

TRENDS IN MILK MARKET AND MILK CRISIS IMPACT IN ROMANIA

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Abstract

The paper aimed to analyze the main trends in milk market and the impact of milk crisis in Romania. The empirical data were provided by the National Institute of Statistics for the period 2007-2015, and have been statistically processed by common used methods to identify the main trends. While cattle livestock decreased, sheep and goat livestock increased, as consequence of the high price for farm inputs and the low milk price at farm gate for dairy farmers. The whole milk production declined by 15 %, cow milk production by 21.3 %, sheep and goat milk increased by 83.5 %. Due to the lack of raw milk, processors were obliged to buy raw milk from other countries. Romanian producers received a low milk price at farm gate, meaning losses and efforts to produce more milk to maintain income level, and to sell milk in Bulgaria. Traders did not react to the decline of produce's milk price. The whole EU was affected by milk and dairy products overproduction, and low milk price, which caused deep disappointments and damages to milk producers. The weak connection between producers-processors-traders and consumers along milk chain have allowed milk crisis to leave deep traces and claimed a change in milk market policy regarding more equitable measures and tools for milk producers, taking into account the expenses for production factors as well as consumer price, in order to avoid production concentration and to assure a balanced distribution of value added along milk chain. The strong competition among farms, oblige farmers to pay more attention to knowledge, training level, modern technologies, and farm management, factors which could keep production cost at a low level, assure a high milk quality, and economic efficiency.

Key words: milk market, milk crisis, milking livestock, milk production, milk price, milk trade, Romania

INTRODUCTION

Milk is a basic and vital food for people and most of animals. Milk production has been continuously developing in the world but at present is facing milk crisis in terms of: lack of raw milk which affects milk processing industry, an unbalanced offer/demand ratio and a decline of the trade with milk and dairy products in many countries.[3, 8].

About 90-96 % of milk production consumed in the world is produced by bovines. However, the offer/demand ratio is unbalanced as long as a cow could not cover the needs of 10-15 inhabitants as it would have be, but only of maximum 6-8 inhabitants [4].

In the EU-28, milk crisis is amplified by the liberalization of the milk market since April 2015 when milk quotas were over, and by the embargo imposed to Russia which led to an overproduction of milk and dairy products and the decline of their price.

In 2015, the EU-28 farm milk accounted for 155.3 billion liters, by 10.92 % more than in 2013 (140.1 billion liters). About 83 % of this milk production in the EU is achieved by the main producing countries: Germany, France, United Kingdom, Netherlands, Denmark. Germany and France together carried out 39 %, meaning 54.2 billion liters of the total EU milk production [15].

The EU bovine livestock accounted for 83.4 million heads, of which 47 % being grown in three member states: France (22 %), Germany (14 %) and United Kingdom (11 %), which are the main milk producers [6].

The EU milk deliveries registered a deep decline in 2015, reaching only 136,000 tones, by 12 % less than in 2014 when they accounted for 153,000 tons. This low level was very close to the 2004 level which accounted for 135,000 tons.

The overproduction of milk and dairy products led to a decline of milk price to Euro 31/100 kg in the year 2015, by Euro 5 (-14%)

less than in 2014, when it accounted for Euro 36/100 kg and being almost similar with Euro 31 recorded in 2004 [2].

In 2020, it is expected as 14 milk producing countries of the EU to increase milk production between 6.8 and 23.2 billion liters, representing between 6.5 and 20.5% growth over the milk production achieved in the year 2013 (114 billion liters) [15].

Milk crisis have had a deep impact on milk producers and processors, many of them registering losses or being in danger to close or fail in many EU countries.

The milk crisis affected Romania also, where milk market was facing a lack of raw milk and the need to assure consumption by import from the neighboring countries. About 25% of the local milk processors are closed due to the lack of access to the market, while the large multinational companies which dominates milk and dairy products market have been able to find solutions to balance their income [13].

In this context, the present paper aimed to analyze the evolution of milking livestock, milk production, milk yield, milk trade in the period 2007-2015 in order to identify the main trends and evaluate the impact of milk crisis in the Romanian milk market.

MATERIALS AND METHODS

The analysis is based on the following system of indicators characterizing milk market: milking livestock: cattle, sheep and goats, agricultural holding raising these species, farm size, milk production, milk production/inhabitant, milk yield, milk production value at farm gate, cow and sheep milk price, milk deliveries, milk consumption, milk export and import, and the ratio of the two aspects of milk trade.

The empirical data were provided by the National Institute of Statistics for the period 2007-2015. They were statistically processed by common used methods to identify the main trends.

For the main indicators have been determined the statistical parameters: mean, standard deviation and variation coefficient.

Also, comparison regarding average farm

size, and milk yield, as important quantitative factors with a deep influence on milk production were made between Romania and other EU countries.

The impact of milk crisis in terms of losses was evaluated mainly in 2015, but also in 2016, regarding raw milk offer, and milk price, milk export and import.

The regression of milk price depending on milk production has been graphically represented both in case of cow milk price and sheep and goat milk price.

The results were graphically illustrated and correspondingly interpreted.

RESULTS AND DISCUSSIONS

The milking livestock. In Romania, milk is produced by three animal species: bovines, sheep and goat. While cattle livestock registered a continuous decline from 2,819 thousand heads in 2007 to 2,092 thousand heads in 2015 (-26%), sheep livestock increased from 8,469 thousand heads in 2007 to 9,809 thousand heads in 2015 (+15.8%) and goat livestock also increased from 865 thousand heads in 2007 to 1,440 thousand heads in 2015 (+66.4%). This situation was created by the high farm input price and high milk production cost and the low milk price at farm gate offered by processors for cow milk. This determined cattle breeders to diminish the number of cows.

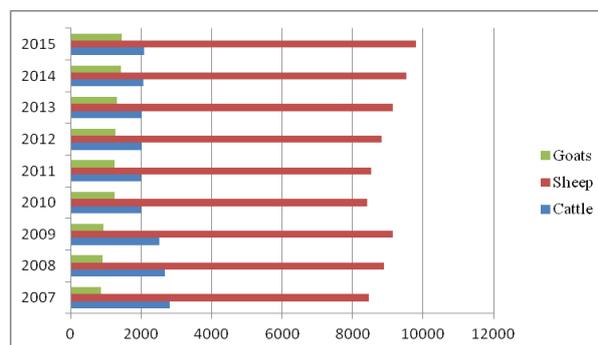


Fig.1. The dynamics of cattle, sheep and goat livestock, Romania, 2007-2015 (Thousands heads)

Source: Own design based on National Institute of Statistics, Tempo-Online, 2017 [9]

Sheep and goat breeders are more advantaged because production cost is lower than in case of dairy farming and due to the increased demand for goat milk products (Fig.1).

In 2015, the female milking livestock was accounted for 1,311 thousand dairy cows and buffaloes, 8,329 ewes, and 1,133 goats (Fig.2).

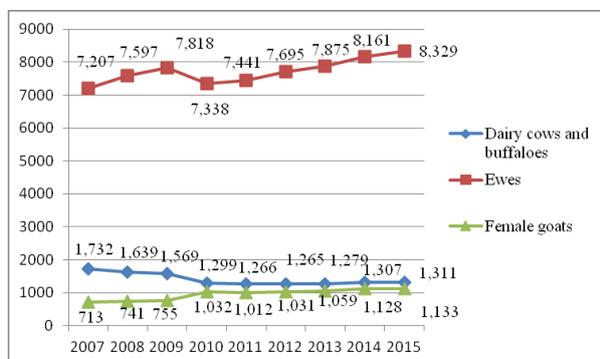


Fig.2. Milking livestock: Dairy cows and buffaloes, Ewes and Female goats, Romania, 2007-2015 (Thousands heads)

Source: Own design based on National Institute of Statistics, Tempo-Online, 2017 [9]

Agricultural holdings raising cattle, and sheep and goats, and average farm size. In 2010, in Romania there were 728,020 holdings growing cattle, by 68.18 % less than in 2007, and 272, 275 holdings raising sheep and goats by 30.39 % less than in 2007. The reduction of the number of holdings was a positive factor, taking into account the dynamics of the livestock, as it contributed to the improvement of farm size.

In case of cattle holding, the average farm size increased from 2.64 heads/farm in 2007 to 2.74 heads/farm in 2010, and in case of sheep and goats the average farm size increased from 21.68 heads in 2007 to 30.91 heads/farm in 2010 (+42.57%).(Table 1).

Table 1. Average size and number of holdings raising cattle, sheep and goats, Romania

	No. of agricultural holdings			Average holding size (heads)		
	2007	2010	2010/2007 %	2007	2010	2010/2007 %
Cattle holdings	1,067,726	728,020	68.1	2.64	2.74	103.7
Sheep and goat holdings	390,562	272,275	69.7	21.68	30.91	142.5

Source: Own calculation based on NIS DataBase, 2017 [9]

About 90 % of dairy holdings raise 1-3 cows, reflecting the characteristics of subsistence farms.

In 2014, the number of dairy farms was 655,541, of which 84.4 % were small farms owning 1-2 cows. These farms are not able to make direct deliveries compared to a number of 2,042 larger farms where modern technologies are applied and milk quality fits quality standards, and which are able to supply raw milk for processors [4].

Farm size in Romania is the smallest compared to the other EU countries and characterizes a subsistence dairy farming, which means that traditional technologies are involved, milk quality does not always compile with the quality standards, direct milk deliveries are prohibited.

The reduction of cattle stock is not an isolated phenomenon in Romania, it also characterizes the whole EU. This aspect has had a good impact on the growth of farm size, 16.4

heads/farm in average at present, and which is expected to grow to 17.5 heads/farm in 2020. The highest average heard size is expected to be in the following countries: Denmark (301), Czech Republic (217), United Kingdom (191), Sweden (106), Netherlands (102), Belgium (102), Italy (85), Germany (76), France (72), Spain (74), Finland (45), Poland (36) and Austria (17) [15].

Milk production. Milk production recorded a variable trend in the period 2007-2015. In 2007, Romania achieved 57,736 thousand hl and in 2008, it reached 59,006 thousand hl, the maximum level in the analyzed period. Since 2009, milk production recorded a continuous decline, being determined by the reduction of cattle stock, also by the low performance per cow, and also due to the climate change, mainly the deep droughts in 2012 and 2013 which had a negative impact on forage production. However, in 2014, milk production reached 50,535 thousand hl, being

by 3.7 % higher than in 2013. But in 2015, due to the ending of quotas, milk production accounted for only 48,156 thousand hl, being by 2.73 % lower than in 2014. In 2015, Romania produced by 15 % less milk than in 2007 [7].

The bovine species gives the most important contribution to milk production. However, milk production from cattle declined from 54,199 thousand hl in 2007 to 42,663 thousand hl in 2015, when production was by 3.08 % lower than in 2014. As a result, the share of milk production from cattle in total milk production declined from 93.87 % in 2007 to 86.79 % in 2015, because of the increased milk production achieved from sheep and goat. Therefore, in 2015, milk production coming from cow and buffaloes represented 78.7 % of milk production produced by these species in 2007.

Milk production coming from sheep and goat increased by 83.5 % in the analyzed period from 3,537 thousand hl in 2007 to 6,493 thousand hl in 2015 (Fig.3).

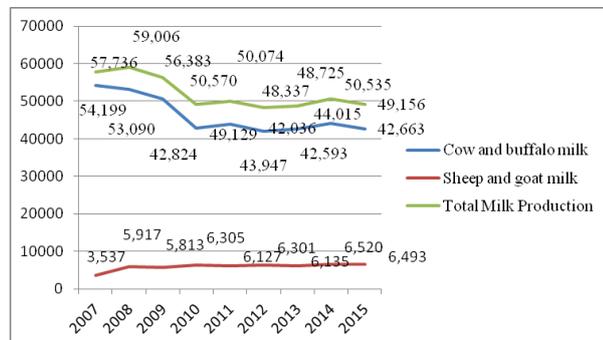


Fig.3. Milk production by species, Romania, 2007-2015 (Thousands hl)

Source: Own design based on National Institute of Statistics, Tempo-Online, 2017 [9]

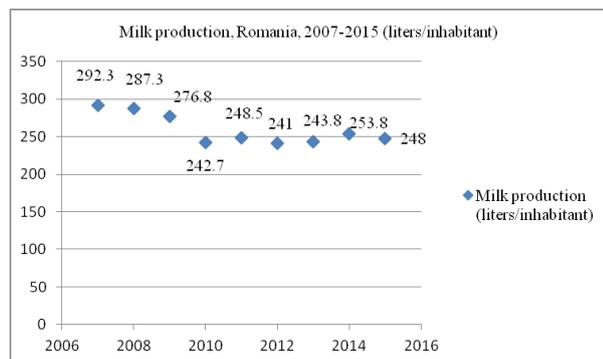


Fig.4. Milk production per inhabitant, Romania, 2007-2015 (liters/capita)

Source: Own design based on National Institute of Statistics, Tempo-Online, 2017 [9]

As a consequence, milk production per inhabitant declined by 15,2 % from 292.3 liters/capita in 2007 to 248 liters per capita in 2015. In 2015, milk production per capita was by 2.3 % lower than in 2014, as an effect of milk crisis.(Fig.4.).

Milk yield. The reduction of milk production was caused also by the low milk performance per cow and its decreasing trend from 3,504 kg/cow in 2007 to 3,328.8 kg/cow in 2015 (-5%). The low yield is determined by the low production potential of the local Black and White Spotted, Yellow and White Spotted and Brown breeds and their crossbreds, by the scarce forage production in the last years caused by the extreme meteo phenomena (droughts and floods), by the reduced percentage of the use of frozen semen from high breeding value bulls (Fig.5.)

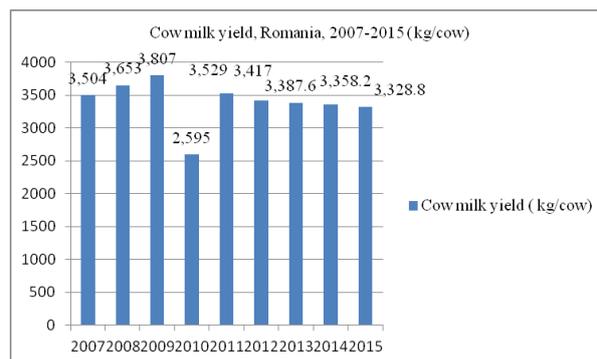


Fig.5. Cow milk yield, Romania, 2007-2015

(kg/cow/year)

Source: Own design based on National Institute of Statistics, Tempo-Online, 2017 [9]

Milk yield in Romania is very low compared to milk performance per cow in other EU countries, for instance, over 7,000 kg/cow in Germany and France. The highest average milk yield is in Denmark (8,647 kg), Czech Republic (8,510 kg), Sweden 98,230 kg), Finland (8,158 kg), Spain (8,150 kg), Netherlands (7,900 kg), Hungary (7,251 kg), United Kingdom (6,742 kg), Italy (6,510 kg). The EU-28 average yield is 6,626 kg/cow, almost double compared to the one registered in Romania [12, 17].

More than this, in Romania milk quality does not fit in most of cases the EU quality standards. Only 26 % of about 4.5-5 million milk tons achieved annually have a high quality [13].

Milk consumption is one of the lowest in the EU-28 because of the high milk consumer price in supermarkets. Compared to 67.5 kg milk/capita/year, the average consumption of packed cow milk in the Western countries, in Romania it was registered just 12.6 kg/capita [5].

Milk value at farm gate increased by 6.88 % in the analyzed period from 4,340.8 Million Lei in 2007 to 4,639.5 Million Lei in 2016, in terms of producer price. However, milk crisis affected milk price at farm gate and this led to a decline of milk value by -5.4 % in 2015 compared to 2014. Even though producer's price was low, milk traders were not interested to diminish their prices in the supermarket shelves. (Fig.6.)

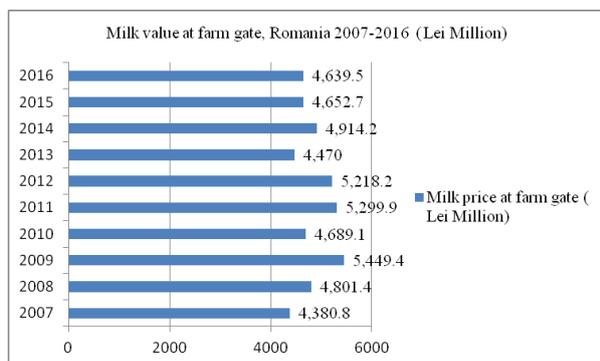


Fig.6. Milk value at farm gate, Romania, 2007-2016 (Lei Million)

Source: Own design based on National Institute of Statistics, Tempo-Online, 2017 [9]

Cow and sheep milk price registered a general increasing trend in the analyzed period. Cow milk price increased by 40 % from 0.75 Lei/kg in 2007 to 1.05 lei/kg in 2015, while sheep milk price increased by 59 % from 1.20 lei/kg in 2007 to 1.91 lei/kg in 2015. However in 2015, cow milk price declined by 16.5 % and sheep milk price by 11 % compared to 2014 due to milk crisis. (Fig.7).

The decline of milk price at farm gate was imposed by milk processors, and the delay of payments from the EU funds for agriculture, milk producers were obliged to diminish milk production because of the low milk price, and many dairy farms registered losses [18].

Due to the lack of raw milk in the market, the Romanian milk processors bought milk at a lower price from the free market of the EU

countries and then they were facing a deficit on spot market. Because of the low milk price offered by milk processors to milk producers, the last ones mainly from the South and South-Eastern Romania were obliged to sell their milk in Bulgaria, the milk export in this country increasing 2.5 times. Also, the decline in milk price in 2015 was caused by the reduction by 19.8 % of cattle livestock [10, 14].

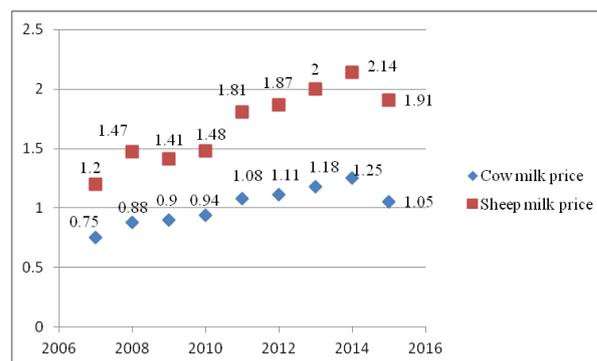


Fig.7. Cow and sheep milk price, Romania, 2007-2016 (Lei/kg)

Source: Own design based on National Institute of Statistics, Tempo-Online, 2017 [9]

In fact, milk crisis in milk industry affected the whole EU. The overproduction of dairy products led to the deep reduction of milk price and price fluctuation, and in addition natural disasters have deeply affected milk producers [11].

The milk price of a bottled liter in the EU countries reached the lowest level of Euro 0.89, being by 33.6 % (-50 Eurocents) cheaper than one liter of bottled water [1, 11]. The low milk price at farm gate determined the European milk producers to produce more milk to keep their incomes at a constant level. But, more milk, means lower milk price, therefore, they were forced to produce in a "vicious circle" [4].

Mean, standard deviation and variation coefficients for the main studied indicators are presented in Table 2. The variability is higher than 10.5 in case of the number of dairy cows and buffaloes, (13.12 %), goats (17.80 %), cow and buffalo milk (10.67 %), sheep and goat milk (15.56 %), cow milk price (14.85 %) and sheep milk price (18.34 %).

Table 2. Statistical parameters of mean, standard deviation and variation coefficient for the main studied indicators

Indicator	MU	Mean	Standard Deviation	Variation coefficient (%)
Dairy cows and buffaloes	Thousand heads	1,407.4	184.72	13.12
Ewes	Thousand heads	7,717	371.08	4.80
Goats	Thousand heads	956	170.19	17.80
Total milk production	Thousand hl	52,120.1	4,292.38	8.23
Cow and buffalo milk	Thousand hl	46,215.2	4,932.7	10.67
Sheep and goat milk production	Thousand hl	5,905.3	919.17	15.56
Milk production per inhabitant	Liters/capita	259.3	20.32	7.83
Cow milk yield	Kg/cow	3,307.7	337.7	9.93
Milk value at farm gate	Lei Million	4,851.5	361.69	7.45
Cow milk price	Lei/liter	1.01	0.15	14.85
Sheep milk price	Lei/liter	1.69	0.31	18.34

Source: Own calculation.

Milk delivery to milk processors.

According to an USDA Report regarding milk market in Romania, cow milk production increased from 4,238 million liters in 2013 to 4,260 million liters in 2016, meaning just a slight increase of 0.5 %. At the same time, cow milk deliveries to milk processors also increased but by 6 % from 883.3 thousand

Metric Tons in 2013 to 935 thousand Metric Tons in 2016 [17].

In 2015, the year when milk crisis started, cow milk yield was 4,240 million liters by 3 % less than in 2014, and cow milk deliveries to milk industry were by 7.8 % lower than in 2014.(Table 3).

Table 3. Cow milk production and deliveries to milk processors, Romania, 2013-2016

	MU	2013	2014	2015	2016	2016/2013 %
Cow milk production	000 000 liters	4,238.1	4,371.3	4,240.1	4,260	100.5
Cow milk deliveries	000 MT	882.3	996.6	919	935	106.0

Source: Own calculation based on the data provided by [17]

Milk export and import. Analyzing only the period 2013-2016, one may notice a general ascending trend both in case of milk export and milk import.

Romania's milk export was doubled in 2016, accounting for 46,000 MT, compared to 21,929 MT in 2013. Cow milk import increased by 36.5 from 136,105 MT in 2013 to 185,000 MT in 2016.

The effect of milk crisis is visible in the year 2015, when milk export was 31,723 MT by 11 % less than in 2014 (35,602 MT), and the cow milk import accounted for 146,522 MT in 2015 being by 26.73 % higher than in 2014 (115,612 MT).(Fig.8).

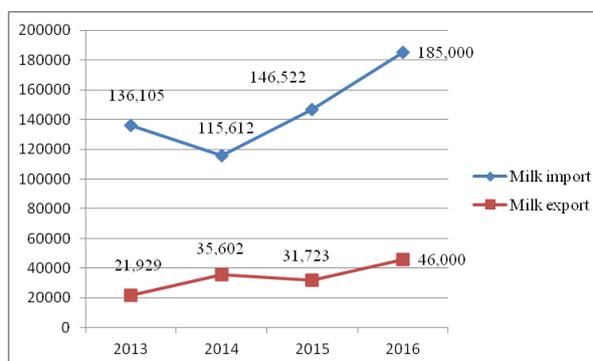


Fig.8. Milk export and import, Romania, 2013-2016 (Metric Tons)

Source: Own design based on the data provided by [17].

As a consequence the export/import ratio increased from 0.16 in 2013 to 0.24 in 2016,

the highest 0.30 being registered in 2014. But, milk crisis led to a decline of 30 % from 0.3 in 2014 to 0.21 in 2015, as imports were much higher than exports.

The raw milk suppliers for Romania are

Hungary, Poland, Czech Republic, Germany, Greece, Slovakia and Bulgaria [17].

The losses registered in milk market in the year 2015 due to milk crisis are presented in Table 4.

Table 4. Losses in Romania's milk market due to milk crisis in 2015

	MU	Δ 2015-2014	$\pm\Delta$ %
Total milk production	Thousand hl	-1,379	-2.72
Cow and buffalo milk	Thousand hl	-1,352	-3.07
Sheep and goat milk production	Thousand hl	-27	-0.41
Milk production per inhabitant	Liters/capita	-5.8	-2.28
Cow milk yield	Kg/cow	-29.4	-0.87
Milk value at farm gate	Lei Million	-261.5	-5.32
Cow milk price	Lei/liter	-0.20	-0.16
Sheep milk price	Lei/liter	-0.23	-0.10
Milk export	Metric Tons	-4,229	-11.87
Milk Import	Metric Tons	+30,910	+26.73
Export/Import ratio	-	-0.09	-30.00

Source: Own calculation.

Regression of milk price depending on milk production are presented in Fig.9 for cow milk and Fig.10 for sheep milk.

The regression line shows that cow milk production has a deep impact on milk price, the coefficient of correlation between these two indicators being, $r = 0.806$, and that the R square reflects that about 65 % of cow milk price is determined by the variation in cow milk production (Fig.9.).

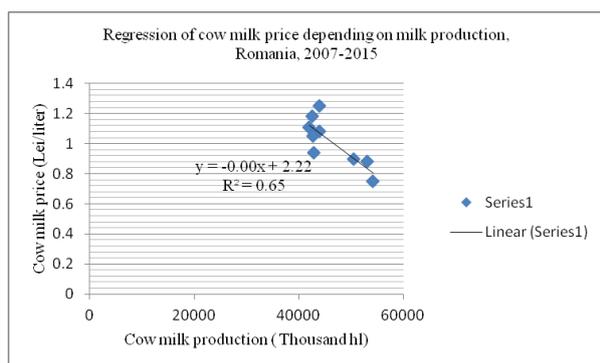


Fig.9. Regression of cow milk price depending on milk production, Romania, 2007-2015

Source: Own design.

Also, the regression line shows that sheep and goat milk production has a strong influence on milk price, the coefficient of correlation between these two indicators being, $r = 0.718$, and that the R square reflects that about 51.61 % of sheep and goat milk price is determined

by the variation in sheep and goat milk production (Fig.10).

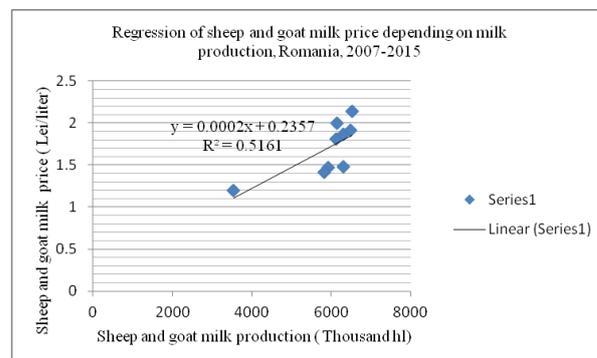


Fig.10. Regression of sheep and goat milk price depending on milk production, Romania, 2007-2015

Source: Own design.

CONCLUSIONS

While cattle livestock decreased, sheep and goat livestock increased, the main cause being the high price for farm inputs and the low milk price at farm gate for dairy farmers whose contribution to milk production is the most substantial one.

Milk production declined by 15 % in general, and while cow milk production declined by 21.3 %, sheep and goat milk production increased by 83.5 %.

All these affected milk supply to milk processors, which were obliged to buy raw

milk from other countries were milk price was lower.

Milk prices affected both Romanian producers and processors. Romanian producers were obliged to receive a low milk price at farm gate, to support losses and to produce more milk to keep their income level and pay their debts. A part of the producers who could not sell their milk at a low price on the local market, decided to sell their milk production in Bulgaria.

Due to the lack of raw milk on the local market, milk processing plants had the initiative to purchase raw milk at a lower price from the EU countries to balance their income.

Milk and milk products traders did not reduce consumer price in accordance with the farm gate price, and this caused the decline in milk consumption.

The overproduction of milk and dairy products in the EU, the low milk price at farm gate and price fluctuation, and natural disasters affected all the EU countries and caused deep disappointments to milk producers.

All these aspects proved the weak link and cooperation between producers-processors-traders and consumers along milk chain. Milk crisis has imposed the need of equity in setting up the corresponding measures and tools for milk producers, taking into account the expenses for production factors as well as consumer price, in order to avoid production concentration and to assure a balanced distribution of value added along milk chain.

Since 2017, the Romania Government decided to offer financial aids for milk producers, more exactly Euro 14 per each 100 cow milk liter of non marketed milk, under the condition that the reduction of production to be of minimum 1,500 liters [16].

Romania's milk producers have to pay attention to the increased competition among farms both at national and European level and to adapt to the market changes and price fluctuations. All these will oblige them to take into consideration that knowledge, training level, modern technical endowment and technologies, farm management are the key qualitative factors which could keep

production cost at a low level, assure a high milk quality, economic efficiency and competitiveness.

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