Innovative Calculating of Products in Industry Enterprises

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Abstract In this work, the main aim is to improve the quality of the information field for making economic decisions. This is done by developing and introducing into accounting process an innovative methodology for direct costs, as well as calculating, on their basis, the cost of production of enterprises in the animal husbandry industry. An instrumental space of the research methodology is structured on the basis of the complex use of a set of theoretical and empirical methods, including: observation, objectification of resources in the accounting and calculation system and their semantic analysis; identification of cost accounting objects, their decomposition and structural classification, verification and validation; systematization and subsequent recording of direct costs in analytical accounting registers; graphic visualization of results. Along with them, we used: structural–functional approach, which allows formalization of information-tool space of cost management and possibilities of adjusting their normative values and functional modeling. Theoretical and methodological bases of accounting and calculating work are considered. The result of the research was developed by the authors' innovative method of accounting for direct costs and calculating the cost of products of the industry in question on the basis of accounting (management) "Directcosting" system, which allows to significantly improve the quality of accounting and calculating process of investigated enterprises, improve the efficiency of management decision-making and efficiency

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of business activity of economic entities in the sphere of livestock husbandry. An introduction of innovative accounting and calculation methods allows to correlate the costs and benefits of livestock enterprises, which largely contributes to the inflow of investments into the sector and its financial stability.

Keywords Cost price · Direct costs · Cost accounting method · Calculation · "Directcosting" · Decision-making

JEL Codes Q10 · Q11

1 Introduction

Development of economic relations in the context of increasing competition in all sectors of agricultural production implies the objective necessity of implementing a balanced enterprise cost management policy for the production and final results, including providing a flexible variation of the sales prices [1]. A solution to the problem of maintaining "low prices" largely depends on "cost leadership," which implies a reasonable and well-planned reduction in the level of the latter. The need for enterprise's efforts to permanently reduce costs through a consistent decrease in the volume of resource consumption of an economic entity at all stages of value creation is emphasized in works of [2–4] which involves a debugging cost management mechanism that allows, among other things, to structure a sustainable implicative dependence Q of cost reduction (CR), flexible pricing policy (FPP), and improve competitiveness (IC) (Formula 1):

$$Q: \ CR \ => FPP => IC \tag{1}$$

An important element of this mechanism is the accounting and calculating function of accounting activities of an enterprise. Where information on costs of production and sale of products play a key role in enterprise management [5, 6].

Current industry is one of the leading in the agro-industrial sector. The research concluded that the problem of complete and qualitative formation of information on the actual cost of production and, therefore, on the received financial remains unsolved due to: (a) duration of production cycles, assuming the costs of future periods; (b) flow of value creation, which involves the realization of biological processes that do not coincide with calendar reporting periods.

The use of innovative methods of cost calculation and financial results of the industry due to a number of technological features. They are: the presence of perishable goods and, therefore, the need for additional expenditure on the maintenance of the equipment for its storage and prompt delivery to the point of sale; the fact that cows give milk only after calving and milking should be carried out on a daily basis without interruption, at least twice a day; litter production process has a long-term nature of time and suffers from uneven yields.

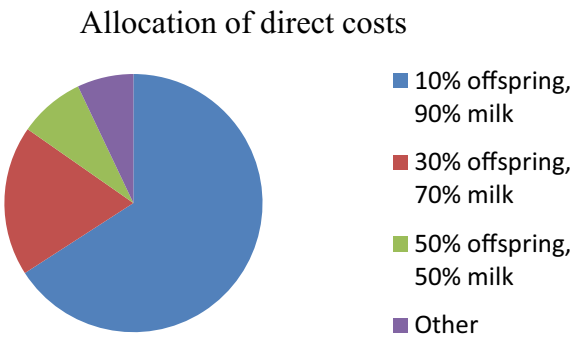

Fig. 1 The ratio of approaches for attributing direct costs to the types of dairy products of studied enterprises. *Source* compiled by the authors

It is quite obvious that technological limitations largely determined the application in the accounting practices of the studied enterprises of an accounting and calculation model based on the conventional ratio of direct costs of milk production and offspring. In most accounting practices of the studied economic entities, it is assumed that 10% of the costs incurred are attributed to the cost of offspring; 90%—for the cost of milk. Figure 1 shows the proportions of approaches for solving this important calculation problem.

An existing accounting and calculation system does not take into account the irreversible, permanent, and objective natural nature of biological processes. It includes the cost of producing offspring, which is lasting about 9 months, and can be attributed to two annual calendar periods following each other. In the accounting of studied enterprises, the costs for the past year are not taken into account. Instead, the calculation includes the costs of a larger number of months of the current year that are carried out after calving, which leads to a distortion of the calculation result in the direction of a significant overestimation of the level of actual production costs. Dropping out from the calculation are the costs of keeping the heifer in the process of forming the cost of the offspring at first pregnancy when she is included in the rearing animals, and not in the main herd. Corresponding costs are attributed entirely to the cost of the heifer gain without further dividing their amount and attributing part of it to a received offspring.

All these facts, obtained by the authors in the course of the study, confirm the need to use innovative calculation approaches in order to improve the quality of the generated production cost and the financial result of the business activity of dairy cattle breeding. Our objectives in this study include substantiating a set of techniques and methods of economic calculations that make it possible to achieve a designated goal.

2 Materials and Method

The research methodology is based on scientific approaches that imply long-term observation of the dynamics of the state of production resources at enterprises and their semantic analysis. Results of which are used to objectify and identify specific types of costs in the accounting and calculation system; their decomposition and structural classification, systematization and subsequent fixation of direct costs in analytical accounting registers; graphic visualization of the results [6–8]. Along with them, we used: structural–functional approach, which allows formalization of information-tool space of cost management and possibilities of adjusting their normative values and functional modeling.

Theoretical and methodological approaches. According to the authors, in order to solve this problem, it is necessary to apply a set of techniques and methods of the highest quality reflection of direct costs, which is feasible by using the method of accounting for costs and calculating the cost of production "Directcosting" [9–12]. Scientists emphasize that the implementation of this method is based on "the classification of costs for fixed (periodic) (indirect–by authors) and variables (for a product) (direct–by authors)." The authors of many studies in this subject area base their professional judgments on these positions. Thus, the presence of analytical accounting registers, which are separately identified direct and indirect costs, allows us to refer to the cost of production. The authors note, "Only direct production costs and all indirect costs are considered costs of the current period and are written off as the cost of sales." This statement should be supplemented, as when using the method "Directcosting" in the cost of sales is written off not only the indirect costs related to the class of product but also on marketing costs (non-manufacturing costs).

3 Results

According to the authors, the following principles should be used as the basis for innovative calculation of dairy products:

- Costs must be charged during the period that begins with the month insemination of cows (heifers) and ends next month insemination;
- Distribution by type of product costs—milk and offspring, should be implemented monthly;
- Costs of maintaining pregnant cows and heifers in terms of offspring formation at the end of the year must be taken into account during work process;
- Part of the costs of maintaining a pregnant heifer related to the formation of offspring should be taken into account separately;
- To organize analytical accounting of costs by groups of cows, formed according to the month of insemination or calving;
- Milk costing should be done on a monthly basis and the cost of litter—at the end of the month of calving.

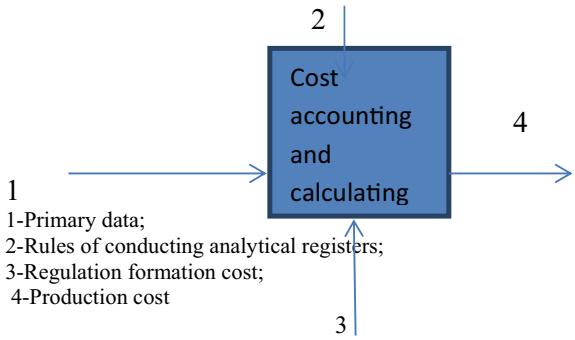

Fig. 2 Context diagram of an innovative cost accounting and costing model for dairy products. *Source* compiled by the authors

Based on these principles, it is proposed to present an innovative model of cost accounting and calculating the cost of dairy products in the form of the following context diagram (Fig. 2).

The basis for making entries in the accounting registers of costs for dairy products of the studied enterprises is a set of primary documents approved by an economic entity. They are confirming the basis and volume of costs incurred, the movement of which is regulated by the approved accounting document flow scheme. It is quite obvious that it is necessary to incorporate information verification procedures into the complex of accounting and calculation, information, and instrumental space, both received for processing and generated at the output of the system. Verification is an iterative process, the completion criterion of which is the compliance of the information results with the established parameters, i.e., a given level of validity.

As stated by authors, a grouping of expenses expediently carried out in the context of the following products: dairy cows (calf before pregnancy); dry cows; calf heifers.

Objectification in the information field of cost accounting and calculating the cost of dairy products involves the following calculations (2, 3):

$$\mathrm{S}_J = \sum^{\mathrm{N}} \mathrm{a}_{ij(2)}, \text{ where } \mathrm{S}_J \text{is the cost of the} J\text{-th object}$$
$$i = 1 \text{a} ij\text{-th cost item of} i\text{-th object} \tag{2}$$

$$\mathrm{S}_K = \sum^{\mathrm{N}} \mathrm{S}_{J(3)}, \text{ where } \mathrm{S}_K \text{ is the cost of production}$$
$$i = 1 \tag{3}$$

Costing accounting object "cash pregnant cows" that is generated by "Direct-costing," can be represented as follows (Table 1).

Table 1 Calculation of the cost of production for April 2020 of the enterprise LLC "XXXXX" Product name: Milk cows, code: 8254, date: 06.04.2020 (fragment)

No. p/n	Cost items	Amount, RUB
A	1	2
Direct costs		
1	Material resources, including:	
1.1	Means of protection and animals	40,000
1.2	Animal feed, including:	
1.2.1	– acquired and own production of previous years	20,000
1.2.2	– own production of the current year	30,000
1.3	Petroleum products	9,000
1.4	Fuel and energy for technological purposes	11,000
1.5	Work and outsourced services	9,000
Total material resources		110,000
2	Wages, including:	
2.1	Basic	60,000
2.2	Additional	20,000
2.3	Natural	–
2.4	Other payments	10,000
Total remuneration		90,000
3	Social contributions	30,000
4	Other direct costs	10,000
Total direct costs		240,000

Source compiled by the authors

Consolidated statement of accounting for direct costs incorporates the content of the calculations, which is formed by the above method and has the following form (Table 2).

It should be noted that according to the consumption of feed produced in the current year is estimated at the planned cost, and at the end of the year, according to the calculation of the cost price, their planned cost is brought to the actual cost. A purchased feed is written off at the purchase price, including the cost of delivery to the farm. Costs under the item of fuels and lubricants spent on the performance of technological and transport work for the maintenance of production, etc., (N) are calculated according to the following formula (4):

$$N = C + P \tag{4}$$

where C—the purchase price; P—the cost of delivery to the farm.

The item "Fuel and energy for technological purposes" is formed in accordance with the cost of purchased fuel from all types spent on maintaining technological

Table 2 Statement of account for direct costs on production in April 2020 of company LLC "XXXXX" rub. Date: 06.04.2020 (fragment)

No. p/n	Name of of product	The code of product	Material resources	Wages	Deductions for social needs	Other	Total C.7 = c.3 + c.4 + c.5 + c.6
A	1	2	3	4	5	6	7
1	Milk cows	8,254	110,000	90,000	30,000	10,000	240,000
2	Dry cows	8,250	80,000	30,000	10,000	5,000	125,000
3	Pregnant heifers	8,251	60,000	18,000	6,000	2,000	86,000
Total			250,000	138,000	46,000	17,000	451,000

Source compiled by the authors

processes in the production and acquisition of all types of energy consumed for technological and other industrial, economic, and administrative needs. Also, the cost of third-party work and services is reflected in the above calculation only insofar as that can be directly attributed to the cost of certain products. It should be noted that the rest of these costs are usually charged to general production costs.

The item "Remuneration" is formed from "cash and in-kind payments, which have the nature of remuneration and are included in the cost of products (works, services), to workers of various categories directly involved in the technological process of a corresponding production." As practice shows accounting calculations on payment of dairy farming workers, that a significant proportion of payments are related to overtime work, work on weekends and holidays.

The use of "Directcosting" makes it possible to calculate the margin of the financial result of CF (5) and the norm of the marginal profit HMB (6):

$$MB = B - \mathrm{S}_{\mathcal{K}} \tag{5}$$

$$\mathrm{HMB} = \frac{MB}{B} * 100\% \tag{6}$$

where B—Revenue from sales of products.

HMB index reflects the degree of influence of the proceeds from sales to the amount of the margin of a financial result. So, upon receipt of proceeds in the amount of 6,290,000 rubles at the enterprise LLC XXXXX, the marginal financial result (margin profit) will be 178,000 rubles, the margin profit rate is 28.3%.

4 Discussion

An innovative model for the formation of the cost of each type and, in general, the gross output of dairy cattle breeding at the studied enterprises should be carried out on the basis of uniform principles and rules enshrined in local acts in strict accordance with the list of costs established by the current regulatory documents. At the researched enterprises it is advisable to keep records at direct costs since this method allows them to obtain the most reliable set of information about expended resources and receive margin financial results.

A company independently chooses a method for determining the cost of production and marginal profit, taking into account the specifics of a particular production, and secures it in accounting policies. During this procedure, it is possible to use the method "Directcosting," which allows not only significantly improve the accuracy and reliability of economic calculations but also to effectively fill the content of the information field of decision management solutions. Also, it forms employees' objective view of what resources are used directly in the creation of use-value of the product (direct costs) and which only allow the implementation of this process (indirect costs). As an important direction for future research, the author considers the study of the possibilities of using artificial intelligence and processing big data, as well as the development of a methodology for assessing the cost of stocks in work progress for dairy products.

5 Conclusion

Formation of conditions for improving the competitiveness of agro-industrial enterprises requires the introduction of innovative managing methods of costs and their results at all stages of value creation. An important sector of the agricultural sector is the breeding of dairy cattle and the production of raw milk. The authors of the study showed that enterprises of two large areas of Russia still have an unsolved problem. It is the problem of complete and high-quality formation of information about the actual cost of production and obtained financial results. Structuring the information space for cost accounting and calculating the cost of dairy products involves clarification of the cost concept. Concerning this area, its interpretation is an integrated indicator that quantitatively characterizes the process of resource consumption in the value stream used for internal monitoring of costs, search for ways to reduce them, and determine economic benefits.

Innovations in the area of accounting and the calculation of dairy cattle suggest the choice of accounting method to organize the direct costs in order to create high-quality information base management decisions and generate the most complete and reliable on-farm reporting. Studies have shown the dominance of conventional approaches in the accounting and calculation process, which do not allow to solve this problem [13, 14]. Under these conditions, according to the authors, the best

solution is to use “Directcosting” method. The cost of products formed through its application literally “highlights” information about the resources that directly form value. It is most relevant for the development of cost reduction strategies. Also, it allows us to find the most advantageous combinations of price and volume, pursue an effective price policy, simplify rationing, planning, accounting, and control. It should be noted that the cost of production, formed by the “Directcosting” method, allows us to significantly expand the information field of the costs and results produced by indicators of the marginal financial result and the rate of marginal profit.

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