

ANALYSES OF ORGANIZATION AND MILK PRODUCTION ECONOMICS ON FARMS IN MONTENEGRO

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Summary

This document presents analyses of organization and milk production economics on farms in Montenegrin municipalities: Berane, Niksic and Pljevlja. In first part of this document are analyzed basic aspects of production organization on observed farms. In second part based on empirical research is given analyze of milk production economics on observed farms. By this analyze are determined total production costs per cattle on annual level, value of achieved production per cattle on annual level, as well as cost price of main products on observed farms. Based on previous values some of basic economic parameters are determined such as: ratio of economy on farms in observed areas, share in income per cattle on annual level in observed areas and size of profit per cattle on annual level in observed areas. At the end of this document are given conclusions of conducted research and given recommendation for improvement of current situation.

Key words: *milk production, organizational-economic aspects, production volume, economics, profitability.*

JEL: *Q12, D13*

Introduction to research

The subject of empirical research was family farms located in the north of Montenegro within the municipality, which are dominantly working with livestock production: Berane, Niksic and Pljevlja. Criteria that were taken in consideration for selection of farms which were subject of research are following:

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- Farms that are in charge of milk production and milk products;
- Producers produced milk intended for market delivers to processing capacity or perform processing of milk on farm;
- Milk cattle is in ATP controls;
- Producers are positioned on different distances from processing capacity;
- There is diversity in racial composition on farms;
- On farms is achieved income from agriculture.

Based on specified criteria it is taken a sample of 15 to 20 farms in every observed municipality. The relevant research was realized by surveys of management of processing capacity and farms management on family farms in specified municipality. The survey was open-ended and respondents were aware of the fact that the collected data will be used only for scientific research purposes.

In survey with management of processing capacity were collected data regarding volume of production, production conditions, assortments, cooperation with cooperative network and distribution and placement of finished products.

Survey with management was realized based on sample of family farms with owners of company, who are usually the farms managers. Questions were related on general conditions and characteristic of farms, i.e. specific farm.

In continuation of this document is reported part of findings, i.e. results, from published research.

General characteristic of organization of milk production on observed farms

Milk production in livestock farm in Berane, as well as whole cattle production is realized on family farms. The most developed branch of livestock production in municipality Berane is the cattle. The milk production was followed in previous period by problems. Traditionally production method did not give enough space for application of new methods. Production was characterized by large number of individual farms, small number of cattle and homogenous food in unsatisfactory conditions. By innovation in last year's the production is intensive. Now because of incentives exists farms that serve as a quality example in the region. On farms that are engaged in production of milk in Berane, it is present half-intensive way of holding livestock. Farms are in private ownership. Number of cattle on farm varies from 2 to 10. Stables on the farm are built from firm material. Average production on farms is 4.550 kg of milk per head of livestock with standard lactation of 305 days. Equipment on the farms is at high level, such as: drinkers for watering cattle, modern systems for manure, sufficient floor space per cattle, necessary quantity of light, ventilation devices, other facilities for food storage, facilities for storage of milking apparatus, quality road infrastructure, etc. Food includes bulky portion (hay, grass, alfalfa) and concentrated portion. Bulky food is produced on private land and on leased land in the amount of 80% of total needs, 20% is purchased by market price, while concentrated food is purchased on the market. Data obtained during the research implies on differences between farms in process and organization of production, as well as financial results. The sample included 92 milk

cattle distributed on 17 farms. The average number of cattle in sample of 17 farms on this area is 5,4. In compare with average on level of Montenegro (4,2 cattle) number of cattle by farms is higher.

Municipality of Niksic is known as agriculture area with dominated by livestock production. Cattle and milk production are primary branches in livestock in this municipality. Since the Niksic is municipality with largest area in Montenegro with large number of agriculture areas, in this municipality is largest number of individual family farms with farms for milk production. In this municipality are raised the most productive cattle with milk production which is above the average farms on state level. Applying the innovation and new trends in zoo techniques are most pronounced in municipality Niksic. The result of innovation and renunciation from traditional lines of production results positively. Milk production on farms is family business. On farms that are engaged in production of milk in Nikšić, it is present intensive way of holding livestock. Number of cattle varies from 2 to 39. Farms are in private ownership. Stables on the farm are built from firm material. Farmers have solid base of fodder and enviable knowledge from zoo techniques. Average production on farms is 5.490 kg of milk per head of livestock with standard lactation of 305 days. Production process is followed by: good organization on farms, larger number of cattle per farm and production with cattle of high genetic potential. Equipment on the farms is at high level, actually farms have capacities for storage of raw milk, drinkers for watering cattle, modern systems for manure, cistern for manure transport, other facilities for food storage, sufficient floor space per cattle, necessary quantity of light, ventilation devices, facilities for storage of milking apparatus, quality road infrastructure, etc. Food includes bulky portion and concentrated portion. Meals consist hay, brewer's trope, barley, maize, cattle salts and mono-calcium phosphate. Bulky food is produced on private land and on leased land in the amount of 70% of total needs, 30% is purchased by market price, brewer's trope is purchased in Nicksicka pivara while rest of the food is purchased on the market. By research are covered 16 farms from the municipality Niksic on which were represented 173 milk cattle. The average number of cattle in sample is 10,8.

Pljevlja is region with significant agriculture areas. By its characteristics that is area that has great potential for improving the current level of livestock production. Production of this area is characterized by diversity in method of keeping cattle, technology and conditions under which is production realized. By intensification of livestock production in last year appears farms on which is applied modern technology and production with cattle of high genetic potential. Half-intensive way of holding livestock is dominant in region of Pljevlja. It is characterized with cattle stay in the stables for 9 months, while other 3 months cattle spend on running and pasture. In the pasture period, cattle in lactation is added part of concentrated food. Variation of number of cattle on the sampled farms is between 2 and 16 lactic cattle. Average production on farms is 4.500 kg of milk per head of livestock with standard lactation of 305 days. Equipment on the farms is on average level and varies from traditional to modern. Farms have drinkers for watering cattle, systems for manure, sufficient floor space per cattle, necessary quantity of light, natural or artificial ventilation

devices, other facilities for food storage, facilities for storage of milking apparatus (only few of them), average road infrastructure, etc. The meals consist hay and concentrated portion. The meal is balanced and it is appropriate to production. Food includes bulky portion and concentrated portion. Bulky food is produced on private land, while maize and barley in grain are purchased by market prices. Research contains 13 farms from municipality Pljevlja and Vranjeske valley on which is represented 74 milk cattle. Average number of cattle in sample is 5,7. In compare with average on level in Montenegro, the number of cattle is larger.

Calculation of total production costs, values of achieved production per cattle on annual level and cost price of basic product on observed farms

Total production costs by cattle⁴ represent sum of food costs, costs of upbringing calves up to the age of 3 months and other direct costs⁵. In the table (Table1) is shown value of production costs per cattle on annual level in observed municipalities.

Table 1. Total production costs per cattle on annual level

Cost categories	Municipality Berane (in €)	Municipality Nikšić (in €)	Municipality Pljevlja (in €)
Food costs	690,05	806,37	887,23
Other direct costs	510,00	560,00	540,00
Costs of upbringing calves	268,60	268,60	268,60
TOTAL	1.468,65	1.634,97	1.695,83

Source: Calculation is prepared based on data obtained in research

On the farms, family members perform almost every activity in production process, so labor costs are not included in calculation of total production costs.

Values of achieved production on farms are determined by adding values of individual products in production process. Main products are milk/cheese⁶, while secondary products are manure, extracted cows and calves. In the table (Table 2) are presented total quantity of all products, prices per unit of product and total value of production on annual level by municipalities where research was conducted.

4 Production costs are, because of the limited space, presented synthetically. Authors have detailed calculation of total production costs.

5 Other direct production costs are: small inventory costs, cost of supplies, cost of electricity, costs of depreciation/repair of herd, costs of veterinary services and other complementary costs.

6 Milk is main product for municipalities Berane and Nikšić, while main product for municipality Pljevlja is cheese.

Table 2. Value of achieved production per cattle on annual level⁷

Product	Municipality Berane			Municipality Nikšić			Municipality Pljevlja		
	Price (€/kg)	Quantity (kg)	Value (€)	Price (€/kg)	Quantity (kg)	Value (€)	Price (€/kg)	Quantity (kg)	Value (€)
Milk/ cheese	0,33 ⁸	4.550,00	1.501,50	0,33	5.490,00	1.811,70	3,30 ⁹	450,00 ¹⁰	1.485,00
Calves	3,00	140,00	420,00	3,00	140,00	420,00	3,00	140,00	420,00
Extracted cows	1,00	111,11	111,11	1,00	111,11	111,11	1,00	111,11	111,11
Manure	0,02	10.000,00	200,00	0,02	10.000,00	200,00	0,02	10.000,00	200,00
TOTAL			2.232,61			2.542,81			2.216,11

Source: Calculation is prepared based on data obtained in research

Since milk production is followed by secondary products, calculation of production cost of main product (milk, cheese) is done with so-called “*subtraction method*”. According this method, total production costs (*UT*) are reduced for value of secondary product (*VPs*). Remained amount of costs is divided with total quantity of main product (*Q*).

7 Calculation of value of achieved production is based on current prices.

8 In sales price is not included subvention which producers achieve on produced quantity of milk, since subvention are not fixed, nor certain.

9 The selling price of cheese from Pljevlja is determined as an average between selling price on bazaar and price for which buyers’ purchasing cheese in Pljevlja. In Pljevlja there is no organized purchasing of cheese, which is one of the reasons of its relatively low price.

10 Average milk production of 4.500 kg for municipality Pljevlja is turned into cheese production because cheese is main product for this municipality (4.500 kg of milk = 450 kg of cheese).

Based on this calculation, we get cost price (*CK*) of main product, actually:

Total production costs (UT) – Value of secondary product (VPs) = UT of main product

UT of main product : Q main product = CK of main product

In continuation of this work, applying this method, it is derived calculation of cost price of main product for observed areas.

a) Calculation of cost price of main product (milk) for municipality Berane and Nikšić and cost price of main product (cheese) for municipality Pljevlja

Table 3. Cost price of milk (per kg)

Total production costs (€)	Value of secondary product (€)	Total costs of main product (€)	Total production costs (€)	Value of secondary product (€)	Total costs of main product (€)	Total production costs (€)	Value of secondary product (€)	Total costs of main product (€)
1.468,65	731,11	737,54	1.634,97	731,11	903,86	1.695,83	731,11	964,72
Total costs of main product (€)	Quantity of main product (kg)	Cost price of main product	Total costs of main product (€)	Quantity of main product (kg)	Cost price of main product	Total costs of main product (€)	Quantity of main product (kg)	Cost price of main product
737,54	4.550,00	0,16	903,86	5.490,00	0,165	964,72	450,00	2,14

Source: Calculation is prepared based on data obtained in research

Based on this calculation, determined cost price of milk on family farms in Berane is 0,16 € per kg. Despite small number of cattle per farm and complicated conditions of production, resulting cost price of milk is 0,17 € lower than selling price (0,33€).

Determined cost price of milk on family farms in municipality Nikšić is 0,165€. Cost price in this municipality in relation to the selling price (0,33€) is different for 0,165€ per kg.

Cost price of cheese on family farms in municipality Pljevlja is 2,14 € per kg. Despite small number of cattle per farm and complicated conditions of production, resulting cost price of milk is 1,16 € lower than selling price.

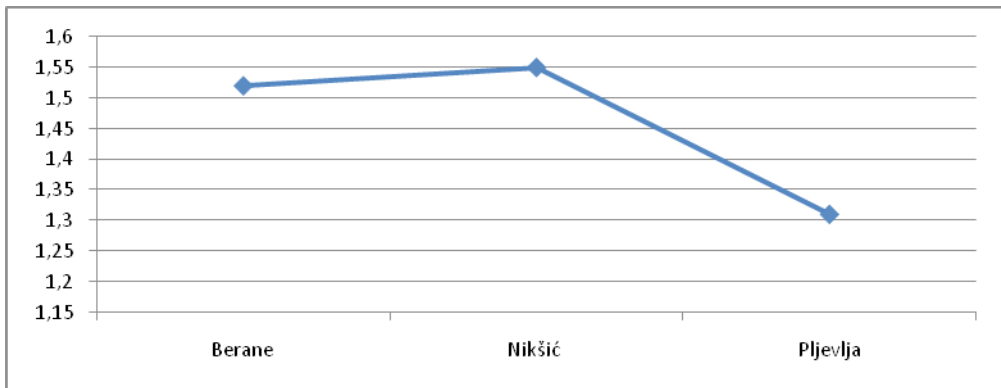
Based on this calculation, cost price of cheese on family farms in municipality Pljevlja is 1,76 € per kg. Despite small number of cattle per farm and complicated conditions of production, resulting cost price of milk is 1,54 € lower than selling price.

Reasons for achieving positive difference between selling price and cost price of main product on farms in all municipalities should be found in following facts:

- Family farms produce or purchase significant quantities of bulky food at low prices (for example brewer's trope, food which is largely included in food on farms, it is purchased at reasonable prices);
- In farm activities are included members of household, so there is no need to allocate funds for labor from market, which significantly decreases cost price of product;
- Production process has several connected products, which also decreases cost price of main product.

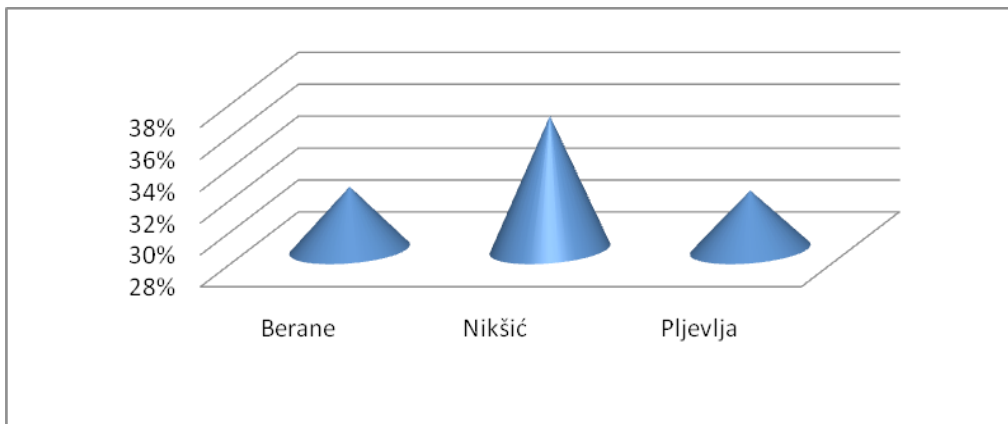
In the following part of the work, for better clarity and comparability of certain economic parameters, determined based on basis of empirical research, it is given their graphical representation.

Graph 1. Ratio of economy on farms in observed areas



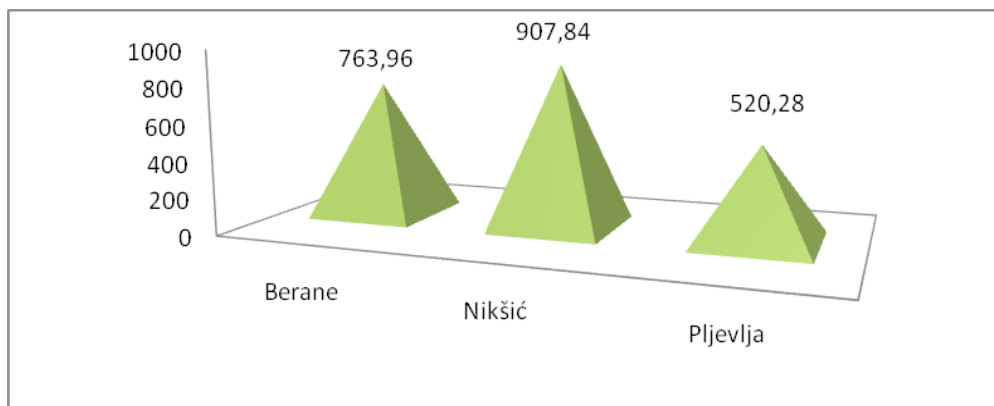
Source: Calculation is prepared based on data obtained in research

Graph 2. Share in income per cattle on annual level in observed areas



Source: Calculation is prepared based on data obtained in research

Graph 3. Profit per cattle on annual level in observed areas



Source: Calculation is prepared based on data obtained in research

Concluding remarks

Research which were conducted on observed farms has directly or indirectly implies on following basic problems in organization and milk production economics on observed Montenegrin farms: insufficient volume of production, relatively high expenses of production (especially cost of food), low level of use of machinery in production process, unsatisfactory breed composition of cattle, bad infrastructure, low level of education of producers, problems with purchasing organization, etc.

Data presented in document shows that volume of production, which influence on business result of farms, is relatively low, i.e. compared with environment of cattle on observed Montenegrin farms produce up to 40% less milk, Inadequate breed composition can be in direct relation with low quantity of cattle production. Namely, by substitution of current cattle's with cattle's with high genetic potential can be significantly contribute on increasing of production volume of cattle's.

Furthermore, the relatively small number of cattle's by farm and insufficient availability of capacity in farms most directly influence on decrease of business of family farms in milk production. Due to the high fixed component of expenses in total expenses (as consequences of insufficient capacity utilization) and relatively small volume of production, significantly increase price of main product, by which is directly affected decreasing of efficiency and profitability on observed farms. High share of expenses for food in composition of price of product (implies on conclusion that obviously farms on observed areas are not followed by European trends in process of cattle feeding. Namely, detailed calculation of expenses for food shows that in composition of the meal are not included nutrients which have low market price, and in the same time are fulfilled with nutrients and replace concentrate part of meal in significant measure (which is provided by rules, for high market prices because farmers do not produce it on their areas).

Low level of machinery using, as a partly consequences of bad infrastructure in observed areas, do not present factor of increased production and decreased expenses of production.

Also, research shows that for insufficient lack of interest of farmers for education in this production, as well as for insufficient using of services of specialized institution of which is expected that in communication with producers, influence on increasing of level of efficiency and profitability of given production.

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