

BENCHMARKING AS THE ASSESSMENT METHOD OF EFFICIENCY THE LEBEDYNSKA BREED OF DAIRY COWS

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Abstract

In the classical sense, benchmarking is the most effective way to find hidden production reserves through a comparative analysis of production and economic indicators of farms (agricultural enterprises) in the industry. It allows you to determine your strengths and weaknesses; to identify those methods of work that need to be improved; compare your achievements with competitor performance; improve business processes and product quality, increase efficiency, reduce costs, etc. In this article by the method of benchmarking was determined the economic feasibility of keeping Lebedynska breed of dairy cows, despite the small amount of livestock. The calculations confirmed the economic feasibility of keeping the Lebedynska breed of dairy cows compared with other more common breeds of dairy cows, taking into account biologically-selective features. In the total cost of milk over 50% is the cost of forage. Therefore, to calculate how profitable is the milk production, it is worth to determine how many kilograms of milk we get from 1 kg of dry matter of forage. Among our calculations, the highest conversion rate of dry matter of forage (1.42-1.44) have Holstein, Ukrainian brown and Ukrainian black-pinto breeds, and the smallest has Ukrainian red-pinto breed (1.18). Lebedynska breed has an index of 1.28. It is very clear: increasing productivity will increase the efficiency of forage conversion and farm profitability. But important factor for the efficiency of forage conversion is the improvement of roughage quality. Productivity of cows has a direct dependence on feeding: Holstein breed has 31.9 kg of milk yield per day (fat 3.84%, protein 3.28%); Lebedynska - 25.1 kg per day (fat 3.8%, protein 3.43%). The structure of the cow ration determines the forage costs (the cost of a feed-day). The highest forage costs have the farms where the concentrated feed is dominated by the structure of ration. It's the farms holding the Holstein breed - 191.7 UAH (by feeding 20.5 kg of grain per day per cow), the smallest - 82 UAH - farms holding the Ukrainian brown (4.3 kg grain per day per cow). In the structure of the diet of Lebedynska breed cows, grains contain 8.5 kg, and the cost of the feed-day is 100.3 UAH.

Key words: benchmarking, economic efficiency, farms, dairy breeds, local breeds

INTRODUCTION

Current economic conditions make business efficacy to regulate their own activities and to abandon unprofitable assets. Under such conditions, owners of farm animals cease to breed non-competitive breeds. The tendency to crowding out local small breeds of low productivity cows occurs in all countries of the world. So, the Commission on Animal Genetic Resources in Food (FAO) has identified [9] that global animal losses due to genetic erosion are very significant. According to [9], more than 1,500 from 2,600 species of farm animals are endangered or have disappeared, taking out a unique genetic structure. This reduces the population's ability to adapt to environmental changes. The ratification by Ukraine of the 1994

Convention on Biological Diversity [8], the approval in 2007 the Interlaken Declaration and the Global Plan of Action on Genetic Resources of Animals, and the adaptation of the Nogai Protocol on Access to Genetic Resources in 2012, impose certain obligations on Ukraine. One of the main programs is to support the preservation of outstanding local and domestic livestock carrying out the reorganization and ensure harmonious development of genetic diversity and genetic resources conservation of hereditary signs of animals [6].

Currently in Ukraine (at date 01.06.2017 year) on the verge of extinction are Ukrainian Gray (928 cows, 12 bulls), Ukrainian Whitehead (303 cows), Brown Carpathian (133 cows), Lebedynska (970 cows) breeds of dairy cows [3].

The objective of this article is to justify not only the biological importance but also the economic value of small breeds of livestock breeds (choosing Lebedynska breed of dairy cows), which was extracted in the Sumy region (Ukraine) by crossing the disappearing gray Ukrainian breed with Shvitska breed of bulls.

MATERIALS AND METHODS

To achieve the task of bringing the economic efficiency of small domestic breeds of dairy cows, which offer comparative economic analysis, or benchmarking, which is widely used throughout the world as an instrument for economic efficiency. In order to achieve the task of bringing the small-scale domestic breeds of dairy cows to the economic efficiency, apply comparative economic analysis or benchmarking, which is widely used worldwide as a tool for assessing the state of the business and increasing its efficiency, especially in difficult economic conditions. First, it is important to identify the provisions of competitiveness of dairy farms, which keep cows Lebedynska cattle, but milk production compare with the average for the industry and the best farms.

Secondly, benchmarking helps to assess the balance of the cost structure. Comparing their performance with other companies, you can see where the imbalance as a business system [1].

To maximize operating margin, benchmarking involves analysis of operating performance, coupled with the financial. Finally, all this has become an effective tool for operational decision making.

The analysis algorithm should be as follows:

(i)Analyze the annual milk cow's production of selected Lebedynska breed and compare where the research company is located in the rating.

(ii)Determine the cost of milk Lebedynska breed in comparison with other farms that hold other breeds of cows.

(iii)Calculate the operating margin as a result of the ratio of purchasing prices and cost.

(iv)Determine the cost structure of milk at the enterprises that hold cows of Lebedynska

breed, compare it with the average indexes

(v)Particular attention in determining the level of costs should be focused on the feeding block, namely, to investigate the level of conversion of dry matter against the background of the cost in the fodder-day [2].

(vi)The key indicator of the efficiency of the diet - the conversion of money (returns through milk in cash to the hryvnia, invested to the ration), which is the main determining factor in calculating the EBITDA. This is exactly what will be the answer to the question of the feasibility of preserving Lebedynska breed of cows in agricultural enterprises.

Thus, the main purpose of such analysis is to identify "bottlenecks" in comparison with other enterprises in the industry and to search for the specific causes of their occurrence and their subsequent elimination. A correct and timely diagnosis provides a platform for the right managerial decisions.

Management accounting methodologies that use farms to calculate financial performance may differ. Therefore, for comparative economic analysis, we follow the worldwide recognized accounting methodology, i.e.:

(a)the fodder grain of own production is calculated at market price, but not at the cost price. Otherwise, the farmer will deceive himself by transferring costs from one pocket to another. He could sell grain at a market price, instead he used it for feeding his own animals;

(b)rearing expenses for the current period include the cost of milk as the main products of the dairy farm, and young animal weight increase is considered as non-monetary income.

(c)compare only operating (production) cost and not take into account depreciation, general production, administrative and financial costs.

It should be emphasized that the task of benchmarking is not to teach a farmer to count money, he is able to do it. The task of benchmarking is to calculate only the operating cost in the same algorithm to be compared.

The analysis is carried out in 4 planes:

- in absolute values (in ths. UAH);
- per 1 fodder cow, UAH;
- per kilogram of milk, UAH;
- share in the structure of cost,%.

To the key indicators of benchmarking we include:

- cost and operating profit in absolute terms for a fodder cow, 100 kg of sold milk and % of margin profit before sale;
- the break-even point and its sensitivity to changes in the value of rations and the purchase price of milk;
- operating profit of the fodder-day for one cow;
- the conversion of the ration to milk in a cash, as an aggregate indicator of the ration's effectiveness.

We want to draw attention to such indicator as the break-even point and its sensitivity to changes in the value of rations and the purchase price of milk. The sensitivity of the breakeven point largely depends on the level of fixed costs. The higher the fixed costs, the more this business is sensitive to changes of market factors and price pressure.

RESULTS AND DISCUSSIONS

In the process of study were processed the data of enterprises of the Sumy region, which kept cattle breeds of dairy breeds, including few local breeds. It was compared the main economic benefits and economic indicators of the gene pool of the herd of these breeds (Table 1).

Table 1. The main breeding and economic indicators of the growth of dairy cows in 2018

Breed	Ukrainian brown	Ukrainian black-pinto	Ukrainian red-pinto	Simmental	Lebedynska	Holstein
Number of cows	389	322	696	711	298	743
Milk yield, kg	7,888.4	7,921.5	9,391.5	10,300.0	7,644.5	9,727
Fat content in milk, %	3.71	3.76	3.77	3.72	3.80	3.84
Protein content in milk, %	3.34	3.29	3.43	3.49	3.43	3.28

Source: own studies and data from the milkua.info information portal.

Grounds on which it is advisable to conduct selection, defined primarily in terms of their importance. In cattle this: yield of milk, the fat content in milk and its quantity. The highest yield of milk was from the Simmental breed of cows by Austrian selection - 10,300 kg, and the smallest - from Lebedynska breed cattle - 7,644.5 kg. The fat content in milk is 3.71-3.84%, and the protein content in milk is 3.28-3.49%. Against this background Lebedynska breed cattle belonging to local had numerous breeds of cows are not significantly different from the best performance of Holstein breed (Fig. 1).

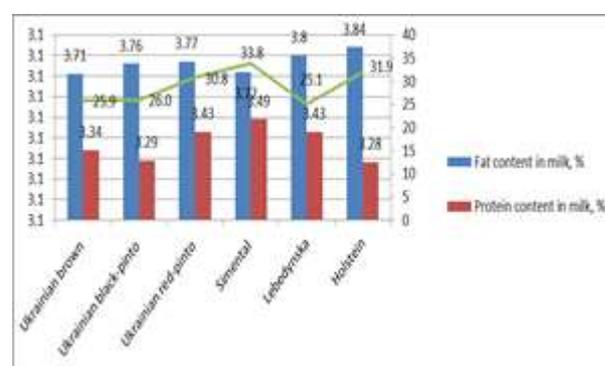


Fig. 1. Diagram of breeding and economic trait of dairy cattle breeds

Source: Own design and calculations.

The production cost of milk by keeping cows of different breeds is significantly different and fluctuates on selected enterprises from 5.18 to 6.29 UAH / kg (full cost will vary within the range of 6.6-7.0 UAH), but the average is 5.65 UAH (Fig. 2).

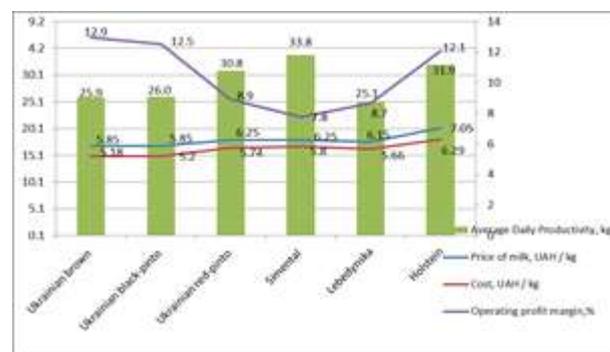


Fig. 2. Diagram of the ratio of animal productivity and operating profit

Source: Own design and calculations.

The analysis of the diagram makes it clear that the farms that holds the Holstein breed

with the highest milk yield has the highest selling price 7.05 UAH / kg, production cost of 6.29 UAH / kg. But at this price of milk the operating margin is not the highest (12.1% compared to 12.9% at the farms holding a Ukrainian brown cow breed).

The investigated Lebedynska breed of dairy cows has average figures - 8.7% margin of operating profit. The lowest operating profit margin has got the farm holding the Simmental breed. Note, that yield of milk per Simmental cow among the investigated farms was the largest (33.8 kg for 305 days).

So, Fig. 2 shows that there is no tight correlation between the level of productivity and operating profit: farms that were in the middle of the performance ranking showed better results in profitability, that is they were more effective.

Consider the main components of the cost of milk production (Fig. 3). According to information that we managed to collect in farms, the average consumption of forage is 65%, 13% - salaries, and 22% - everything else.

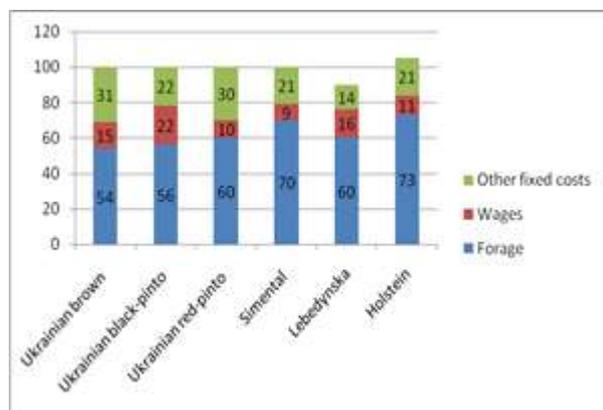


Fig. 3. Structure of the cost of milk production by breed of cows in the investigated farms
Source: Own design and calculations.

The forage is the main cost item (more than half) of milk. In the statistical reporting of agricultural enterprises forage costs account not in natural units, but in money value. This degrades the data, because such indicator reflects not only the technological efficiency of forage, but also the efficiency of their production (a significant portion of forage at agricultural enterprises are by own production) [4, 5].

Forage - a variable flow rate and the factor that directly affects at milk production, the rest - a fixed cost, and they do not depend on the level of production [7].

According to our calculations (Fig. 4), in fixed other expenses about 5% are veterinary drugs, fuel and oils - 4%, artificial insemination - only 1% (but this is the best and cheapest investment that may be on the farm).

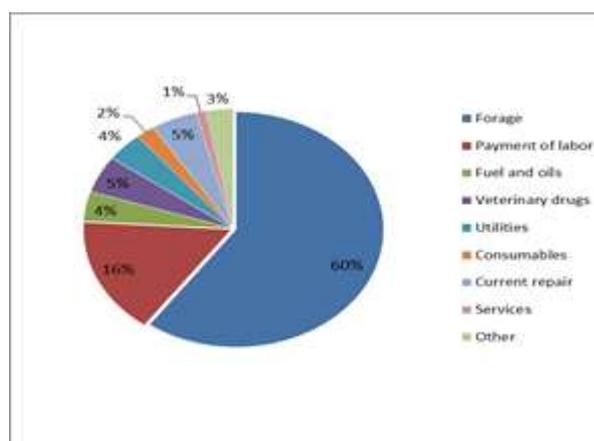


Fig. 4. Cost structure for milk production at the farms holding Lebedynska breed cattle
Source: Own design and calculations.

The main purpose of organizing milk production in a market economy is to make a profit. The unprofitability production of any goods or services in a market economy is bound to go down and even to disappear. If it is not profitable for the manufacturer to produce products each owner will try to get rid of production, which causes him losses.

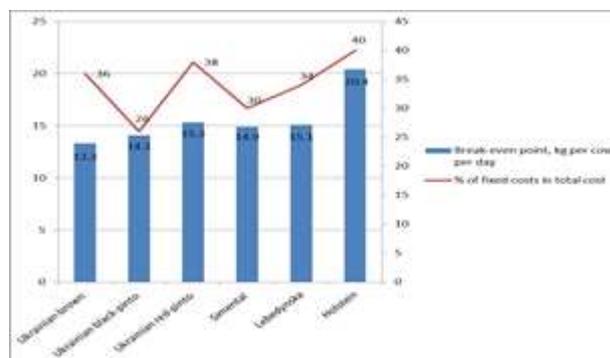


Fig. 5. Break-even point in relative to the level of fixed costs for different breeds of cows
Source: Own design and calculations.

That is why the most important is the question of what is the break-even point: how much should farm milk produce to cover its costs?

Figure 5 by line shows the percentage of fixed costs in the total cost. There is a clear tendency: the higher level of fixed costs, is the higher break-even point.

It was interesting to study the structure of the diet: all rations in Table 2 are reorganized from the smallest proportion of concentrates to the maximum. Note that the rations of Holstein contain more than 50% concentrates, and the conversion of dry matter forage into milk is only 1.24, while the level of protein content in milk is the lowest and the level of cost for veterinary drugs is the highest. But at the same time average daily milk yield is 31.9 kg.

Table 2. Economic evaluation of keeping dairy cows of different breeds according to the intake the diet structure

Breed	Ukrainian brown	Ukrainian black-pinto	Ukrainian red-pinto	Simmental	Lebedynska	Holstein
Amount of cows	389	322	696	711	298	743
Milk yield, kg	25.9	26.0	30.8	33.8	25.1	31.9
Fat content in milk, %	3.71	3.76	3.77	3.72	3.80	3.84
Protein content in milk, %	3.34	3.29	3.43	3.49	3.43	3.28
The consumption of feed per cow, kg, including						
Roughage	27.4	27.2	28.7	34.6	29.3	22.2
Protein Group	3.5	3.7	2.1	3.5	3.3	3.9
Grain forage and others	4.3	5.5	8.7	9.9	8.5	20.5
Conversion of dry matter, kg	1.42	1.43	1.18	1.19	1.28	1.44
Cost of ingredients of the ration, UAH per kg						
Roughage	1.97	2.11	1.97	2.14	1.67	1.85
Protein Group	0.97	0.93	1.17	0.99	1.16	0.93
Grain forage and others	5.72	7.15	4.59	7.7	5.6	7.17
The cost of feed-day per cow, UAH	82.0	100.2	98.9	153.7	100.3	191.7
Forage conversion, UAH per kg	2.72	2.74	2.69	2.27	2.26	2.24
EBIDA, %	24.4	25.2	22.2	26.8	22.3	32.6

Source: own research.

The money value of the fodder-day depends on the quality of the roughage. There is a clear trend: an increase in prices a kilogram of cow's ration (variable cost) increases the total

cost of milk production. Therefore, special attention now should be paid to their best harvesting their own quality roughage.

The best conversion of forage has the Holstein, Ukrainian brown and Ukrainian black-pinto breeds, because the quality of coarse feed is high, which makes it possible from this source to maximally satisfy the needs of cows in nutrients. Lebedynska breed in all indicators occupies median positions.

Conducted analysis of variance possible to determine the influence of factors - yield per lactation (A) and the cost of feed daily (B) on indicators of overall economic efficiency of keeping these breeds of cattle at farms (Table 3).

Table 3. The share of influence factors A and B and their interaction AB on indicators of overall economic efficiency of keeping these breeds of cattle at farms

	Factor	Ukrainian brown	Ukrainian black-pinto	Ukrainian red-pinto	Simmental	Lebedynska	Holstein
Profit of feed-day, UAH per day	A	19.5	14.2	7.7	5.2	18.9	9.5
	B	36.4	40.6	44.1	54.3	41.8	59.2
	AB	44.1	45.2	48.2	40.5	39.3	31.3
EBIDA, %	A	21.3	19.4	23.5	20.6	22.1	11.6
	B	14.4	14.3	7.9	20.0	12.4	8.5
	AB	64.3	66.3	68.6	59.4	65.5	79.9

Source: own research.

Thus, the calculated EBIDA showed that keeping cows of Lebedynsk breed is economically feasible. Taking into account indicators of biological value, farm receives 22% of the profit from each unit of the Ukrainian currency ("hryvnya", UAH) of milk revenue. This indicator is the average for dairy cattle breeding in Ukraine.

CONCLUSIONS

Organizing production, should think twice about the technological aspects, on which depends the result. In order to evaluate the total efficiency of the farm, experts use the following key indicators:

-In the total cost of milk over 50% is the cost of forage. Therefore, to calculate how

profitable is the milk production, it is worth to determine how many kilograms of milk we get from 1 kg of dry matter of forage. Among our calculations, the highest conversion rate of dry matter of forage (1.42-1.44) have Holstein, Ukrainian brown and Ukrainian black-pinto breeds, and the smallest has Ukrainian red-pinto breed (1.18). Lebedynska breed has an index of 1.28. It is very clear: increasing productivity will increase the efficiency of forage conversion and farm profitability. But important factor for the efficiency of forage conversion is the improvement of roughage quality.

Productivity of cows has a direct dependence on feeding: Holstein breed has 31.9 kg of milk yield per day (fat 3.84%, protein 3.28%); Lebedynska - 25.1 kg per day (fat 3.8%, protein 3.43%).

The structure of the cow ration determines the forage costs (the cost of a feed-day). The highest forage costs have the farms where the concentrated feed is dominated by the structure of ration. It's the farms holding the Holstein breed - 191.7 UAH (by feeding 20.5 kg of grain per day per cow), the smallest - 82 UAH - farms holding the Ukrainian brown (4.3 kg grain per day per cow). In the structure of the diet of Lebedynska breed cows, grains contain 8.5 kg, and the cost of the feed-day is 100.3 UAH.

That is, the keeping of the Swan breed of dairy cows, taking into account biologically-selective features, is economically feasible in modern conditions of management.

REFERENCES

- [1]Bratushka, R. V., 2019, Vplyv henetychnykh i paratypovykh faktoriv na formuvannya selektsiynykh oznak tvaryn sums'koho vnutrishn'oporodnoho typu ukrayins'koyi chorno-ryaboyi molochnoyi porody/The influence of genetic and paratypic factors of the formation of breeding features of animals Sumy interbreed type of Ukrainian Black and White dairy cattle: avtoref. dys. kand. s.-h. nauk: 06.02.01. Chubyns'ke (in Ukrainian). 16 p.
- [2]Dekkers, C. M., 2004, Commercial application of marker- and gene-assisted selection in livestock: Strategies and lessons, Journal of animal science. – 2004. Vol. 82, suppl 13, 313-328.
- [3]Derzhavna sluzhba statystryky Ukrainy, 2019, Sil's'ke hospodarstvo Ukrayiny (Agriculture of Ukraine), Kyiv: Informatsiino-analitychne ahentstvo, 413 p.
- [4]Petrychenko, V.F., Korniiichuk, O.V., 2012, Strategy of development of forage production in Ukraine, Kormy ta kormovyrobnytstvo, no. 73, pp. 3-10, http://fri.vin.ua/pdf_materials/KiK_73.pdf#page=3, Accessed on 03.02.17.
- [5]Pivtorak, Ya. I., Holodiuk, I.P., Mateus, V.L., 2012, The use of modern of technologies in the production of milk, Bezpeka produktiv kharchuvannya ta tekhnolohiya pererobky, no. 4 (62), pp. 191-195, <http://agrojournal.vsau.org/files/pdfa/155.pdf>, Accessed on 13.05.2013.
- [6]Program for the conservation of local and endangered breeds of farm animals in Ukraine, 2016, Chubyns'ke (in Ukrainian).24 p.
- [7]Surovev, V., 2012, Estimation of influence improving the quality of roughage on the competitiveness of milk production. Moloko i ferma, Vol. 5 (11), 46-49.
- [8]The Convention on Biological Diversity, ratified by the Law of Ukraine of 11.29.1994 № 252-94. https://zakon.rada.gov.ua/laws/show/995_030, Accessed on 29.10.2010.
- [9] The state of global genetic resources in the field of food and agriculture - FAO report (2016). Roma. 38 p.