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## MILK CHAIN IN THE CONTEXT OF THE COMMON AGRICULTURAL POLICY REFORM – PRODUCTIVITY GAPS BETWEEN ROMANIA AND THE EU-27 COUNTRIES

### ABSTRACT

Considering the new Common Agricultural Policy (2014-2020) for the milk sector, which will have as main component the removal of milk quotas after 2014, the paper makes an analysis of the links in the milk chain (agriculture, processing, trade, consumption) in Romania and the EU-27 countries in the period 2009-2012, based on the comparative analysis of some sets of specific indicators for each link in the chain, **in order to indicate the performance level and position held by Romania among these European countries**, as well as the modalities to narrow the productivity gaps on the Romanian milk chain compared to the European Union, aiming at improving the domestic supply and meeting the consumers' needs.

In this context, an investigation was made on each link in the chain, at the level of milk production, of raw milk collection for processing, milk distribution and consumption, strictly linked to the evolution of its quality and price, variants and measures being elaborated to narrow the productivity and institutional organization gaps of the milk chain in Romania.

**Key words:** livestock, milk production, size, prices, quality, productivity.

**JEL Classification:** Y10, Q13, Q10, Q19.

### 1. INTRODUCTION

The Romanian milk sector in Romania is characterized by a low integration among the participants in the chain, the main reasons being the following: the low attractivity of milk producers' association, which has as a consequence the excessive supply fragmentation and the diminution of farmers' bargaining power in the relation with processors implicitly, the lack of market information, mainly in the case of the medium and small-scale operators, who most often make decisions unknowingly, which results in losses at all levels, significantly diminishing competitiveness.

The global increase of the demand for dairy products on one hand, and the milk market liberalization on the other hand, as a result of the removal of the European quota system starting with 2015, will create a new context for the economic operators in the milk chain, as competition among the Member States will be higher, and therefore Romania will have to be ready to face this

competition. From this point of view, we consider the associative organization forms as competitive structures that encourage the modernization of the milk sector and could improve the commercialization of dairy products, as they make it possible for a great number of small producers to actively and efficiently participate in the economic process, narrowing the productivity gaps on the milk chain between Romania and the remaining EU-27 countries.

## 2. MATERIAL AND METHOD

The method used was the comparative analysis of certain sets of indicators specific for each link in the chain in the period 2009-2011: cow herds and their yields, milk production collected from total production total by the processing units by the main two sources (from the country and from imports), production of dairy products resulting from industrial processing, raw milk procurement price, milk consumption, trade with dairy products. The main aspects of the milk market in Romania were revealed having as information source the national data supplied by the National Institute of Statistics (NIS), through the official publication *Romania's Statistical Yearbook* and the Tempo-online database, NIS, which was subsequently processed, as well as information supplied by the Ministry of Agriculture and Rural Development (MARD) and the National Sanitary Veterinary and Food Safety Authority (NSVFSA). The aspects regarding the evolution and the quantitative and qualitative modifications on the European milk market had as information source the international reports and studies elaborated by the European Commission, the FAOSTAT Agriculture and EUROSTAT data.

The possibilities to narrow the productivity gaps between Romania and the other EU-27 member states were analysed on the basis of two scenarios, which took into consideration the increase of farm productive performance in the case of farms with 1-5 dairy cow heads (97% of total farms), on which 78% of the total number of cows from Romania are found, in order to estimate the milk surplus that goes to the processing industry.

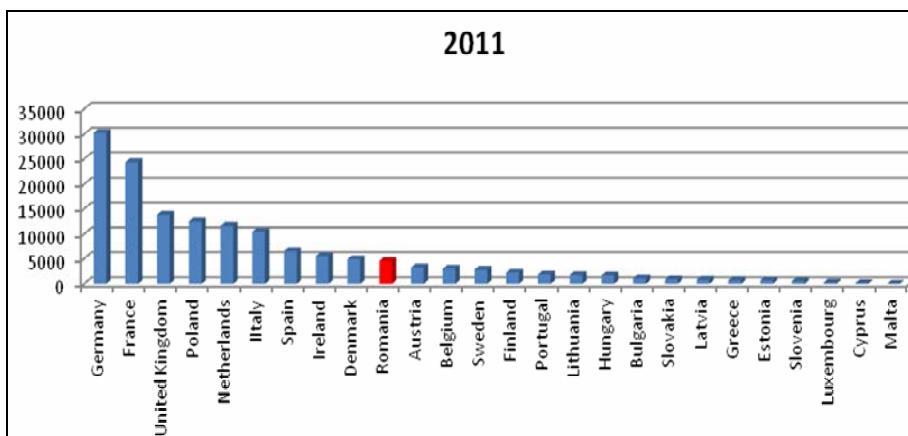
## 3. RESULTS AND DISCUSSIONS

### 3.1. The milk chain on the European market– evolutions and trends

**Milk production in EU-27.** *The total cow milk production* in the European Union in the year 2011 reached 147 million tons. The main producers are Germany, France, United Kingdom and Poland, which together sum up over 70% of the total production in the European Union. In the period 2009-2011, no significant changes were produced in the evolution of milk production in the EU-27 member states (Figure 1).

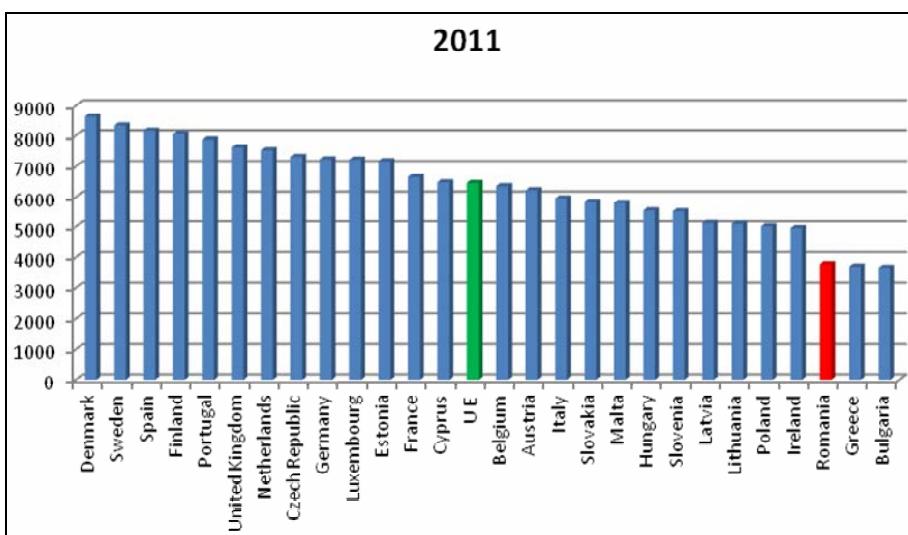
In general, the production increase ranged from 5.9% (Ireland) to 0.4% (Hungary), and the production decrease ranged from 13.1% (Romania) to 0.3% (Poland). At the level of EU-27, in the investigated period, although the dairy cow herds diminished by 0.4%, the production increased by 1.9%.

**The average milk yield/cow** largely variates among the European countries (Figure 2). Thus, the highest yield in the year 2011 was noticed in Denmark (8,636 kg/head), Sweden (8,341 kg/head), Spain (8,174 kg/head) and Finland (8,058 kg/head). Bulgaria (with 3,653 kg/head), Greece (3,691 kg/head) and Romania (3,776 kg/head) are countries that lie at the opposite pole.



Source: www.fao.org – FAOSTAT Agriculture.

Figure 1. The total cow milk production in the European Union – thousand tons.



Source: www.fao.org – FAOSTAT Agriculture.

Figure 2. The average cow milk yield in the European Union – kg/head.

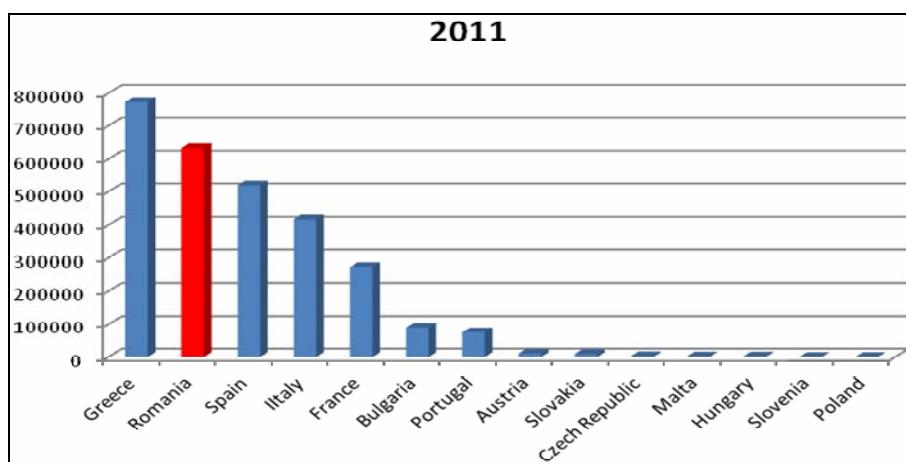
**The total ewe milk production** in EU-27 increased by 34.4 thousand tons in the period 2009-2011. Significant production increases were noticed in Hungary (15.8%), Slovenia (14.9%) and Austria (14.8%). The highest decline of this indicator could be noticed in Poland, where the total production decreased by 13.9% in the mentioned period (Figure 3).

As regards the **total goat milk production** in the EU-27 countries, we mention that in the period 2009-2011 this was maintained at a relatively constant level of 194.3 thousand tons (2011). Positive evolutions are signalled in Estonia (25.8%), Hungary (16.6%), Luxemburg and Belgium with 12.7% and 11.0% respectively (Figure 4). The decrease of milk production is obvious in Malta (22.1%), Slovenia (13.8%) and Spain (9.3%).

**Herds.** From the analysis of this indicator, in the period 2010-2012, it is noticed that in EU-27, the number of dairy cows was down by 0.4%. The diminution of herds is noticed in most European countries, but the most important diminutions are found in Slovakia (30.2%) and Greece (10.4%). Significant increases in the dairy cow herds are found in Slovenia (36.4%), Italy (15.1%), Hungary (5.9%) and Ireland (5.3%), while in the remaining countries the number of dairy cows remained relatively constant (Figure 5).

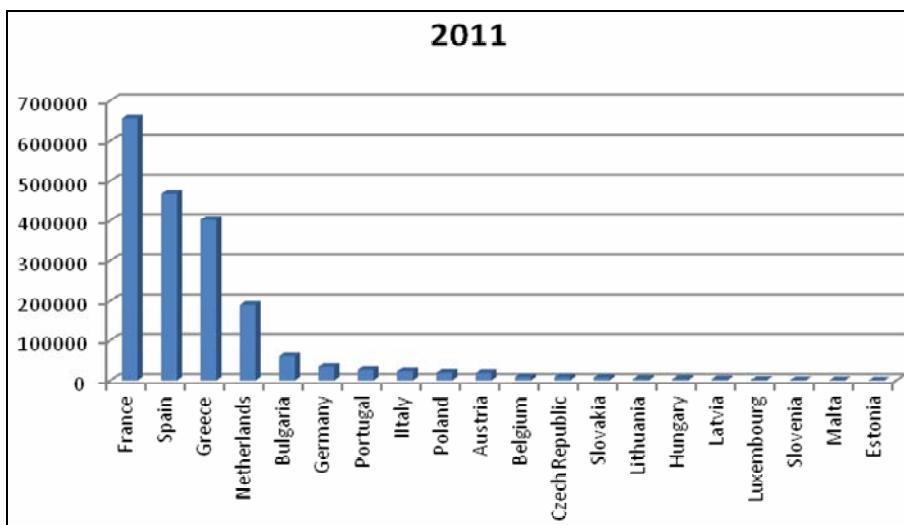
In Romania, although a permanent decrease of total bovine herds was noticed (including the cow and heifer herds), in the period 2007-2011, the number of cows, buffalo cows, and heifers continued to represent over 60% of total livestock herds.

The comparative analysis 2009-2011, with regard to the number of sheep and goats in the EU-27 countries, reveals the most significant increase of livestock herds by 40.7 % in Lithuania (Figure 6). Significant increases can be also met in Ireland (9.9%), Sweden (8.1%), United Kingdom (7.6%) and Greece (6.7%). The decrease in the sheep herds is stronger in Spain (11.9%).



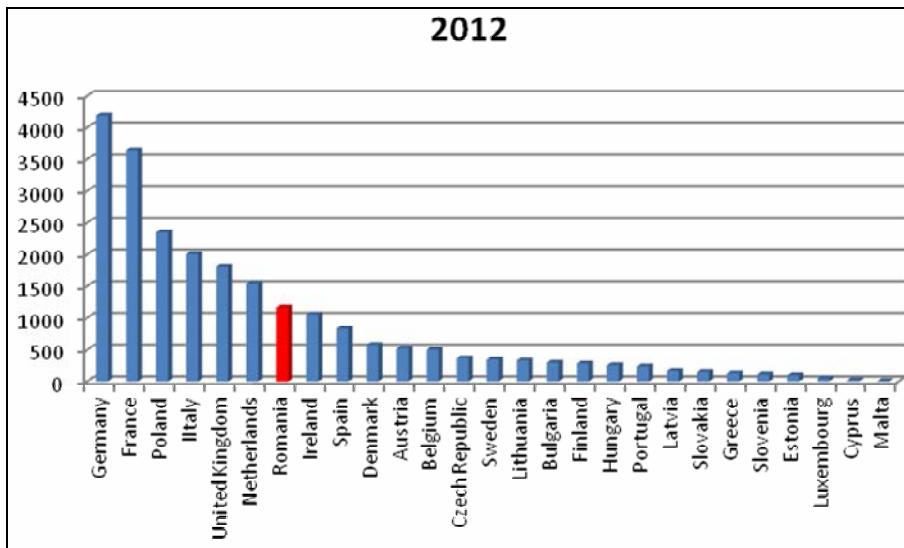
Source: [www.fao.org - FAOSTAT Agriculture](http://www.fao.org - FAOSTAT Agriculture).

Figure 3. The total ewe milk production in the European Union – tons.



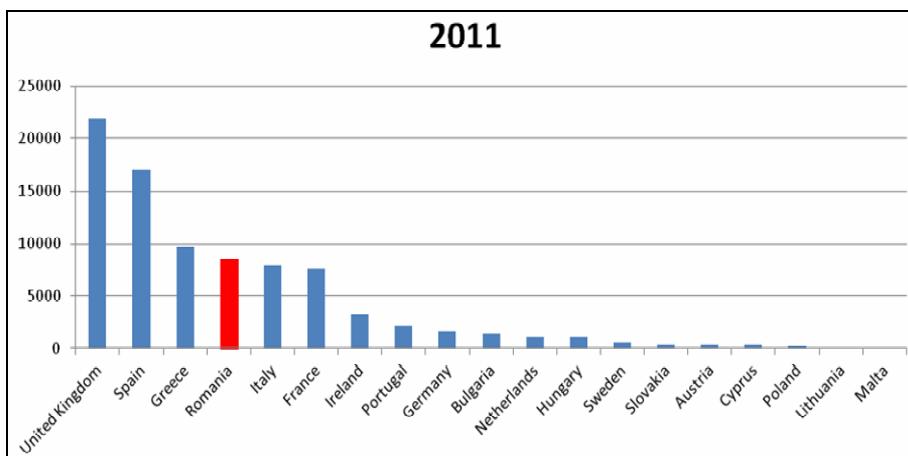
Source: [www.fao.org](http://www.fao.org) – FAOSTAT Agriculture.

Figure 4. The total goat milk production  
in the European Union – tons.



Source: [www.fao.org](http://www.fao.org) – FAOSTAT Agriculture.

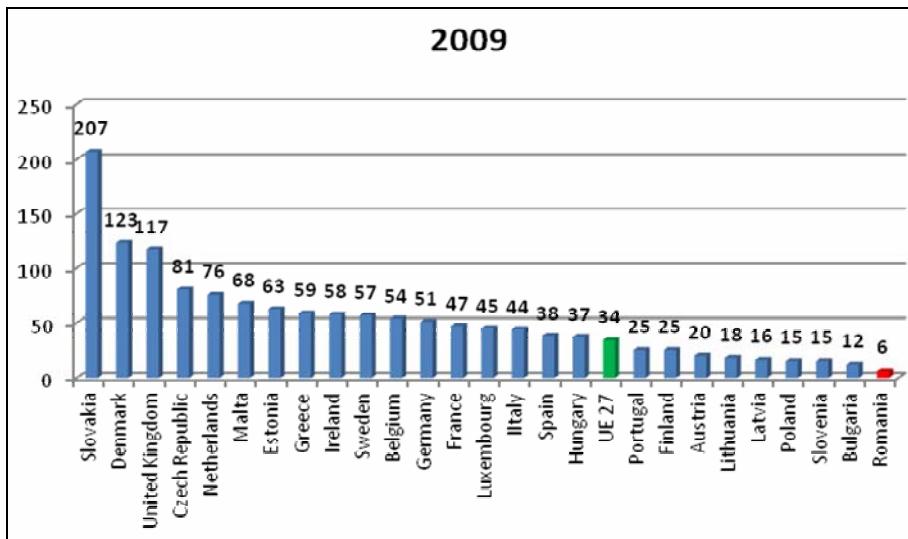
Figure 5. The number of dairy cows  
in the European Union – thousand heads.



Source: www.fao.org – FAOSTAT Agriculture.

Figure 6. Sheep number in the European Union – thousand heads.

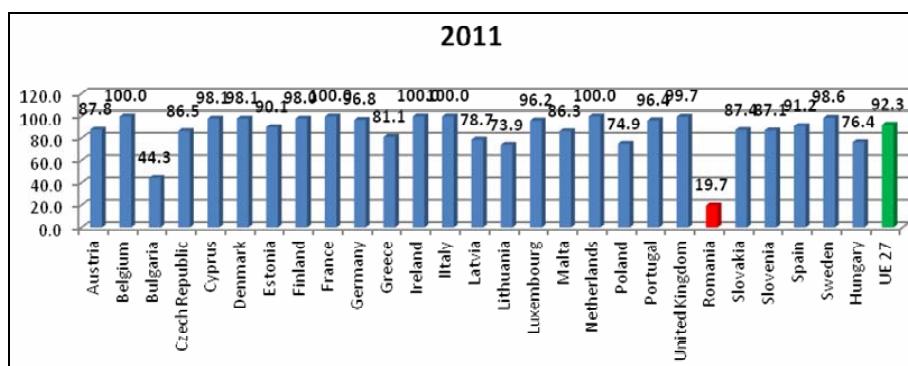
An analysis of the average size of farms specialised in dairy cows, for the year 2009, indicates that Romania is on the last place among the 27 European countries, with an average size of only 6 heads/farm, as opposed to Slovakia (which is on the first place) with an average size of 207 heads, Denmark 123 heads, United Kingdom 117 heads, while the EU-27 average is 34 heads/farm (Figure 7).



Source: EU dairy farms report 2012, based on FADN data.

Figure 7. The average size of farms specialized in dairy cows in the European Union – heads/farm.

**Milk processing on the European market.** The collected milk quantity in EU-27 in the year 2011 totalled 138.24 million tons; Germany, with 29.33 million tons (21.2%), was the main milk producer and collector in the European Union countries. Anyhow, Germany is on the first place in EU as regards cheese production (24.5 million tons), butter (0.4 million tons) and skimmed powder milk (0.3 million tons).



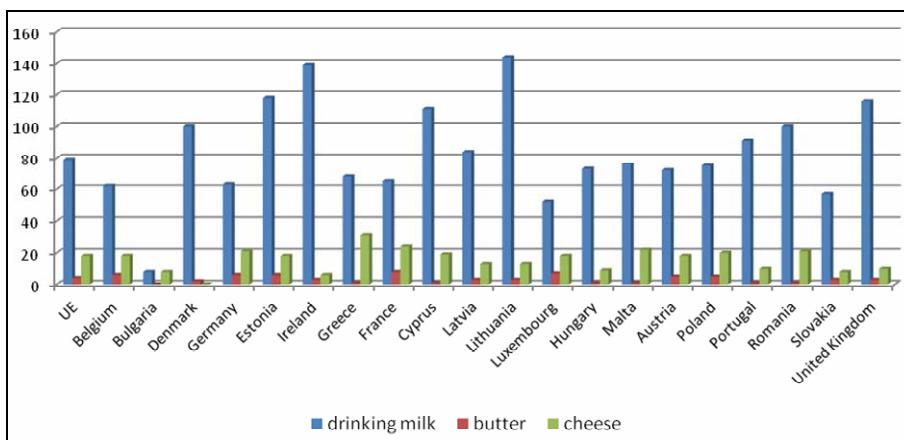
Source: Eurostat.

Figure 8. Share of deliveries in total cow milk production in the EU-27 countries, in the year 2011 (%).

As regards the fresh milk production, the United Kingdom is on the first place in EU, with 13.3 million tons. As regards the share of milk deliveries in total obtained production, in the year 2011, it can be noticed that compared to the EU average of 92.3%, most European countries deliver milk to processing in shares ranging from 87% to 100% (Figure 8). Bulgaria (44.3%) and Romania (19.7%) are an exception.

The reason why Romania delivers milk to the processing industry in such a small percentage is represented by the excessive supply fragmentation (great number of farms with 1-5 heads), which constrains raw milk collection, as well as by the high self-consumption and direct sales percentage.

**Milk and dairy products consumption.** The average consumption of milk and dairy products in the European Union, in the year 2009, was 79 kg fresh drinking milk, 4 kg butter and 18 kg cheese per capita. There are obvious significant differences, among the EU-27 Countries with regard to the structure of dairy products consumption. Thus, the highest liquid milk consumption is found in Lithuania (144 kg/inhabitant), Ireland (139 kg/capita), Estonia (118 kg/capita), and the lowest in Bulgaria (8 kg/capita). The butter consumption ranges from 1 to 6 kg/capita, while cheese consumption ranges from 8 kg/capita (Bulgaria and Slovakia) to 21 kg/capita in Malta (Figure 9).



Source: "From farm to fork", EUROSTAT, 2011.

\* unavailable data only for Czech Republic, Spain, Italy, Netherlands, Slovakia, Finland and Sweden.

Figure 9. Milk and dairy products consumption\* in the European Union countries, in the year 2009, kg/capita.

**The trade with dairy products.** The European Union represents the most important player on the world market, mainly as regards the export of dairy products, cheese in particular (Table 1). Thus, from total world production, the exports of EU-27 are represented by 30.5% cheese, 25.9% skimmed powder milk and 19.2% butter. As regards imports, it is important to mention that small quantities are generally imported, under 5% of the total world production.

Table 1  
Trade with dairy products in EU-27, 2010

Item	EXPORT		IMPORT	
	thousand tons	%	thousand tons	%
Butter	159	19.2	40	4.4
Cheese	676	30.5	82	4.6
Skimmed powder milk	378	25.9	4	0.1

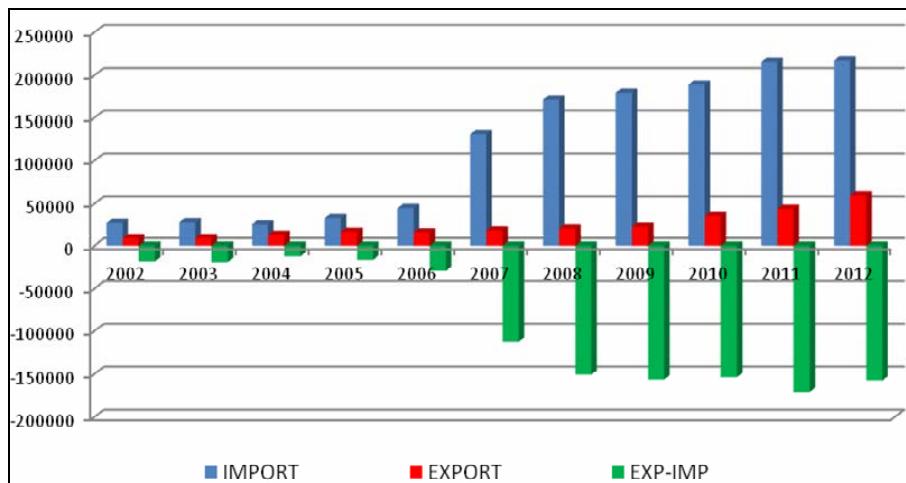
Source: Agriculture in the European Union – Statistical and Economic Information, 2012 Report.

In the period 2002-2012, Romania constantly had a trade balance deficit from the trade with milk and dairy products (Figure 10).

The commercial deficit grew stronger starting with the year 2007, this increasing about 5 times in the period 2006-2012, from 28,875 thousand euro to 157,552 thousand euro. This situation is the result of massive imports of dairy products, both from the intra- and extra- Community areas, to the detriment of exports, the trend of which increased, yet much under that of imports.

Compared to the year 2012, in value terms, imports increased 22.5 times in non-concentrated milk and cream (0401) and 16.0 times in cheeses and curds

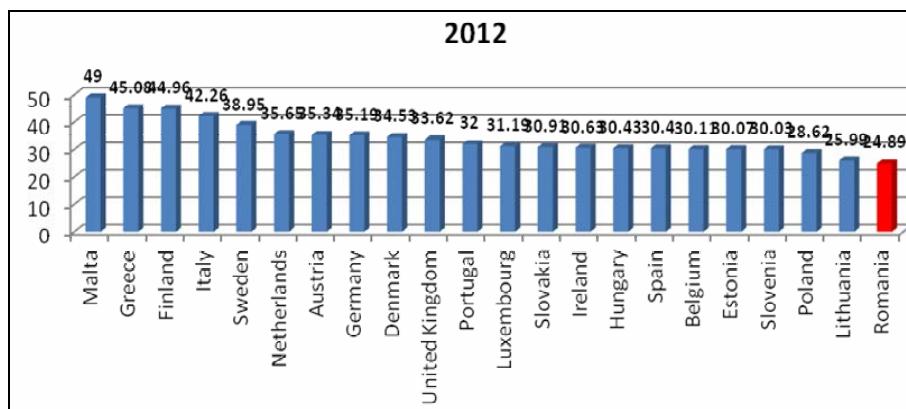
(0406). The lowest evolutions were noticed in butter (twice), whey (6.1 times) and fresh dairy products (6.5 times).



Source: <http://exporthelp.europa.eu/thdapp/comext/ComextServlet?languageId=EN&CFID=3643232&CFTOKEN=42354002&jsessionid=643038c411e8b4454515>.

Figure 10. The trade balance in dairy products in the period 2002-2012 (thousand euro).

**The raw milk price.** In Romania, although the raw milk price, in the year 2012, was the lowest in EU-27 (24.89 euro/100 kg), this is mainly dictated by the evolution of the neighbour markets – Hungary, Poland and Slovakia, as the main sources for covering the national deficit (Figure 11).



Source: Eurostat.

Figure 11. The raw milk procurement price in the EU-27 countries (euro/100 kg).

The European farmers sold the milk at farm gate, in the year 2012, at prices ranging from 24.89 euro/100 kg to 49 euro/100 kg. The farmers from Malta get most of the money from Europe when they sell their merchandise. According to the official data, the milk from the Maltese farms was purchased by processors at 49 euro/100 kg. The processors from Greece and Finland come next, which get 45.08 euro and 44.96 euro respectively per 100 kg milk. A compact block of countries consists of Netherlands, Austria, Germany, which sold the milk at 35.65 euro/100 kg, 35.34 euro/100 kg and 35.19 euro/100 kg respectively. In the second part of the list we find countries as Poland (28.62 euro/100 kg), Lithuania (25.99 euro/100 kg) and Romania (24.89 euro/100 kg).

The forecasts indicate a milk price increase in the next period, based on the increase of demand from milk processors.

### **3.2. Romania after the removal of quotas – modalities to recover the productivity gaps**

As the market evolution proved that the daily collection of raw milk coming from the small-sized farms becomes more and more unattractive for processors due to the costs incurred by milk collection, the inexistence of a concentrated quantitative supply, the respect of the milking hygiene requirements, insufficient meeting the milk quality standards (its maintaining at a low temperature, corresponding to norms, until delivery to processing), we proposed ourselves, starting from the real situation (**the basic scenario**), to assess which would be the production surplus (**scenario 1**) that goes to the processing industry, so that the small producers could sell, on contract basis with processors, part of the milk production, which at present is almost fully the object of self-consumption and direct sales; this could contribute to the increase of small farmers' incomes, with positive consequences in investments in technology, quality biological material and animal feeds. The basic scenario, which starts from these considerations, next presents the situation of total milk production and average yields in the year 2010, by farms types, the supply of the processing industry with raw milk by the two collection sources (**from the country** – milk collected from the agricultural holdings and collection centers and from **imports**).

As it can be noticed (Table 2), 78.32% of the total number of Romanian cows, raised on farms with 1-5 heads/farm, produce 66.56% of the total milk production. It is interesting to notice that the average yield in this category is only 3,050 litres/head.

Out of the total quantity of 28,508 thousand hl, produced by these cows, a great part goes to self-consumption and direct sales (that usually are not registered), which means that the preponderantly formalized sales (by invoices) are practiced only by a small number of producers. The cows raised on farms with 6-30 heads/farm, which represents 13.27% of total, give a milk production of 7,434 thousand hl (17.35% of total), their average yield being 4,669 litres/head. In the category of

farms over 30 heads, there are 100,520 cow heads (8.39% of total), which give a milk quantity of 6,891 thousand hl (16.0% of total), with an average yield of 6,855 litres/head.

*Table 2*  
The situation of milk production in the year 2010 by farms types

Item	No. of cows and buffalo cows	%	Litres/head/day	Litres/head/lactation	Total prod. - thousand hl	%
1-2 heads	712,024	59.43	10	3,050	21,605	50.44
3-5 heads	226,319	18.89	10	3,050	6,903	16.12
6-10 heads	71,526	5.97	13	3,965	2,836	6.62
11-15 heads	35,703	2.98	16	4,880	1,742	4.07
16-20 heads	25,879	2.16	17	5,185	1,342	3.13
21-30 heads	26,118	2.18	19	5,795	1,514	3.53
31-50 heads	24,681	2.06	20	6,100	1,506	3.51
51-100 heads	27,316	2.28	22	6,710	1,833	4.28
over 100 heads	48,523	4.05	24	7,320	3,552	8.29
Total	1,198,089	100	12	3,574	42,832	100

Source: calculations based on MARD data.

The conclusion that can be drawn is that the poor productive performance of the dairy cows is the main factor contributing to the present situation and upon which it must be intervened, for the change of the presented picture.

Table 3 presents the situation of milk production on the farms with more than 11 dairy cow heads.

*Table 3*  
Milk production on the dairy farms with more than 11 heads in the year 2010

Item	No. of cows and buffalo cows	%	Litres/head/day	Litres/head/lactation	Total prod. thousand hl	Market prod. thousand hl	%
11-15 heads	35,703	2.98	16	4,880	1,742	1,568	4.07
16-20 heads	25,879	2.16	17	5,185	1,342	1,208	3.13
21-30 heads	26,118	2.18	19	5,795	1,514	1,362	3.53
31-50 heads	24,681	2.06	20	6,100	1,506	1,355	3.51
51-100 heads	27,316	2.28	22	6,710	1,833	1,650	4.28
Over 100 heads	48,523	4.05	24	7,320	3,552	3,197	8.29
Total	188,220	15.71	20	6,103	11,488	10,339	26.82

Source: calculations based on MARD data.

As structure, the average yields range from 4,880 litres/head to 7,320 litres/head, the average being 6,103 litres/head. It can be seen that a percentage of about 16% of the number of cows, on the farms with more than 11 heads, obtain about

27% of the total milk production in Romania, while 84% of the cow number on farms with 1-10 heads obtain 73% of the total production. We specify that, in this variant, the resulting market production is that from which only the consumption of calves was excluded, not the self-consumption and the direct sales.

As it can be seen, Romania ensures 91.2% of its raw milk necessary for processing from the domestic production and 2.04% of the raw milk from imports (Table 4). If we make a comparison by the two components, i.e. milk collected from the country for processing (9,051 thousand hl) and the market production (excluding the consumption of calves) of 10,339 thousand hl, obtained from the farms with over 11 heads, we can conclude that the necessary milk for processing can be obtained from 188,220 milk cows, the average yield of which is 6,103 litres/head.

*Table 4*  
Milk production by components and farm types – 2010

Item	Thousand hl	%
Raw cow and buffalo cow milk collected from the country (thousand hl)	9,051	91.20
Imported raw milk	873	2.04
Total raw milk collected for processing (thousand hl)	9,924	100
Total production excluding calves' consumption (thousand hl)	3,8549	100
Milk production from the farms with more than 11 heads	10,339	26.82

*Source:* calculations based on MARD data.

Having in view the present situation, **in Scenario 1, we started from the following hypotheses:**

– the increase of milk production that goes to processing, from the farms smaller than 5 heads as a result of Government's Decision (November 2013) on the *de minimis* aid for the purchase of cooling tanks for milk, which will benefit the animal raisers who own up to 5 heads dairy cows and who are organized in this respect into a single associative form established at the level of one commune;

– the increase of milk production for deliveries to processing, from the farms with 1-5 heads, is based on the increase of the average yield by 20% (from 10 to 12 litres/head/day) on one hand; on the other hand it is based on the decrease of the percentage for self-consumption from 40%, as it is at present, to 25%, in favour of the deliveries to processing by 15%;

– constant maintaining of the number of dairy cows present on the two types of farms.

Thus, the surplus of milk for processing (Table 5) will total 6,006 thousand hl (76% of farms with 1-5 heads and 24% of farms with 3-5 heads). This milk, obtained under hygiene conditions and maintained immediately after milking in cooling tanks at the temperature of 4° Celsius, will meet the quality standards required by the processors, so that an obvious improvement of the milk quality will be possible.

*Table 5*  
The production surplus for processing on the farms with 1-5 heads

Item	1-2 heads	3-5 heads	Total
Number of dairy cows	830,134	263,875	1,094,009
%	59.43	18.89	78.32
Litres/head/day	12	12	12
Litres/head/lactation	3,660	3,660	3,660
Total production thou. hl	30,383	9,658	40,041
Calves' consumption thou.hl	3,038	966	4,004
Self-consumption thou. hl	7,596	2,414	10,010
Deliveries to processing thou. hl	4,557	1,449	6,006
Direct sales thou. hl	15,191	4,829	20,020

Source: calculations based on MARD data.

Of course, we can also take into consideration the case when an increase of average yields will be obtained on the farms with more than 6 heads, this situation leading to the substantial increase of the milk quantity for processing. The measure adopted by the Government on *the minimis* aid for the purchase of milk cooling tanks is welcome for the milk producers, as they can better sell their production and increase their incomes, on one hand; on the other hand, it will also benefit the processors, as they would appeal less to raw milk imports, thus decreasing their transport-linked costs.

#### 4. CONCLUSIONS

The milk sector in Romania has significant discrepancies compared to EU-27 as regards productivity. This fact can be explained both by the internal structure of the Romanian dairy farms (small size, strong fragmentation), inadequate or defective utilization of production factors (including the human capital), and by the institutional framework and the present deficient infrastructure.

The basic problem of the livestock production, in general, and of the milk production in particular is the chronic crisis in ensuring the necessary quantity of feedstuffs and their quality. This phenomenon is the main cause of the unsatisfactory production situation, of the low production performance and of the low economic efficiency of livestock farms in the first place. The chronic feed scarcity, their low quality and the quantitative and qualitative losses brought about by the inadequate harvesting, storage and preservation technologies, all contribute to the low reproduction indices, to the productive performance much under the genetical potential of breeds and to the high specific feed consumption per unit of product.

The performance of the milk sector in Romania is also seriously affected by the excessive fragmentation. Thus, in the year 2010, 59% of the total dairy cow herds were found on very small-sized farms with 1-2 heads, and the total number of farms was 761,528, with an average size of 1.83 heads/farm. Even though a diminution by 28% of the number of farms was noticed as compared to 2007, the number of the non-performant small farms remains very high, which reflects the

subsistence and semisubsistence phenomenon persisting in the milk sector from Romania, as the main factor limiting the competitiveness increase.

From this point of view, due to the low competitiveness of the Romanian producers compared to those in the developed states, it is estimated that after the removal of milk quotas, many farmers with 1-3 cow heads per farm will disappear from the Romanian market, because December 31, 2013 means the end of the term for non-conform milk processing.

One of the important conclusions detached from our study is that the farm size and the productive performance of dairy cows is an important factor in profit maximization.

The removal of the milk quota system in the European Union, in 2015, will create a new context for the economic operators who worked with an old system for 30 years. In order to prepare this sector for the new working environment new working instruments were designed, within the European Project "The milk package".

From this point of view, for the diminution of the productivity gaps between Romania and the EU-27 countries, as a measure of support after 2015 for the Romanian farmers, the **encouragement of farms with at least 50 cows, owners of land, through projects with financial aid, as well as the strengthening of the contracts is imposed. The Ministry of Agriculture has put under public debate the Decision on the establishment of contract relationships in the milk sector as well as the acknowledgement of the producers' organizations**. According to the project, the authorities will recognize the producers' associations having at least five members and covering a minimum quantity of 35 tons of tradable production in one year.

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