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STRUCTURAL CHANGES AND LABOUR INPUT IN POLISH AGRICULTURE AFTER THE ACCESSION TO THE EUROPEAN UNION

Agnieszka BIERNAT-JARKA

Warsaw University of Life Sciences – SGGW, Warsaw, 166 Nowoursynowska St., 02-787 Warsaw, Poland, Phone: +48 22 59 34071, Fax: + +48 22 59 34077,
Email: biernat-jarka.agnieszka@wp.pl

Corresponding author: biernat-jarka.agnieszka@wp.pl

Abstract

This article aims to show structural changes in Polish agriculture in the years 2002-2013, and to define labour input on farms. Despite the positive changes in the Polish area structure, it continues to be one of the worst area structures in the European Union. Another problem is the amount of labour input per 100 ha of arable land. On average, this amount is two times higher than in European Union countries. The high level of labour input is the result of overemployment, especially on small farms. This directly translates into reduction of productivity in Polish agriculture. At the same time, you should also bear in mind that the high unemployment rates in Poland lead to limited job opportunities outside agriculture.

Key words**:** *area structure, structural policy, Poland*

INTRODUCTION

Polish accession to the European Union in 2004 was associated with numerous changes and the need for adjustment of economic operators throughout the economy, including agriculture. Polish economy faced a significant challenge of joining the single European market, the necessary legal adjustments or opportunities to benefit from EU aid funds. On the one hand, there were great new opportunities for improving the competitiveness of the Polish economy. On the other hand, questions were raised whether or not Polish economic operators were able to adjust to the new principles of operation and manage in the new economic reality, and whether or not in a few years, we would be able to conclude that Polish integration with the European Union had brought positive effects. In agriculture, governed by the Common Agricultural Policy, in a situation where Polish farms had to adopt to EU regulations, including those related to environmental protection, the question of changes after the integration has become even more significant. At the same time, agriculture was facing huge opportunities for assistance and support, not only through the system of direct payments but also within the framework of the Rural Development Programme, where such measures as Modernisation of Agricultural Holdings enjoyed the greatest popularity among the beneficiaries.

MATERIALS AND METHODS

This article aims to present structural changes in Polish agriculture and attempts to evaluate the impact of Polish integration with the European Union in terms of changes in the area structure of agricultural holdings. According to Ciepielewska, the concept of agricultural structures is defined broadly, and includes both structural features of agriculture itself (including agrarian structure, production factors and management system) and its immediate economic environment (including trade and agri-food industry) as well as spatial environment (in regional terms) [6]. In turn, the New Encyclopaedia of PWN defines the concept of structure of agricultural holdings as a classification of farms in spatial terms, according to a specific criterion, usually the area of the land and arable land. Most often, the area characteristics of agricultural holdings are complemented by the criterion of

diversity of their economic size [10]. Agrarian structure is one of the factors that determine the development of agriculture. It influences the optimum utilisation of production aspects, economic situation of agricultural population and competitiveness of farms [4]. According to Babiak [1], diversification of farms in terms of agrarian structure results from natural conditions and the level of advancement of structural transformations. Of course, structural transformations may be supported and changes in the agrarian structure may become objectives of agricultural policy, as exemplified by the EU's structural policy [9].

In this article, the author focused on changes in the agrarian structure in Poland in the years 2003-2013, emphasising their importance for the functioning of agriculture as a whole. After the Polish accession to the European Union, in 2014, there were two possible scenarios of transformations in the area structure of Polish farms. On the one hand, the relatively easy acquisition of direct payments by Polish farmers, after the accession to the EU, could have resulted in the maintenance of the existing agrarian structure and lack of willingness to change on the part of farm owners. Especially, in the case of small and unprofitable farms, such payments often serve as social support and are used for current purchases, not always related to the functioning of the farm, or even treated as money for consumption purposes [5]. Such payments may even preserve the existing agrarian structure of farms, given the fact that Poland is dominated by small agricultural holdings. There were also cases of informal leases, under which the owner of the land received payments per arable land and a rent under the informal lease, agreed upon with another farmer, while the lessee generated profits from production on the leased land [10]. According to Poczta [13], the limits of support granted to a particular entity for modernisation of farms may result in their formal division, and thus negatively influence the agrarian structure. On the other hand, we are aware of the fact that concentration of land and increase in the size of farms is a perfectly natural process for entities involved in agriculture. For farmers focused on agricultural production, generating profits mainly from agricultural produce, it has become clear that they should strive to increase the size of their holding. In some parts of Poland there are problems associated with purchase of land, which has an obvious influence on the price of land in the region. In the case of large agricultural holdings, direct payments are used for different purposes than in the case of small farms, and these include investment purposes, which in turn contributes to the development of the farm as a whole.

Bearing in mind the foregoing evidence of possible structural changes after Polish integration with the EU, the author has decided to look more closely at this issue. The author formulated the following research questions:

(i)Did the area structure of farms change in the period after Polish integration with the European Union?

(ii)How did agricultural labour input change after Polish integration with the European Union?

The article uses the data provided by Eurostat and the Central Statistical Office for the years 2002-2013. The data for 2002 and 2010 are census data, obtained as a result of the Common Agricultural Census. However, you shall also bear in mind that due to the application of changes in the methodology of agricultural studies in 2010, aimed at its adjustment to the methodology applied in EU countries, there has been a change in the definition of agricultural holding. In accordance with the currently applicable definition, agricultural farms do not include holders of arable land who are not involved in agricultural production or holders of arable land of less than 1 ha who are involved in agricultural activity on a small scale. Any farm with arable land of less than 1 ha may still qualify as an agricultural holding only if it is involved in special agricultural production or production of the so-called significant scale, e.g. fruit trees, fruit bushes, vegetables or ground strawberries [7, 14]. Due to the large share of part-time or seasonal work, labour input in agriculture was

presented as annual work units. Annual work unit is an equivalent of full-time employment on a farm, which – according to the methodology of Eurostat – amounts to 1,800 hours. However, the national legislation in many EU Member States may provide otherwise, e.g. in Poland, the equivalent of full-time employment, i.e. annual work unit, is 2,120 hours.

RESULTS AND DISCUSSIONS

In analysing the structural changes in agriculture, we should also compare the area structure of Polish farms against the background of other EU countries. In 2010, in EU there were 12 014.7 thousand agricultural holdings involved in agricultural activity. In Poland, agricultural activity was conducted by more than 1500 thousand agricultural holdings. When comparing the years 2002-2010, we can observe a prominent decrease in the number of farms, from 2 172.2 thousand to 1506,6 thousand, i.e. by 30.6%. The reduction of the number of agricultural holdings is a continuous process – in 2013, the number dropped further to 1 429 thousand. If you compare 2013 and 2002, the number of agricultural holdings decreased by 34%.

Table 1. Number of agricultural holdings by area groups of arable land in the years 2002-2013

Itemisation [x]	Year			Percentage of agricultural holdings in 2013
	2002	2010	2013	
Total (in thousands)	2,172.2	1,509.2	1,429.0	100
0-5	1,444.8	831.4	767.2	53.7
5-10	372.5	335.0	315.2	22.1
10-20	246.7	218.5	211.5	14.8
20-50	90.3	95.3	103.3	7.2
> 50	17.9	26.5	31.8	2.2

[x] left-closed and right-open intervals were used in area groups

Source: Eurostat, Statistical Yearbook of Agriculture, GUS, Warsaw 2014, page 113

Changes related to individual area groups of agricultural holdings are of key importance. The largest decrease in the number of such holdings pertained to the group of farms with arable land between 0 and 5 ha, and amounted to 47%. Such a decrease is observed in all groups of agricultural holdings with arable land of up to 20 ha. On the other hand, in the years 2002-2013, there was an increase in the number of the largest holdings with arable land in excess of 20 ha, i.e. between 20-50 ha – by 13 thousand, and above 50 ha - by 13.9 thousand. The decrease in the number of the smallest farms and increase in the number of the largest farms contributed to the increase in the average area of agricultural holdings in Poland, namely from 6.5 ha of arable land in 2002 to 9.6 ha in 2010 and 10.22 ha in 2013.

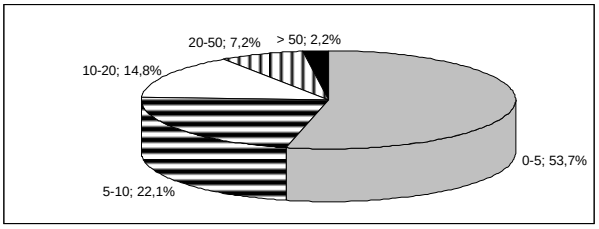

Fig. 1. Structure of agricultural holdings in Poland in 2013

Source: Author's own calculations on the basis of GUS [Central Statistical Office] data

Despite the positive changes, Poland continues to have one of the worst area structures of agricultural holdings in the European Union [16]. Farm area, due to the dual role of land in the agricultural production process (production and production area factors), limits the use of other production factors, and thus determines the size of production potential and the scale of production of the farm [15].

The so-called concentration index, developed by Corrido Gini, was used to determine the degree of concentration of arable land [2]. The value of this index may vary from 0 to 1. In the case of even distribution, the index equals 0, while in the case of total concentration of the value in one unit, the index equals 1. Weak concentration occurs if the index equals 0-30%, visible concentration for indexes between 30%-60%, and strong concentration for indexes in excess of 60%. The following formula has been applied in calculations:

$$Gx = 1 - \sum_{j=1}^{k} [(cj - cj\text{-}1)(uj + uj\text{-}1)]$$

where

cj is the cumulative part of the variable, calculated by dividing the cumulative amount by the total number of cases - n,

uj - is the cumulative share of the total value of the variable.

Table 2. Gini Index for the number of agricultural holdings by area groups of arable land

Itemisation [x]	Year		
	2002	2010	2013
Gini Index	0.60	0.49	0.47

Source: Author's own calculations

Based on the Gini index, we can conclude that in the case of farm concentration we are dealing with the so-called visible concentration. In 2002, this index amounted to 0.60, and in 2013 – 0.47 – with regard to concentration of small farms, i.e. with an area of up to 5 ha.

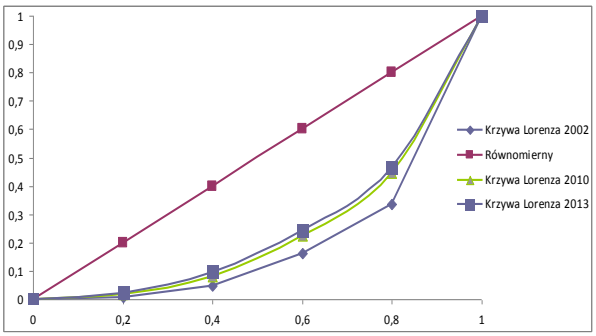

Fig. 2. Lorenz Curve for the concentration of the number of agricultural holdings by area groups of arable land in the years 2002, 2010 and 2013
Source: Author's own calculations on the basis of Eurostat and Statistical Yearbook data
[Legend: from top to bottom: Lorenz Curve 2002; Even (distribution); Lorenz Curve 2010; Lorenz Curve 2013]

Lorenz Curve has been used for the purpose of graphic presentation of the uneven distribution of the quality, i.e. the number of farms in each area group. The curve will be closer to the diagonal with the more even distribution of the value of the quality between the intervals, and vice versa, i.e. the curve will move further from the diagonal with the increase of concentration of the value of the quality in a small number of intervals.
Figure 2 shows a relatively large concentration of the number of farms.
Another characteristic feature of Polish agriculture is unfavourable structure of land use. Namely, in 2013, farms with an area of up to 5 ha of arable land used 13.1% of all arable land in Poland, and they represented almost 53% in the total number of farms. Reduction of the area of arable land in the years 2002 – 2010, was visible in farms with an area of up to 20 ha.

Table 3. Arable land in individual area groups of farms in the years 2002-2010

Itemisation	Year			share (%) of arable land in area groups of farms in 2013
	2002	2010	2013	
Total (in thousands)	14 426.3	14 447.3	14 609.2	100
0-5	2 309	2 004	1 910.6	13.1
5-10	2 657	2 387	2 228.3	15.3
10-20	3 389	3 011	2 916.8	20.0
20-50	2 562	2 779	3 052.9	20.9
> 50	3 510	4 266	4 500.6	30.8

Source: http://ec.europa.eu/agriculture/statistics/agricultural/2012/index_en.htm, Statistical Yearbook of Agriculture, GUS, Warsaw 2014, page 113

On the other hand, farms with an area exceeding 20 ha showed a visible increase in the land use, and in 2013 such farms used more than 50% of all arable land. To sum it up, we can conclude that both types of changes, i.e. changes in the area structure of farms and land use, are positive. After the Polish accession to the European Union, there was a significant decrease in the number of agricultural holdings in Poland, and increase in farms with an area of 20 ha. In addition, the structure of land use improved as well. Similar conclusions can be drawn with regard to specialised farms, e.g. in terms of orchard production. Nevertheless, if you compare Poland to other EU countries, its position is visibly worse [14]. Undoubtedly, the low concentration of arable land translates into less economic strength.

Labour Input

In accordance with the methodology of Eurostat, labour input relates to annual work units, i.e. the equivalent of full-time employment in an agricultural holding - 1800 hours. Based on the analysis of labour input, the table below presents the amount of total labour input and labour input per 100 ha of arable land.
In the analysed period, there was a decrease in labour input in agricultural holdings. The number of AWUs in Polish agriculture in 2002 amounted to more than 2 190 thousand units, while in 2010 it dropped to app. 1890 thousand units. The number of AWUs in 2010 corresponded to 19.5% of labour input in 27

EU Member States. Of all the European Union countries, only in Romanian agriculture labour input was comparable to Poland [14].

Table 4. Labour input (AWU) in Polish agriculture

Year	Itemisation	
	AWU (in thousands)	AWU/100 ha of arable land
2002	2 190.9	15.2
2010	1 897.2	13.1
2013	x	x

x no data available
Source:
http://ec.europa.eu/agriculture/statistics/agricultural/2012/index_en.htm, (15.03.2015)

The amount of labour input in agricultural holdings varies between individual area groups of farms. The highest amount, i.e. approximately 43% of total labour input is incurred on farms with an area of up to 5 ha. On farms with an area in excess of 20 ha, the engagement of labour input amounts to 11% of AWUs, and on farms with an area in excess of 50 ha – 6.2% [14]. The number of AWUs per 100 ha of arable land is also a significant indicator. In 2010, in Polish agricultural holdings, the average value of this indicator was 13.1, while in 27 EU Member States, in 2010, it amounted to 5.7. In the smallest agricultural holdings in Poland, this indicator amounted to app. 42 AWUs per 100 ha, while in those with an area in excess of 20 ha – it was only 2.8.
The large labour input in the small agricultural holdings in Poland is mostly associated with overemployment in such entities, which has a negative effect on the level of labour productivity in Polish agriculture. This aspect has also been emphasised in the studies of large-scale farms, which concluded that the slow pace of structural changes contributed to the low level of labour productivity and low dynamics of changes [7].

CONCLUSIONS

To sum it up, it should be noted that over the last ten years there have been some positive changes in the area structure of farms. The biggest decrease in the number of farms pertained to the area group of farms with arable land of up to 5 ha, while there was an increase in the number of the largest farms, i.e. with arable land exceeding 20 ha. However, despite the positive changes, Polish agriculture continues to have one of the worst agricultural area structures in EU countries. The Gini Index points out to concentration which is visible with regard to the number of farms in individual area groups. However, such concentration only relates to small farms, i.e. those with an area of up to 5 ha. The existing agrarian structure exerts significant impact on the economic situation of agricultural holdings. The area of the farm is not the only factor affecting the production potential of agriculture or its economic strength, but still, it is of essence. Especially, if we compare the area structure of Polish farms with that of other EU countries with similar production structure. Another important indicator which may be used to compare the situation in agriculture is labour input per 100 ha of arable land. In 2013, in Poland, labour input amounted to 13 AWUs, while in 27 EU countries, on average, it amounted to app. 6 AWUs. The large labour input in the small agricultural holdings in Poland is mostly associated with overemployment in such entities, which has a negative effect on the level of labour productivity.

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