ISSN 1644-0757
eISSN 2450-4602
http://acta_oeconomia.sggw.pl

ACTA SCIENTIARUM POLONORUM *Oeconomia 15 (2) 2016, 113–125*

THE COMPETITIVENESS OF AGRICULTURE OF EU MEMBER COUNTRIES OF CENTRAL AND EASTERN EUROPE

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Abstract. The aim of the study is to assess the competitiveness of agriculture in the countries of Central and Eastern Europe which are members of the European Union in relation to the agriculture of the so-called old EU countries. The partial indicators of productivity of production factors (land, labour, capital) for the years 2007–2014 were adopted as a measure of competitiveness. The research shows that the productivity of land and labour in the group of 11 countries in Central and Eastern Europe is much lower than the average for the 15 countries from the so-called old EU. The lowest competitive position of agriculture in terms of labour productivity occurs in countries with low levels of development, measured by GDP per capita (Bulgaria, Romania, Poland). Capital productivity differentiated the countries in the group to a lesser degree, as well as in a relation to the average results in the EU-15.

Key words: competitiveness, productivity, agriculture, European Union, countries of Central and Eastern Europe

INTRODUCTION

Competitiveness is considered to be a natural economic phenomenon and the main source of wealth creation. It is a quality that can be attributed to entities/beings of almost all the levels of analysis in the economics [Rosłanowska-Plichcińska and Jarosiński 1996]. Competitiveness also applies to the agriculture, where winning the competitive rivalry is – as in the whole economy – a prerequisite to achieving better opportunities for the development in the conditions of competition with other participants in the market process.

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Sector-level competitiveness refers to "the performance of a given industry in a given country or region in relation to the same industry in other countries or regions. A sector could be characterized as competitive on the basis of its capacity to grow, to innovate and to produce more and higher-quality goods and services, and to keep or gain market shares in international and domestic markets" [EU Commission 2009]. Kulawik [2012] in turn defines competitiveness as the ability of any economic system to function effectively (to endure) and develop under existing competition.

Competitiveness is a relative and gradated category, but it is also a condition that is shaped by many factors. In the short term competitiveness is determined by such factors as sectoral specialization, quality and density of infrastructure and other factors affecting the efficiency of the country/region. In the long term its level depends on the ability to sustain changes of the factors generating an increase in productivity, i.e. technology, human resources, spending on research and the structure of the economy [Huggins and Izushi 2008]. In such context, competitiveness is increasingly conditioned by the level of creativity and creation, circulation and absorption of knowledge [Golejewska and Gajda 2012]. In this context investment in learning and knowledge development play special role. Technologies, also known as innovation, are factor in the creation and introduction of new production techniques, management, and new modern principles of production organization [Jagiełło 2011]. With regard to the agriculture, a particular determinant of competitiveness is the geographical location, natural resources and their quality, the degree of market openness, the quality of human capital, institutions, both formal and informal, and innovation. Cebulak et al. [2008] are of the opinion that the competitive ability of agriculture and its individual entities are shaped more by internal resources (e.g. the production technologies, resources, factors of production) rather than by the market. In turn, the basic condition specific of studies into the competitiveness of agriculture and its entities is the limited mobility of production factors involved in agriculture [Nosecka et al. 2011], and in particular land, family labour resources but also, to a considerable extent, the capital adapted to the needs of agricultural activity [Nosecka 2014]. The growing importance of competitiveness stems from the intensification of globalization processes and liberalization of international trade [Komorowska 2014, Carraresi and Banterle 2015].

Due to the broad meaning of competitiveness and the diversity of factors influencing it, there is no uniform measure for its evaluation [Korom and Sági 2005]. Productivity is considered the most reliable indicator of competitiveness in the long term [European Bureau and Butault 1992, Commission 2009]. Trade theory suggests that the competitiveness of a nation is based on the concept of comparative advantages. Among the factors influencing country's position in the international food trade are mentioned, among others, costs of production, productivity of labour in agriculture [Nowak 2012] or the use of innovative technologies. Staszczak [2011] emphasizes that the EU supports its own agriculture by protecting it from external competition, but must gradually liberalize trade in food as a result of negotiations within the World Trade Organisation (WTO), which leads to an increase of trade in foreign food. In international comparisons, the competitiveness of agriculture is also assessed in terms of costs. According to Latruffe [2010], the

evaluation of competitiveness should be decided based on several components. However, the available studies usually include only one aspect of its assessment. Regardless of the adopted measures, competitiveness should be assessed in relation to the reference point due to the fact that it is a relative term. This justifies the comparison of countries or sectors to each other.

MATERIAL AND METHODS

This study aims to evaluate the economic significance of agriculture and its competitiveness in the European Union member states situated in Central and Eastern Europe in relation to agriculture of the so-called old Union member states. The partial indicators of productivity of production factors (land, labour, capital) for the years 2007–2014 were adopted as a measure of competitiveness. The selection of measures was determined by the fact that productiveness is a frequently used method of evaluating competitiveness and upon the approval of the Lisbon Strategy the improvement of productiveness became one of the main parameters for evaluating the progress of economic development [Floriańczyk et al. 2013]. On the other hand, the role of agriculture for the economies of respective member states was described using indicators such as: GDP per capita, share of agriculture in total gross value added (GVA), share of people employed in agriculture, share in the EU-28's agricultural output and share in the EU-28's agricultural area. Thus, the study covered 11 countries of Central and Eastern Europe and a group of 15 countries of the Old EU. The study did not include Cyprus and Malta due to the fact that they are not part of either the group of countries of Central and Eastern Europe, nor a group of countries of the old 15. The competitive analysis was based on Eurostat data from the years 2007–2014.

THE ECONOMIC IMPORTANCE OF AGRICULTURE IN THE EU COUNTRIES

In assessing the competitiveness of the agricultural sector in EU member states, one should pay attention to the specific conditions of its development. The results of research of many authors indicate considerable differences in the level of development of individual member states, including the level of development of agriculture [Arzeni et al. 2001, Serrão 2003, Fuller and Beghin, Eds 2007, Poczta and Fabisiak 2007]. In the agricultural sector, these differences relate to the economic importance of agriculture, the production potential of this sector and efficiency of its use. Table 1 presents selected indicators characterizing agriculture of 27 EU countries, as well as a synthetic indicator of socio-economic development – GDP per capita.

According to the indicators presented in Table 1, the importance of agriculture in the individual member states of the European Union presents a strong differentiation. It is suggested by this sector's part in the gross value added, ranging on average in the years 2007–2014 in the new EU countries from more than 5% in Bulgaria to 0.56% in Slovakia.

Table 1. Selected characteristics of agriculture in the EU member countries of Central and Eastern Europe compared to the countries of the Old EU (the average for 2007–2014)

Country	GDP per capita (EUR)	Share of agriculture in total gross value added (%)[a]	Share of people employed in agriculture (%)	Share in the EU-28's agricultural output (%)	Share in the EU-28's agricultural area (%)
	Countries of Central and Eastern Europe				
Bulgaria	5 262.5	3.96	12.7	0.9	2.7
Croatia	10 437.5	2.77	12.2	0.8	0.9
Czech Republic	14 787.5	0.68	2.3	1.0	2.0
Estonia	12 712.5	1.83	4.3	0.2	0.5
Hungary	10 100.0	2.31	11.5	1.7	2.7
Latvia	10 300.0	1.57	9.7	0.2	1.1
Lithuania	10 300.0	3.21	11.2	0.5	1.6
Poland	9 525.0	2.25	13.2	5.0	8.3
Romania	6 637.5	5.33	20.0	3.6	7.5
Slovenia	17 825.0	1.36	8.5	0.3	0.3
Slovakia	12 587.5	0.56	2.9	0.4	1.1
UE-11	10 952.3[b]	2.35[b]	9.8[b]	14.7[c]	28.6[c]
	Countries of the Old EU				
Austria	36 200.0	0.95	3.2	1.6	1.6
Belgium	34 025.0	0.52	1.4	2.0	0.8
Denmark	43 975.0	0.82	2.0	2.4	1.5
Finland	36 112.5	1.34	3.3	1.1	1.3
France	31 225.0	1.61	3.2	19.0	15.9
Germany	32 487.5	0.51	1.3	11.8	9.6
Greece	19 150.0	3.79	12.2	3.2	2.8
Ireland	39 537.5	0.89	8.2	1.6	2.8
Italy	26 912.5	1.86	5.0	12.7	6.9
Luxembourg	80 050.0	0.25	1.7	0.1	0.1
Netherlands	38 337.5	1.79	1.9	6.7	1.1
Portugal	16 600.0	1.91	6.5	1.8	2.1
Spain	23 050.0	3.19	4.9	13.5	13.4
Sweden	40 887.5	0.40	1.4	1.3	1.7
United Kingdom	31 312.5	0.40	1.0	6.2	9.8
UE-15	35 324.2[b]	1.35[b]	3.8[b]	85.1	71.3

[a] average for the years 2007–2013; [b] average for the group of EU countries; [c] together for a group of EU countries.

Source: Own calculations based on data from Eurostat.

In the countries of the old EU this indicator reached the average of 1.35% during the researched period, ranging from 3.79% in Greece to 0.25% in Luxembourg. In the EU-15 countries in addition to Greece, only in Spain the share of agriculture in the country's gross value added exceeded the average index level calculated for a group of 11 new member states.

Similar difference as the indicator discussed above is shown by the level of employment in agriculture. The greatest importance of this sector from the point of view of the labour market among the new EU member states is presented in Romania, Poland, Bulgaria and Croatia, where the percentage of people employed in agriculture in the years 2007–2014 reached respectively 20, 13.2, 12.7 and 12.2%. On average, in the group of 11 researched countries almost 10% of people were employed in this sector, with less than 4% achieved for the EU-15. It may also be noticed that a higher share of agriculture in gross added value of the country corresponds with a higher proportion of workers in this sector and the low level of development of the country. In countries such as Romania, Bulgaria, Poland, Croatia, Hungary, and Lithuania, GDP per capita is much lower than the average in the EU-15 and lower than the average in the 11 researched countries. This is accompanied by a relatively high share of agriculture in the creation of gross value added and high levels of employment in agriculture.

The role of agriculture in individual countries is also demonstrated by land resources, which show the production potential in this sector. The largest land resources of the 11 researched countries have Polish and Romanian agriculture with 8.3 and 7.5% respectively of the EU-28 agricultural lands. The group of the researched countries have at the disposal 28.6% of the EU's land resources. Among the "old 15" the dominant role in terms of resources of agricultural land plays the French and Spanish agriculture, which have a total of 29.3% of acreage in the European Union.

Factors of production, in addition to economic and organizational conditions, determine the level of agricultural production in different countries. The highest share in the EU's agricultural production had, in the researched years, the agriculture of Poland (5%) and Romania (3.6%), while the total contribution of 11 countries in Central and Eastern Europe in the production of the whole Community stood on average at 14.7% in the period 2007–2014. Among the countries of the old EU the production with the highest value was generated by the agriculture of France and Spain, and its share in the total Union production in the period amounted to 19 and 13.5%.

An important role in building the competitiveness of agriculture in national and international markets plays an agrarian structure and changes in its scope. This is due to the fact that the economic power of farms is closely linked to the wealth of individual holdings in productive assets, including mainly the land [Sikorska 2013]. European Union countries are characterized by a great diversity of agricultural structures. This is mainly because of the historical and natural factors and the level of sophistication of structural transformation. However, the general trends of these changes can be noted, which point to reduction of the number of farms, as well as stimulate the growth of production units areas. These changes, which are beneficial from the perspective of the ability to compete on the Community market, are slow processes and they require the mobilization of stimulating mechanisms both at EU and national levels. Therefore, the governments of many countries introduce a statutory or even constitutional protection of family farms which are the basis of the agricultural system [Babiak 2010].

Table 2 shows the average area of farms, an area of nutrition (area of arable land per 1 inhabitant of the country) and the level of concentration of land used for agriculture in the 11 researched EU countries against the group of countries of the old 15. The degree of concentration of land used for agriculture was determined based on the Lorenz

concentration factor, which adopts the value in the range of <0, 1>. If the ratio is equal to 0, we deal with a lack of concentration, with its value equal to 1, the concentration is complete. It was determined by the following formula [Wysocki and Lira 2003]:

$$k = \frac{5,000}{5,000} - M$$

where: $M = \frac{1}{2}\sum_{i=1}^{k} u_{i(1)} \cdot (\tilde{u}_{i(2)} + \tilde{u}_{i-1(2)})$;

$u_{i(1)}$ – a share of the i interval;

$\tilde{u}_{i(2)}$ – the sum of cumulated interest.

The indicators presented in Table 2 refer to the year 2010 due to the fact that these are the most recent available data on the structure of farms in the European Union.

Table 2. The average size of farms, the degree of concentration of agricultural land and the area of nutrition in the countries of Central and Eastern Europe which are members of the EU and the group of countries of the Old EU in 2010

Country	The average size of farm (ha)	The Lorenz concentration index	The area of nutrition (ha per 1 inhabitant)
	Countries of Central and Eastern Europe		
Bulgaria[a]	6.2	0.88	0.7
Croatia	nd	nd	0.3
Czech Republic	152.4	0.75	0.3
Estonia	48.0	0.79	0.7
Hungary	8.1	0.91	0.6
Latvia	21.5	0.71	0.8
Lithuania	13.1	0.72	0.8
Poland	10.5	0.62	0.4
Romania[a]	3.5	0.70	0.6
Slovenia	6.5	0.52	0.2
Slovakia	77.5	0.89	0,3
	Countries of the Old EU		
UE-15	23.1	0.78	0.4

[a]data for 2002, nd – no data.

Source: Own calculations based on data from Eurostat.

The area of arable land per 1 inhabitant (i.e. area of nutrition) is diverse within the researched group of the countries. The largest area of arable land per person was noted in such countries as Latvia and Lithuania. The lowest level of this index occurred in Slovenia, Slovakia, Croatia and the Czech Republic. The average potential for farms defined by the resources of agricultural land ranged in 2010 from more than 150 ha in the Czech Republic to only 3.5 ha in Romania.

The area of agricultural land at the disposal of area groups of individual farms determines the level of concentration of land in agriculture. Lorenz concentration ratio which

reflects this situation received values between 0.52 (Slovenia) to 0.91 (Hungary) in the researched group, while for the old EU it reached the level of 0.78. Alongside Slovenia, the largest distribution of agricultural land among farms of the researched group of countries occurred in the Polish agriculture. It points to the necessity for further structural transformation in the agricultural sector of these countries. It seems that the significant drivers of transformations within the agricultural structures are, and will be in longer term, measures implemented both at the level of national policies, as well as in the framework of the Common Agricultural Policy.

THE PRODUCTIVITY OF PRODUCTION FACTORS IN AGRICULTURE

Analysis of productivity is a useful management tool at every economic level. At the level of national and sectoral productivity indicators help to evaluate the performance of management and the quality of social and economic policy [Prokopenko 1987]. The importance of productivity in assessment of the agriculture competitiveness level is also indicated by Latruffe [2010], who lists the measure next to other measures relating to the international trade in agricultural products, as well as to the strategic management (strategic management measures of competitiveness). Productivity can be measured with the help of partial indicators relating to the different factors of production, or as the total productivity. In this research partial indicators of land, labour and capital were calculated (Table 3). Labour productivity was determined as the relation of the value of agricultural production to the number of full-time employees in the sector, the productivity of the land as the value of production per 1 ha of agricultural land, and the capital productivity was determined based on the value of agricultural production relation to the value of total intermediate consumption[1].

Labour productivity is generally the most important measure of productivity [Poczta 2003]. The importance of labour productivity stems from the fact that this measure determines the income situation, and the possibility of internal accumulation in agriculture [Poczta and Kołodziejczak 2008]. It is an indicator of both economic strength and prospects for development [Kowalski 1998]. Labour productivity is also closely related to innovation, in the introduction of new products, services, processes as well as organisational and marketing innovations can increase labour productivity and create further high potential for productivity gains [EU Commission 2009]. Labour productivity index in any of the countries surveyed could not match the level attained on average in the EU-15. In the years 2007–2014 the average value of production per one person employed full-time in agriculture ranged from 6,926.2 in Romania and 7,649.1 in Bulgaria to 31,118.7 EUR per capita in the Czech Republic, thus demonstrating relatively great diversity. Labour productivity in a group of old member states was in the period nearly four times higher than the average in the group of new countries.

[1] Total intermediate consumption – total specific costs (including inputs produced on the holding) and overheads arising from production in the accounting year.

Table 3. Productivity of land, labour and capital in agriculture countries in Central and Eastern Europe belonging to the EU against the Old EU countries (average for 2007–2014)

Country	Productivity of land (EUR·ha UAA^{-1})	Productivity of labour (EUR·AWU^{-1})	Productivity of capital (EUR·EUR^{-1})
	Countries of Central and Eastern Europe		
Bulgaria	761.9	7 649.1	1.6
Croatia	2 147.4	12 785.4	1.8
Czech Republic	988.2	31 118.7	1.4
Estonia	629.7	23 046.1	1.6
Hungary	1 258.6	12 809.3	1.6
Latvia	449.2	9 214.8	1.5
Lithuania	660.5	12 300.2	1.7
Poland	1 104.6	8 021.5	1.7
Romania	890.2	6 926.2	1.8
Slovenia	2 000.4	11 985.3	1.8
Slovakia	757.0	22 195.3	1.2
UE-11	1 058.9	14 368.3	1.6
	Countries of the Old EU		
UE-15	2 846.2	54 038.3	1.8

Source: Own calculations based on data from Eurostat.

The productiveness of land is the central point for all analyses of agricultural production effectiveness and growth [Bezat-Jarzębowska and Rembisz 2015]. Productivity of land among the countries in Central and Eastern Europe also varied, in four countries (Croatia, Hungary, Poland and Slovenia) its level exceeded the average fixed for 11 of the countries studied, but none of them could equal the average of the EU-15. The smallest effective use of the land factor was characterized by agriculture of Latvia (449.2 EUR per 1 ha), where the studied indicator was more than two times lower than the average for the entire group.

Differentiation in capital productivity in the surveyed countries and in relation to the average for the whole group (11 countries) is less than for the other two factors of production – land and labour. Agriculture in Croatia, Romania and Slovenia achieved efficiency of capital at a level similar to that which occurred in the group of 15 countries of the Old EU, i.e. 1.8 EUR per 1 EUR. The lowest efficiency of intermediate consumption reached agriculture in Slovakia, where the cost of generating 1.2 EUR worth of production cost 1 EUR. Two-dimensional graph in which the location of each country depends on two sub-indices of productivity – land and labour – was prepared to illustrate the diversity factor productivity in agriculture of the researched countries, as well as its level in relation to the group of countries forming the Old EU (Fig.). Due to the relatively small differences in the productivity of capital in the group, this indicator was not included in the chart. Distribution of countries covered by the research shows the great difference separating them from the average level represented by the countries of the Old 15, especially in terms of the efficient use of labour in agriculture.

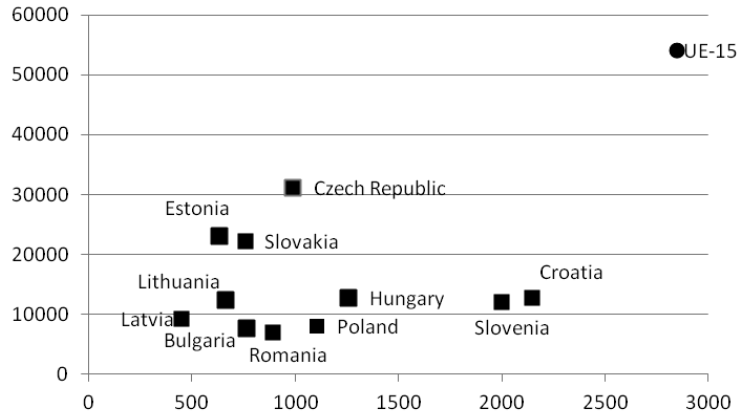

Fig. Distribution of countries in Central and Eastern Europe belonging to the EU, depending on labour productivity and land productivity compared to other countries from the Old EU (average for 200–2014)

Source: Own calculations based on data from Table 3.

The competitive position of agriculture of the researched countries, based on partial productivity indicators were determined based on their relationship to the average value calculated for the EU-15. The results are summarized in Table 4.

Table 4. Productivity of land, labour and capital in the agriculture of the EU member states in Central and Eastern Europe in relation to the productivity of the countries of the Old EU (EU-15 = 100) (average for 2007–2014).

Country	Land productivity	Labour productivity	Capital productivity
	Countries of Central and Eastern Europe		
Bulgaria	26.8	14.2	88.9
Croatia	75.4	23.7	100.0
Czech Republic	34.7	57.6	77.8
Estonia	22.1	42.6	88.9
Hungary	44.2	23.7	88.9
Latvia	15.8	17.1	83.3
Lithuania	23.2	22.8	94.4
Poland	38.8	14.8	94.4
Romania	31.3	12.8	100.0
Slovenia	70.3	22.2	100.0
Slovakia	26.6	41.1	66.7
UE-11	37.2	26.6	88.9
	Countries of the Old EU		
UE-15	100.0	100.0	100.0

Source: Own calculations based on data from Eurostat.

The analysis of competitive advantages in relation to the factor of land and labour shows that in none of the researched countries in Central and Eastern Europe reached productivity similar to that which occurred on average in the years 2007–2014 in the group of 15 countries from the Old EU. On average across the group of 11 countries the land productivity reached only 37.2% of the land productivity of the EU-15, and in 6 countries that ratio was even less favourable.

The competitive position of the researched group based on the labour productivity was lower than in the case of competitiveness based on the effectiveness of the use of land, because this factor reached on average the level of 26.6% of the value calculated for the EU-15. Such a large gap between old and new EU countries in terms of labour productivity should translate to a much lesser level of employment in agriculture and better technical equipment and manpower in the EU-15.

Smaller disparities relate to the productivity of capital, in three of the 11 researched countries, the value of this indicator was the same as in the EU-15 and the average for the entire researched group this ratio stood at 88.9%.

CONCLUSIONS

The presented research assessed the competitiveness of agriculture in 11 EU-member countries in Central and Eastern Europe in relation to the countries of the Old EU by the factors of production. The average values for the 15 countries making up the Community since 1995 were adopted as a reference point for the examined indicators, which made it possible to determine the competitive position of countries that have joined it much later, i.e. 2004, 2007, 2009 and 2013. This also means that these countries operate in a completely different market conditions and undergo different development paths. Each of the 11 surveyed countries has a much lower level of development than the old EU countries, as evidenced by the value of the synthetic development meter, which is GDP per capita. Only Slovenia has achieved in the researched period the level of 50% of the index calculated for the group of EU-15 countries. In the remaining ten countries that ratio was much less favourable. Different levels of development in different countries, diverse role of agriculture in the economy, as well as differences in the resources, form a relatively strong differentiation of competitiveness of the agricultural sector. They should also be explained by the historical and natural determinants, and also the length of belonging to the European Union, which determines the level of support of the agricultural sector from EU funds.

The analysis of indicators adopted for research show that the competitiveness of agriculture assessed by the partial productivity of land, labour and capital in the group of 11 countries in Central and Eastern Europe is lower than the average for the 15 countries of the Old EU. This is true particularly for the productivity of labour and land, less for the capital. The absolute difference in average productivity of land between the group of 11 researched countries and the group of 15 old EU countries, averaged over the period 2007 to 2014 to 1,787.3 EUR per 1 ha. In relative terms, the difference was almost three-fold. Even worse competitive position was reached by the countries of Central and Eastern Europe when considering labour productivity in agriculture, which should be associated

with structural problems that exist in many countries in this group. In the case of this indicator, agriculture of 11 researched countries reached an average level of less than 27% of the level of labour productivity of the Old EU and only in the Czech Republic this ratio exceeded 50%.

It can be assumed that the pace of changes in agriculture in the group of new member states will be faster than in the EU-15 in the coming years, which will be determined by the assumptions of the common agricultural policy and the cohesion policy. The measures implemented under those policies activate structural transformation in the agriculture of each country.

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KONKURENCYJNOŚĆ ROLNICTWA KRAJÓW EUROPY ŚRODKOWO-WSCHODNIEJ BĘDĄCYCH CZŁONKAMI UNII EUROPEJSKIEJ

Streszczenie. Celem opracowania jest ocena konkurencyjności rolnictwa krajów Europy Środkowo-Wschodniej będących członkami Unii Europejskiej w relacji do rolnictwa krajów tzw. starej Unii. Jako miarę konkurencyjności przyjęto cząstkowe wskaźniki produktywności czynników produkcji (ziemi, pracy, kapitału) dla lat 2007–2014. Z badań wynika, że produktywność ziemi i pracy w grupie 11 krajów Europy Środkowo-Wschodniej jest

znacznie mniejsza niż przeciętnie w 15 krajach tzw. starej Unii. Najniższa pozycja konkurencyjna rolnictwa pod względem produktywności pracy występuje w krajach o niskim poziomie rozwoju, mierzonego PKB per capita (Bułgaria, Rumunia, Polska). Produktywność kapitału w mniejszym stopniu różnicowała kraje w badanej grupie, a także w relacji do przeciętnych wyników uzyskanych w krajach UE-15.

Słowa kluczowe: konkurencyjność, produktywność, rolnictwo, Unia Europejska, kraje Europy Środkowo-Wschodniej

Accepted for print: 28.04.2016

For citation: Nowak A. (2016). The competitiveness of agriculture of EU member countries of Central and Eastern Europe. Acta Sci. Pol., Oeconomia, 15 (2), 113–125.