Cost management models in agricultural business

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Abstract. Any business, no matter how large it is, cannot work effectively without proper management of production costs. Some aspects of cost management have already been sufficiently studied, but new questions arise related to the industry specifics of cost formation. The paper considers the characteristics of various cost management tools, identifies conditions that restrict their use in agricultural production, justifies the selection of tools that are most adapted to the agricultural sphere of production and current Russian accounting and taxation practices, and presents a model of cost management by responsibility centers. The relationship between production costs and the final results of agricultural production organizations was studied, and potential opportunities for increasing production efficiency were identified. The composition of additional costs for the production of products with improved environmental characteristics is determined, and a method for their separate accounting for the use of various cost management tools is proposed.

1. Introduction

Agricultural business is an important element of the economic system of any state. Over the past years, the agricultural business in Russia has shown fairly steady growth. In today’s difficult economic conditions, it is necessary to maintain the ability to healthy competition in the national and foreign markets, and to maintain the achieved positions. However, innovation processes in the agricultural business are not as fast as in other industries and spheres of activity. High investment risks and insufficient financing hinder their development. Therefore, the conditions of entrepreneurial activity in the agricultural sector dictate the need for competent management of available resources, including prompt solutions to cost optimization issues based on the use of special tools.

A modern organization as a separate business unit is a complex production system, the management of which requires a comprehensive system approach [1]. The cost management system is an integral part of the overall management system of an economic entity and consists of the managing (managers at all levels) and managed (processes of cost formation, costs and their places of origin) subsystems. The differences between them are the tools that the controlling subsystem uses to influence the managed subsystem. Management tools, i.e. a set of methods and models used to solve tasks, are the basis for their achievement [2].

The cost management system covers the stages of forecasting and planning costs, organizing and coordinating cost management activities, and regulating costs when business conditions change. It provides staff motivation, encourages cost savings, establishes forms of responsibility for the irrational use of resources; provides accounting and control; includes cost analysis, efficiency assessment, and identification of possible options for eliminating identified shortcomings [3].
In the world theory and practice, various cost management tools are known and widely used: direct-costing system, standard-costing system, cost accounting by stages of the product lifecycle (life-cycle costing (LCC)), operational analysis (CVP-analysis), differentiated accounting method (activity based costing (ABC)), and absorption-costing. The field of cost management is considered one of the most developed in the world practice, but for the specific Russian agricultural sector, existing standards and models in “pure form” are not always applicable [4].

2. Materials and methods
In the process of work, we used general scientific methods and techniques of research, including methods of empirical research (comparison, description, measurement); general logical methods and techniques of research (analysis, generalization, induction, deduction, system approach). The research was based on official state statistics; normative legal acts of the federal and regional levels; data from the Ministry of Agriculture of the Russian Federation and the Ministry of Agriculture of the Penza region; reference materials of specialized publications on the subject under study; materials of own research; Internet data (scientific papers and works of practitioners, industry portals, economic reviews).

3. Results
Currently, the focus of modern Russian agricultural business is cost management within the framework of the concept of lean production. All well-known cost management models in the theory and practice one way or another are based on the principles of optimization and cost reduction [5, 6]. The deeper study of the characteristics of cost management tools with a view to their possible application in Russian practice revealed restrictions on their use in agricultural production. In the conditions of seasonality and duration of production cycles in certain sectors of agriculture, the use of part of the produced product for internal production needs and, as a result, the dependence of the cost of one product on the cost of another, the opportunities for effective use of existing tools are reduced. In addition, direct-costing is not permitted by Russian accounting standards for financial reporting and tax calculation [1, 7]. Thus, in relation to the agricultural sphere of production and the current Russian practice of accounting and taxation, the most relevant and most promising at present is the use of cost management tools of standard-costing and the absorption - costing.

Combining the elements of rationing with the calculation of full actual costs, identifying deviations from the norms, analyzing them and taking measures to eliminate them, is an effective way to optimize costs in agricultural production. Therefore, improving the technology of cost management and improving the management culture at all levels in the agricultural business should be carried out on the principles of budgeting [8, 9].

Cost budgeting is a separate, relatively independent part of the budget management system that determines the baseline level of planned expenditures and tracks deviations in actual cost indicators and projected profits. In order for the cost management module to work effectively, they need a clear and well-established algorithm for implementing its impact on the managed subsystem (Fig. 1).

A well-designed budget, clearly defined tasks, operational cost accounting and control, as well as an assessment of budget performance identify savings or cost overruns relative to the baseline. Both the first and second variants of budget execution make it possible to make informed economic decisions on cost management, development and expansion of production in any branch of agriculture.
The application of modern cost management models is becoming particularly relevant. The agricultural business of Russia has specific tasks to increase the production of crop and livestock products, and ensure the country’s food independence [10, 11, 12]. As part of the State program for the development of agriculture and regulation of markets for agricultural products, raw materials and food, the project “Development of agro-industrial sectors that provide accelerated import substitution of main types of agricultural products, raw materials and food” was approved. The aim of the project is to increase production volumes in 2025 to the level of 2017: for crop production by 14.8 %, livestock – by 15.8 %, food products – by 29.7 % [13, 14]. The growth of production volumes in the modern market should be accompanied by an optimal level of costs and an increase in financial results. The relationship between the final results of activity and the value of production costs is studied on the materials of agricultural organizations of the Penza region (table 1) [15].

**Table 1.** Dependence of production efficiency on the value of production costs in agricultural organizations of the Penza region, 2018.

| Groups of organizations on the cost of agricultural production per 100 hectares of agricultural land, thousand rubles | Number of organizations in the group | Accounts for 100 hectares of agricultural land, thousand rubles | Level of profitability, % |
|---------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------|--------------------------|
|                                                               | total | % to total | costs | revenue | profit (loss) |                                                      |
| < 300                                                         | 9     | 7.2       | 133.9 | 156.6   | 22.7         | 16.9                                                  |
| 300-900                                                      | 50    | 40.0      | 718.7 | 968.0   | 243.7        | 33.9                                                  |
| 900-1800                                                     | 42    | 33.6      | 1278.6| 1773.2  | 494.6        | 38.7                                                  |
| 1800-3000                                                    | 17    | 13.6      | 2291.2| 3553.6  | 1116.8       | 48.7                                                  |
| > 3000                                                       | 7     | 5.6       | 4045.3| 4418.8  | 352.2        | 8.7                                                   |
| Total average                                                | 125   | 100.0     | 1513.7| 1954.1  | 404.1        | 26.7                                                  |

The results of the grouping showed that 80 % of agricultural producers have potential opportunities to improve the efficiency of their business by increasing the cost per 100 hectares of agricultural land to the optimal value of 2291.2 thousand rubles.

It is important to achieve growth in gross production volumes with high quality of the resulting products, which will ensure the competitiveness of Russian manufacturers, both in the national and foreign markets [16, 17, 18].

The organic combination of high product quality with an acceptable level of production costs is an important principle of cost management in the agricultural business [19]. Currently, the first national standards for “green” products were developed, approved and have already entered into force in 2020 [20]. Their application in practice will ensure the creation of Russian protected brands of environmentally friendly agricultural products and raw materials. According to the Ministry of
Agriculture of the Russian Federation, the share of products with improved environmental characteristics in the country’s total agricultural exports may reach 10-15% by 2024, and exports will increase to $45 billion.

In fact, all costs associated with the production of products are already costs for quality, but production that provides improved environmental characteristics of the product will require additional costs (table 2).

### Table 2. Types and composition of production costs for products with improved environmental characteristics.

| Types of costs                             | Composition of costs                                                                                                                                                                                                 |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Information support                        | - development of a set of documents that reflect the cost of quality;                                                                                                                                                |
|                                            | - development of a system for recording quality costs;                                                                                                                                                    |
|                                            | - development of an information support system using modern technologies.                                                                                                                                  |
| Ensuring the quality of seeds, fertilizers, feed, etc. | - development of input control at receiving seeds, mineral fertilizers, feed, etc.;                                                                                                                               |
|                                            | - development of measures for storage of seeds, mineral fertilizers, feed, etc.                                                                                                                                   |
| Quality assurance in production            | - modernization of technological process;                                                                                                                                                                         |
|                                            | - development of a process control system;                                                                                                                                                                          |
|                                            | - elimination of inconsistencies in the quality of finished products.                                                                                                                                            |
| Ensuring quality in the sale of products   | - development of requirements for the maintenance of warehouses, storage of finished products, packaging;                                                                                                       |
|                                            | - development of requirements for transportation of finished products to the consumer.                                                                                                                        |
| Personnel training                         | - development of the schedule of professional development, methods of personnel training and quality control of training.                                                                                         |
| Study of product market needs              | - development of a scheme for collecting and analyzing information on market needs in products;                                                                                                                 |
|                                            | - development of a scheme for processing consumer claims.                                                                                                                                                          |

The composition of costs for the production of products with improved environmental characteristics is not closed and may change, depending on the industry specifics. It is important that a system for recording quality costs is established, which forms the basis for applying various tools for managing these costs. Information collection will be provided by the accounting system of the company, in which it is important to approve the methodology for including quality costs in the cost of the finished product. Based on the above list of costs, it follows that one part of them relates to industry expenses, and the other to general economic expenses. [21, 22] Therefore, when forming expenses on accounts 25 “General production expenses” and 26 “General economic expenses”, it is necessary to supplement the current list of cost items with an independent position “Ensuring improved environmental characteristics of products”. This will allow controlling the formation of additional expenses and analyze their impact on the results of production and sales.

### 4. Summary

Cost management based on the application of adapted management models, effectively integrated into the overall management system of organizations, will ensure the growth of volumes and improve the quality of agricultural products at the optimal level of production costs in the agricultural business. Accounting and control of costs for production of products, raw materials and food with improved environmental characteristics that reduce the negative impact on the environment and human health, it will provide an opportunity to make economically sound management decisions to improve the competitiveness of domestic products in foreign markets.

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