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Differentiation in cereal production among Member States of the European Union

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Abstract. The paper aimed at evaluating spatial differentiation and trends in changes in the level and structure of cereal production in the European Union. The significance of the undertaken studies is a result of the growing requirement for cereals and a high cereal production potential, thanks to which respective member states are able to compete on the global market. This paper is based on the statistical and tabular analysis of EUROSTAT database pertaining to years 2007–2016. It provided grounds for calculating the selected indicators of changes in the cereal production level and structure as well as the roles of respective member states in the EU production of major cereals. The surveys showed fluctuations in the value of cereal production in the study period. A high increase was recorded in the value of wheat production (20.4%) in 2016 in comparison to that in 2007. The total area under cereal crops in the EU slightly decreased. The largest producers of cereals in the EU are France, Germany, Poland, Spain and the United Kingdom – in 2016 those states produced 58% of the total cereal crops. In addition, studies show that EU member states differ in terms of technological yield of cereals measured as yield per 1 ha. The average yield of cereals in 2016 ranged from 82.2 dt ha^{-1} in Ireland to 21.9 dt ha^{-1} in Cyprus.

Keywords: cereals, European Union, production value, crops, yield

INTRODUCTION

Cereal production is of strategic importance both in agriculture in Poland and in other European Union (EU) countries, where the average area of grain cultivation occupies about 70% of arable land (Czakowski, 2013; Ginter, Szarek, 2010). Europe produces about 20% of the world's cereal production, 63% of which in 28 European Union countries (FAO, 2016). Cereals are grown on half of the farms in the European Union, occupying one third of the agricultural area and 53.4% of the EU arable land structure (European Commission, 2014). In 2016, the EU production of cereals amounted to 301 million tonnes. Approximately 20% of world wheat, 7% of maize and 41% of barley were produced in 28 EU countries (Eurostat, 2017). From studies by Baer-Nawrocka and Kiryluk-Dryjska (2015) show that, at EU level, the production of the majority of cereals covers the needs of the internal market.

According to OECD and FAO forecasts (2018), global grain consumption will increase by 14% between 2018 and 2027, mainly due to higher food and feed consumption in developing countries. Wheat consumption will increase by 13% over period mentioned before and will continue to be greatly used for human consumption. Simultaneously, by 2027, the use of wheat for animal feed is projected to increase mainly in China, Russia and the EU-28, while the use of wheat for biofuels will represent only 2% of global consumption.

The agriculture of the European Union is characterized by a large internal diversity, which determines the level and structure of production in individual countries (Janiszewska, Ossowska, 2014; Nowak et al., 2016; Rzeszutko, 2017). Donfouet et al. (2017) emphasise that the spatial distribution of agricultural production is shaped by agronomic, environmental and economic factors. The structure of agricultural production is also influenced by market factors, which include demand for agricultural products (Nowak, Wójcik, 2013). In the countries of the European Union, the regulations of the Common Agricultural Policy is also a factor influencing agricultural production.

As research by many authors' prove, yields and production of cereal grain are more determined by the size and area structure of farms and their equipment with technical means than by natural and agrotechnical factors (Jaśkiewicz, Sułek, 2013; Musiał, 2015). According to Kopiński and Matyka (2016), changes in the production of cereals in the long term are shaped by economic conditions, particularly price fluctuations related to the import of grain and relations between cereal purchase prices and prices of

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means of production. They also indicate an important role of trends in changes in animal production.

The rising global demand for cereals justifies undertaking a study on the diversification of cereal production in the European Union and on possible opportunities for increasing cereal production (Schils et al., 2018). The importance of analyses concerning the cereal market results also from their high production potential, allowing for competition with other countries (Jaczewska-Kalicka, 2008). Realising this, the aim of this study was to assess spatial differentiation and tendencies of changes occurring in the level and structure of cereal production in the European Union.

MATERIAL AND METHODS

The research was conducted based on data from the Eurostat database (2019). It covered 28 Member States of the European Union. The time span of the survey covers the years 2007–2016, i.e. a 10-year research period. It has been determined by the availability of figures for the new members, especially for the countries that joined the EU last (Bulgaria, Romania and Croatia). The scope of the survey covered changes in the level and structure of cereal production, as well as the role of individual Member States in EU production of the most important cereals. The study is based on statistical-tabular analysis of data from the Eurostat database (2019). The research was limited to selected indicators, being aware that they are concerned with only selected aspects of cereal market in the European Union. Production potential of agriculture, shaped by labour, land and capital resources, creates grounds for achieving specific production effects in particular countries (Baer-Nawrocka, Markiewicz, 2013). The value of agricultural production is shaped on the one hand by the size and structure of agricultural production, and on the other hand by market and natural conditions. Therefore, the analysis covered changes in the value of cereal production in the EU, the percentage share of Member States in the value of cereal production, as well as the share of selected cereals in the total value of cereal production in a given country. According to the Eurostat methodology (Baza Eurostat, 2019), cereal production is valued at basic prices, i.e. prices received by the producer, after deduction of all taxes on products but including all subsidies on products. Another variable included in the surveys is the area sown to cereals. According to Kulikowski (2013), the spatial analysis of agricultural production is most often carried out using data on sown areas. The analysis also considers the level of yields and harvest of cereals. Czakowski (2013) accentuate that harvest structure and yields are of strategic importance for the cereal market. They are determined, among others, by: climatic conditions, soil quality and structure, as well as the level of farming standard.

Analysing individual cereal species, due to the availability of figures for 28 EU countries and within the assumed time range, the research was narrowed down to wheat, barley, oats and spring cereal mixtures together and group of other cereals.

RESULTS

According to the data presented in Figure 1, the value of cereal production in the EU was subject to fluctuations

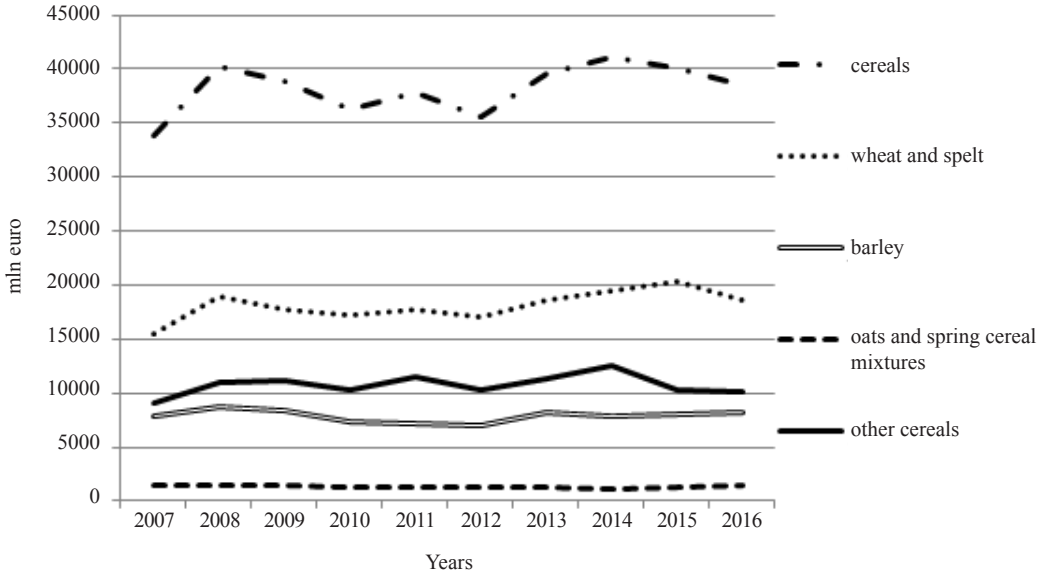

Figure 1. Changes in the value of cereal production in EU-28 in 2007–2016 (MEUR – fixed prices in 2005)
Source: author's study based on EOUROSTAT (2019)

over time. In 2016 it amounted to 38 504 million EUR and was 13.7% higher in relation to 2007. These fluctuations resulted from changes in the sown area, from the diversification of yields shaped, among others, by weather conditions, as well as from price conditions. An important factor influencing cereal yields and, consequently, the value of production is also the intensity of farming (Jaśkiewicz, Sułek, 2017). The changes in the production value also affected individual grain species. The highest growth dynamics in 2016 compared to 2007 was recorded for wheat and spelt, whose production value increased by 20.4%. Wheat occupies the first place in the world's cereal production and is primarily a typical cereal of the temperate climate (Ginter, Szarek, 2010). Moreover, the study by Gołaś (2017) shows that EU farms specialising in the production of wheat in the period 2007–2013 have seen a fairly pronounced increase in production capacity, mainly due to an increase in wheat yields. Barley production recorded a 5.8% incre-

Table 1. Contribution of EU Member States to the value of cereal production in the years 2007 and 2016.

Member state	Structure of cereal production value in EU [%]		Share of wheat and spelt in cereal production value [%]		Share of barley in cereal production value [%]		Share of oats and summer cereal mixtures in cereal production value [%]		Share of others cereals in cereal production value [%]	
	2007	2016	2007	2016	2007	2016	2007	2016	2007	2016
UE-28	100.0	100.0	45.8	48.5	23.1	21.5	4.5	3.9	26.6	26.1
Belgium	0.7	0.4	66.0	76.0	15.0	20.1	0.9	1.6	18.1	2.3
Bulgaria	0.7	1.9	70.2	61.3	14.5	9.1	1.5	0.3	13.8	29.3
Czechia	1.9	2.1	53.6	61.2	28.4	22.7	1.9	1.4	16.1	14.7
Denmark	2.4	3.5	54.4	52.7	38.5	35.6	3.9	6.4	3.2	5.3
Germany	12.4	8.4	52.1	60.6	25.4	30.5	2.0	2.2	20.5	6.7
Estonia	0.3	0.2	40.1	48.5	41.4	37.4	9.1	6.2	9.4	7.9
Ireland	0.5	0.6	34.3	29.3	58.3	62.2	7.2	8.1	0.2	0.4
Greece	3.0	2.8	44.8	50.6	5.4	6.8	2.5	2.8	47.3	39.8
Spain	16.6	18.4	30.6	36.1	46.8	36.7	6.3	4.7	16.3	22.5
France	25.8	21.3	55.5	53.8	15.9	18.9	0.7	0.7	27.9	26.6
Croatia	0.9	1.4	43.0	31.9	9.5	7.1	2.3	2.2	45.2	58.8
Italy	8.9	7.7	37.5	44.6	5.2	4.2	2.0	1.4	55.3	49.8
Cyprus	0.03	0.01	16.5	54.7	79.2	29.6	3.5	1.5	0.8	14.2
Latvia	0.4	0.8	51.8	70.8	23.0	10.7	9.0	5.2	16.2	13.3
Lithuania	1.0	1.6	43.0	69.4	36.0	11.0	4.0	3.1	17	16.5
Luxembourg	0.04	0.04	53.9	56.9	27.1	21.9	3.8	4.1	15.2	17.1
Hungary	2.8	4.4	40.3	33.1	11.0	9.9	1.4	0.7	47.3	56.3
Malta	-	-	-	-	-	-	-	-		
Netherlands	0.6	0.4	61.6	69.9	17.2	16.3	0.4	0.5	20.8	13.3
Austria	1.2	1.4	27.9	32.5	16.8	13.8	1.9	1.3	53.4	52.4
Poland	6.5	5.9	33.6	39.9	15.4	11.1	19.5	10.4	31.5	38.6
Portugal	1.1	1.4	34.5	24.6	4.9	1.9	4.2	47.2	56.4	26.3
Romania	2.3	5.9	38.5	38.7	6.9	8.5	4.1	2.1	50.5	50.7
Slovenia	0.2	0.2	28.7	28.2	14.2	15.6	1.5	0.9	55.6	55.3
Slovakia	0.8	1.1	47.7	47.8	25.1	12.8	1.5	0.8	25.7	38.6
Finland	1.8	0.9	18.4	22.2	47.7	44.6	30.0	26.3	3.9	6.9
Sweden	1.3	1.2	45.2	50.5	28.8	26.2	16.0	13.8	10	9.5
United Kingdom	5.6	5.9	69.3	65.8	27.0	29.3	3.5	3.4	0.2	1.5

Source: author's study based on EUROSTAT (2019)

ase and oats and spring cereal mixtures a 1% decrease. The value of production of other cereals in 2016 was 11.5% higher than in 2007.

The importance of the EU cereals market varies from one Member State to another. When analysing the percentage share in the value of EU cereal production, the leader is France and Spain, which together produced almost 40% of total cereal production in 2016. Poland produces about 6% of the EU grain production value (Table 1). The Eurostat database (2019) lacks data on the value of cereal production for Malta, but the importance of this country's agriculture in the EU is small (Nowak et al., 2016).

The analysis also included the share of selected cereal species in the value of cereal production in a given country. This implies that wheat and spelt have the largest share in cereal production in such countries as Belgium, Germany, Latvia, Lithuania and the Netherlands. In Poland above species accounted for 33.6% and 39.9%, in 2007 and 2016 respectively. The value of wheat and spelt production in Poland in 2016 increased by 24.4% compared to 2007. On average in the EU the share of these cereals in the value of cereal production was 48.5%. Barley played a major role in the production value structure in Ireland and Finland. Oats and spring cereal mixtures constituted on average 4.5% and 3.9% of the total value of cereal production in the EU in the analysed years. A large increase in the value of production of these species and consequently in the share in the value of cereal production was recorded in Portugal. In Poland, the importance of these cereals significantly decreased in the years under review.

According to Eurostat data, the EU cereal sown area slightly decreased between 2007 and 2016 (by 1.4%). A decrease in the area under cereals was recorded in 16 member states, including Poland (by 11.4%). The largest increase in area cropped to cereals took place mainly in the new Member States, such as Latvia, Lithuania, Estonia, Bulgaria and, among the EU-15, in Belgium (Table 2). In 2016 in the EU cereals occupied 57,2 million ha. The largest area of cereal cultivation was in France, Poland, Germany and Spain. In 2016, these countries sowed 16.7%, 12.9%, 11% and 10.9% of the total area of their crops in the EU respectively. As shown by the Eurostat study (2019) in the years 2007–2015, as opposed to production, the cereal sown area in the EU-28 remained relatively stable – it never fluctuated by more than 6%.

Changes in sown areas and grain yields determined the level of harvest in particular years. The highest total grain harvest was recorded in 2014, when it amounted to over 332 million tonnes. In 2016, however, the harvest was 14.6% higher than in the first year of research (Fig. 2). Wheat was sown in the European Union in 2016 on an area of 27 024.37 thousand ha. This cereal plays an important role due to its importance in human and animal nutrition and high yield potential (Jaśkiewicz, Sułek 2017). The wheat harvest in 2016 reached 142.2 million tonnes and was by 18.3% higher than in 2007. The results of the forecast by Skarżyńska and Pietrych (2018) indicate a further increase in wheat production in the EU until 2030. According to the forecast, this increase will occur in the countries admitted to the EU in 2004 and later (the so-called EU-13) to a greater extent than in the EU-15 countries. The level of barley harvest showed smaller fluctuations than wheat, the dynamics in 2007–2016 amounted to 103%. The harvest of oats and spring cereal mixtures decreased in the period under examination by 20% and the harvest of other cereals increased by 24%.

Table 2. Area of cereal crops in the EU Member States in years 2007 and 2016 [thousand ha].

Specification	2007	2016	Dynamics [2007=100]
UE-28	58 008.4	57 209.3	98.6
Belgium	272.1	337.0	123.9
Bulgaria	1 533.2	1 816.6	118.5
Czechia	1 579.8	1 359.0	86.0
Denmark	1 448.3	1 464.8	101.1
Germany	6 571.7	6 325.0	96.2
Estonia	292.1	351.4	120.3
Ireland	273.1	280.3	102.7
Greece	1 106.2	988.0	89.3
Spain	6 244.3	6 239.8	99.9
France	9 089.5	9 536.8	104.9
Croatia	553.0	508.7	92.0
Italy	3 933.3	3 257.0	82.8
Cyprus	43.6	23.8	54.6
Latvia	521.9	706.1	135.3
Lithuania	1 003.3	1 326.7	132.2
Luxembourg	28.5	27.9	97.8
Hungary	2 765.0	2 566.8	92.8
Malta	-	-	-
Netherlands	222.1	179.2	80.7
Austria	811.2	784.3	96.7
Poland	8 352.9	7 400.3	88.6
Portugal	312.7	259.4	82.9
Romania	5 129.9	5 490.2	107.0
Slovenia	99.3	95.5	96.2
Slovakia	784.4	753.9	96.1
Finland	1 168.4	998.1	85.4
Sweden	983.4	1 004.7	102.2
United Kingdom	2 885.2	3 128.0	108.4

Source: author's study based on EUROSTAT (2019)

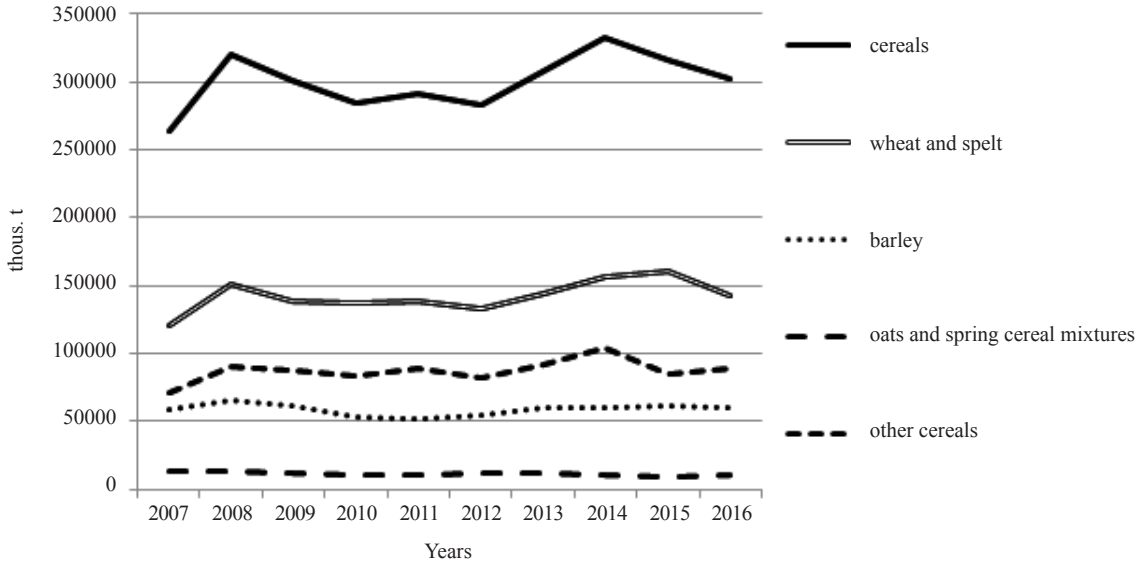

Figure 2. Changes in cereal crops in EU-28 in 2007–2016 (thousand tonnes)
Source: author's study based on EUROSTAT (2019)

While analysing the share of particular countries in the EU cereal production, one can notice that the highest contribution to the 2016 harvest was made by such countries as France, Germany, Poland, Spain and Great Britain (Table 3). The total harvest of these countries constituted 64.6% and 58% of the EU cereals harvest in 2007 and 2016, respectively. The same countries are the main wheat producers, in 2016 they produced over 60% of the total EU production. In addition to these countries, Denmark played an important role in barley production, as did Romania, Denmark and Sweden in the case of oats and spring cereal mixtures. Noteworthy is a high share of Poland in the harvest of oats and cereal mixtures and in the harvest of other cereals. According to the research carried out by Jaśkiewicz and Sułek (2017), the cultivation of triticale is becoming increasingly important in Poland, which is becoming an important product used mainly in the feed sector. According to the Central Statistical Office (GUS)

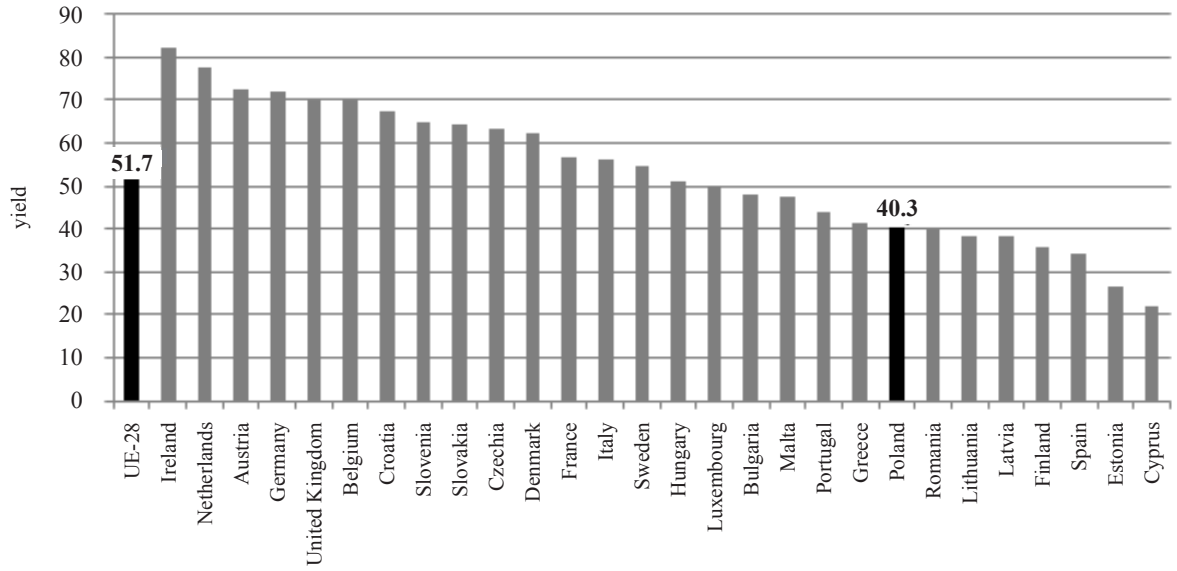

Figure 3. Average cereal yield in the EU Member States in 2016 [dt ha^{-1}]
Source: author's study based on EUROSTAT (2019)

Table 3. Share of EU Member States in cereal crops in years 2007 and 2016 [%].

Member state	Share of cereal crops (EU=100%)		Share of wheat and spelt crops (EU=100%)		Share of barley crops (EU=100%)		Share of oats and spring cereal mixtures crops (EU=100%)		Share of others cereals [%]	
	2007	2016	2007	2016	2007	2016	2007	2016	2007	2016
UE-28	100.00	100.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Belgium	0.99	0.74	1.4	1.0	0.6	0.6	0.2	0.2	0.2	0.2
Bulgaria	1.24	2.95	2.0	4.2	0.7	1.2	0.2	0.3	0.2	0.3
Czechia	2.72	2.85	3.3	3.8	3.3	3.1	1.2	1.3	1.2	1.3
Denmark	3.12	2.99	3.7	2.9	5.3	6.5	2.3	2.8	2.3	2.8
Germany	15.43	15.05	17.3	17.2	17.8	17.9	5.9	5.3	5.9	5.4
Estonia	0.33	0.31	0.3	0.3	0.6	0.6	0.7	0.6	0.7	0.6
Ireland	0.71	0.72	0.5	0.4	1.9	2.3	1.1	1.6	1.1	1.4
Greece	1.57	1.32	1.2	1.2	0.5	0.7	1.1	1.2	1.1	1.3
Spain	9.32	8.27	5.5	5.9	21.0	16.0	10.2	10.8	10.4	10.8
France	22.32	17.76	26.9	20.3	16.1	17.1	4.7	5.2	4.8	5.2
Croatia	0.97	1.15	0.7	0.7	0.4	0.4	0.4	0.8	0.4	0.8
Italy	7.71	6.09	5.9	5.8	2.1	1.7	2.7	2.5	2.7	2.5
Cyprus	0.02	0.00	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Latvia	0.58	0.90	0.7	1.4	0.6	0.5	1.1	1.5	1.1	1.5
Lithuania	1.15	1.70	1.2	2.7	1.7	0.9	1.3	1.7	1.3	1.7
Luxembourg	0.06	0.05	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1
Hungary	3.67	5.50	3.3	3.9	1.7	2.7	0.9	1.0	0.9	1.0
Malta	-	-	-	-	-	-	-	-	-	-
Netherlands	0.60	0.45	0.8	0.7	0.4	0.4	0.1	0.1	0.1	0.1
Austria	1.81	1.87	1.2	1.4	1.4	1.4	0.9	1.0	0.9	1.0
Poland	10.31	9.71	6.8	7.5	6.8	5.6	40.3	32.5	40.3	32.2
Portugal	0.41	0.38	0.1	0.1	0.1	0.1	0.5	0.6	0.5	0.6
Romania	2.97	7.21	2.5	5.9	0.9	2.9	1.9	3.5	1.9	3.6
Slovenia	0.20	0.21	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0
Slovakia	1.06	1.61	1.1	0.0	1.1	1.0	0.3	0.3	0.3	0.3
Finland	1.58	1.20	0.7	0.6	3.5	2.7	9.5	10.0	9.2	10.1
Sweden	1.92	1.82	1.9	2.0	2.5	2.6	7.1	7.6	7.1	7.7
United Kingdom	7.23	7.19	10.8	10.0	8.7	10.8	5.4	7.5	5.4	7.5

Source: author's study based on EUROSTAT (2019)

data (2018), in 2016 the harvest of this cereal amounted to 5102.4 thousand tons.

The cereals harvest in each country depends on the area sown and the yields obtained. The yield level is the basic factor that determines the profitability of cultivation and the competitiveness of a given species (Matyka, 2014). Figure 3 presents average grain yields in EU countries in 2016.

By analysing the average cereal yields in the European Union countries, it can be concluded that they are characterized by average variability. The coefficient of variation of yield level in 2016 amounted to 29.8%. The highest cereal yield was characteristic for Ireland, Netherlands, Austria, Germany and Great Britain, where it exceeded 70 dt ha^{-1}. The yields below 40 dt ha^{-1} were achieved by such countries as Romania, Lithuania, Latvia, Finland, Spain, Estonia and Cyprus. In Poland the average grain yield in 2016 was 40,3 dt ha^{-1} and was 22,1% lower than the EU average.

DISCUSSION

The cereals market is an important segment of the food economy in many EU Member States. Cereal cultivation is favoured by relatively easy production technology, relatively low labour intensity as well as easy storage and transport (Baer-Nawrocka, Kiryluk-Dryjska, 2015). The European Commission (2018) forecasts a systematic increase in the production of cereals in the EU by 2030. According to the forecasts, it will occur due to higher demand for feed grain and good export prospects. A relatively high increase in grain yield can only be expected in the new Member States, since in the countries of Western Europe (EU-15) cereal production is approaching its agro-economic maximum (European Commission, 2016). Also R. Schils et al. (2018) emphasise that the potential to increase cereal production in Europe by reducing the yield gap is greatest in Eastern Europe. The authors pointed out that among the EU countries, the greatest opportunities for increasing cereal yields are in Poland and Romania. The research undertaken in this study showed that such countries as Ireland, the Netherlands, Austria, Germany and Great Britain were characterized by the highest cereal yields. Similar observations were formulated by Baer-Nawrocka and Kiryluk-Dryjska (2015) emphasizing that in the countries of Central and Eastern Europe, despite positive changes on the cereal market, their yield level is still much lower in comparison with the countries of Western Europe (EU-15). The predictions of the European Commission indicate that the introduction of new regulations under the CAP will not negatively affect the level of production in the European Union. According to these forecasts, by 2025, this production will increase to the level of about 318 million tons. The increase in production, resulting mostly from the increase in expected yields, but also from the increase in the sown area in some regions of the EU, will apply especially to maize and wheat (European Commission, 2015).

Apart from fluctuations in the volume of cereal production, structural changes are also observed. They result i.a. from the impact of the Common Agricultural Policy instruments. One of them is the cross-compliance principle implemented since 1 January 2005, according to which obtaining direct payments by an agricultural holding depends on meeting certain standards. They have been included in three areas: 1) environment, climate change and good agricultural practices; 2) public, animal and plant health; 3) animal welfare (MRiRW 2019). The consequence of this solution was also the implementation of pro-environmental principles known as "greening", which also had an impact on the production structure and the use of land resources in agriculture (Kułyk, Czyżewski 2015). The study by Tłuczak (2018) shows that individual rate of changes in cereal production in the years 2005–2016 was different depending on cereal species as well as different for individual member states. The author showed that the greatest structural changes in cereal production took place in Lithuania and Latvia, where the increase in wheat production was 175% in Lithuania and 205% in Latvia. In Poland, an over 20% increase in the value of wheat and spelt production resulted, among others, from relatively high profitability (Jarzębowski, 2008; Kopiński, Matyka, 2016). Increasing the share of wheat in the sown/cropped area was also a consequence of improving grain quality (Jaśkiewicz, Sułek 2017).

Differentiation of the level and structure of cereal production in the European Union countries results also from the fact that particular countries and regions have characteristic features (e.g. natural conditions) which stimulate or inhibit the development of particular branches of agriculture, thus shaping the level and structure of production. An example is the high share of barley in the value of cereals production in Ireland and Finland. The great importance of barley production in these countries is also demonstrated by Fierli (2005), who explained the popularity of barley by its suitability for more extreme climatic conditions. On the other hand, the high humidity of the climate and the presence of a long day in the polar summer account for the high proportion of oats in the cereal production structure in countries such as Finland and Sweden (Fierli 2005). According to the conducted research, the share of oats and cereal mixtures in cereal production value in these countries in 2016 amounted to 26.3% and 13.8% respectively. The research also showed a high share of Poland in the area cropped to other cereals. This is a consequence of, i.a. the increase in popularity of triticale cultivation in Poland. According to Jaśkiewicz and Sułek (2017), it is an effect of a large share of light soils, unsuitable for growing both wheat and barley.

Spatial diversification of cereal production also results from the level of socio-economic development, structural features of agriculture, agricultural policy and the situation on the market (Nowak, Wójcik, 2013). The research also showed the average variability of yields in the EU Member States. As Syp (2015) notes, it was the result of unequal use of advances in biology, organisation and technology. This view is also shared by Matyka et al. (2013), according to which the impact of organisational and technological factors has increased significantly in recent years.

The large role of cereals in the production structure is caused by the wide use of cereal grain due to its various usable properties. On the other hand, too high a share of cereals in the sowing structure has negative consequences (Wasilewska 2008). With theirhigh cropping frequency, soil fertility deteriorates. Moreover, the majority of cereals ill-tolerate their cultivation after each other, crop rotation problems appear, including cereal diseases, and, consequently, a decrease in yields. Therefore, the management of agricultural land and making decisions concerning the cropland structure of has certain limitations, not only of economic, but also of natural and organizational nature.

CONCLUSIONS

1. The study showed fluctuations in the value of cereal production in the years 2007–2016, that resulted from changes in the total area under cereals and under individual cereal crops, variation in yield, as well as from price conditions. A high increase in the value of production in 2016 in relation to 2007 was recorded for wheat (20.4%), which should be explained, among others, by an increase in its yield level.

2. In contrast to the value of production, the area sown to cereals in the European Union has remained relatively stable. The total EU cereal-growing area decreased by 1.4% over the period considered. A decrease in the area under cereals was recorded in 16 member states, including Poland. On the other hand, countries such as Lithuania, Latvia, Estonia and Belgium recorded an over 20% increase in cereal area.

3. The largest cereal producers in the EU are France, Germany, Poland, Spain and Great Britain, which produced 58% of the EU cereal harvest in 2016. It is worth noting the high share of Poland in the harvest of oats and cereal mixtures and in the harvest of other cereals. The cultivation of triticale is becoming increasingly important in Poland, which is becoming an important product used mainly in the feed sector.

4. The research shows that EU countries vary in terms of the technological output of cereal production measured by yield per hectare. This is due to different natural conditions and to different degree of production intensification. At the same time, it indicates the potential for production growth, mainly in countries where the yield potential is not fully utilized.

5. The studies carried out do not give a complete picture of the evolution of the cereal market in the European Union and its spatial diversity. Further research should address the economic and organisational aspects of cereal production and take into account other factors determining spatial and structural diversity of production and changes in production over time.

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