

**PROFITABILITY FARM PRODUCTION OF MILK FROM HOLSTEIN FRIESIAN BREED  
IN THE BITOLA PART OF PELAGONIJA, R. MACEDONIA**

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**ABSTRACT**

Competition in the farm production of milk today is a relentless struggle for survival on which the economic profitability of the farms depends.

The policies of the Ministry of Agriculture, Forestry and Water Management of the Republic of Macedonia are aimed at developing the economic viability of milk production and increasing the livestock fund through the Program for Financial Support of Agriculture, as support of the milk production.

The goal of the research was to determine the profitability and cost-effectiveness of the farm production of milk in Holstein Friesian breeds through economic analysis. In the economic analysis, the method of calculation was used and the value of production-revenues, variable costs and gross margin were calculated.

For the purposes of this paper, two farms for the production of milk from the Holstein Friesian breed in the Bitola part of Pelagonia were taken (1. Farm DOOEL-Junta in the village Karamani and 2. Farm DOOEL-Mrmach in the village of Mogila) whereby the revenues and variable costs are recorded annually and per milkshake. The research was conducted in the 2016 and 2017 production years.

From the analysis of the results, it can be concluded that the farm DOOEL-Mermach in the village of Mogila is more profitable, with a total profit of 52 006.98 euros, ie a higher profit of 12 523.81 euros compared to the farm DOOEL-Yunta in the village of Karamani, which has realized lower total profit of 39 483.17 euros.

The financial support received by the state has great influence in the formation of profits.

*Key words: farm, milk production, economic analysis, revenues, variable costs.*

**INTRODUCTION**

Milk production today represents the global dairy industry and is becoming a business. In dairy cattle breeding, high production results can only be achieved by selecting heads with a high genetic potential for milk production, such as the Holstein Friesian breed, which is absolutely the most lactic breed of cattle in the world. For this breed, optimal living conditions must be provided, which is a basic requirement for maximum utilization of their inherited qualities. From the conditions on which the production of milk depends on the dairy cows, the most important place belongs to the diet.

In the R. Macedonia cattle breeding economically is the most important business branch. The territory of the R. Macedonia is divided into 8 development regions for development of agriculture (1. Vardar region, 2. East region, 3. South-East region, 4. Southwest region, 5. Pelagonia region, 6. Polog region, 7. North-East region and 8. Skopje region), with the Pelagonia region taking a leading position in the number of dairy cows and total milk production.

**Table 1. Number of dairy cows, average per dairy cow in liters and total milk production in Pelagonija region by individual producers and business entities**

Pelagonia region	Total number of dairy cows		Average milk per dairy cow in liters in lactation (305) days		Milk production in liters	
		%		%		%
	<b>32 433</b>	<b>100</b>	2 685	100	87 070	100
1. Individual sector	<b>29 881</b>	<b>92.13</b>	2 402	89.46	71773	82.43
2. Business entities	<b>2 552</b>	<b>7.87</b>	5 994	223.24	15297	17.57

(According to statistical data on the state of total milk production in dairy cows in RM. in 2015).

Table 1 presents the number of cattle (dairy cows) in the Pelagonia region in the Republic of Macedonia. Macedonia, where it can be concluded that there are a total of 32 433 heads with average milk production of 2 685 l / per head and total milk production of 87 070 liters of which in the individual sector there are 29 881 heads or 92.13%, with an average milk production of 2 402 l / per head and a total milk production of 71 773 liters, while in the business entities there are 2 552 heads or 7.87% average production of milk 5 994 l / per head and total milk production of 15 297 liters.

From the presented data it can be concluded that in the Pelagonia region the production of milk per milking cow in lactation is higher for the business entities as a result of the application of intensive technology in the production of milk in dairy cows, which is on average 5 994 liters or 223.24% in lactation per dairy head while in the individual sector it is much smaller and it amounts to 2 402 liters or 89.46% milk production per dairy cow, as a result of the applied extensive technology in the production of dairy cows.

According to the statistical data of the State Statistical Office of the Republic of Macedonia, from year to year with small variations the number of cattle in our country is constant and it moves around 250 000 heads. With regard to the production of cow's milk, in 2016 it was the largest and amounted to over 403 044 000 million liters, while in 2017 it fell to 394 140 000 million liters. According to the State Statistical Office, this decline is due to the reduced average milk yield per dairy cow in 2017, which amounted to 2,867 liters per cow, and in 2016 it was 3.046 liters per dairy cow.

The reason for this decline in the milk average per dairy cow is primarily due to:

- The large and massive migration from rural areas, especially by the young population,
- Low purchase price of raw milk, which barely covers the production costs and farmers are not motivated to grow milk for milk production,
- Most farmers, due to the possession of a small fund on arable agricultural land, cannot produce themselves and therefore are forced to buy expensive fodder, which significantly increases the cost of milk production – the solution is granting state-arable agricultural land in order to produce cabbage and concentrate fodder.

The economic profitability of this industry means a continuous struggle for profit, but it is not a quick turnover of capital, but rather a rather slim profit. Only in the long run something can be expected. The economic profitability of dairy cattle farms depends on the realized total costs and the

realized total revenues of these farms, through the obtained profit and the resulting calculation of the price of a liter of milk. The policies of the Ministry of Agriculture, Forestry and Water Management of R. Macedonia are aimed at developing the economic viability of milk production and increasing the livestock fund through the Program for Financial Support of Agriculture, in support of the milk production. In accordance with the National Five-Year Program for Financial Support for Agriculture, from 2019, the payment of subsidies is planned to be in line with the class of raw milk. Key parameters in determining the price of raw milk when introducing the EU standards for quality raw milk are: proteins, fats, microorganisms, somatic cells, determining the freezing point and determining the occurrence of residues.

Through the Program for Financial Support of the Rural Development for 2018, in measure 121 "investments for modernization of the agricultural economy", a return on funds of 50% of the investment for purchase of high-grade pedigree heifers is envisaged.

### **MATERIALS AND METHODS**

With economic analysis, it was necessary to determine the profitability and cost-effectiveness of farms for milk production in the cows from the Holstein Friesian breed.

For these agricultural enterprises or family economies, special calculations are made for the value of production and costs (planning and accounting) to see the costs and results obtained from individual products, and to make optimum working decisions, in order to select the one that is most profitable from the enterprise or the family economy (З. Васиљевић, Ј. Субић, 2009).

For the purposes of this paper, two farms for the production of milk from the Holstein Friesian breed in the Bitola part of Pelagonia were taken (1. Farm DOOEL-Junta in the village Karamani and 2. Farm DOOEL-Mrmach in the village of Mogila). In doing so, the revenues and variable costs are recorded on an annual basis and per milkshake. The research was conducted in the 2016 and 2017 production years. Both farms own facilities (stables), necessary equipment, mechanization for production of fodder, have the necessary experience in production and the work is mainly performed by family members. The obtained financial indicators are expressed in euros.

The following economic elements or indicators for analysis were taken into account in the compilation of the calculation of the *value of production (revenues)*: value of the milk delivered to the dairy, value of consumed milk by calves, value of sold barren cows, value of sold bulls, the value of sold or used manure, value of received financial support (milk premium), and financial support for the cultivation of high quality heads.

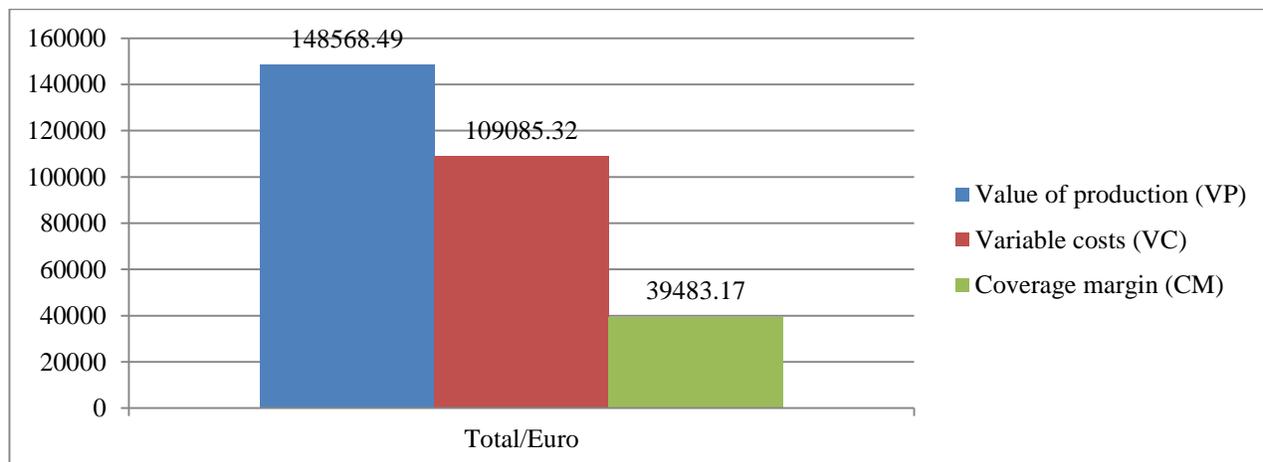
In compiling (preparation) of the calculation for the *value of the variable costs* the following economic elements or indicators for analysis were taken: expenses for green food (spent lucerne seed and costs for consumed corn silage), costs for consumed concentrate food, costs for veterinary services and medicines, costs for artificial insemination (AI), water costs, electricity costs, telephone costs, fuel costs, costs for other contractual services (workers and maintenance).

### **RESULTS AND DISCUSSION**

On the basis of the conducted comparative research that pertains to the average financial results for profitability in the production of cow's milk from the Holstein Friesian breed, the following results have been obtained:

**Table 2. Average results for profitability in the production of cow's milk from Holstein Frisian breed at the farm DOOEL - Junta v. Karamani in the 2016/2017 production years**

Description	Total / Euro
Value of production (VP)	148 568.49
Variable costs (VC)	109 085.32
Coverage margin (CM)	<b>39 483.17</b>



**Figure 1. Average results for profitability in the production of cow's milk from Holstein Frisian breed at the farm DOOEL - Junta v. Karamani in the 2016/2017 production years**

In table 2 and figure 1 the average financial results for profitability in the production of cow milk from Holstein Friesian breed on the farm DOOEL -Junta in the village of Karamani in both years of research in the production 2016/2017 are presented, whereby from the indicators of profitability of the production it can be concluded that the value of the total production is 148 568.49 euros. The total variable costs are 109 085.32 euros, while the margin of coverage or profit amounts to 39 483.17 euros. This presents the financial picture of the economic sustainability and cost-effectiveness of this farm. The total average financial support from the state is 26 505.02 euros. If we compare its share as a part of the realized total profit for the production 2016/2017 year, it is 67.13% of the total revenue. This means that the financial support in comparison with the total income takes up most of the profits.

**Table 3. Average results for profitability in the production of cow's milk from Holstein Frisian breed at the farm DOOEL - Mrmach v. Mogila in the 2016/2017 production years**

Description	Total / Euro
Value of production (VP)	134 212.66
Variable costs (VC)	82 205.68
Coverage margin (CM)	<b>52 006.98</b>

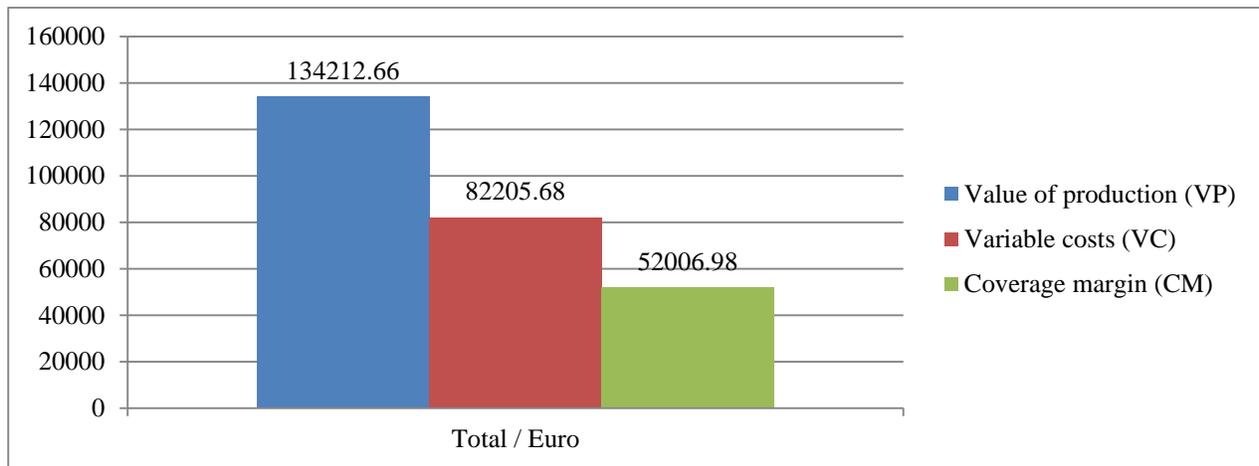


Figure 2. Average results for profitability in the production of cow's milk from Holstein Friesian breed at the farm DOOEL - Mrmach v. Mogila in the 2016/2017 production years

In table 2 and figure 1 the average financial results for profitability in the production of cow milk from Holstein Friesian breed on the farm DOOEL-Mrmach in the village of Mogila in both years of research in the production 2016/2017 are presented, whereby from the indicators of profitability of the production can be concluded that the value of the total production is 134 212.66 euros, the total variable costs amount to 82 205.68 euros, while the amount of the coverage margin i.e. the realized profit amounts to 52 006.98 euros. This presents the financial picture of the economic viability and profitability of this farm. The total average financial support is 21 497.56 euros. If we compare its share as a part of the realized total profit for the production 2016/2017 year, it is 43.33% of the total revenue. This means that the financial support in comparison with the total income takes up most of the profits.

Table 4. Comparative analysis of average results for profitability in the production of cow's milk from Holstein Friesian breed at the farm DOOEL - Junta v. Karamani and the farm DOOEL - Mrmach v. Mogila in the 2016/2017 production years

Description	DOOEL - Junta v.Karamani	DOOEL-Mrmach v.Mogila
	Total / Euro	Total / Euro
Value of production (VP)	148 568.49	134 212.66
Variable costs (VC)	109 085.32	82 205.68
Coverage margin (CM)	<b>39 483.17</b>	<b>52 006.98</b>

Based on the comparative analysis of the obtained average financial results, given in Table 4, for profitability in the production of cow's milk from the Holstein Friesian breed on the farm DOOEL - Junta in the village of Karamani and the farm DOOEL - Mrmach in the village of Mogila in the production year 2016/2017, economic sustainability and cost-effectiveness of cow's milk production is confirmed through the obtained profitability indicators (profit).

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From the total value of production (income), on the farm DOOEL - Junta in the village of Karamani, which amounts to 148 568.49 euros, compared to the total value of production (income), at the farm DOOEL - Mrmach in the village of Mogila which amounts to 134 212.66 euros, it is concluded that it has realized a higher value of the total production (income) of 14 355.82 euros.

From the the total costs on the farm DOOEL - Junta in the village of Karamani, which amounts to 109 085.32 euros, compared with the total costs of the farm DOOEL - Mrmach in the village of Mogila amounting to 82 205.68 euros, it is concluded that it has realized higher costs of 26 879.64 euros, which means that according to the presented indicators, a more profitable farm is the farm DOOEL - Mrmach in the village of Mogila with a total profit of 52 006.98 euros, ie higher profit of 12 523.81 euros, compared with the farm DOOEL - Junta in the village of Karamani, which has realized lower total profit of 39 483.17 euros.

From the comparative analysis of the obtained total average financial support from the state (financial support of a milk premium and financial support for the cultivation of high quality heads) in the production 2016/2017 year, which is a part of the realized total profit, on both farms production of cow milk from Holstein Friesian breed it can be concluded that on the farm DOOEL - Junta in the village of Karamani, which amounts to 26 505.02 euros or 67.13% of the realized total income (profit) compared to the total financial support received on the farm DOOEL - Mrmach in the village of Mogila which is 21 497.56 euros, or 41.33% of the realized total income (profit), is higher by 25.80%.

### CONCLUSIONS

From these results we can conclude that the financial support received from the state has a great influence on the formation of the profit (profit), ie the economic viability and profitability of the farms, which opens the opportunity for the management of the farms to improve the weaknesses, that is, in the day-to-day decisions to maintain farm profitability and improve. Such similar results were obtained in the research of Z. Vasiljevich, J. Subich (2009).

The obtained results for the profitability of the farms and the used methodology can be used by the advisors in the Agency for Encouraging the Development of Agriculture in the Bitola part of Pelagonia and wider in our country for improving the advisory packages offered to the farmers in this area.

Agricultural production (whether plant or animal) is a very complex process that imposes everyday important decisions to maintain or increase the profits of agricultural enterprises (legal entities) or family individual holdings. On the other hand, the market competition postulation has resulted in a new way of organizing and working in the agrarian sector, which specifically refers to the family individual economy.

If the agricultural enterprise wants start a production process it must obtain basic and working capital (fuel, fodder, veterinary services, agricultural machinery and equipment, labor force, etc.), which implies costs. Imperative of profit making imposes a need for total output of production to be greater than the value of total production costs.

Profit or loss, as a result of the work carried out by the agricultural enterprise or family business, is a sum of the profit and loss that is realized in separate production lines. In other words, in order to make sound working decisions, it is necessary to specify the costs and outputs of production by individual products or production lines.

For each production of an agricultural enterprise or family economy, a separate calculation of the value of production and costs (planning and calculation) should be made, in order to be able to see the costs and the results obtained from individual product lines, and in doing so choose optimal work

decisions, in order to choose the ones that are the most profitable (most profitable) for the enterprise or the family economy.

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