

COMPARATIVE ANALYSIS OF ECONOMIC EFFORTS AND EFFECTS IN MILK PRODUCTION AT RUMINANTS

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Abstract

In milk production, as in any economic activity, in order to obtain favourable economic results, it is necessary to allocate a certain level of resources, of different types. The present research is based on 157 case studies carried out on ruminant farms of various species, as follows: 54 on dairy farms, 47 on sheep farms, 33 on goat farms and 23 on buffalo farms, and aim at the comparative analysis of the economic results, in relation to the allocations of resources, in the direction of milk production. For this, a series of indicators are analysed such as average milk production, different categories of expenses, unit cost, profit/loss, taxable income rate, etc., highlighting the minimum, maximum and average levels of indicators calculated by species. The results of the analysis indicate, among others, that species such as goats and buffaloes, whose notoriety on the market is below that of cow's or sheep's milk, can obtain superior economic results compared to them.

Key words: milk, cows, sheep, goats, buffaloes

INTRODUCTION

In Romania milk is produced by cows, with the highest share in production and also by buffalos, ewes and goats. Milk yield differs from a species to another and depends on breed, farm size and farming system [1, 3,13]. The activity of milk production in livestock farms, regardless of the species of economic interest, involves the development of flows of activities both inside the system and outside it, in order to sell the production.

These activities involve the allocation of resources of various kinds, which, from an economic point of view, are reflected in financial efforts, and their result must be aimed at maximizing the economic effects.

Therefore, a major challenge for the dairy sector is to improve profitability [14].

In different contexts, external factors, regardless of the internal allocation of resources, can play a decisive role in conditioning the profitability of farms [7].

The analysis of the resources used in the milk production sector must take place at the farm level, in order to achieve the best use of the resources.

When the farm produces at the optimum level of production, it is considered efficient,

through the efficiency of transforming the input into output [8].

Different research results indicate that higher milk production requires higher production costs, but higher production results in better economic results [11, 12].

In this context, the purpose of the paper was to make a comparative analysis of the economic results in relationship with the resource allocation in milk production in Romania using a sample of 157 ruminant farms raising dairy cows, ewes, goats and buffalo in order to identify which is the hierarchy of the farm species producing milk based on their economic results.

MATERIALS AND METHODS

The present study is based on the results of research carried out between 2017 – 2020 in 157 case studies on dairy farms of different species, as follows: 54 on dairy farms, 47 on sheep farms, 33 on goat farms and 23 on buffalo farms.

The farms are located in different regions of Romania, with different forms of relief and have different sizes.

Thus, the average size of cow farms was 73.4 heads, between 5 - 568.3 heads; for sheep the

average was 516.7 heads, between 31.7 - 3,983.3 heads; at goats the farm average size of 159.7 heads, between 15 - 476.7 heads; and for buffaloes an average of 44.3 heads, between 2 - 300 heads.

For each species, different technical-economic indicators of economic efforts and effects were calculated, such as average production of milk, total expenses, variable expenses, material expenses, fixed expenses, labour expenses, unit cost, profit/loss per unit, taxable income rate, by their average, minimum and maximum.

RESULTS AND DISCUSSIONS

The average milk production for ruminant species under study is very different, but in order to compare the efforts and the effects and find differences or similarities, the indicators calculated refer to the unit of product, meaning 1 litre of milk. Thus, the average milk production for cows was 4,554.9 litres, with a minimum of 2,600 litres/head and a maximum of 9,633.3 litres/head (Figure 1).

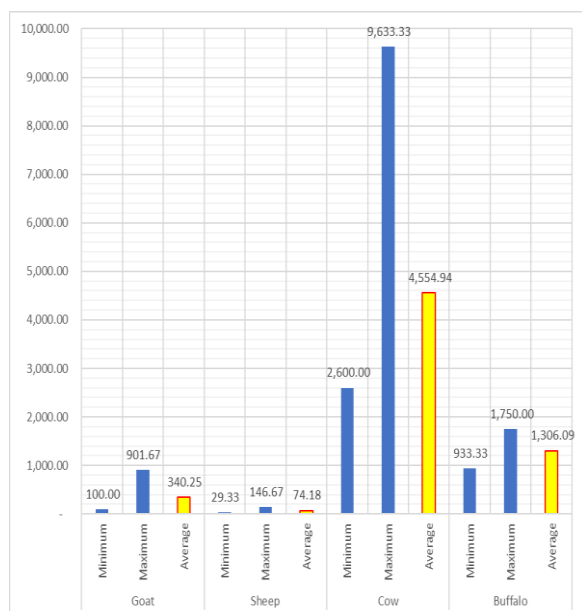


Fig. 1. Milk productions, by species (l/head)
 Source: Own results.

For buffaloes, the average milk production was 1,306.09 l, ranging between the minimum of 933.33 litres and maximum of 1,750.0 litres. For goats, the average milk production accounted for 340.25 l, varying between 100.0

litres, the minimum level and – 901.67 litres, the highest one. The lowest milk production was for sheep, with an average of 74.18l, a minimum of 29.33 l and a maximum of 146.67 l.

In terms of total expenses, the highest values were for sheep, with an average of 6.74 RON/litre. Of these, the expenses related to the main production (milk) were 3.39 RON / litre, representing 50%, the rest being covered by the value of the secondary production (lambs, young sheep fattening).

The next species in terms of total expenditure are buffaloes, with 3.79 RON/l, of which 3.42 RON/l are related to the main production.

For goats, the total expenses are 3.02 RON / l, of which 2.35 RON are related to the main production, and the lowest costs are for cow's milk, 1.71 RON/l, respectively related to the main production, of 1.55 RON/l (Figure 2).

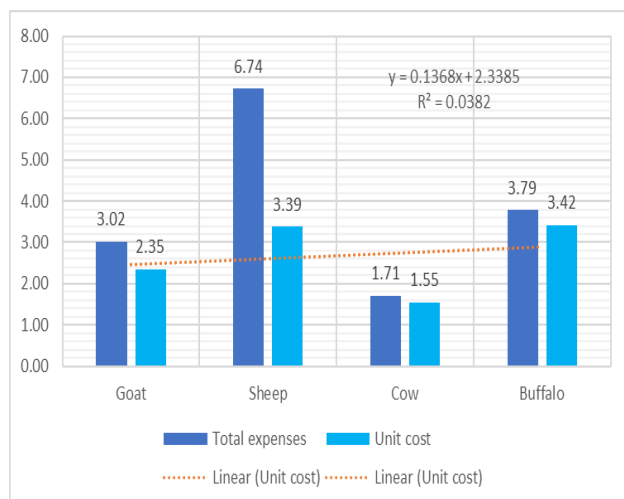


Fig. 2. Total expenses and unit costs (RON/litre)
 Source: Own results.

The biggest difference between total expenses and expenses for milk production (unit cost) is for sheep, of 3.35 RON (almost 50%), indicating that secondary production for this species occupies an important or even decisive place for obtaining favourable economic results.

In the absence of selling the secondary production at sheep, which is represented by lambs and young sheep, the milk production alone would bring negative financial results. For the other species, there are smaller differences between total costs and those for

the main production (unit cost): 10% for cows and buffaloes and 22% for goats (and for this species, the sale of kids can bring a significant increase to cover farm expenses).

Variable expenses represent the large majority of total expenses. These include expenditures with forages, biological material, medicines and medical supplies, other material expenditures, supply quota and animal insurances.

The highest variable expenditures were for sheep, on average of 5.13 RON/litre, representing 76.1% of the total expenditures.

On the second place are buffaloes, with 2.84 RON/l (75% of total expenses), followed by goats with 2.06 RON/l (68.2% of total expenses), and we find the most advantageous variable expenses for cows, with 1.3 RON/l (76% of total expenses) (Figure 3).

Of the various categories of variable expenditures, the largest share are feed expenditures. In fact, it can be said that these are the most important, being the object of optimization calculations, both for technical, productive and economic purposes.

With a proper management of the feed system for animals, the forages expenditures will be reduced. Beside to lower feeding costs, also production efficiency and profitability will be improved [4].

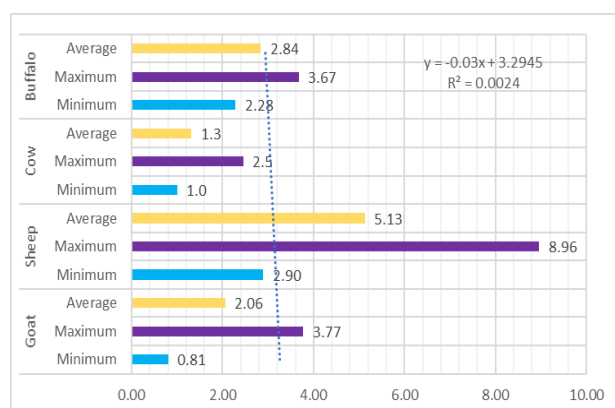


Fig. 3. Variable expenses, by species (RON/litre)
 Source: Own results.

Material costs are part of the variable costs and include forages, biological material, medicines and veterinary materials, as well as other material costs.

On average, by species, these expenses were: 1.2 RON/l milk for cows, 1.98 RON/l for

goats, 2.73 RON/l for buffaloes and 4.91 RON/l for milk (Figure 4).

Fixed expenses include labour costs, general expenses, interest on loans and amortization.

For dairy cows, they were, on average, 0.4 RON/l, for buffaloes 0.95 RON/l, for goats 0.96 RON/l, and for sheep 1.6 RON/l (Figure 5).

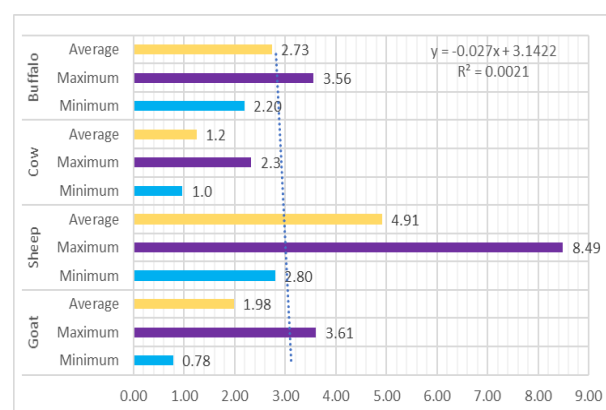


Fig. 4. Material expenses, by species (RON/litre)
 Source: Own results.

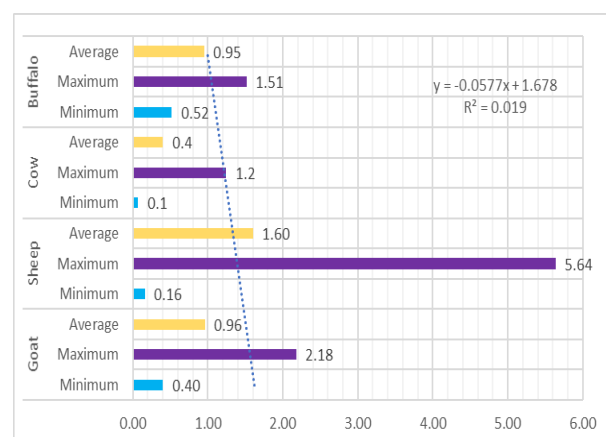


Fig. 5. Fixed expenses, by species (RON/litre)
 Source: Own results.

Even the value of fixed expenses is lower than variable expenses, they are important in determining the value of the breakeven point. Labour costs represent the most part of fixed expenditures. Making them more efficient means optimizing working standards, depending on the category of animals and production.

For cows, they were 0.4 RON/l, for buffaloes 0.87 RON/l, for goats 0.90 RON/l, and for sheep 1.60 RON/l (Figure 6).

The selling prices of milk varied from one species to another. The highest average price

was for buffaloes, 4.15 RON/litre, and the lowest price was for cows, 1.56 RON/litre. Buffalo milk is appreciated as having special nutritional qualities and is sold at a much better price than cow's milk, being present on the market in lower quantities. This price compensates for the low level of production compared to cows.

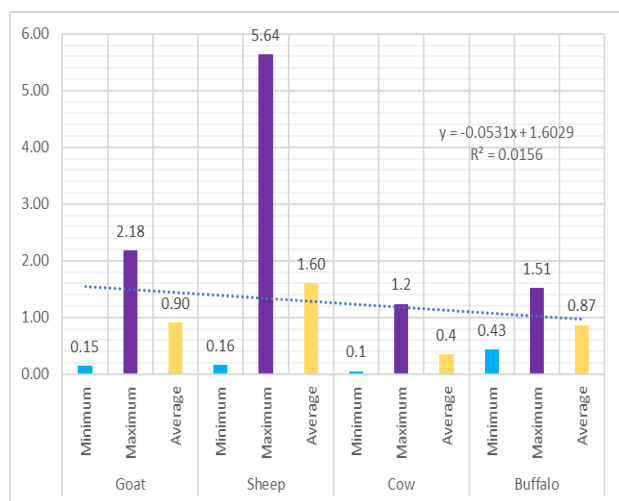


Fig. 6. Labour expenses, by species (RON/litre)
 Source: Own results.

For cows, the minimum selling price of milk was 1.10 RON/l, and the maximum was 3.67 RON/litre (Figure 7). Prices vary greatly depending on how the milk is sold. The lowest values are found at farmers who sell milk to processors, and higher price levels are obtained where milk is sold through vending machines, or directly on the local markets, or as different categories of cheese [6]. This shows how important a minimum primary milk processing is on the farm.

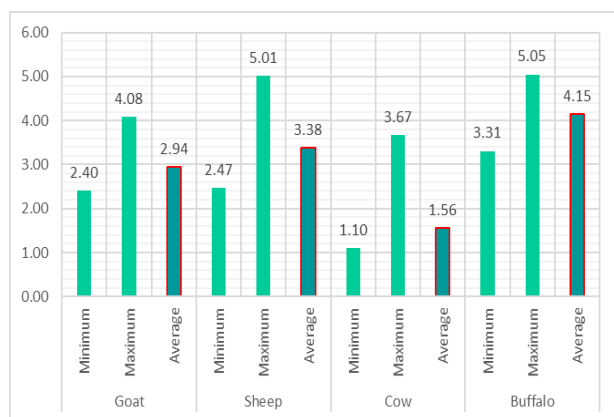


Fig. 7. Milk prices, by species (RON/litre)
 Source: Own results.

For goats, the price of milk was, on average, 2.94 RON/l, and for sheep 3.38 RON/l. It should be noted that the average price of milk is a price calculated and converted according to the form of delivery of milk (drinking milk, or cheeses). For sheep, the price is fully converted, as milk is sold as cheese.

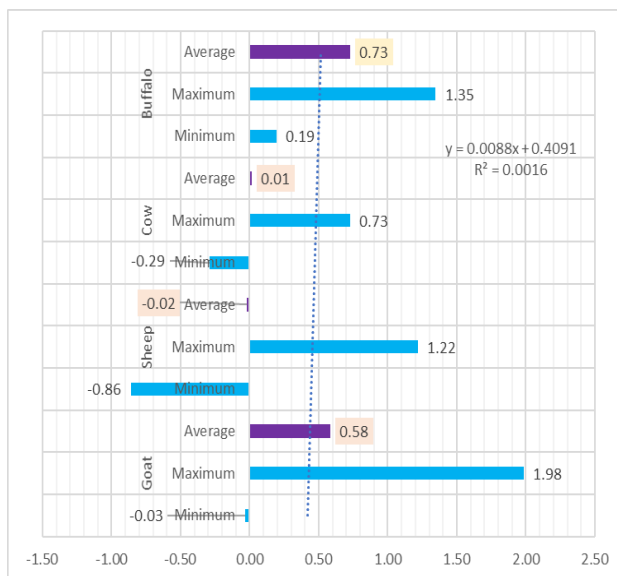


Fig. 8. Profit / loss, by species (RON/litre)
 Source: Own results.

The financial results (economic effects) of the milk production activity for the 4 species of ruminants, and here we refer to profit / loss, indicate that, for cows and sheep, whose products are the most common on the market, the situation differs from one farm to another, but the average results show a critical level, in the sense that it is in the immediate vicinity of zero (close to the break-even point); specifically, for cows a profit of 0.01 RON/l (with a minimum of -0.29 RON/l and a maximum of 0.73 RON/l), and for sheep, a loss: -0.02 RON/l (with a minimum of -0.86 RON/l and a maximum of 1.22 RON/l) (Figure 8).

The encouraging situation for farmers is in the case of goats and buffaloes, where the highest levels of profit are: on average 0.58 RON/l for goats and 0.73 RON/l for buffaloes.

These two species of ruminants, whose milk is not bought by the large mass of consumers, are sold at slightly higher prices (due to the superior and even curative qualities of their products, as well as due to the fact that they are somehow niche products), and

economically, production efforts are accompanied by satisfactory effects for farmers. This is a solid reason for stimulating the spread of the exploitation for these two species.

Raising goats is mostly described as low-input systems across the world, no matter extensive or semi-intensive [9]. Also, according to other researches, the profitability of buffalo breeding in extensive farming system was higher than other species [10].

As a result, the rate of taxable income varies both from one species to another and between farms of the same species (Figure 9).

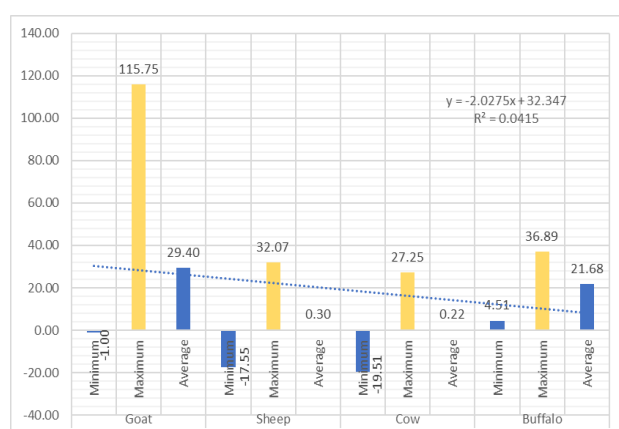


Fig. 9. Taxable income rate, by species (RON/litre)
 Source: Own results.

For dairy cows, the average is 0.22% (minimum -19.51%, maximum 27.25%), the negative results being in farms with low milk production (around 3,000 l/head, or even less, with a very low price obtained).

The rate of taxable income for buffaloes is much higher than for cows, on average 21.68% and only positive (minimum 4.51%, maximum 36.89%).

For goats, the average is the highest of the ruminant species, of 29.40%, and also in this species we find the highest level of maximum value, of 115.75% (in the case of an elite farm of 60 heads, with milk productions of 586.6 l/head).

In sheep, the taxable income rate is similar to that of cows, on average 0.30% (minimum -17.55%, maximum 32.07%), the minimum values being in the case of small farms (below 200 heads) and with reduced milk production (less than 100 l/head).

The results pointed out that a large range of factors have a deep influence on milk production besides the species [2].

Technical aspects have a deep impact on milk production efficiency and competitiveness [5].

CONCLUSIONS

The analysis of the different indicators of effort and, respectively, of the effect of the milk production activity highlighted the fact that there are a multitude of factors that contribute to obtaining favourable economic results, namely farm size, average and total milk production, level of different categories of expenses, market context for the sale of milk production, the degree of production processing (primary processing on the farm, or creation of added value by delivering different varieties of cheese), the general management of the farm, etc.

It is necessary that the farms from the milk sector to reappraise the coordinates of the systems of milk production at farm level with specific focus on enhancing technical efficiency and competitiveness of the sector.

It should also be noted that the positive economic results obtained in raising goats and buffaloes may be an incentive for dairy farmers to address these species and expand their use in production, along with a certain level of primary processing of milk on the farm.

The analysis of the indicators in the case studies shows that smaller farms, with lower levels of milk production per animal, generally have the highest unit costs and the lowest profit levels. They fail to adapt quickly to fluctuations in the economic sphere.

In the case of larger farms, even if the average milk production per animal is not high, this is compensated by the higher number of animals, which will create the conditions for positive financial results.

The objectives of the activities carried out must be defined in such a way as to specify the desired results, to guide the design of strategies for their implementation and to serve as performance standards.

These objectives fall into various priority areas, such as increasing the profitability of

the farm, its position on the market, launching new products, providing financial resources, improving human resources, increasing labour productivity, etc.

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