

ANALYSIS OF THE RESULTS OF DAIRY FARMS OF THE LARGEST MILK PRODUCERS IN THE EUROPEAN UNION

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Abstract

Germany, France, Great Britain, Poland, the Netherlands and Italy are the largest milk producers in the EU. The objective of the study was to assess the income situation of farms specialising in the milk production and to show the possibility of covering farmer's labour costs. The source of the data were the surveys of the farms carried out in the FADN system in years 2010-2013. The assessment covered the resources of the farms, production intensity and level of income. Also, the impact of the CAP instruments on effects of management were presented. The highest farm income with subsidies was achieved by the farmers from Italy, and the lowest by those from Poland. Farm income without subsidies provided coverage of farmer's labour costs only in the Italian farms. Thanks to subsidies, farmer's labour inputs have been paid in all countries, with the highest level in Italy, and the lowest in France.

Key words: *milk production, coverage of farmer's labour costs, milk yield of cows, farm income, subsidies*

1. INTRODUCTION

The milk sector is of great importance in the European Union (EU). The major producers of milk are Germany, France, Great Britain, Poland, the Netherlands and Italy, which together manufacture almost 70% of the milk production in the EU. In 2014, the production of cow's milk in the EU achieved the level of 159.8 million tonnes, of which milk produced in the EU-15 countries accounted for 82% and in the EU-N13 countries – 18%. The largest share in the EU production of cow's milk is held by Germany, about 20%. The milk production volume in the EU is very diversified, there are many countries in which it does not exceed 1 million tonnes and those as Germany or France, where the annual production is about 32 and 26 million tonnes, respectively. In the EU, a decisive influence on the market situation is therefore exerted only a few countries with the large production potential (European Commission 2016a).

The largest milk producers in the EU are mostly the countries belonging to the EU-15. Among the countries which joined the EU after 2004 (EU-N13), only Poland was included in this group. In the EU production of cow's milk, Poland is ranked fourth, with the share of more than 8%.

The study results indicate that dairy farms in the EU are very diversified. In 2013, in the EU-15 countries 1 farm had, on average, 55 dairy cows with the milk yield of 7,264 kg/cow. On the other hand, in the EU-N13 countries, 1 farm had, on average, only 9 dairy cow with the milk yield of 5,036 kg/cow. This means that the milk production per farm, on average in the EU-15 countries was by 8.7 times higher (401 against 46 tonnes). These data reflect the diversity of dairy farm structures in the EU-28, which are linked to the differences in natural potential and also in the social, economic and regulatory context. In particular, the different national policies on the milk quota management are very likely to have had an impact on the level of restructuring within each Member State (European Commission 2016b).

The milk production is considered to be a difficult, complex and time-consuming activity in an agricultural farm. For its conduction, the specific farm size is required, the reason are close relations between dairy cattle breeding with the crop production. This relation largely determines the size of a herd of cows. What is also necessary is proper equipment in the farm and the large knowledge and commitment on the part of the farmer. The amount of milk produced per cow is affected by the type of cow (breed and genetic potential), the diet of the cow and other farm management (quality of the

stables, health management etc.). And high milk production per cow usually requires a higher share of concentrates in the diets and an increased attention for cow management (Reijs et al. 2013).

Recently, the development of the milk production has been closely related to the increased milk yield of cows. It is likely that industrialization-of the dairy sector will continue in the future. Improved genetics and nutrition have resulted in a 2% to 3% increase in milk production per cow and year (Von Keyserlingk et al. 2009). From the information published by the European Commission (European Commission 2015) it results that in the next few years (by 2025), we should also expect an increase in the milk yield of cows, but these changes will have a different intensity in the EU-15 and EU-N13 countries. On the other hand, the number of cows will probably decrease, however, this will not reduce the milk production in the EU. Just the opposite, its volume will increase due to the increase in the milk yield of cows.

This article presents the economic situation of farms specialising in the milk production in six EU countries (i.e. Germany, France, Great Britain, Poland, the Netherlands and Italy), which are the largest producers of milk. A comparative analysis of the production results, production costs and achieved effects has been carried out, also the main factors differentiating the economic results have been identified. The main objective was to examine the possibility of covering farmer's and farmer family members' labour costs by farm income without subsidies. What was also assessed, was the scale of dependence of the farm on support of subsidies to the operating activity. Thus, the impact of the CAP on the economic effects of the farms has been determined.

2. MATERIALS AND METHODS

The study sample were the farm specialising (specific type TF 14) in the production of cow's milk in six countries, which are the largest producers of milk in the EU, i.e. Germany, France, Great Britain, Poland, the Netherlands and Italy. The analysis uses the data from the years 2010-2013 (the most up-to-date and available), collected and processed within the framework of the system for the collection and use of EU farm accountancy data – FADN (Farm Accountancy Data Network, 2016).

The results of the farms in a tabular form were presented on average in the adopted study period, i.e. in the years 2010-2013. The studies used a horizontal analysis by comparing the parameters describing the farms in the individual countries. The assessment covered the resources of the farms, i.e. utilised agricultural area (UAA), labour resources expressed by the number of full-time employees (Annual Work Unit – AWU) and total assets. The structure of fixed assets and the share of fixed assets in total assets have been examined.

The analysis also covered the animal production intensity. The production intensity is one of the determinants of transformations in agriculture, this indicator is regarded as the universal progress indicator. According to the literature, the intensity in agriculture is evidenced by the amount of inputs incurred per production unit. Over the years, the approach to this issue has changed, mainly in the context of selecting the most appropriate parameters for assessing the intensity (Manteuffel 1984; Hernández-Rivera & Mann 2008). The studies carried out adopted as the production intensity indicator:

- animal stocking density of the utilised agricultural area in conversion units (LU),
- herbivore stocking density of the forage area (i.e. area used in fodder crops¹) in conversion units (LU),
- actual inputs of the means of production which in value terms expresses the level of direct costs of animal production, per 1 LU (Floriańczyk et al. 2014).

The basic indicator for assessing the economic situation and competitiveness of the farms was farm income but the studies covered also the production value and costs. The indicator for assessing the

¹ According to FADN, fodder crops cover: root and cruciferous fodder crops, other fodder crops, field grass, rough grazing (Floriańczyk et al. 2014).

financial effectiveness was the cost of gaining a unit of farm income without subsidies. The level of covering – by farm income – farmer’s labour inputs has also been estimated. As the cost of 1 hour of farmer’s labour, the wage rate of hired employees in the individual countries has been adopted. It has been calculated as a quotient of hired labour wage and the number of hours worked.

The assessment also covered the scale of dependence of the farms on support of subsidies to the operating activity. Thus, the impact of the CAP on the economic effects of the farms has been determined. The study also contains the data on total labour inputs in the farm (Annual Work Unit – AWU, expressed in labour units, i.e. full-time employees). After reducing them to the single reference basis, the information about the labour-intensity of the production was obtained. Also, the share of own labour inputs (Family Work Unit – FWU, expressed in labour units, i.e. persons employed full-time in the family) in total labour inputs in the farm (AWU) has been presented.

3. RESULTS

3.1. General characteristics and resources of the farms

The economic size of the farms specialising in the milk production in the countries which are the largest milk producers in the EU (Germany, France, Great Britain, Poland, the Netherlands, Italy) is very different. In the analysed four-year period (2010-2013), the highest economic force was characteristic of the farms from Great Britain (EUR 316.9 thousand), and the lowest – of those from Poland (EUR 29.3 thousand). When comparing these extreme values, the differentiation is 10.8-fold.

Table 1. Selected information about the farms specialised in the milk production in the selected EU countries, on average, in the years 2010-2013

Specification		Germany	France	Great Britain	Poland	Netherlands	Italy
Economic size of farms	[thousands EUR]	175.0	138.4	316.9	29.3	269.4	138.9
Utilised agricultural area – UAA	[ha]	69.74	86.89	105.91	20.95	49.85	28.24
Share of the additionally leased UAA	[%]	64.7	90.0	40.5	25.9	38.5	63.1
Share of the forage area in the UAA	[%]	72.1	77.5	90.8	60.6	97.7	81.9
Total labour inputs	[AWU]	1.96	1.82	2.61	1.81	1.73	2.00
in this: the share of own labour inputs (FWU)	[%]	72.7	90.9	61.9	97.0	89.0	78.3
Total labour inputs per 100 ha of the UAA	[AWU]	2.81	2.09	2.46	8.65	3.46	7.08
Animals in total	[LU]	93.8	94.4	197.1	22.7	120.6	74.7
Herbivores	[LU]	92.5	93.4	195.5	22.3	118.9	74.4
in this: dairy cows	[LU]	54.0	52.6	122.0	14.7	83.0	47.4
other cattle	[LU]	38.4	40.6	67.9	7.5	34.9	27.0
Milk yield of cows	[kg/cow]	7 535	6 789	7 347	5 178	7 943	6 133
Milk price	[EUR/100 kg]	33.81	33.34	32.12	29.33	35.40	37.02
Total production value structure	[%]	100.0	100.0	100.0	100.0	100.0	100.0
in this: crop		13.3	13.4	11.0	18.5	1.5	16.5
animal		80.7	84.3	87.5	80.4	91.3	80.7
Share of the production value of milk and milk products in the total production	[%]	67.5	69.3	75.3	65.3	83.0	71.3

Source: own study based on Farm Accountancy Data Network 2016; European Commission 2017.

The data contained in Table 1 also indicate other characteristics that make the farms differ. Noteworthy is the average number of dairy cows, their milk yield and milk price. The average number

of cows over the years was 14.7-122.0 of animal units (LU), and their milk yield – 5,178-7,943 kg/cow. In both cases, the lowest values were found in the Polish farms, and the highest – for the number of cows in Great Britain, and for the milk yield in the Netherlands. The average milk price over the years was also the lowest in Poland (EUR 29.33/100 kg), while the highest price of milk (on average EUR 37.02/100 kg) applied to that sold by the Italian farmers. The production value structure of the farms, in all countries covered by the analysis, was dominated by the animal production, its share ranged from 80.4% in Poland to 91.3% in the Netherlands. On the other hand, the share of the production value of milk and milk products in the total production of the farm ranged from 65.3 to 83.0%, respectively, in the same countries.

A determinant of the production potential of the agricultural farm are its resources. In the market economy conditions, meeting the emerging new challenges requires analysing the phenomena occurring and appropriate management of possessed assets i.e. resources of the farm. To assess the differences among the analysed farms in terms of the resources they possess, the data describing agricultural land, labour resources and farm assets have been used.

From the data presented in Table 1 it results that land resources of the Polish farms were the smallest, the average utilised agricultural area (UAA) amounted to 20.95 ha and was by 5.1 times smaller when compared to the farms from Great Britain (105.91 ha), which were the largest in terms of their area. However, the average utilised agricultural area located in the Polish farms was the greatest own resource of the farm families – in 74.1% (the share of the leased UAA was 25.9%). The smallest share of own land was reported in the French farms, only 10.0%.

The differences between farms are also visible in terms of labour resources. These resources expressed by the number of full-time employees (AWU) per 100 ha of the UAA ranged from 2.09 AWU in France to 8.65 AWU in Poland. This means that in the French farms, labour resources have been used more rationally, while in Poland the production labour-intensity was by 4.1 times higher. In contrast, the share of own labour inputs expressed in the number of full-time employees (FWU) amounted to from 61.9% in Great Britain to 97.0% in Poland. These data show that the farms to varying degrees supported their activity by means of hired labour force. In this context, it should be added that, in case of employing hired employees, in the farm income accounting a component of the cost of the foreign production factor appears in a form of remuneration for hired labour.

Table 2. Assets and technical infrastructure of land and labour in the farms specialising in the milk production in the selected EU countries, on average, in the years 2010-2013

Specification		Germany	France	Great Britain	Poland	Netherlands	Italy
Total assets	[EUR/farm]	802 744	416 556	1 600 521	197 907	2 758 085	948 971
in this: the share of fixed assets	[%]	87.4	70.9	90.7	89.7	91.0	67.0
Machines, technical equipment and means of transport	[EUR/ha UAA]	1 549	943	1 172	1 651	2 677	2 294
	[EUR/1 AWU]	55 037	45 016	47 664	19 077	77 365	32 393

Source: own study based on Farm Accountancy Data Network 2016.

The value of assets in the farms specialising in the milk production, in the countries included in the study, was also highly diversified – Table 2. Total assets per farm were in the range from EUR 197.9 thousand in Poland to EUR 2,758.1 thousand in the Netherlands (diversification was 13.9-fold). In all countries, the farms maintained the higher value of fixed assets rather than of current assets. The share of fixed assets in total assets ranged from 67.0% in the Italian farms to 91.0% in the Dutch farms. A large share of fixed assets in property is an unfavourable phenomenon, creates high fixed costs and is one of the major barriers to limit opportunities for the efficient use of owned resources. The ability of such farms to adjust to the changing market situation is also lower. The asset structure of those

farms is, however, a result of investment decisions made much earlier. In addition, we should be aware of the fact that in agriculture there is the higher demand for fixed assets than in the non-agricultural sector production enterprises.

Fixed assets of agricultural farms include 4 basic groups, i.e. land [L], buildings [B], machinery [M] and livestock [S] – Table 3. The higher is the share of land and basic herd in the structure of fixed assets, the higher are chances are for the high production value. Land and basic herd are in fact the production part of the farmers' property. The results indicate that in the majority of the countries covered by the study, the high share of land was maintained, it amounted to from 50.7% in Poland to 79.1% in the Netherlands. The exception was France where it amounted to 11.7%, however, this results from the fact the structure of agricultural land was dominated by leased land – it accounted for 90% (in case of having foreign, i.e. leased land in the farm resources, in the farm income accounting a component of the cost of the foreign production factor appears in a form of rent for land lease). From the calculations it results that the in structure of fixed assets the share of the basic herd was from 3.9% in the Netherlands to 23.2% in France.

Table 3. Structure of fixed assets of the farms specialising in the milk production in the selected EU countries, on average, in the years 2010-2013

Specification		Germany	France	Great Britain	Poland	Netherlands	Italy
Land	[%]	60.9	11.7	72.6	50.7	79.1	65.7
Building	[%]	15.3	37.3	7.1	22.6	11.6	15.1
Machinery	[%]	15.4	27.8	8.6	19.5	5.3	10.2
Livestock	[%]	8.3	23.2	11.8	7.1	3.9	9.0

Explanations: L – land, permanent crops and production quotas, B – buildings and fixed equipment, M – machinery, equipment and transport equipment, S – breeding livestock, female animals.

Source: see table 2.

An important component of fixed capital are machinery, equipment and means of transport. They form technical infrastructure of land and labour, thus, they affect directly the technical labour productivity. The level of equipping with machinery, technical equipment and means of transport was very diversified among 6 countries of the largest milk producers in the EU. Per 1 ha of the UAA, it ranged from EUR 943 in the French farms and EUR 2,677 in the Dutch farms – the diversification was 2.8-fold. The value of machinery and other tools in the Polish farms was EUR 1,651 per 1 ha of the UAA. This state of mechanisation of land placed the Polish farms on the 4th position. On the other hand, technical infrastructure of labour, expressed by the value of machinery, technical equipment and means of transport per full-time employee (AWU) was more diversified than mechanisation of land. It was from EUR 19,077 in the Polish farms to EUR 77,365 in the Dutch farms – the diversification was 4.1-fold. According to this criterion, the Polish farms were in the last place – Table 2. Low technical infrastructure of labour in the Polish farms explains the high labour-intensity of production – 8.65 AWU per 100 ha of the utilised agricultural area.

The appropriate selection of agricultural machinery and equipment and their rational use affects the economic performance. Is also of great importance in the labour and production processes taking place in the farms. It allows to increase the labour productivity and reduce its nuisance for employees. Unfortunately, it also has a negative feature, technical equipment is expensive to purchase and also to use. Therefore, it constitutes a major capital expense and then the driver of both fixed and variable costs.

A confirmation are the studies on the dairy farms in North-Western Germany. They were medium-sized farms with the moderate milk production volume per 1 cow and per 1 ha of the utilised agricultural area. Income of those farms were higher, when compared to other countries. Comparing to the neighbouring countries, i.e. the Netherlands and Denmark, a decisive factor was the fixed costs (rent, building, machinery, contract work, labour), which in the German farms were much lower (Reijs et al. 2013).

3.2. Animal production intensity

The number of animals expressed in conversion units (LU) on 1 ha of the utilised agricultural area (UAA) indicates the animal production intensity. This parameter has been significantly diversified among the countries covered by the study. The smallest number of animals was characteristic of the Polish and French farms (1.1 LU), and the largest – of the Italian farms (2.6 LU) and Dutch farms (2.4 LU) – Table 4.

Table 4. Animal production intensity in the farms specialising in the milk production in the selected EU countries, on average, in the years 2010-2013

Specification		Germany	France	Great Britain	Poland	Netherlands	Italy
Animals in total per 1 ha of the UAA	[LU]	1.3	1.1	1.9	1.1	2.4	2.6
Herbivores on 1 ha of the forage area	[LU]	1.8	1.4	2.0	1.8	2.4	3.2
Animal production value	[EUR/LU]	1 842	1 598	1 736	1 163	2 336	2 064
Direct costs of the animal production	[EUR/LU]	665	440	922	377	746	960

Source: see table 2.

The herbivore stocking density of the forage area (i.e. the area used for fodder crops) is an indicator of the productivity of land providing feed for these animals. This indicator is often used to assess the degree of environmental-friendly management (Goraj 2007). It is estimated that in the French farms the cultivation of fodder crops was least burdensome to the environment (i.e., was most environmental-friendly), per 1 ha of the forage area there were 1.4 LU, the second position was occupied by the Polish and German farms (1.8 LU). On the other hand, in the Dutch and Italian farms the number of animals per one 1 ha of the forage area was, respectively, 2.4 and 3.2 LU. So, we may assume that the feed production intensity was higher, thus, the same environmental safety was more at risk. It should be noted, however, that in all countries, the intensity of using the forage area (1.4-3.2 LU/ha) was higher than the intensity of using the utilised agricultural area (1.1-2.6 LU/ha). The exception were only the Dutch farms, where in both cases it was the same (2.4 LU/ha).

By analysing the animal production intensity, account has been also taken of direct costs incurred for that production and calculated per number of animals in total expressed in conversion units (LU). The results indicate that in the countries where the number of animals per 1 ha of UAA was lower (Poland – 1.1 LU; France – 1.1 LU; Germany – 1.3 LU), direct costs per 1 LU were lower (they ranged from EUR 377 to 665/LU). On the other hand, in other countries (Great Britain – 1.9 LU; Netherlands – 2.4 LU; Italy – 2.6 LU), with the higher number of animals per 1 ha of UAA, direct costs were higher (they ranged from EUR 746 to 960/LU). These results confirm the previous considerations in the context of environmental safety. The diversification – among the countries covered by the analysis –of direct costs was 2.5-fold, the lowest were recorded in the Polish farms (EUR 377/LU), and the highest in the Italian farms (EUR 960/LU). In contrast, the diversification of the production value was 2-fold, the lowest had the farmers in Poland (EUR 1,163/LU), and the highest the farmers in the Netherlands (EUR 2,336/LU).

3.3. Farm income

The economic effect of the activity pursued in the farms is farm income. Its amount determines the level of satisfying the consumer needs of the farm family and the development opportunities of the farm. Farm income determines achieving the competitive advantage of the farms, but at the same time, its amount per 1 full-time employee (FWU) shows the potential amount of covering farmer's and family members' labour costs.

One of the Common Agricultural Policy's objectives is to increase farmers' income – it determines achieving the competitive advantage as a primary condition for the existence of the farms in the future. Taking this aspect into account, it should be concluded that the most competitive were the Italian farms, farm income with subsidies amounted to EUR 77.25 thousand. The further positions were taken by the farms in Great Britain and the Netherlands, income amounted to, respectively, EUR 74.77 and 64.91 thousand. The competitiveness of the German and French farms was weaker, income reached the level of, respectively, EUR 44.38 and 37.69 thousand. In contrast, the worst situation applied to the Polish farms, their competitiveness was the weakest, farm income with subsidies amounted only to EUR 14.73 thousand – Table 5.

To assess the financial effectiveness of the farms, a parameter has been used which shows the cost of achieving a unit of income from the farm without subsidies. The value of this parameter points to the very large diversification among the countries included in the study, i.e. the largest milk producers in the EU. By comparing the extreme values, the diversification was 15.4-fold. The lowest cost of achieving EUR 1 of income without subsidies was incurred by the Italian farms (EUR 2.06), and the second place was occupied by the Polish farms (EUR 2.91). On the other hand, the highest cost of achieving EUR 1 of income without subsidies was recorded by the French farms (EUR 31.63) – Table 5.

Table 5. Production and economic results of the farms specialising in the milk production in the selected EU countries, on average, in the years 2010-2013

Specification		Germany	France	Great Britain	Poland	Netherlands	Italy
Total production value	[EUR/farm]	214 441	178 859	391 125	32 931	308 656	191 197
Total costs	[EUR/farm]	202 059	173 268	351 254	24 546	266 960	128 136
Farm income without subsidies	[EUR/farm]	11 762	5 479	41 432	8 422	37 074	62 339
	[EUR/FWU]	8 240	3 310	25 694	4 792	24 153	39 833
Subsidies for the operating activity of the farm	[EUR/farm]	32 614	32 216	33 339	6 305	27 840	14 912
	[EUR/ha UR]	468	371	315	301	559	528
Farm income with subsidies	[EUR/farm]	44 376	37 695	74 771	14 728	64 914	77 252
	[EUR/FWU]	31 087	22 776	46 370	8 380	42 289	49 362
Share of subsidies for the operating activity in farm income with subsidies	[%]	73.5	85.5	44.6	42.8	42.9	19.3
Subsidies for the operating activity per EUR 1 of farm income with subsidies	[EUR]	2.77	5.88	0.80	0.75	0.75	0.24
Subsidies for the operating activity per EUR 1 of farm income with subsidies	[EUR]	17.18	31.63	8.48	2.91	7.20	2.06

Source: see table 2.

The level of farm income is largely affected by subsidies. However, the strength of their impact is determined by the value of economic surpluses obtained from the production and amounts of received subsidies. In this context, it should be noted that subsidies led to the higher competitiveness of the French farms. Income without subsidies placed those farms on the last position (it amounted to EUR

5.48 thousand), while thanks to subsidies they occupied the last but one position (income with subsidies amounted to EUR 37.69 thousand). Per EUR 1 of income without subsidies in the French farms there were EUR 5.88 of subsidies and the share of subsidies in income with subsidies was very high – 85.5%. The impact of subsidies on the results was the smallest in the Italian farms, per EUR 1 of income without subsidies there were only EUR 0.24 of subsidies and their share in income with subsidies amounted to 19.3% – Table 5.

The scale of support for farm income by the CAP instruments i.e. subsidies for the operating activity is also reflected by the level of financing the cost of generating a unit of economic power of farms (EUR). This support was different in the individual countries. On average, in the analysed period (2010-2013), the level of financing by subsidies for the cost of generating EUR 1 of economic power of farms was the lowest in the Netherlands – amounted to 10.3%, and the highest in France – 23.3%. This means that in the French farms it was higher by 13 percentage points. This evidences the greater dependence on subsidies, which is confirmed also by the results of the studies carried out.

Table 6. Coverage of farmer’s own labour costs in the farms specialising in the milk production in the selected EU countries, on average in the years 2010-2013 (estimate)

Specification		Germany	France	Great Britain	Poland	Netherlands	Italy
Wage rate for hired employees	[EUR/hour]	10.66	11.70	11.55	2.70	13.86	10.98
Level of coverage of farmer’s labour costs by:							
farm income without subsidies	[%]	34.9	17.7	82.0	77.0	73.2	156.1
farm income with subsidies	[%]	131.7	121.5	149.2	134.7	128.1	193.4

Source: see table 2.

Farm income determines achieving the competitive advantage of the farms, but at the same time its amount per 1 full-time employee (FWU) shows the potential amount of coverage of farmer’s and family members’ labour costs. Among the countries, the differences in the income level per 1 full-time unpaid employee (FWU) are very clear. Different is also the share of own labour inputs (FWU) in total inputs. These factors affected the level of coverage of farmer’s own labour costs. As the cost of 1 hour of own labour, the study adopts the wage rate of hired employees in the individual countries. In the first place, it was considered reasonable to study the possibility of coverage of farmer’s labour costs by farm income without subsidies. The results indicate that this was possible only in the Italian farms – coverage of farmer’s labour costs exceeded the wage rate of hired employees by 56.1%. On the other hand, in other countries it was from 17.7% (in France) to 82.7% (in Great Britain) of its level. Full coverage of farmer’s own labour costs was provided by farm income with subsidies, i.e. it was possible only thanks to subsidies. At the highest level, farmer’s labour costs were covered in the Italian farms, and at the lowest in the French farms. In these countries, coverage of costs of 1 hour of farmer’s labour exceeded the wage rate of hired employees by, respectively, 93.4 and 21.5% – Table 6.

4. SUMMARY AND DISCUSSION

The milk production volume in the European Union is largely determined by six countries i.e. Germany, France, Great Britain, Poland, the Netherlands and Italy. The total milk production in these countries accounts for nearly 70% of the total production in the EU. The economic situation of the farms specialising in the milk production in those countries on average in the years 2010-2013 was different. To some extent, it is determined by the geographical location of the individual countries, which creates different climate and soil conditions for the development of the agricultural production, but the impact is also exerted by the external conditions of the agricultural sector. The great

diversification was found as regards the production potential held by the farms in the individual countries and in the area of achieved financial results. The studies conducted allow to formulate the following final conclusions:

- When analysing the resources of the farms, the 5.1-fold diversification in the utilised agricultural area was found, the smallest land resources were possessed by the Polish farms (20.95 ha), and the largest by those from Great Britain (105.91 ha).
- The area of the farms determined the number of kept cows, the average herd size in the countries covered by the analysis differed 8.3-fold. The Polish farms kept, on average, 14.7 LU, and those from Great Britain – 122.0 LU.
- Taking into account labour inputs, it was found that the best labour organisation was characteristic of the French farms and the worst – of the Polish farms. The difference in the production labour-intensity, in favour of the French farms was 4.1-fold.
- Differences in the area of the farms, population of animals kept and as well as technical equipment (machines, buildings) were reflected in the total asset value of these farms. The lowest asset value was typical of the Polish farms and the highest – of the Dutch farms. The average asset value of the Polish farms was only 7.2% of the asset value of the Dutch farms. A common feature of the farms is the advantage of fixed assets in assets of the farms. Their share ranged from 67.0% in Italy to 91.0% in the Netherlands.
- A measure of the production effectiveness was the cost of generating EUR 1 of the production value. In this respect, the best results were achieved by the Italian farms (EUR 0.67), and the worst by the French farms (EUR 0.97). This means that the cost effectiveness of the production in the Italian farms was lower by 30.9%.
- A measure of the financial effectiveness was the cost of achieving EUR 1 of farm income without subsidies. In this respect, the best results were achieved by the Italian farms (EUR 2.06), and the worst by the French farms (EUR 31.63). The cost of generating EUR 1 of income in Italy accounted for only 6.5% of this cost in France.
- Subsidies were not equally beneficial to all countries. They were the least important for the Italian farms – per EUR 1 of income without subsidies, there were EUR 0.24 of subsidies. The most dependent on subsidies were the French farms – for EUR 1 of income without subsidies farmers received EUR 5.88 subsidies.
- The highest farm income without subsidies per full-time employed family member (1 FWU) was achieved by the Italian farmers – EUR 39,833. From the studies, it results that only in the Italian farms farmer's labour costs could be fully covered, while in other countries the level of coverage ranged from 17.7% to 82.7%.
- Thanks to subsidies, farmer's labour costs were covered in all countries. The wage rate of hired employees was exceeded by: in the Italian farms – 93.4%, in the British farms – 49.2%, in the Polish farms – 34.7%, in the German farms – 31.7%, in the Dutch farms – 28.1%, and in the French farms – 21.5%.

In the analysed years (2010-2013), the functioning of the milk market was regulated by the EU agricultural policy instruments. Milk quotas were a factor shaping the supply, demand and prices of milk. The abolition, on 30 March 2015, of milk production limits and therefore an increase in its supply contributed to a decline in the prices of milk. In the European Union, in December 2015, the average price of milk was EUR 30.47/100 kg, and was lower when compared to December 2014 by 7.9%, and to December 2013 – by 24,2 (European Commission 2017).

It would be interesting to learn the results of the farms covered by the analysis in the new conditions of functioning, i.e., after the abolition of milk quotas. It is estimated that the absence of limits on the supply of milk may be an opportunity for those farmers, who still want to deal with rearing dairy cattle. The lack of formal restrictions on the supply will, in fact, allow to increase the production scale.

However, we should bear in mind the fact that for the farms specialising in the milk production a problem is the lack of flexibility in the production. This means that despite the favourable natural conditions, it is not possible to immediately adjust the production to the demand.

In view of the coming years, however, we should expect that the milk production in the EU will increase, this is indicated by, *inter alia*, the higher demand for protein-rich dairy products due to changes in dietary habits and the increased population of the world. The EU analysts foresee that in 2025, when compared to 2015, the average EU milk production will increase by about 8%.

However, as assessed by the LEI experts in Wageningen (Jongeneel & Berkum 2015), in 2024 when compared to 2014, the milk production will increase in the Northern European countries, where production conditions are relatively favourable. The estimated increase in the production differs depending on the country and ranges from 4.5% in Great Britain to even 27.2% in Ireland. The high increase in the production should be expected in the Netherlands – by 17.3% and in Poland – by 14.7%, whereas in Germany, the milk production may increase by 9.5% and in France by 8.9%. In contrast, in Italy, Spain, Greece, Bulgaria, Hungary, Czech Republic, Slovakia, Slovenia, Sweden and Finland it is foreseen that the milk production will decrease.

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