17.0	13.2
beef and veal – wołowina i cielęcina	7.3	3.4
pig meat – wieprzowina	10.6	16.4
sheep and goats – baranina i koźlęcina	1.8	0.1
poultry meat – drób	3.0	13.4
eggs – jaja	1.3	1.4
ewes' and goats' milk – owcze i kozie mleko	1.4	0.0
other livestock and products – inna produkcja zwierzęca	1.3	0.6
3. Other output [b] 3. Inna produkcja[b]	5.1	0.9

[a]Without Malta.

[b]Other output – for example: leased land ready for sowing, forestry products, contract work for others, hiring out of equipment, etc.

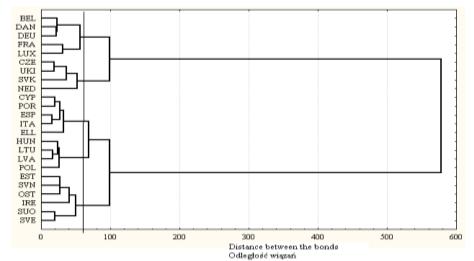Source: own preparations and calculations based on FADN [2007] data.

[a]Bez Malty.

[b]Inna produkcja – na przykład: produkcja z wydzierżawionej powierzchni lub produkty leśne lub zakontraktowana praca na rzecz innych, wynajem sprzętu, itp.

Źródło: obliczenia i opracowanie własne na podstawie danych FADN [2007].

In the livestock production's structure of average individual farm in Poland in the year 2004 production of pig meat (16.4%), poultry meat (13.4%) and cow milk and milk products (13.2%) were of the greatest importance. At the same time, in the livestock production's structure of EU average individual farm in the year 2004 cow milk, milk products (17.0%) and pig meat (10.6%) dominated. In Poland, the production of sheep, goats, ewes' milk and goat milk was almost unnoticeable.

THE HIERARCHICAL AGGLOMERATION CLASSIFICATION
AS A METHOD OF CLASSIFICATION OF AVERAGE INDIVIDUAL FARMS

The objects' classification, that is, a division of 24 average individual farms from particular EU-24 countries in classes on the basis of the method called hierarchical agglomeration classification is shown on Figure 1. This division was made on the basis on standardized data on ESU and the structure of total output (23 variables together).

Level of fixing of classes. Euclidian's distance = 60
Poziom wyznaczenia klas. Odległość euklidesowa = 60

Fig. 1. Hierarchical agglomeration classification of average individual farms from EU-24 countries in the year 2004. BEL – Belgium, CYP – Cyprus, CZE – Czech Republic, DAN – Denmark, DEU – Germany, ELL – Greece, ESP – Spain, EST – Estonia, FRA – France, HUN – Hungary, IRE – Ireland, ITA – Italy, LTU – Lithuania, LUX – Luxembourg, LVA – Latvia, NED – The Netherlands, OST – Austria, POL – Poland, POR – Portugal, SUO – Finland, SVE – Sweden, SVK – Slovakia, SVN – Slovenia, UKI – United Kingdom.
Source: own preparations and calculations based on FADN [2007] data.
Rys. 1. Hierarchiczna klasyfikacja aglomeracyjna przeciętnych indywidualnych gospodarstw rolnych z krajów UE-24 w 2004 roku. BEL – Belgia, CYP – Cypr, CZE – Czechy, DAN – Dania, DEU – Niemcy, ELL – Grecja, ESP – Hiszpania, EST – Estonia, FRA – Francja, HUN – Węgry, IRE – Irlandia, ITA – Włochy, LTU – Litwa, LUX – Luksemburg, LVA – Łotwa, NED – Holandia, OST – Austria, POL – Polska, POR – Portugalia, SUO – Finlandia, SVE – Szwecja, SVK – Słowacja, SVN – Słowenia, UKI – Wielka Brytania.
Źródło: opracowanie własne na podstawie danych FADN [2007].

The objects – average individual farms – are hierarchically positioned. Starting with 24 objects at the beginning of this research, as a result of analysis one class is created. Depending on the chosen level of the Euclidian's distance, different number of classes can be distinguished. Hence, for example, assuming the lowest calculated Euclidian's

distance (equalled to 15.6), 23 classes can be obtained. In this case, into 22 separated classes single average individual farms from different countries are classyfied and the 23rd class includes 2 average individual farms from Italy and Spain. On the other hand, assuming the highest calculated Euclidian's distance (equalled to 578.1), one class consisted of all 24 objects (average individual farms from EU-24 countries) is obtained.

The choice of classes' optimal number results from tradeoff between small number of classes with very diversified objects and large number of classes with smaller number of objects. While considering objects like average individual farms from different countries, high level of their individualization has to be taken into consideration. Hence, in this research, the Euclidian's distance being equal to 60 was chosen. Further, 5 classes were distinguished (Table 4), among them the two include 4 objects, other two classes consist of 5 objects whereas the last class contents 6 objects.

On the basis of hierarchical agglomeration classification, class 1 groups big average individual farms from the Western Europe (Belgium, Denmark, Germany, France and Luxembourg). The differentials between farms in this class were almost unnoticable. The mean value of farms' size equalled to 83.5 ESU, their output was mainly of livestock character. The characteristic feature of this output was a considerable share of cows milk, milk products, pig meet, beef and veal, and also cereals, vegetables and flowers in the total output. The agricultural area of average individual farm from class 1 referred to 67.4 hectares and produced the total output equalled to 157 000 euro. The average family farm income in class 1 amounted to above 29 000 euro.

The very big average individual farms from the Western and Central Europe were classified into class 2 (Czech Republic, Great Britain, Slovakia and the Netherlands). The mean size of farms from this class amounted to above 120 ESU, and their output was determined with crops production. The characteristic feature of output of farms from class 2 was a considerable share of crops, vegetables and flowers, cows milk and milk products in farms' total output. The average individual farm from this class covered average agricultural area equalled to above 240 hectares. Its total output equalled to above 278 000 euro. The average family farm income in class 2 amounted to above 19 000 euro.

Class 3 included medium big average individual farms from the Southern Europe (Cyprus, Portugal, Spain, Italy and Greece). Mean value of their economic size equalled to 17.7 ESU. Their total output was dominated by crops production. The vegetables and flowers, wine and grapes, olives and olive oils, citrus fruits, and also milk and milk products from cows, ewes and goats were the main elements in the structure of farms' total output. The average individual farm from class 3 encompassed agricultural area equalled to 15.6 hectares, its total output equalled to almost 31 000 euro and family farm income amounted to above 13 600 euro.

To the class 4, the average individual farms from the Central and Eastern Europe were qualified (Hungary, Lithuania, Latvia and Poland). The differentials between farms in this class were significant, but can be referred to medium ones. Farms from class 4 were of medium small character – their average size amounted to 12.0 ESU, they had bigger share of crops production, than livestock production, in the total output. These farms cultivated cereals, vegetables, sugar beets and potatoes. The considerable share in farms' total output had production of cows milk, pig meet and poultry. The average individual farm from class 4 covered 43.9 hectares of agricultural area, produced above 32 500 euro of output and gained family farm income of 8300 euro.

Table 4. Classes of average individual farms from the EU-24 on the basis of hierarchical classification agglomeration and their average basis characteristics in the year 2004[a]

Tabela 4. Klasy przeciętnych indywidualnych gospodarstw rolnych z UE-24, wyodrębnione na podstawie hierarchicznej klasyfikacji aglomeracyjnej oraz ich średnie podstawowe charakterystyki w 2004 roku[a]

Class Klasa	Average farm from country Przeciętne gospodarstwo rolne z kraju	Euclidian's distance Odległość euklideso-wa	Average value in class (v – variability indicator – %) Średnia wartość w klasie (v – współczynnik zmienności – %)			
			ESU[b] (euro)	total agricultural area całkowita powierzchnia UR (ha)	total output produkcja ogółem (euro)	family farm income dochód z gospodarstwa (euro)
1	Belgium, Denmark, Germany, France, Luxembourg Belgia, Dania, Niemcy, Francja, Luksemburg	56.1	83.5 (16.7)	67.4 (22.7)	157 785.4 (19.8)	29 571.0 (48.8)
2	Czech Republic, United Kingdom, Slovakia, the Netherlands Czechy, Wielka Brytania, Słowacja, Holandia	51.8	120.9 (8.7)	241.6 (89.1)	278 327.8 (27.1)	19 364.5 (100.1)
3	Cyprus, Portugal, Spain, Italy, Greece Cypr, Portugalia, Hiszpania, Włochy, Grecja	31.8	17.7 (51.0)	15.6 (65.6)	30 734.4 (54.3)	13 696.4 (72.8)
4	Hungary, Lithuania, Latvia, **Poland** Węgry, Litwa, Łotwa, **Polska**	25.6	12.0 (47.9)	43.9 (47.1)	32 678.5 (54.5)	8309.8 (24.8)
5	Estonia, Slovenia, Austria, Ireland, Finland, Sweden Estonia, Słowenia, Austria, Irlandia, Finlandia, Szwecja	50.2	26.4 (56.1)	58.1 (70.2)	57 769.7 (62.8)	15 578.0 (47.2)
Average in EU-24 Średnio w UE-24			33.5	34.2	61 471.0	18 111.0

[a]Without Malta.
[b]ESU – economic size unit.
Source: own preparations and calculations based on FADN [2007] data.
[a]ESU – ekonomiczna jednostka wielkości.
[b]Bez Malty.
Źródło: obliczenia i opracowanie własne na podstawie danych FADN [2007].

Class 5 encompass average individual farms from the Central and Northern Europe. These were medium big farms from Estonia, Slovenia, Austria, Ireland, Finland and Sweden. Their mean value of economic size amounted to 26.0 ESU and total output was dominated mostly by livestock production. The characteristic feature of their total out-

put was a considerable share of cow milk, milk products and beef and veal. The greatest influence of these farms' on crops production had only the cultivation of cereals. The average individual farm from this class encompassed average agricultural area of 58 hectares, its total output equalled to above 57 700 euro. The average family farm income observed in class 5 amounted to above 15 500 euro.

The results obtained on the basis of research can serve as an evidence that the necessary precondition of successful changes in Polish agriculture and the situation of individual farms is significant improvement of its economic strength. The simplest way in order to overcome existing obstacles is to raise the medium agricultural area of individual farm in Poland. The size of a farm determines its output and incomes, and in indirect manner influences the volume of subsidies gained from the budget and the European Union. The complete agricultural policy should assure the support for Polish individual farms and pursue systematical rise of incomes until reaching the European level.

Effects of conducted classification are an additional argument supporting postulates formulated in the literature of agricultural economy. According to them, the increase in financial resources' transfer for agriculture as well as complex modernization of agricultural industry, should be understand as the priority tasks with the state character. These tasks require a special and reasonable involvement of state and common public support [Czyżewski 2003, Wilkin 2001, Woś 2002, 2003, Zegar 2003].

CONCLUSIONS

1. The comparison of results of average individual farms from Poland and from the EU countries, revealed that the majority of chosen economic categories in Polish average farm was c.a. three times lower than in the EU one. For example in the year 2004, the medium value of total output of Polish average individual farm was equal to 21 077 euro, whereas value of this indicator observed in the EU was equal to 61 471 euro and family farm income in Polish average individual farm was equal to 6398 euro (in EU-24 it was equal to 18 111 euro respectively). It's noteworthy, that the total agricultural area of Polish average individual farm in analyzed year was two times lower than the EU average (15.8 hectares in Poland, 34.2 hectares in the EU). Taking into consideration the ESU – the size of Polish average individual farm equalled to 9.9 ESU, whereas the average calculated for the EU one accounted for 33.5 ESU. So in the ranking, prepared according to ESU, the Polish average individual farm took the twentieth place among 24 average individual farms from the EU-24.

2. The characteristic feature of agricultural output of the Polish individual farm was an equal share of crops production (50.6%) and livestock production (48.5%) in the total output. In the structure of crops production of the Polish average individual farm in the year 2004, production of cereals, vegetables and flowers dominated. A reverse phenomenon could be revealed, while analysing the EU average individual farm's structure of crops production. For the sake of climatic conditions in Poland, production of citrus fruits, wine and grapes, olives and olives oil was impossible to perform to the extent observed in the Southern Europe. Being negligible, it was of no use to take it into account. In the livestock production's structure of average individual farm in Poland in the year 2004 production of pig meet, poultry meet and cows milk and milk products were of the greatest im-

portance. At the same time, in the livestock production's structure of EU average individual farm in the year 2004 cows milk, milk products and pig meet dominated. In Poland, the production of sheep, goats, ewe milk and goat milk was almost unnoticeable.

3. The research confirmed the individualization of output' structures of average individual farms in the EU countries. On the basis of hierarchical agglomeration classification according to ESU and output's structure, 5 classes were obtained:

– class 1 groups big average individual farms from the Western Europe. The characteristic feature of this output was a considerable share of cows milk, milk products, pig meet, beef and veal, and also cereals, vegetables and flowers in the total output. The agricultural area of average individual farm from class 1 referred to 67.4 hectares and produced the total output equalled to 157 000 euro. The average family farm income in class 1 amounted to above 29 000 euro;

– the very big average individual farms from the Western and Central Europe were classyfied into class 2. The characteristic feature of output of farms from class 2 was a considerable share of crops, vegetables and flowers, cows milk and milk products in farms' total output. The average individual farm from this class covered average agricultural area equalled to above 240 hectares. Its total output equalled to above 278 000 euro. The average family farm income in class 2 amounted to above 19 000 euro;

– class 3 included medium big average individual farms from the Southern Europe. The vegetables and flowers, wine and grapes, olives and olive oils, citrus fruits, and also milk and milk products from cows, ewes and goats were the main elements in the structure of farms' total output. The average individual farm from class 3 encompassed agricultural area equalled to 15.6 hectares, its total output equalled to almost 31 000 euro and family farm income amounted to above 13 600 euro;

– to the class 4, the medium small average individual farms from the Central and Eastern Europe (including Poland) were qualified. These farms cultivated cereals, vegetables, sugar beets and potatoes. The considerable share in farms' total output had production of cows milk, pig meet and poultry. The average individual farm from class 4 covered 43.9 hectares of agricultural area, produced above 32 500 euro of output and gained family farm income of 8300 euro;

– class 5 encompass medium big average individual farms from the Central and Northern Europe. The characteristic feature of their total output was a considerable share of cow milk, milk products and beef and veal. The greatest influence on these farms' crops production had only the cultivation of cereals. The average individual farm from this class encompassed average agricultural area of 58 hectares, its total output equalled to above 57 700 euro. The average family farm income observed in class 5 amounted to above 15 500 euro.

REFERENCES

Błąd M., 2000. Gospodarstwa rolnicze w Sieci Danych Rachunkowości Rolnej Unii Europejskiej. Zag. Ekon. Rol. 4-5, 75-97.
Czyżewski A., 2003. Redystrybucja dochodów na rzecz rolnictwa w świetle doświadczeń amerykańskich. Zag. Ekon. Rol. 3, 102-115.
Czyżewski A., Henisz-Matuszczak A., 2004. Rolnictwo Unii Europejskiej i Polski. Studium porównawcze struktur wytwórczych i regulatorów rynków rolnych. Wyd. AE, Poznań.

FADN. 2007. www.europa.eu.int/comm/agriculture/rica/dwh.

Strategia rozwoju obszarów wiejskich i rolnictwa na lata 2007-2013 (z elementami prognozy do roku 2020). 2004. Ministerstwo Rolnictwa i Rozwoju Wsi, Warszawa.

Walesiak M., 2004. Metody klasyfikacji. In: Metody statystycznej analizy wielowymiarowej w badaniach marketingowych. Wyd. AE, Wrocław, 316-350.

Wilkin J., 2001. Wieś – społeczeństwo – państwo: nowe podstawy dyskursu społecznego w sprawach wsi w Polsce. Wieś i Rolnictwo 2 (111), 28-40.

Woś A., 2000. Układy strukturalne w rolnictwie chłopskim (w świetle danych rachunkowości rolnej). IERiGŻ. Komunikaty, Raporty, Ekspertyzy 465.

Woś A., 2002. Przestrzeń ekonomiczna rolnictwa. IERiGŻ, Warszawa.

Woś A., 2003. Przekształcenia strukturalne rolnictwa w dobie integracji europejskiej. Zag. Ekon. Rol. 4, 5-14.

Wyniki standardowe uzyskane przez indywidualne gospodarstwa rolne prowadzące rachunkowość rolną w 2005 roku. 2006. IERiGŻ, Warszawa.

Wysocki F., Lira J., 2005. Statystyka opisowa. Wyd. AR, Poznań.

Zegar J.S., 2003. Strategia polskiego rolnictwa po akcesji do Unii Europejskiej. Zag. Ekon. Rol. 3, 66-84.

SIŁA EKONOMICZNA POLSKICH INDYWIDUALNYCH GOSPODARSTW ROLNYCH W UNII EUROPEJSKIEJ W 2004 ROKU

Streszczenie. Celem badania była prezentacja siły ekonomicznej poszczególnych przeciętnych indywidualnych gospodarstw rolnych z krajów UE-24, ze szczególnym uwzględnieniem Polski. W badaniu położono duży nacisk na podobieństwa struktur produkcji. Analiza została oparta na danych FADN dla 2004 roku. Podstawowymi metodami badawczymi były analiza opisowa i porównawcza. Wykorzystano również wybrane metody statystyki opisowej, a wśród nich – standaryzację cech prostych oraz przeprowadzono hierarchiczną klasyfikację aglomeracyjną. Porównanie przeciętnych wyników polskiego i unijnego gospodarstwa rolnego, wykazało, że większość podstawowych kategorii ekonomicznych w polskim przeciętnym indywidualnym gospodarstwie rolnym była około trzykrotnie niższa niż w gospodarstwie unijnym. W rankingu według wielkości ESU polskie przeciętne indywidualne gospodarstwo rolne zajęło 20 miejsce pośród 24 przeciętnych unijnych indywidualnych gospodarstw rolnych. O specyfice produkcji rolniczej polskiego indywidualnego gospodarstwa rolnego zdecydował wyrównany udział produkcji roślinnej i zwierzęcej w produkcji ogółem. W strukturze produkcji roślinnej w polskim przeciętnym indywidualnym gospodarstwie rolnym dominowały zboża oraz warzywa i kwiaty. W strukturze produkcji zwierzęcej przeciętnego indywidualnego gospodarstwa rolnego w Polsce przeważały: wieprzowina, drób oraz mleko krowie i produkty mleczne. Na podstawie przeprowadzonej hierarchicznej klasyfikacji aglomeracyjnej według ESU i struktury produkcji uzyskano 5 klas przeciętnych indywidualnych gospodarstw rolnych z krajów UE-24.

Słowa kluczowe: ESU, indywidualne gospodarstwo rolne, aglomeracja, produkcja rolnicza