

An Overview of the Recent Situation on the Milk Sector Sources and Resources

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Abstract. *The dairy sector has an important role in the world food system, with a variety of products consumed by people worldwide. This paper aims to analyze the recent situation of the milk and dairy products sector, from the perspective of milk sources and resources on the dairy products market. Recent data show that in the European Union, the total milk production exceeds 160.8 million tons, of which 96.5% is cow's milk. Romania has a significant increase in demand for milk and dairy products, driven both by the evolution of the dairy market at European and national level, and by changes in consumer preferences, which are increasingly oriented towards a healthier diet. The research methods used in this paper are structural data analysis, comparative analysis, studying trends based on regression equations and graphical representation of data. The main research questions formulated in the paper refer to the recent breed structure of cattle, sheep, goats, and buffaloes, as sources of milk production, the types of milk-supplying farms, productions of milk and milk products, milk imports and exports. The research showed that households, along with commercial farms, constitute an important source of marketable milk, and that the dairy sector's resources come from a combination of commercial and non-professional farms. Also, the internal supply is completed by an important offer from imports. Regarding milk prices at the farm gate, it has always been a subject of dissatisfaction for farmers, who have not always covered their production costs. The present paper realizes an overview and provides important data on the recent situation on the milk sector sources and resources, that are currently facing several challenges.*

Keywords: milk, cow, sheep, farm, import, export.

Introduction

Within food and nutritional security, functional dairy products have become increasingly important (Mohapatra, A., Shinde, A.K. and Singh, R., 2019). On the other hand, animal husbandry has had a significant impact on the socio-economic life of human communities, especially in rural areas. In these regions, animal products represent an essential source of protein, having the ability to transform low-quality natural resources into a valuable food product (Dubeuf J. P., Morand-Fehr P. et al, 2004).

The dairy industry plays a key role in the global food system, providing a variety of products consumed daily by millions of people around the world. It is not only an important source of income for farmers, but also contributes to job creation in sectors such as processing, transport, and agricultural services. The unique characteristics of this sector, as well as continuous production

throughout the year and the specific composition of milk, underline its strategic importance in the global food chain (Fiorillo et al, 2024).

The domestic sources of milk are cow, buffalo, sheep, or goat farms of various types, which can be commercial farms or households (non-professional farms). In addition, a large part of the milk and dairy products on the market are imported.

The research objectives in this paper are:

- to explore the current trends in the dairy sector both from the perspective of sources and resources;

- to capture the most recent values and trends in terms of: species, breed structure, number of animals, quantities produced, trade, and purchase prices.

The main research questions formulated in the paper are:

Q1: What is the recent breed structure of cattle, sheep, goats, and buffaloes, as sources of milk production valued on the market?

Q2: What are the types of milk-supplying farms and what share do they occupy, according to recent data?

Q3: What are the productions of milk and milk products that are recently valued on the market, by species?

Q4: What are the recent values of the level of milk imports and exports?

The main research hypotheses were:

H1: Households play an important role as sources of marketable milk, both for cattle and buffalo, sheep, and goats. This hypothesis suggests that in the dairy sector commercial farms are not the main source of milk.

H2: Resources in the dairy sector, such as quantities of milk for consumption and dairy products come from both commercial and non-professional farms, and this hypothesis was confirmed by the data taken into the analysis.

The research hypotheses are based on the premise that households, along with commercial farms, constitute an important source of marketable milk. Also, the dairy sector's resources come from a combination of commercial and non-professional farms.

Literature review

The dairy sector has an important role in the global agricultural economy, with an annual milk production of approximately 968.2 million tons in 2023, according to FAO (Food and Agriculture Organization of the United Nations). The main species involved in this production – cattle, sheep, goats, and buffaloes – contribute differently to the global supply, and their distribution varies significantly between regions of the world.

For example, Asia and Europe concentrate approximately 70.7% of the world milk production, highlighting the dominant role of these regions. In contrast, in Africa and Latin America, diversification of dairy products is essential for the local economy (FAO, 2023). Analyzing the distribution of raw milk, important differences are observed between regions. Buffalo milk is produced almost exclusively in Asia, which contributes 98.9% to the global supply. Camel milk production is concentrated in Africa with 68.78%, while 31.2% comes from Asia. Cow milk dominates global production, with Asia accounting for 36.15% of the total, followed by Europe with 29.2% and the Americas with 25.5%. In the case of goat milk, almost 60% of production comes from Asia, while Africa contributes 21.8% and Europe only 14.4%. For sheep milk, Asia provides 44.9%, Europe 30.6% and Africa 24.2% of global production.

The total milk production in each region highlights specific characteristics. In Africa, the total production is 53.23 million tons, of which 80.9% is cow milk, 15.5% buffalo milk, and the rest from other species. In Asia, total production reaches approximately 450 million tons, of which 99.6% is cow's milk. Oceania, with a production of 29.7 million tons, follows a similar pattern, with cow's milk representing 97.3% of the total. Europe shows greater diversification within the total production of 234.3 million tons, with 62.9% raw cow's milk and 33% buffalo's milk (FAO, 2023).

In the European Union, total milk production exceeds 160.8 million tons, of which 96.5% is cow's milk. Germany ranks first, with a share of 21.15% of milk production, followed by France with 15.5%. Buffalo milk is produced in only a few Member States, with Italy being the largest producer, with 254.3 thousand tons (85.9%), and Romania following with a production of 19.3 thousand tons (Eurostat, 2024). The use of goat and sheep milk to produce various types of milk and dairy products is constantly increasing, although it represents a much smaller proportion compared to cow and buffalo milk globally. However, in some countries, this sector is much better organized than in others, with changes in lifestyle and modern diet posing a challenge (Pandya, A.J. and Ghodke, K.M., 2007).

Regarding the structure of dairy farms, in addition to commercial farms, family farms and small producers play a significant role in the milk market, making an important contribution. Another important aspect is the trade flows of milk and dairy products, which have undergone significant fluctuations in recent years. Also, the milk imports and exports have experienced variations due to economic changes, trade policies and consumer preferences. They are an important factor to analyze in the context of the globalization of dairy markets. Although global milk production has been steadily growing, it is currently facing several challenges. These include a shortage of raw milk, which is affecting the milk processing process, an imbalance between supply and demand, and a decline in trade in milk and dairy products in various countries (Gavorski, M., 2016).

In recent years, Romania has seen a significant increase in demand for milk and dairy products. This trend is driven both by the evolution of the dairy market at European and national level, and by changes in consumer preferences, which are increasingly oriented towards a healthier diet. Milk remains an essential food in the Romanian diet, with an average consumption of approximately 243 liters per capita per year. The most consumed type is cow's milk. In terms of the number of cattle herds, Romania ranks ninth in the European Union, with 1.88 million heads in 2020 and a total production of 42.6 million hectoliters of milk (Stoica, G.D. and Ilie, D.M., 2021).

A positive trend is noted in milk production from agricultural enterprises and peasant households in 2022, but milk production from households has declined. This decline is determined by the high costs of animal feed and the demanding work required to raise them. More and more consumers are choosing to buy dairy products, meat and eggs from stores and markets, to the detriment of their own production. Since 2015, imports of milk and dairy products have been on a continuous increase, which emphasizes the need to develop the local sector to reduce dependence on the foreign market (Șcerbacov, E. and Zbancă, A., 2023). The dairy sector is dominated by small producers, and the development of local cooperative structures, based on community interests, can lead to much better performance (Ignat, A., 2013).

Food losses in supply chains are huge, caused by the lack of adequate technological infrastructure and various organizational problems. This phenomenon is true where food losses are often the result of a lack of accurate data on the locations and quantities of products available

(Mangla, S.K. et al, 2021). In terms of milk production, the greatest losses occur during the production phase. These losses are largely caused by antibiotic residues resulting from non-compliance with regulations on antibiotic treatments and calving. Wastewater generated by the milk production process is also another major problem in supply chains. However, due to the lack of accurate data, food waste at this stage remains considerable.

At the same time, due to demographic and lifestyle changes, processing technologies have evolved, expanding the range of liquid dairy products available on the market. These include skimmed or low-fat milk, flavored milk, low-lactose or long-life milk, as well as milk with increased protein and calcium content. The technology for producing specialized, protein-rich sports drinks has also been developed, which has further diversified the offer of milk-based beverages for consumers (Barbano, D.M., 2017).

The Common Agricultural Policy (CAP) has evolved steadily over the last five decades. It adapts to socio-economic changes in the Member States, to the enlargement of the European Union and to the pressures of globalization. In this context, the Common Market Organization and regulatory measures in the milk and milk products sector have undergone progressive transformations over the last 40 years. However, unlike other sectors where reforms have been significant, changes in this area have been slower and less radical. The global and European dairy market continues to be influenced by changes. These refers to consumer preferences, technological progress, and interaction with related sectors, such as beef and veal or arable crops and feed, which have undergone profound reforms. These factors are generating increasing pressure on the dairy sector. In here, existing support and regulatory mechanisms are becoming less and less appropriate to the new economic realities. In this context, the need for a major structural reform of policy in this area is becoming increasingly obvious and urgent (Giurca, D. et al, 2008).

Methodology

The research methods used in this paper are structural data analysis, comparative analysis, studying trends based on regression equations and graphical representation of data, using Excel applications.

The paper analyzes the following indicators related to dairy sector in Romania:

- breed structure of cattle, sheep, and goats;
- number of cows, buffaloes, sheep, goats, in 2024, by farm types;
- production of milk marketed in 2024, by species and by farm types;
- imports and exports of milk and dairy products in 2023 and 2024;
- monthly evolution of dairy products in 2024: drinking milk, acidophilic dairy products, sour cream, cheeses, butter;
- monthly evolution of milk prices at producer, in 2023, 2024.

The trend of milk production for consumption in 2024 was described by the equation:

$$y = 382.84x + 28,976$$

The calculations and analyses were performed based on operational data provided by the Ministry of Agriculture and Rural Development (MARD), as well as official statistical data from the National Institute of Statistics (NIS).

Results and discussions

In the Figure 1, the breed structure of cattle raised in Romania is shown, in which the largest share (31.61%) is held by Bălțata românească breed - a mixed breed, for both milk and meat production, followed by the Bălțată cu Negru Românească (28.23%), specialized in milk production, and on third place is the Simmental breed (24.24%) - a mixed breed, meat and milk.

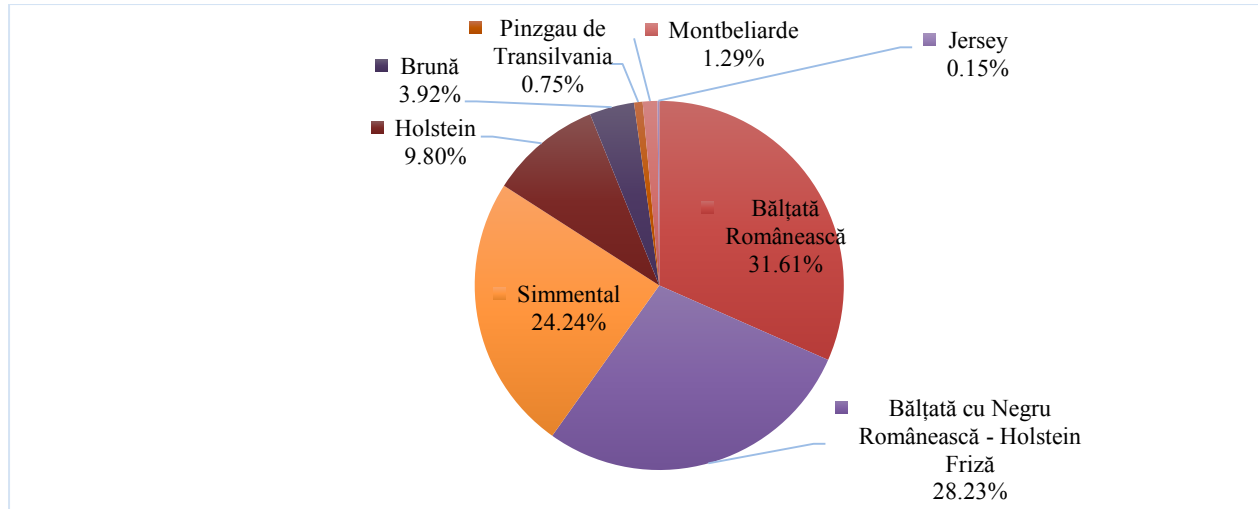


Figure 1. Breed structure of cattle in Romania, November 2024

Source: MARD, operative data.

The other breeds are Holstein (9.8%), Brună (3.92%), Montbeliarde (1.29%), Pinzgau de Transilvania (0.75%), Jersey (0.15%).

The Carpathian areas are characterized by a distinct natural environment, marked by mountainous geographical and climatic conditions, which favored the development of traditional agriculture. In these regions, animal husbandry was dominated by indigenous breeds of cattle, well adapted to the specific conditions (Necula, D., Ciupe, S., Tamas-Krumpe, O., Todoran, D. and Ognean, L., 2024).

In sheep, the Țurcană breed holds the overwhelming share, with 85.4%, followed by Țigaie breed, with 7.73% (Figure 2). Other sheep breed are Oaia cu cap negru de Teleorman (3.22%), Țigaie ruginie (2.75%), Rovasi (0.37%), Lacaune (0.25%), Rațca (0.23%), Rasa de lapte Palas (0.04%) (Figure 2).

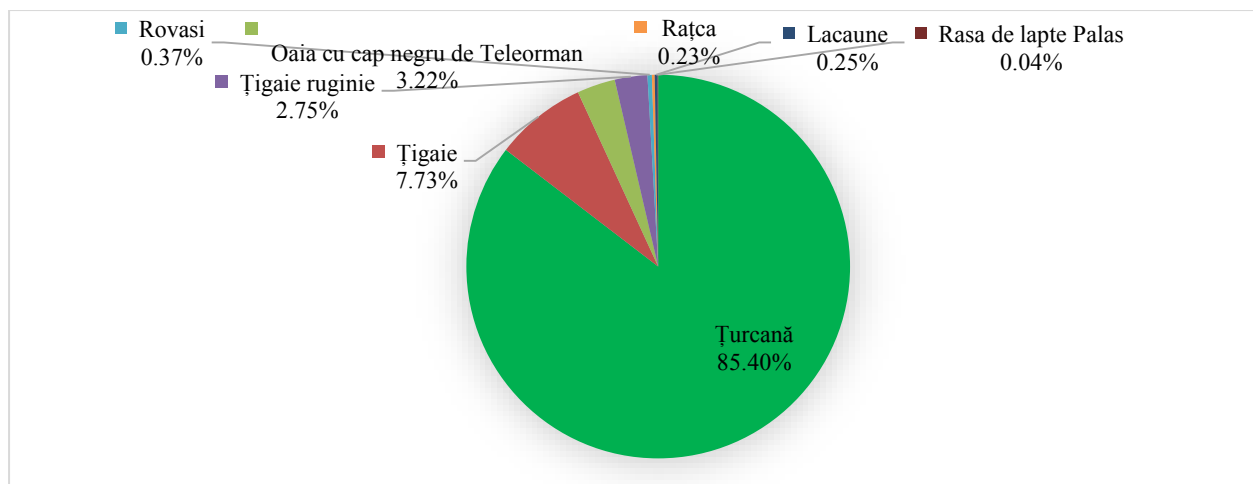


Figure 2. Breed structure of sheep in Romania, November 2024

Source: MARD, operative data.

In goats, 90.55% of the animals are of the Romanian Carpatina breed, the rest being Saanen (3.33%), Alpina (3.01%), Alba de Banat (1.01%), Anglo Nubiana (0.85%) (Figure 3).

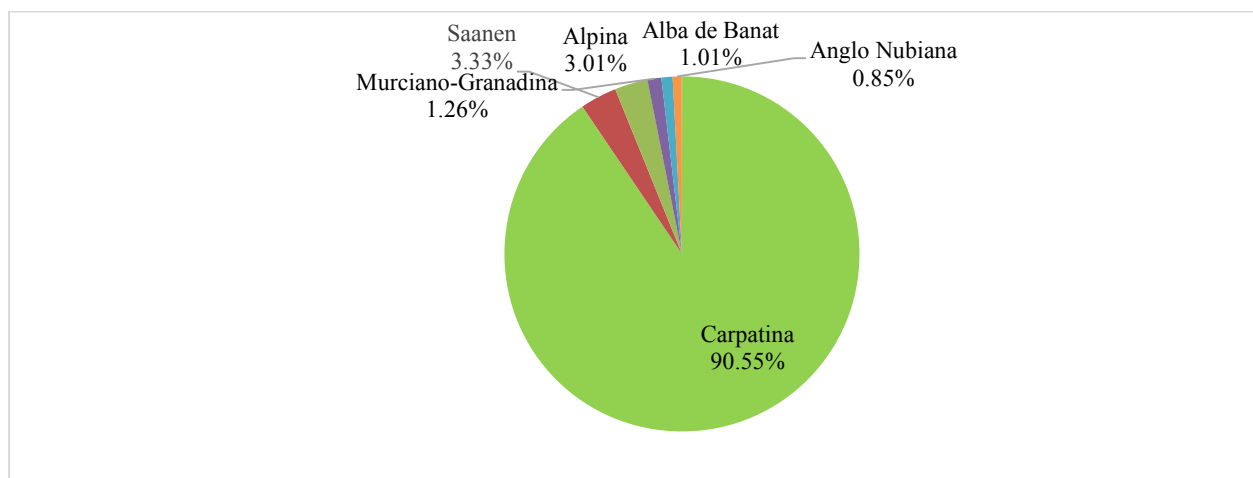


Figure 3. Breed structure of goats in Romania, November 2024

Source: MARD, operative data.

Regarding the number of milk-producing cows, approximately 84% of them belong to non-professional farms (households), the rest being in commercial farms (Figure 4).

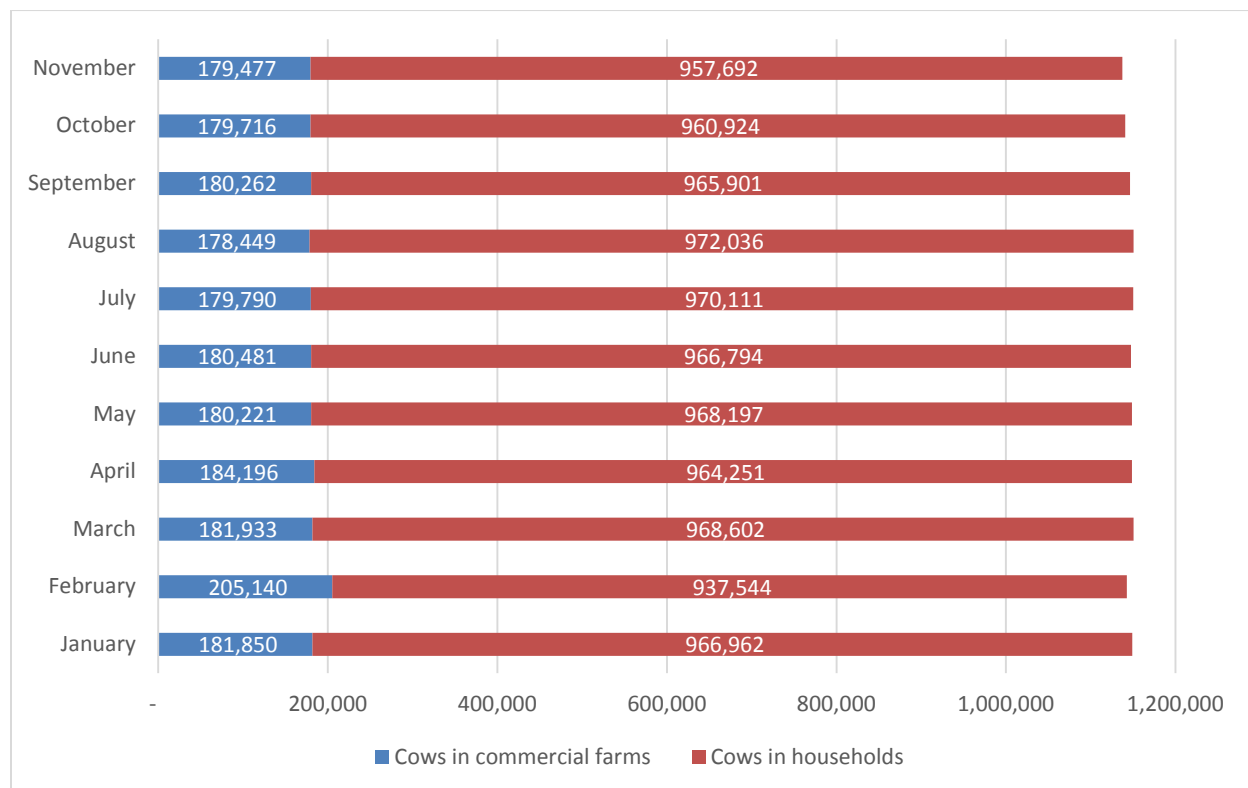


Figure 4. Milk producing cows, on farm types in 2024 (heads)

Source: MARD, operative data.

In the case of milk-producing buffaloes, over 95% belong to households, and less than 5% of them are on commercial farms (Figure 5).

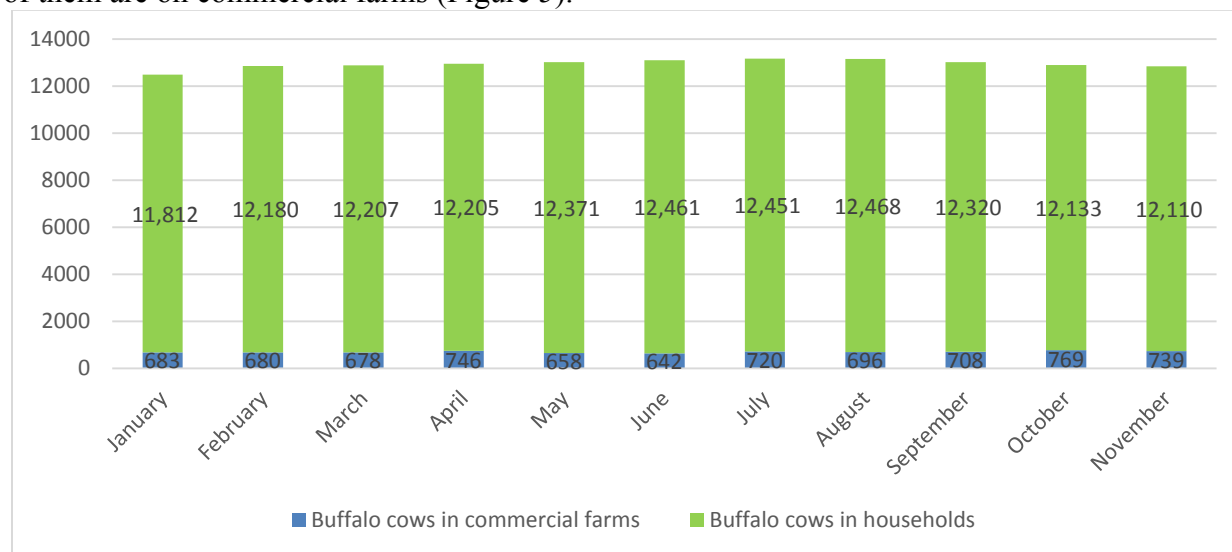


Figure 5. Milk producing buffalo cows, on farm types in 2024 (heads)

Source: MARD, operative data.

In sheep and goats, of the over 10.3 million heads as of November 2024, over 98% are in households, the rest belonging to commercial farms (Figure 6).

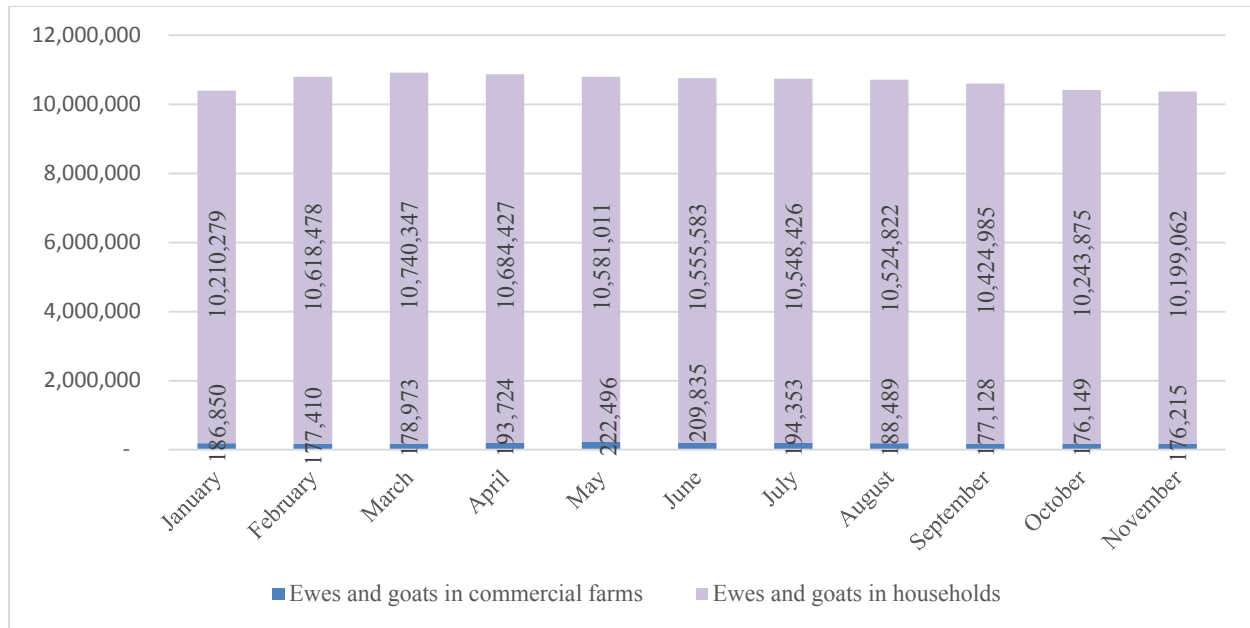


Figure 6. Ewes and goats, on farm types in 2024 (heads)

Source: MARD, operative data.

During 2024, the largest quantities of milk were sold on the market in May and November, 275,083 tons and 252,568 tons, respectively, of which only a quarter came from commercial farms, the rest being from non-professional farms (Figure 7).

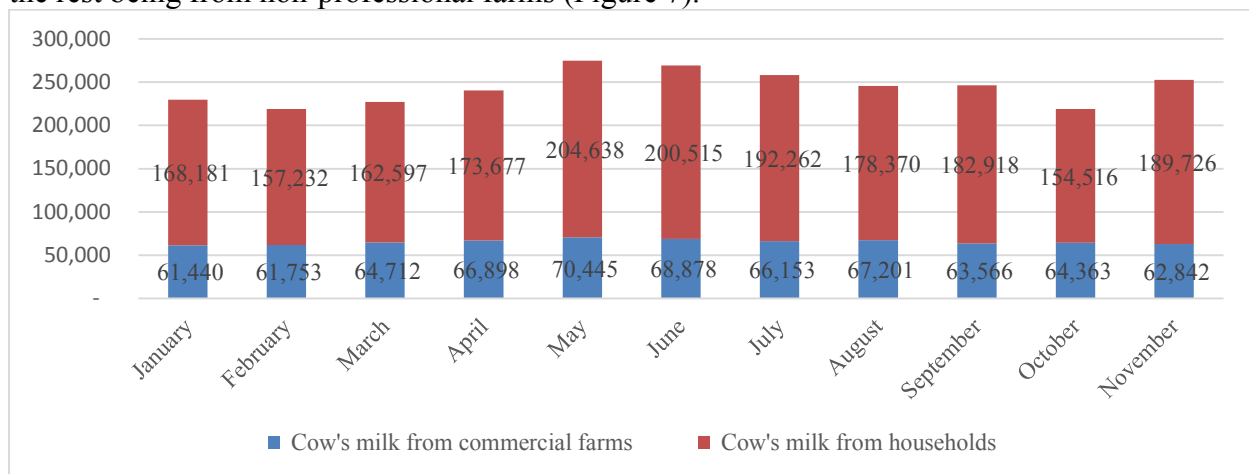


Figure 7. Cow's milk marketed, on farm types in 2024 (tons)

Source: MARD, operative data.

Milk production is an essential branch of agriculture in Romania, having a considerable impact on the national economy. In recent years, the milk and dairy products market in Romania has made significant progress. At national level, there are more than 360 milk processing units, of which 120 are equipped with a large production capacity. Romania has considerable potential in this sector, becoming one of the main certified dairy producers in the European Union, alongside countries such as Germany, France, the United Kingdom, the Netherlands, Poland, Italy, and Spain (Bercu, F., Micu, M.M., Pătrașcu, G., 2010).

In the case of buffalo milk, between 96-98% of the quantity sold on the market comes from households (Figure 8).

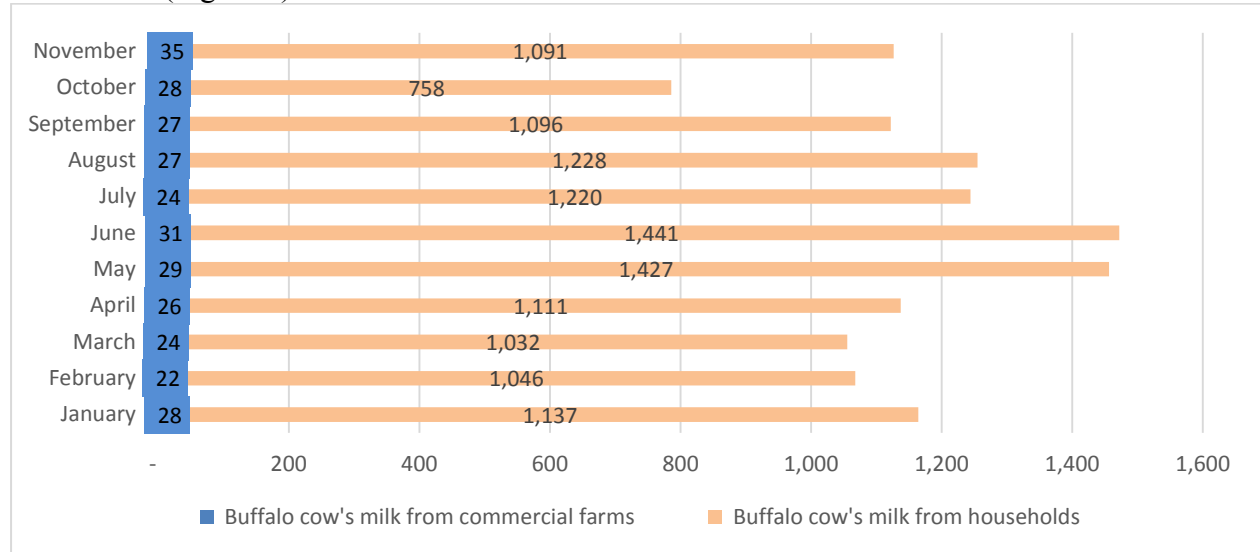


Figure 8. Buffalo cow's milk marketed, on farm types in 2024 (tons)

Source: MARD, operative data.

Advances in genetic selection and improvements in feeding have led to the development of superior breeds of goats and sheep. These advances have demonstrated evolutionary potential for both species, responding to increased market demand and increasing popularity, particularly for goat and sheep milk cheeses (Haenlein, G.F.W., 2007). In Romania, 93-99% of sheep and goat milk sold on the market comes from non-professional farms (households) (Figure 9).

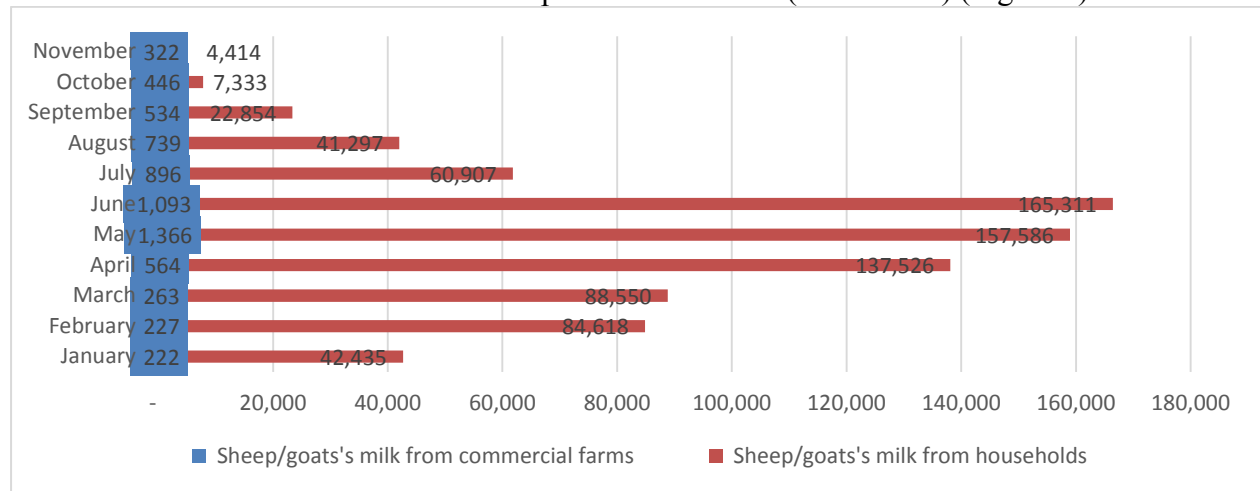


Figure 9. Sheep/goat's milk marketed, on farm types in 2024 (tons)

Source: MARD, operative data.

Within the contemporary economy, the market is conceived as a main and decisive economic and social mechanism. Through this, the activity of economic agents is oriented, as well as the allocation of resources in the development process. It is presented as a complex system in which the laws and mechanisms of the market - demand, supply, prices - interact and mutually

condition each other with numerous institutions. These institutions have the role of regulating these mechanisms, as well as with an entire internal and external economic context.

Within the livestock products market, the supply appears in the form of products of animal origin, both from domestic production and from imports. So, another source of milk sold on the market is that coming from imports. These are highlighted in Figure 10, where the 2024 import curve exceeds that of 2023 in every month. The highest increase was in October 2024, where 89.33% more milk was imported compared to the same month in 2023.

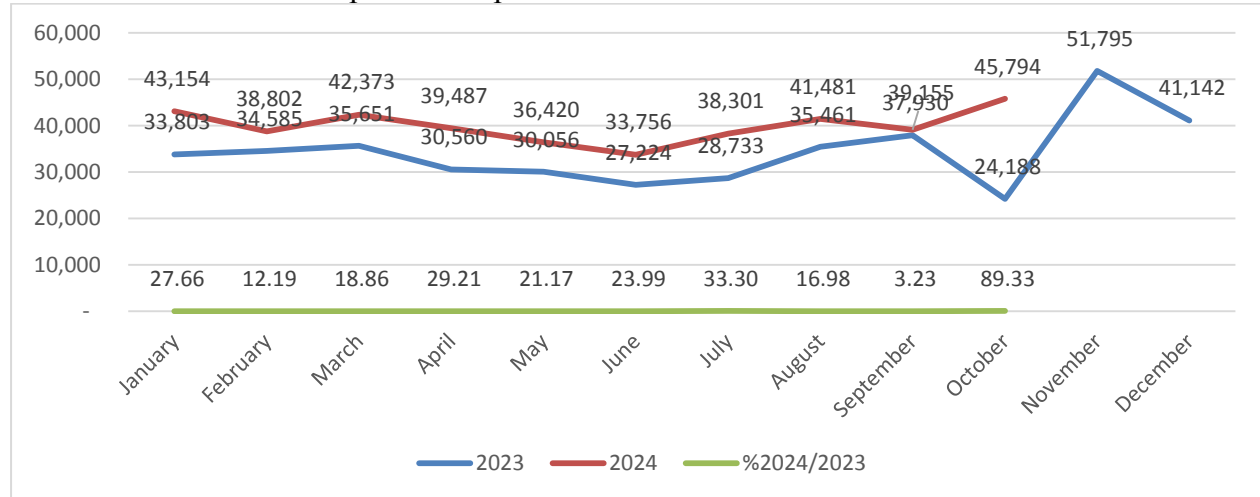


Figure 10. Imports of milk and dairy products in 2024 (tons)

Source: NIS.

The competition from imported dairy products is borne, especially by farmers and processors, but also by consumers. Therefore, sustainable measures are needed to protect domestic production. The Romanian livestock products market is dominated by imported products. Often, these are of questionable quality, heavily subsidized in the country of origin, at lower selling prices. This means that the products of Romanian farmers can no longer find their place on the shelf, as higher domestic costs determine higher prices. This thing leads to discouragement of the local producer. How can it compete in the market with international concerns with experience and marketing power, with well-established supply chains, with technologies that involve automation at all levels? The natural question seems rhetorical and discouraging, but things can be different. Awareness, will and real support are necessary to stop the decline of Romanian livestock.

Regaining confidence in Romanian products has already taken place on the part of the Romanian consumer and not only. There is now a need to regain trust between producers, to create production, distribution, and market sales chains, to create commercial centers that will also receive the quality products of Romanian farmers. There is a need for a management within the producers to function, which will act for their interests. Balancing the market for animal products with domestic products is an achievable goal. As participants in an open market, it is necessary to apply its rules, but we must earn our own position, which is not yet lost.

Among the main factors negatively influencing the position of Romanian brands are the accumulation of dairy stocks, the decrease in the purchase price of milk and dairy products in other EU Member States, the increase in imports of raw milk and dairy products from Germany, Austria, Poland, and Hungary. Also, the reduced purchasing power of consumers represents an additional challenge for local producers. In this context, only strong Romanian brands, well-equipped from a technological point of view, with a large production capacity, a varied range of products, solid

financial resources and efficient management will be able to cope with market pressures. Given these challenges, it is necessary to implement appropriate measures to reduce the negative impact on the milk and dairy sector (Popescu, A., Chirciu, I., Soare, E., Stoicea, P. and Iorga, A., 2022).

In the case of milk exports, 2024 exceeds 2023 in most months (except March and June), with July 2024 seeing the largest increase, 38.08% more than the same month of the previous year (Figure 11).

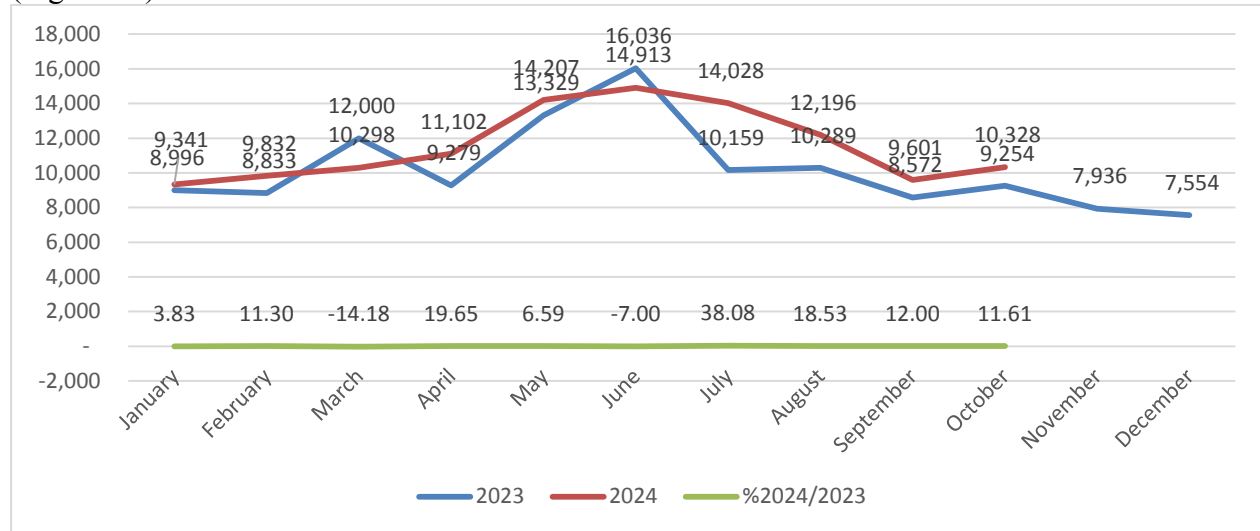


Figure 11. Exports of milk and dairy products in 2024 (tons)

Source: NIS.

Dairy products in 2024 are presented in Figure 12, where the milk for consumption, acidophilic dairy products, sour cream, cheese, and butter are highlighted. The largest quantity of milk for consumption was marketed towards the end of 2024, in October, of 35.9 thousand tons, and acidophilic dairy products in May - over 28 thousand tons. In January 2024, the largest quantity of cheese was produced, 17.6 thousand tons, as well as sour cream, 627 thousand tons. In March, the largest quantity of butter was placed on the market, 785 thousand tons.

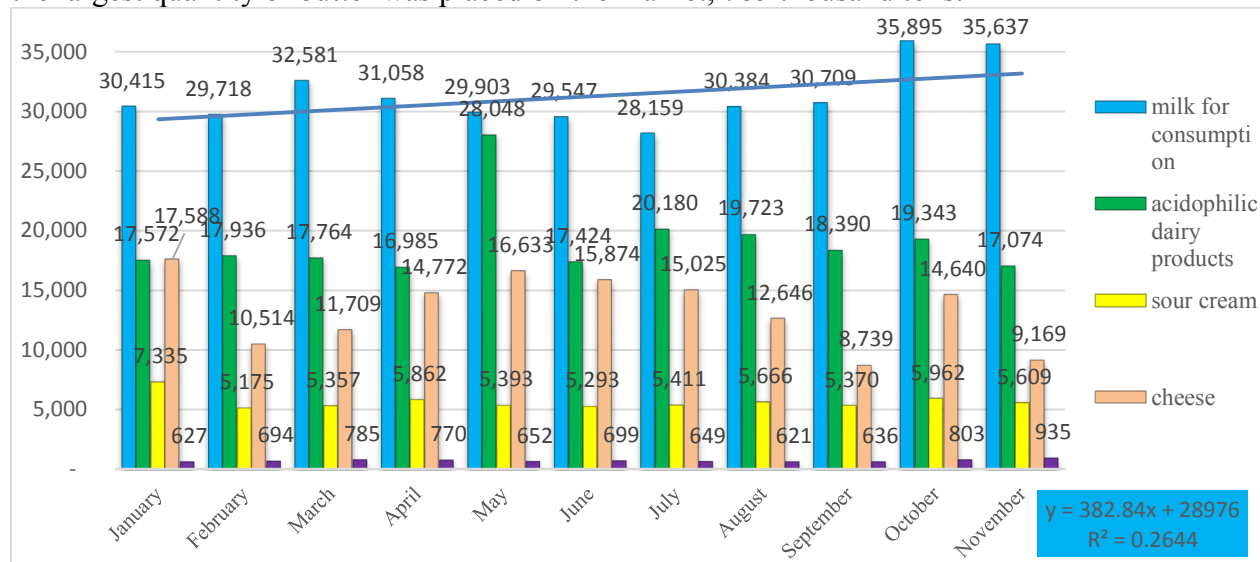


Figure 12. Dairy products in 2024 (tons)

Source: MARD, operative data.

The price of milk at the farm gate has always been a subject of dissatisfaction for farmers, who have not always covered their production costs. Throughout 2024, this price has varied between 2.05-2.28 RON/kg and at least in the first part of the year, these prices have been lower than those in the same period of 2023. This situation endangers the profitability of milk producers and endangers the resources of the dairy sector (Figure 13).

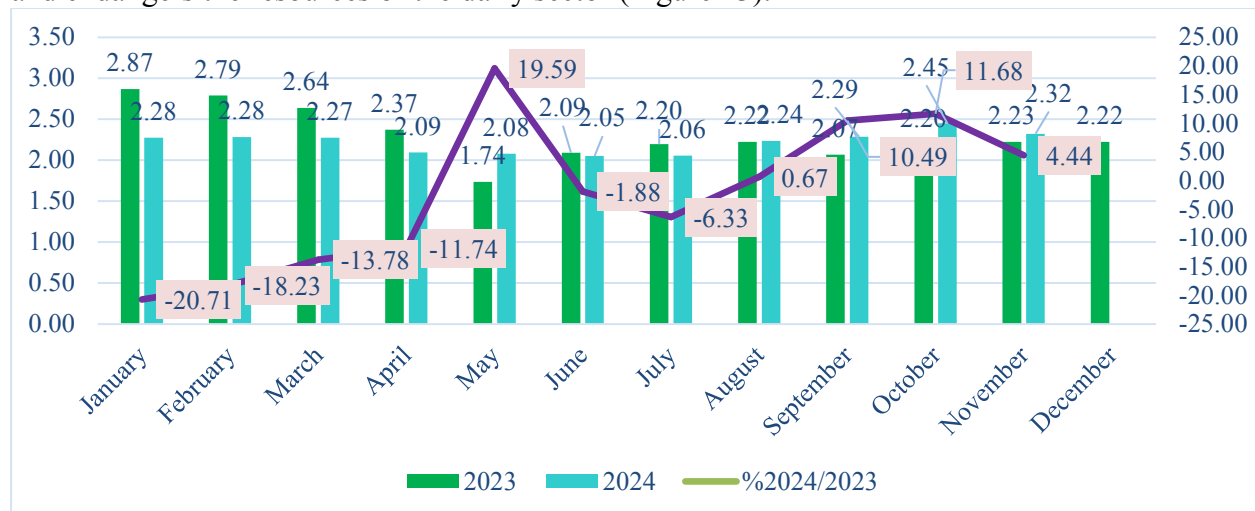


Figure 13. Average cow's milk price situation reported by first buyers (RON/kg)

Source: MARD, operative data.

Among the current challenges faced by the dairy sector, it can be listed the high prices of inputs, especially in the production segment, i.e. in livestock farms, and here we talk especially about forages, which accounts for 60-70% of the cost of milk, also energy, the difficult geopolitical context, competition from imported products, etc.

The development of deficient agricultural sectors, the balanced socio-economic development of rural areas, as well as the consolidation of farms to allow them to reach an optimal level of viability, is a permanent objective of agricultural policies. Through the support granted to livestock farmers, the aim is to revitalize the sector and stimulate users of agricultural land to practice sustainable agriculture by exploiting grazing land. Farmers can have access to financial resources through a fair level of direct payments. Also, there are complementary redistributive support for income, as well as production-coupled payments. To compensate for the gap in the value of the subsidy compared to the European average, Transitional National Aid is granted.

The National Strategic Plan also aims to strengthen the market orientation of activities, increase the level of competitiveness of the agri-food sector, intensify cooperation and modernize farms through investments to improve labor productivity.

In Romania, the predominant segment is that of small/medium-sized farms, which exploit a significant part of the agricultural area. Considering the small size of the holdings, the low capital and the volatility of farmers' incomes, these farms have an increased vulnerability. This comes both from an economic point of view and from an adaptation degree to the effects of climate change. Small and medium-sized farms that produce for the market, especially family farms, require a combined financial support. This can be through subsidies, financial interventions for investments, access to consultancy and new technologies etc. The purpose of them is to avoid the abandonment of agricultural activities, to facilitate market access and to support the introduction of processing of the products. Support granted to small and medium-sized farms can contribute to avoiding rural

migration and depopulation of villages, to renewing generations of young farmers, preserving jobs in the agri-food sector and consolidating the country's rural areas.

Obtaining advantageous prices by farmers could be achieved based on considerations such as: establishing a system of milk payment depending on its quality, the ability to conclude contracts with beneficiaries, establishing trust and communication relations between producers and processors.

As a result of the increased role of market competitiveness research in the milk sector, it is necessary to expand the area of information, in the direction of identifying changes in the supply level. Other necessities are determining the types of dairy products required in different markets, analyzing the degree of coverage of different areas with dairy products, determining consumer needs, etc. This information can be of concern both for producers and processors, and for the research part in the field.

Conclusion

The dairy sector is of paramount importance for ensuring the food security of the population. It is necessary that recent data and information regarding its situation be permanently available to all interested parties, regardless of whether they are farmers, processors, importers, exporters, or consumers.

Breed diversity plays a key role in market structure, influencing both the quality and quantity of production. At the same time, supporting small and medium-sized farms is crucial for maintaining sustainable and balanced production. The paper highlights the importance of correlating domestic production with imports, to ensure market stability and the development of a well-structured dairy sector.

Research has proven that, in the creation of milk resources, alongside commercial farms, non-professional farms bring an essential contribution. Also, in the process of valorizing milk as raw material to processors, there are difficult situations, when prices have quite low values, which do not cover the costs of milk production. The paper therefore creates a current and overall vision, which reflects the situation in the dairy sector, from different perspectives: sources structure, resources varieties, present values in the domain. Recent information, in any field, can be used as references that can bring solutions to increase competitiveness.

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