

**Piotr Bórawski\*, James W. Dunn\*\***

\* *University of Warmia and Mazury in Olsztyn, Poland,*

\*\**Pennsylvania State University, University Park, Pennsylvania, USA*

## **DIFFERENTIATION OF MILK PRODUCTION IN EUROPEAN UNION COUNTRIES IN THE ASPECT OF COMMON AGRICULTURAL POLICY**

### *ZRÓŻNICOWANIE PRODUKCJI MLEKA W KRAJACH UNII EUROPEJSKIEJ W ASPEKCIE WSPÓLNEJ POLITYKI ROLNEJ*

**Słowa kluczowe: produkcja mleka, kraje UE, produkty mleczarskie**

*Key words: milk production, EU countries, milk products*

**Abstract.** The objective of this paper is to present the structure of milk production in EU countries. The authors used data from Main Statistical Office to highlight the changes. The authors used descriptive and graphical methods to analyze the changes in EU milk production. The production of cow's milk per capita in kg and milk yield in EU was analyzed. The authors also evaluated the production of selected dairy products. The biggest milk producers in EU are Germany, France, United Kingdom and Poland. The highest yields of milk per cow are achieved in 2011 in Denmark, Sweden and Spain. The highest butter production in 2012 was observed in: Germany (448 thous. t), France (427), Poland (200) and Ireland (145). The five countries with the highest cheese production in 2012 were: Germany (2071 thous. t), France (1922), Italy (1276) Holland (764) and Poland (685). The production of dry milk in 2012 was the highest in: France (214 thous. t), Netherlands (118), Germany (80), and Ireland (58). However, the production of dairy products in many European Union countries decreased in the period 2005-2012.

### **Introduction**

The European Union introduced the Common Agricultural Policy (CAP) in 1962 to control the situation in agriculture and rural areas. The Common Agricultural Policy is crucial in the EU and is responsible for the agricultural production increase, which improves the quality of life, stabilization of markets, and provides good prices for producers. The CAP undertook a reform in 2003 with the aim to increase the competitiveness of the rural sector, market' promotion, and sustainable development of rural areas [Rytko 2012]. The research conducted by the author points out that 86% of total output is produced in old EU countries (EU-15) and 14% by the new members (EU-27). The introduction of new rules of EU in 2003 has increased the economic results of agriculture.

The CAP is now regulated by new budget perspectives 2014-2020. The CAP is having an impact on sustainable development of rural areas, in particular: improving efficiency, creating work places, conserving nature and land management and keeping social peace and social security [Spychalski 2012]. In the legislation package of the CAP for 2014-2020 are actions supporting human capital, particularly the transfer of knowledge, extension services, basic services, risk management and local development. All of these actions should impact the efficiency of agriculture and improve the living standard of rural inhabitants.

The CAP is focused on increasing efficiency, which increases concentration and the scale of production. It supports the process of farm competition development, but small farmers are treated as non-competitive. In 2008 the EU focused on small farms, pointing out their importance for economic, social and environmental goals [Żmija, Czekaj 2012]. Small farms impact the development of rural areas and agriculture because they keep portions of society out of poverty, diversify and create multifunctional development, manage the environment and create environmental benefits. The CAP revisions should support the development of small farms because they provide employment in an otherwise high-unemployment country. To support the development of small farms, it is necessary to introduce the tools which will help in diversify incomes and stimulate non-agricultural activities.

The milk market was the subject of intervention under the Common Agricultural Policy, too. Good conditions for milk production such as production limits and good prices lead to overproduction. The European Commission decided to have the quotas system introduced in 2003 and proposed quotas increase by 1% each year. Next, the European Commission prepared using direct support payments linked to milk productivity. The process of milk deregulation started in 2003 and included ending the quota system after 2014 and reduction of the support prices of butter and milk powder. For the next programme period 2015-2020 the European Commission prepared many changes to milk production such as: increasing the force of milk producers by common negotiation of milk purchase, introduction of formal conventions for milk purchase, the possibility of creation of multibranch organizations on milk market, the improvement of changes of milk production in the EU, and the possibility to support cheese production [Guba, Dąbrowski 2012].

Like much of agriculture, milk production in EU countries is a spatial economy. This science recognizes the spatial diversification of processes and placement of economic activities in geographic space. The space has an impact on the development in countries and understanding the spatial connections between countries is the key to understanding the rules governing the current economy [Lewandowska-Gwara 2013].

### **Aim and methodology**

The objective of the paper is to discuss the diversity of European Union countries in milk production. To develop the problem of milk production in the EU the authors address the following questions:

- what is the cow's milk production per capita in EU,
- what is the total cow's milk production of the EU,
- what is the production of selected dairy products in the EU,
- how is the milk production diversified in the EU.

The authors used mainly data from the Main Statistical Office. The authors used the graphic and tabular methods to present the results. To reach our conclusions we used descriptive methods. The collected data enabled us to conduct analysis pointing at differentiation of milk production per capita and production of dairy products. The analysis included changes in the years 2005-2012. To evaluate the changes that happened in the milk production in the EU the authors calculated the coefficient changes indicator as a percent change in 2012 in comparison to 2005.

### **Research results**

Our initial analysis presents production of cow's milk in EU per capita in kg in 2012. As we can see Ireland (1176 kg), Denmark (895) and Netherlands (699) are countries with the highest per capita milk production (Fig. 1). These countries have a surplus of milk production and must find consumers in other countries. Poland is in twelfth place in the analysis. On the other hand, Greece (72 kg), Malta (101 kg) and Spain (135 kg) have the least production per capita. These countries must import milk to fulfill domestic consumer needs.

Many EU countries are self-sufficient in milk production. The indicator of self-sufficiency of milk production was the highest in 2007 in Netherlands (140%), Poland (119%), Germany (115%) and France (114%) [Rynek mleka 2013]. The increase of milk production was the effect of specialization and concentration processes in dairy farms in many European Union countries. After the integration into the European Union, the number of dairy farms in Poland decreased by 60%, the number of cows decreased by 13.9% and the milk yield increased by 26.4% in the years 2004-2012 [Żekała 2014].

Such countries as: Italy (75%), Great Britain (86%) have the lowest self-sufficiency indicators in milk production, what means that the production does not cover internal needs [Parzonko 2009].

The production of cow's milk per capita changed in the years 2005-2012 The biggest decreases were observed in: Sweden (-14.08%), Slovakia (-12.25) and Romania (-11.95). The biggest growth in the years 2005-2012 was observed in: Latvia (16.85%), Estonia (10.28) and Germany (8.55).

The production of milk in EU countries was diversified and subject to different conditions. Such countries as: Hungary, Slovakia, Czech Republic, Latvia, Lithuania and Estonia faced collectivization of land, which had an impact on improving dairy farm efficiency. West European Union countries had an economic situation that had furthered concentration processes [Pocza et al. 2008].

Milk production is diversified in the world. The following countries delivered most milk in the world: India (117.00 million tonnes), the United States of America (87.46), China (41.14), Pakistan (35.49), the Russian Federation (32.14), Brazil (31.82), Germany (29.67), France (24.21), New Zealand (17.01), United Kingdom (13.96) and Poland (13.20). The data proves that four countries of European Union are major world milk producers [*Milk production...* 2012].

The new deregulation of the milk market and the end of the quota system in European Union should lead to an increase of the dairy herd to 4,2% and average milk production to 4,4% in the years 2015-2020. As a consequence the price of milk should decrease by about 10%. This situation will especially effect dairy farms in many European Union countries. For example, 55% of dairy farms has fewer than 10 cows in Poland in 2010. To stay competitive in the market the smaller dairy farms will have to grow and decrease average production costs [Żekało 2014].

Next, the authors analyze the production of cow's milk in % of the European Union (Fig. 2). As we can see the four biggest producers of cow's milk in the European Union in 2012 are: Germany (20.2%), France (15.9%), United Kingdom (9.2%) and Poland (8.4%). These results demonstrate the scope of milk production in the European Union and the excess production of milk and dairy products that is available to sell to other countries. The exports of milk and milk products from Poland account for nearly 9% of total exports of agricultural products in 2011 [Soczewka, Ginter 2013].

On the other hand following countries have the least scope of milk production: Malta (0.1%), Cyprus (0.1%), Luxemburg (0.2%) and Slovenia (0.4%). These countries produce very little milk and are mainly importers. The production of cow's milk as a percentage of the EU changed in the years 2005-2012. The percentage decreased mostly in Romania (-23.68%), Bulgaria (-22.22%), Slovakia (-14.29) and others. The percentage increased mostly in Belgium (15.0%), Netherlands (8.45%) and Portugal (8.33). The percentage did not change in the years 2005-2012 in Hungary, Estonia, Greece, Slovenia, Luxemburg and Cyprus.

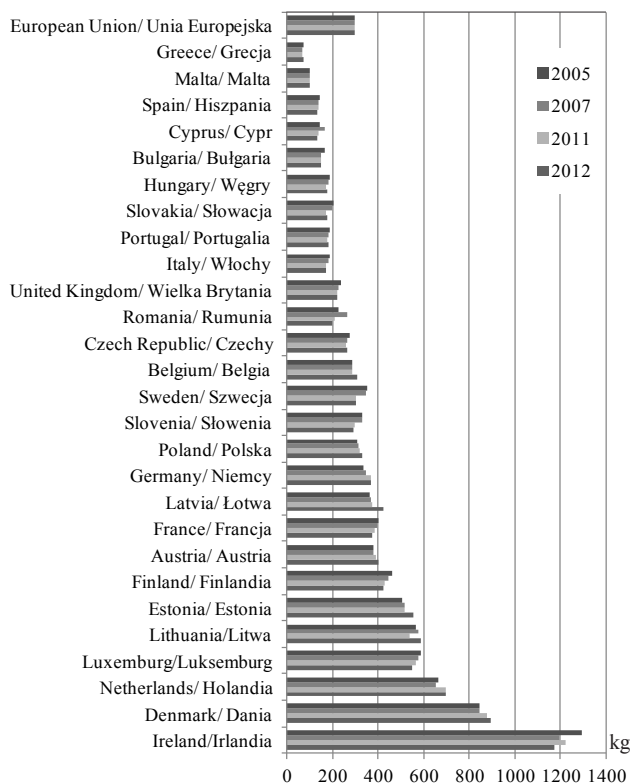


Figure 1. Production of cow's milk per capita in kg in EU in the years 2005-2012

Rysunek 1. Produkcja mleka krowiego na osobę w kilogramach w UE w latach 2005-2012

Source: own study based on [Statistical Yearbook ... 2013]

Źródło: opracowania własne na podstawie [Statistical Yearbook ... 2013]

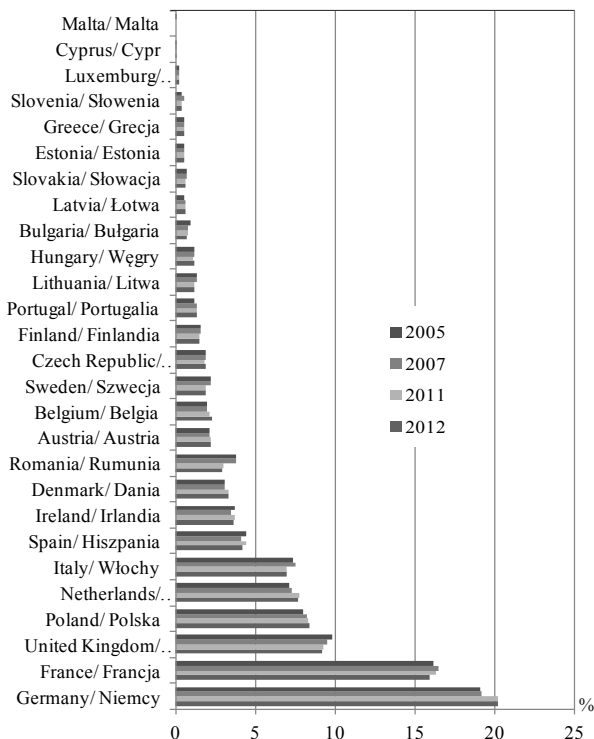


Figure 2. Production of cow's milk in % of the Union in the years 2005-2012

*Rysunek 2. Produkcja mleka krowiego w UE w % w latach 2005-2012*

Source: see fig. 1

*Źródło: jak na rys. 1*

cow) and Finland (8058 kg per cow). On the other hand, the four countries with the least milk yield per cow in EU in 2011 were: Bulgaria (3653 kg per cow), Greece (3691 kg per cow), Romania (3776 kg per cow) and Poland (4756 kg per cow). Poland is the fourth largest milk producer in the EU but has low milk yields per cow [Statistical Yearbook of Agriculture 2013]. The milk yield per cow has decreased in the years 2007-2011 in the following countries: Hungary (-19.38%), Slovenia (-6.95%), Slovakia (-5.06%), Sweden (-3.65%), Italy (1.32%) and the whole EU (-9.16%). On the other hand the production of milk yield per cow increased in the years 2007-2013 in following countries: Portugal (25.7%), Spain (21.04%), Estonia (12.43%), Latvia (11.60%), Romania (11.49%), Bulgaria (11.37%), Czech Republic (8.99%), Malta (9.66%), Poland (7.60%), Cyprus (6.66%), United Kingdom (6.31%), Belgium (5.92%), Luxembourg (5.49%), Lithuania (5.37%), France (4.91%), Austria (3.84%), Ireland (3.62%), Germany (2.67%), Denmark (2.40%), Greece (1.60%), Finland (1.28%) and Netherlands (1.17%). At a time when the world's milk yield per cow is growing steadily, any country with declining milk per cow is losing competitiveness.

The production of dairy products is diversified across EU countries (Tab. 1). The four countries with the highest butter production in 2012 were: Germany (448.0 thousand tonnes), France (427.0), Poland (200.0) and Ireland (145.0). The production of butter increased mostly in the years 2005-2012 in following countries: Slovenia (34.3%), Holland (30.4%), and United Kingdom (9.8%). Most countries of the European Union have decreased the production of butter in the same period. Particularly large decreases were observed in Hungary (-70.7%), Luxembourg (-66.7%) and Estonia (-55.6%).

Many countries of the EU have shown biological and technical improvement in dairy farms, which has resulted in an increase of milk yields per cow of an average of 15%. This can result in a reduction in the cost of production [Wilczyński 2012]. Milk production is profitable in EU countries such as Poland because of low cost of production [Poczta et al. 2008].

The analysis conducted by Sass [2007] proved that scale of production has an impact on economic results of farms engaged in milk production. The larger scale of milk production improves the efficiency of farms, land incomes and workforce wages.

The analysis of Śmigła [2007] proved big differentiation of economic results of dairy farms in EU. The highest production and economic results were achieved in the richer West European countries, whereas farms from Poland, Bulgaria and Romania achieved the weakest economic results. Farms from these countries were subsidized within the CAP, which should improve their efficiency.

The four countries in EU with the highest milk yields per cow are: Denmark (8636 kg per cow), Sweden (8341 kg per cow), Spain (8174 kg per

The five countries with the highest cheese production in 2012 were: Germany (2071.0 thousand tonnes), France (1922.0), Italy (1276.0), Holland (764.0) and Poland (685.0). However, the production of cheese decreased in the years 2005-2012 in the following countries: Slovenia (-18.8%) and Hungary (-18.0%) Slovakia (-17.6%). On the other hand the production of cheese increased in the years 2005-2012 in many countries, for example in: Spain (67.2%), Ireland (58.8%) and Lithuania (34.9%). If a country is losing competitiveness in dairy production, importing storable products like butter and cheese offsets the lack of domestic production.

The four countries with the highest dry milk production in 2012 were: France (214.0 thousand tonnes), Netherlands (118.0), Germany (80.0), and Ireland (58.0). The production of dry milk increased in the years 2005-2012 in many countries of European Union, for example in: Latvia (307.7%), Sweden (200.0%) and Finland (89.5%). The production of dry milk decreased in many countries, for example in: Estonia (-83.8%), Lithuania (-55.8) and Czech Republic (-40.9).

Table 1. Production of selected dairy products in thousand tonnes in EU in the years 2005-2012  
Tabela 1. Produkcja wybranych produktów mlecznych w tysiącach ton w UE w latach 2005-2012

Country/ Kraj	Production of selected dairy products [thous. t]/ Produkcja wybranych produktów mlecznych [tys. t]								
	butter/masło			cheese/ser			dry milk/mleko w proszku		
	2005	2012	%	2005	2012	%	2005	2012	%
Denmark/DK	45	-	-	336	-	-	87	-	-
Sweden/SE	50	40	-20	122	110	-9.8	10	30	200
Spain/ES	51	37	-27.5	128	214	67.2	14	14	0
Finland/FI	58	52	-10.3	-	92	-	1.9	3.6	89.5
Portugal/PT	26	24	-7.7	-	74	-	10	9.2	-8
United Kingdom/UK	133	145	9.8	399	390	-2.3	83	50	-39.8
Holland/NL	102	133	30.4	671	764	13.9	120	118	-1.7
Czech Republic/CZ	52	42	-19.2	132	126	-4.5	22	13	-40.9
Luxemburg/LU	0.6	0.2	-66.7	-	-	-	-	-	-
Germany/DE	444	448	0.9	2046	2071	1.2	76	80	5.3
Estonia/EE	9	4	-55.6	-	43	--	8	1.3	-83.8
France/FR	426	427	0.2	1824	1922	5.4	230	214	-7.0
Cyprus/CY	-	-	-	6.6	4.8	-	-	-	-
Belgium/BE	120	62	-48.3	79	-	-	55	-	-
Austria/AT	33	36	9.1	186	202	8.6	7	0.6	-91.4
Italy/IT	120	101	-15.8	1367	1276	-6.7	0.2	-	-
Malta/MT	-	-	-	0.2	-	-	-	-	-
Hungary/HU	15	4.4	-70.7	111	91	-18	7.5	5.3	-29.3
Slovakia/SK	11	7.1	-35.5	51	42	-17.6	0.2	2.2	1000
Slovenia/SI	3.5	4.7	34.3	22	18	-18.2	0.5	0.0	-
Latvia/LV	7.3	5.6	-23.3	20	32	60	1.3	5.3	307.7
Lithuania/LT	18	11	-38.9	63	85	34.9	5.2	2.3	-55.8
Ireland/IE	142	145	2.1	119	189	58.8	41	58	41.5
Poland/PL	190	200	5.3	595	685	15.1	45	39	-13.3
Romania/RO	-	7.5	-	-	86	-	-	-	-
Greece/GR	3.8	2	-47.4	250	225	-10	-	-	-
Bulgaria/BG	-	1.1	-	-	76	-	-	-	-
EU/UE	2060	1979	-3.9	8717	8817.8	1.16	825	645.8	-21.7

Source: see fig. 1

Źródło: jak na rys. 1



As we can see many European Union countries decreased production of dairy products. Such situation is the effect of strong competition and problems with selling products outside European Union markets. But, agriculture is still important for the development of rural areas and the agribusiness sector. The non-elastic adjustment causes economic surplus outflows to other non-agricultural sectors [Czyżewski, Kułyk 2012]. Milk delivered by farmers is the source of rural rent which flows to the agribusiness sector, giving jobs and employment. That is why dairy farmers have an impact on the agribusiness sector and may need more support from the EU to stay in the market.

Milk is an important part of the agricultural economy in many countries of the European Union. Most dairy farms sell milk to milk processors. These companies process milk and deliver products to EU markets. Very few dairy producers sell products on their own or from the farms. Such a situation proves that the logistic process of milk and dairy products is developing nicely on EU markets. In the dairy industry, supply chain management, and strengthening cooperation of dairy enterprises with suppliers and customers are very important. This collaboration is usually very organized, and it is administered through agreements and contracts [Pietrzak et al. 2010].

### Conclusions

The spatial economy is a key factor in understanding economic processes in the overall EU market. Geography impacts agricultural development, but especially in milk production. The analysis of the European Union spatial market shows that the center of milk production is in the western countries of the European Union. The different economic situation of dairy farms in EU is the result of location and efficiency of production.

The production of milk is diversified across EU countries. The four countries with the greatest milk production are: Germany, France, the United Kingdom and Poland. These four countries deliver more than 54% of the total EU milk supply. These countries are also the major exporters. The production of milk per capita increased in the years 2005-2012 in many countries for example: Latvia (16.85%), Estonia (10.28%) and Germany (8.55%) and other. The production of milk yield per cow also increased in 2007-2013 in many countries, for example in: Portugal (25.7%), Spain (21.04%), Estonia (12.43%), et al.

The improvement of competitiveness of dairy production in Poland and other countries having small yields per cow requires improved genetics and management. Genetic advances and better management can increase milk production, reduce costs, and improve the competitiveness of EU milk on world markets. Poland is the fourth producer of milk in the EU, but its milk yield per cow is one of the smallest. Milk production on smaller farms is still profitable because of lower costs compared to other EU states.

The changes in the European Union dairy markets include the liquidation of quota system. This may eliminate small farms from the market. The improvement of the economic situation of dairy farms requires more support from the CAP. Without help from the CAP, many dairy farms will end production, which may increase rural unemployment and poverty.

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### Streszczenie

Celem badań było przedstawienie struktury produkcji mleka w krajach UE. Analizowano produkcję mleka krowiego na jednego mieszkańca oraz wydajność mleczną krów w krajach UE. Oceniono także produkcję wybranych produktów mleczarskich. Do analiz posłużyły dane GUS, a wyniki przedstawiono za pomocą metod opisowej i graficznej. Największymi producentami mleka w UE były takie kraje, jak Niemcy, Francja, Wielka Brytania i Polska. Najwyższą wydajność mleka na krowę osiągnięto w Danii, Szwecji i Hiszpanii. Największą produkcję masła w 2012 roku uzyskano w Niemczech (448 tys. t), Francji (427 tys. t), Polsce (200 tys. t) i Irlandii (145 tys. t), a największą produkcję sera w Niemczech (2071 tys. t), Francji (1922 tys. t), Włoszech (1276 tys. t) Holandii (764 tys. t) i Polsce (685 tys. t). Produkcja mleka w proszku była w 2012 roku największa we: Francji (214 tys. t), w Holandii (118 tys. t), Niemczech (80.0 tys. t) i Irlandii (58.0 tys. t). Stwierdzono także, że produkcja artykułów mleczarskich w wielu krajach UE w latach 2007-2011 uległa zmniejszeniu.

Correspondence address  
Dr hab. Piotr Bórawski  
University of Warmia and Mazury in Olsztyn  
Plac Łódzki 2  
10-957 Olsztyn, Poland  
e-mail: pboraw@uwm.edu.pl