ISSN: 2249-7137 V

Vol. 15 Issue 5, May, 2025 A peer reviewed journal SJIF 2022= 8.252

#### EMPIRICAL STUDY OF COST ACCOUNTING AND COSTING OF PRODUCTS IN GRAIN PROCESSING ENTERPRISES

#### Abdullaev Altinbek Yangibaevich\*

\*Professor, Doctor of Economics, Department of TSAU "Accounting, analysis and audit", UZBEKISTAN DOI:10.5958/2249-7137.2025.00027.2

#### ABSTRACT

This study examines the financial difficulties encountered in managing the cost of production of flour and compound feed products and cost calculation at grain processing enterprises. Based on the quantitative approach of empirical research, the main factors leading to the failure of the financial management of the cost of production of flour and compound feed products and cost calculation at grain processing enterprises are identified, the economic efficiency of the rules for the financial management of the cost of production per unit of flour and compound feed products and cost calculation is assessed through the developed scenarios, and the medium and long-term forecast indicators of the strategy for managing the cost of production per unit of flour and compound feed products and cost calculation are determined based on artificial intelligence technologies, in order to make scientifically based optimal decisions.

**KEYWORDS:** Long-Term Forecast Indicators, Accounting For Production Costs, Financial Management Of Cost Calculations, Assessment Of The Effectiveness Of Production Costs, Collecting, Documenting, Processing Information, Making Optimal Decisions.

#### 1. INTRODUCTION

The issue of keeping track of expenses in the production of products of grain processing enterprises and improving the calculation of product costs is one of the urgent problems of scientific and research work. Cost accounting in product production and effective organization of product cost calculations require perfect control over the use of resources at any stage of technological processes and effective use of loss accounting information to achieve management goals.

In recent years, measures to improve the technological and organizational aspects of the activities of grain processing enterprises have had a significant impact on the structure of production costs and the cost of products, but the level of ensuring the economic efficiency of product production in the grain processing sector does not fully meet the established requirements.

Finding a solution to this problema complex organizational and management measures system, as well as various methods of collecting, documenting, processing and summarizing information on production costs and product costs, cost accounting and improving product calculations play an important role.

Practice shows that in recent yearsInsufficient attention is paid to improving the quality indicators of grain processing enterprises, identifying high levels of cost overruns and losses, and

ISSN: 2249-7137

Vol. 15 Issue 5, May, 2025 A peer reviewed journal SJIF 2022= 8.252

finding internal production resources. This situation leads to excessive costs in production and the loss of finished products. An objective description of the production process creates an opportunity for organizing and maintaining scientifically based accounting of costs and calculating the cost of products. This requires manufacturers to optimize the results of production activities at the enterprise [2; 97 - 113].

In a market economy, the adequacy and reliability of information on production costs and cost price is one of the ways to achieve competitive advantages in business management and administration. In practice, it is important to develop cost accounting and product cost calculation methods aimed at increasing the relevance of production activities, and to provide rules that determine the variety of methods that affect costs when making management decisions at various levels in the current system of accounting for production costs.

To date, the purpose of accounting for the cost of production and costing methods at grain processing enterprises and their application in the industry have not been fully covered in existing scientific works, or even generalized. The lack of methodological support for accounting helps to use existing methods in the theory and practice of accounting at grain processing enterprises and enrich them with techniques that correspond to the characteristics of the industry. However, issues related to improving cost accounting, as well as, the effectiveness of managing cost accounting and costing cannot be solved without the use of certain methods and approaches. According to international practice, accounting for product production costs and costing helps to provide internal and external users with useful information on reducing product costs and effectively managing cost allocation. The information collected helps to ensure the economic stability of the enterprise and make effective management decisions.

So,product of the main goal of improving the methodology for accounting for production costs and costing is to increase production efficiency, find internal production resources to reduce costs, optimally use the internal potential of the enterprise, and achieve economic efficiency.

But today in enterprises product significant neglect of accounting of production costs and cost calculation, imperfect planning, violations of the rules of management organization cause certain deficiencies to occur. In particular, the volume of production of flour products and fine fodder at grain processing enterprises has significantly decreased, competition between enterprises has increased. This situation is causing disproportionality and monopolization of product prices, failure to pay for received products on time, increase in resource prices, and decrease in control efficiency. From this point of view, in grain processing enterprises productkeeping track of production costs and effective management of cost calculation, finding internal reserves of cost reduction, creating an opportunity to avoid bankruptcy processes of enterprises through the optimal distribution of costs, keeping track of production costs per unit of flour and soft feed products based on artificial intelligence technologies, and the long-term forecast indicators of the cost calculation management strategy for the long term are scientifically based optimal decision-making, quality production rate development of acceptable variants of determines the relevance of the topic of the article.

#### Literature Analysis

Economic scientists such as Kiseleva O.V., Makarova E.N., Kochetov V.L., Izykova A.V., Bondin I.A., and C. Drury conducted scientific research on the issues of accounting for production costs and improving cost calculation at processing plants. In particular, in the research of Bondin I.A., a concept of managing production costs at agricultural enterprises was created based on the systematization of the theory of production costs; the mechanism of production cost management was proposed to be targeted, informatized, resource exchange, and

ISSN: 2249-7137

Vol. 15 Issue 5, May, 2025 A peer reviewed journal SJIF 2022= 8.252

innovative methods, methods, and means of organizing and equipping agricultural production; factors affecting production costs with cost elements were identified; economic and statistical models of production costs at different levels of management were created; the impact of indicators characterizing the activities of enterprises on the cost of a unit of production was assessed; financial plans are drawn up that allow making management decisions aimed at reducing production costs; a methodical approach has been developed that provides for the expansion of the list of indicators used in practice (absolute liquidity ratio, debtor and creditor debt) to ensure the impartiality of the comprehensive assessment of the creditworthiness of enterprises; A mechanism for stratified distribution of budget funds was proposed through a comprehensive assessment of the creditworthiness of product manufacturers [3; 24].

*Kiseleva O.V. in* his research, due to the lack of a unified approach in accounting, a method for accounting for production costs and cost calculation was developed; classifications of the method for accounting for production costs and cost calculation methods are proposed, the completeness of the identified features differs from other approaches; a new approach to cost accounting for production costs was developed, in which the method for accounting for production costs and product cost calculation and the rules regulating them were formed [6; 24].

*Makarova E.N.* in his research, taking into account the recommendations of international accounting and reporting standards and the specific features of accounting for production costs at processing enterprises, nomenclatures were determined for the items of unit cost of production; a scheme for operationally reflecting deviations of actual costs from standard costs at enterprises and methodological recommendations for their accounting were developed; a methodology for medium-term forecasting of production costs adapted to activity was recommended; a model for accounting and analytical support of the production cost management system at processing enterprises was developed by adapting the current accounting system to new economic conditions; a method for analyzing production costs based on the industry characteristics of enterprises; the use of adaptive budgeting with a marginal approach in analyzing production costs was recommended; the effectiveness of accounting and analytical data in optimizing production costs was formed [7; 24].

*Kochetov V.L.*in the research of , a proposal was made to manage costs by profit centers, which would allow for the generalization and evaluation of data on costs and efficiency indicators for each center in flour industry enterprises; recommendations were developed to help align the cost control process for each participant in the production process with the organizational structure of the flour production complex, increase flexibility in decision-making, and increase the efficiency of the enterprise's activities in a competitive environment; a distribution by cost flows was proposed based on primary accounting documents; using structural analysis methods, the main sources of costs were summarized and systematized by cost items [5; 193-198].

*Izykova A.V. in* his research, the structural elements of production costs were identified; production costs were studied as a general category of social reproduction; theoretical and methodological aspects of the formation of production costs and cost price were revealed; the differences between costs and cost price were identified and assessed through labor indicators; factors that significantly affect the cost price of products and production costs were identified and assessed; reserves for reducing the cost price of products were identified at enterprises and economic and mathematical models were created to optimize the production structure at the enterprise [4; 24].

ISSN: 2249-7137

Vol. 15 Issue 5, May, 2025 A peer reviewed journal

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However, in the above scientific works, based on the quantitative approach of empirical research, there have been no studies on identifying factors that lead to failures in the allocation of production costs of individual products and the calculation of product cost, evaluating the effectiveness of the optimal allocation of production costs of individual products and the calculation of product cost through developed scenarios, creating models for effectively assessing the accounting of product production costs and the calculation of cost at grain processing enterprises, and establishing scientifically based medium and long-term forecast indicators of the strategy for managing the accounting of production costs per unit of flour and compound feed products and the calculation of cost based on artificial intelligence technologies.

#### 1. Methodology

It should be noted that the intensive growth of production volumes at grain processing enterprises is ensured by the accounting of production costs and the influence of factors affecting the cost of production. This situation requires the scientific substantiation of the accounting of production costs and cost calculation. Our goal is to increase the efficiency of grain processing enterprises, improve the methodology of accounting for production costs and cost calculation, find internal resources for reducing costs, create opportunities for enterprises to avoid bankruptcy processes through optimal distribution of costs, and provide high-quality**production** rate. It consists of developing acceptable options for and generalizing and holistically systematizing the elements associated with them.

Currently, there are no models for effectively estimating the cost of production and calculating the cost of grain processing enterprises. Therefore, in order to mathematically characterize the composition of the cost of production and calculating the cost of production, it is necessary to pay serious attention to the quantitative and qualitative indicators that represent them. In accordance with the conditions for mathematically characterizing the cost of production and calculating the cost of production processes at grain processing enterprises, we have developed models and algorithms for calculating the cost of production and calculating the cost of production of flour products and compound feed.

#### Algorithms for keeping accounts of production costs of flour products and calculating I. product costs in grain processing enterprises were developed in the following order:

1. The unit of initial wholesale value of grain  $(D_{uq}^{e})$  is equal to the ratio of the quantity of grain consumed for the production of flour products(Ddm)multiplied by the wholesale price of grain (b<sub>du</sub>)to the number of flour products produced (M<sub>um</sub>)

 $D_{uq}^{e} = (D_{dm} * b_{du}) : M_{um}$ 

2. The total wholesale unit cost of grain  $(D_{tq}^{e})$  (including transportation costs) is equal to the ratio of the total wholesale cost of grain  $(D_{uq}^{e})$ , railway costs  $(X_{ty})$ , automobile costs  $(X_{av})$ , internal transportation costs (Xit) and savings interest (Xif) spent on the production of flour products to the total flour products produced (M<sub>um</sub>).

 $D_{tq}^{e} = D_{uq}^{e} + (X_{ty} + X_{av} + X_{it} + X_{jf}) : M_{um}$ 

3. Unit of value of additional products  $(M_{qq}^{e})$  bran product  $(M_{kp})$  with wheat waste  $(M_{bc})$  is equal to the ratio of the sum of the values of flour products produced (M<sub>um</sub>)

$$\mathbf{M}_{qq}^{e} = (\mathbf{M}_{kp} + \mathbf{M}_{bc}) : \mathbf{M}_{um}$$

4. The total unit value of grain after deducting the cost of ancillary products  $(D_{yq}^{e})$  is equal to the difference between the unit value of grain  $(D_{tq}^{e})$  plus transportation costs and the cost of  $\begin{array}{l} ancillary \ products \ (M_{qq}{}^{e}). \\ D_{yq}{}^{e} = D_{tq}{}^{e} \text{ - } M_{qq}{}^{e} \end{array}$ 

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5. The unit cost  $(X_{mp}^{e})$  paid to suppliers and contractors is equal to the ratio of the sum of electricity consumption (S<sub>ee</sub>), water consumption (S<sub>sr</sub>), gas consumption (S<sub>gz</sub>) and other resource consumption (S<sub>br</sub>) to the amount of flour produced (M<sub>um</sub>).

 $X_{mp}^{e} = (S_{ee} + S_{sr} + S_{gz} + S_{br}): M_{um}$ 

6. The unit cost of various other materials used to produce a product  $(S_{bm}^{e})$  is equal to the ratio of the sum of the cost of yarn  $(S_{ip})$ , labels  $(S_{ek})$ , bags  $(S_{qp})$  and other materials  $(S_{tm})$  to the number of flour products produced  $(M_{um})$ 

 $S_{bm}^{e} = (S_{ip} + S_{ek} + S_{qp} + S_{tm}): M_{um}$ 

7. Direct and indirect unit costs  $(X_{bb}^{e})$  are equal to the ratio of the sum of fuel  $(S_{yq})$ , spare parts  $(S_{eq})$ , construction materials  $(S_{qm})$ , various other materials  $(S_{bm})$ , expenses paid to suppliers and contractors  $(S_{mb})$ , wages  $(S_{is})$ , single social payment  $(S_{it})$ , depreciation of fixed assets  $(S_{am})$  and other expenses  $(S_{bs})$  to the total amount of flour produced  $(M_{um})$ .

 $X_{bb}{}^e = (S_{yq} + S_{eq} + S_{qm} + S_{bm} + S_{mb} + S_{is} + S_{it} + S_{am} + S_{bs}) : M_{um}$ 

8. The unit cost of production  $(T_{is}^{e})$  is equal to the sum of the unit cost of grain  $(D_{yq}^{e})$ , the ratio of the value of grain lost during transportation, storage and production  $(Q_{yb})$  to the flour products produced  $(M_{um})$ , and the sum of the unit direct and indirect costs  $(X_{bb}^{e})$ 

$$T_{is}^{e} = (D_{yq}^{e} + Q_{yb}) : M_{um} + X_{bb}^{e}$$

9. Other operating expenses  $(X_{bo}^{e})$  are equal to the ratio of the sum of land tax  $(SQ_{er})$ , water tax  $(SQ_{sv})$ , property tax  $(SQ_{ms})$ , other types of taxes  $(SQ_{bt})$  and other types of expenses  $(X_{bt})$  to the total flour products produced  $(M_{um})$ .

 $X_{bo}^{e} = (SQ_{er} + SQ_{ms} + SQ_{bt} + X_{bt}) : M_{um}$ 

10. The unit cost of production  $(X_{dr}^{e})$  is equal to the ratio of the sum of administrative and management costs  $(X_{mb})$ , selling costs  $(X_{rl})$  and other operating costs  $(X_{bo})$  to the total flour products produced  $(M_{um})$ .

 $X_{dr}^{\ e}=(X_{mb}+X_{rl}+X_{bo}):M_{um}$ 

11. Total unit production costs  $(X_{um}^{e})$ , unit production cost  $(T_{is}^{e})$ , unit period costs  $(X_{dr}^{e})$  and the ratio of financial activity costs  $(X_{mf})$  to flour products produced  $(M_{um})$  is equal to the sum of  $X_{um}^{e} = T_{is}^{e} + X_{dr}^{e} + (X_{mf} : M_{um})$ 

12. The unit of gross profit  $(F_{ux}^{e})$  is equal to the unit of the difference between the unit of wholesale price of the product  $(Q_{ss}^{e})$  (excluding value-added tax) and the unit of total costs  $(X_{um}^{e})$ .

$$F_{ux}^{e} = Q_{ss}^{e} - X_{um}^{e}$$

13. Profit tax  $(S_{fs}^{e})$  is equal to the ratio of profit before tax  $(F_{ts})$  multiplied by the profit tax rate  $(F_{ts})$  to the amount of flour produced  $(M_{um})$ .

 $S_{fs}^{\ e} = (F_{ts} \ast F_{ss}) : M_{um}$ 

14. Value Added Tax ( $Q_{qs}$ ) is equal to the product sold ( $M_{rq}$ ) multiplied by the tax rate ( $S_{qs}$ )  $Q_{qs} = M_{rq} * S_{qs} / (S_{qs} + 100)$ 

15. The unit of the wholesale selling price of the product (including VAT)  $(Q_{uq}^{e})$  is the wholesale price of the product  $(Q_{ss})$  (excluding VAT) plus VAT  $(Q_{qs})$  is equal to the ratio of the difference in flour products produced  $(M_{um})$ 

 $Q_{uq}^{e} = (Q_{ss} - Q_{qs}) : M_{um}$ 

16. Net profit unit  $(F_{sf}^{e})$  equal to the ratio of the difference between the unit of profit of general economic activity  $(F_{ux}^{e})$  and the profit before tax  $(F_{ts})$  to the number of flour products produced  $(M_{um})$ 

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 $F_{sf}^{e} = F_{ux}^{e} - F_{ts}: M_{um}$ 

17. Rate of return:

17.1. The level of profitability relative to the cost of production ( $R_{ut}$ ) is expressed as the ratio of the net profit unit ( $F_{sf}^{e}$ ) to the cost of production unit ( $T_{is}^{e}$ ):

 $R_{ut} = F_{sf}^{e} * 100 / T_{is}^{e}$ 

17.2 The level of profitability ( $R_{ix}$ ) relative to total costs is expressed as the ratio of net profit ( $F_{sf}^{e}$ ) to total costs ( $X_{um}^{e}$ ):

 $R_{ix} = F_{sf}^{e} * 100 / X_{um}^{e}$ 

18. Accounting and cost calculation of production costs of flour products

conditions are expressed in the form of the following inequalities:

 $D_{uq}^{e} < D_{tq}^{e}; M_{qq}^{e} < D_{tq}^{e}; T_{is}^{e} > X_{be}^{e}; X_{um}^{e} > T_{is}^{e}; F_{sf}^{e} < F_{ux}^{e}$ 

**II.**Algorithms for keeping track of the costs of production of fodder products in grain processing enterprises and calculating the cost of products were developed in the following order:

1. Unit of total cost of raw materials  $(Q_{xa}^{e})$  bran  $(X_{kp})$ , chaff  $(X_{tr})$ , corn grain  $(X_{md})$ , flour  $(X_{un})$ , barley  $(X_{ar})$ , wheat waste (70 - 85%)  $(X_{ch})$ , wheat waste (50 - 70%)  $(X_{sh})$ , lime flour  $(X_{ou})$  and mechanical losses  $(X_{my})$  are equal to the ratio of the sum of the prices of each of them to the produced compound feed products  $(M_{oe})$ 

 $Q_{xa}^{e} = (X_{kp} * b_{kp} + X_{tr} * b_{tr} + X_{md} * b_{md} + X_{un} * b_{un} + X_{ar} * b_{ar} + X_{ch} * b_{ch} + + X_{sh} * b_{sh} + X_{ou} * b_{ou} + X_{my}) : M_{oe} * b_{my}$ 

where  $b_{kp}$ ,  $b_{tr}$ ,  $b_{md}$ ,  $b_{un}$ ,  $b_{ar}$ ,  $b_{ch}$ ,  $b_{sh}$ ,  $b_{ou}$ ,  $b_{my}$  are the prices of raw materials

2. The unit cost of production  $(T_{ic}^{e})$  is the total cost of raw materials  $(Q_{xa}^{e})$  is equal to the ratio of the sum of auxiliary materials  $(S_{ym})$ , electricity consumption  $(S_{ee})$ , railway costs  $(X_{ty})$ , car costs  $(X_{av})$ , internal transportation costs  $(X_{it})$ , spare parts  $(S_{eq})$ , wages  $(S_{is})$ , single social payment  $(S_{it})$ , depreciation of fixed assets  $(S_{am})$ , equipment maintenance costs  $(X_{us})$  and other costs  $(S_{bs})$  to the produced compound feed products  $(M_{oe})$ 

 $T_{ic}^{\ e} = Q_{xa}^{\ e} + (S_{ym} + S_{ee} + X_{ty} + X_{av} + X_{it} + S_{eq} + S_{is} + S_{it} + S_{am} + X_{us} + S_{bs}) : M_{oe}$ 

3. Other operating expenses unit  $(X_{bo}^{e})$  is equal to the ratio of the sum of land tax  $(SQ_{er})$ , water tax  $(SQ_{sv})$ , property tax  $(SQ_{ms})$ , other types of taxes  $(SQ_{bt})$  and other types of expenses  $(X_{bt})$  to the total amount of compound feed produced  $(M_{oe})$ .

 $X_{bo}^{e} = (SQ_{er} + SQ_{ms} + SQ_{bt} + X_{bt}) : M_{oe}$ 

4. The unit cost of the period  $(X_{dr}^{e})$  is equal to the ratio of the sum of administrative and management costs  $(X_{mb})$ , selling costs  $(X_{rl})$  and other operating costs  $(X_{bo})$  to the total amount of compound feed produced  $(M_{oe})$ .

$$X_{dr}^{e} = (X_{mb} + X_{rl} + X_{bo}) : M_{oe}$$

5. Total unit production costs  $(X_{um}^{e})$ , unit production cost  $(T_{is}^{e})$ , unit period costs  $(X_{dr}^{e})$  and the ratio of financial activity costs  $(X_{mf})$  to the total feed produced  $(M_{oe})$  is equal to the sum of  $X_{um}^{e} = T_{is}^{e} + X_{dr}^{e} + (X_{mf} : M_{oe})$ 

6. The unit of gross profit  $(F_{ux}^{e})$  is equal to the unit of the difference between the unit of wholesale price of the product  $(Q_{ss}^{e})$  (excluding value-added tax) and the unit of total costs  $(X_{oe}^{e})$ .

 $F_{ux}^{\ e} = Q_{ss}^{\ e} - X_{oe}^{\ e}$ 

7. Profit tax  $(S_{fs}^{e})$  is equal to the ratio of profit before tax  $(F_{ts})$  multiplied by the profit tax rate  $(F_{ss})$  to the flour products produced  $(M_{oe})$ 

 $\mathbf{S_{fs}}^{e} = (\mathbf{F_{ts}} * \mathbf{F_{ss}}): \mathbf{M_{oe}}$ 

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8. Value Added Tax ( $Q_{qs}$ ) is equal to the product sold ( $M_{rq}$ ) multiplied by the tax rate ( $S_{qs}$ )  $Q_{qs} = M_{rq} * S_{qs} / (S_{qs} + 100)$ 

9. The unit of the wholesale selling price of the product (including VAT)  $(Q_{uq}^{e})$  is the wholesale price of the product  $(Q_{ss})$  (excluding VAT) plus VAT  $(Q_{qs})$  is equal to the ratio of the difference in the produced compound feed products  $(M_{oe})$ 

$$Q_{uq}^{e} = (Q_{ss} - Q_{qs}) : M_{ot}$$

10. Net profit unit  $((F_{sf}^{e}))$  equal to the ratio of the difference between the unit profit of the general economic activity  $(F_{ux}^{e})$  and the profit before tax  $(F_{ts})$  to the amount of compound feed produced  $(M_{oe})$ 

 $F_{sf}^{e} = F_{ux}^{e} - F_{ts}$ : M<sub>oe</sub>

11. Rate of return:

11.1. The level of profitability relative to the cost of production  $(R_{ut})$  is expressed as the ratio of the net profit unit  $(F_{sf}^{e})$  to the cost of production unit:

 $R_{ut} = F_{sf}^{e} * 100 / T_{is}^{e}$ 

11.2. The level of profitability ( $R_{ix}$ ) relative to total costs is expressed as the ratio of net profit ( $F_{sf}^{e}$ ) to total costs ( $X_{oe}^{e}$ ):

 $R_{ix} = F_{sf}^{e} * 100 / X_{oe}^{e}$ 

12. The conditions for accounting and cost calculation of production costs for dry fodder products are expressed in the form of the following inequalities:

$$T_{is}^{e} > X_{be}^{e}; X_{oe}^{e} > T_{is}^{e}; F_{sf}^{e} < F_{ux}^{e}$$

Thus, these models and algorithms allow us to use them as a rule for calculating the cost of production and expressing the cost calculation for a certain period (month, quarter, year). Their typical conditions are summarized and systematized, taking into account both quantitatively and qualitatively, proportionally to the planning period.

#### **2.** Discussion and Results

In the context of artificial intelligence technologies, the development of management decisions related to the accounting of product production costs and costing involves comparing two or more options in solving problems and choosing the optimal one. This requires the development of functional, software, information support and other measures for conducting empirical research on computers.

Functional maintenance is based on the models and algorithms of the production program, taking into account the features of cost calculation and accounting of production costs in grain processing enterprises. The relationship between them is based on a single database.

In information processing, the results entered into the information source and printed are divided into separate groups. The information entered into memory forms a set of information related to the accounting of product production costs and cost calculation [1; 459 - 471].

Based on the data in the computer memory, the system of accounting for product production costs and cost price calculation indicators is analyzed. Based on the results obtained from the calculation iterations in the study, a decision is made to continue or terminate the experiment. Based on the principle of systematic information and logical connections of the problem, we have developed a scheme for assessing the effectiveness of accounting for product production costs and cost price calculation at grain processing enterprises based on functional, software and information support (Figure 1).



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# Fig. 1. A mechanism for keeping track of product production costs and evaluating cost calculations

To effectively manage the accounting of production costs and cost calculation of products, it is possible to calculate complex production costs for individual types of grain products and estimate cost calculation through scenarios developed in the framework of the project. In this case, if the results achieved when managers at different levels access the information database

ISSN: 2249-7137

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are not satisfactory, the procedure is repeated until a positive result is achieved, and decisions on alternative options are compared.

**Tab. 1.** Calculation of production costs and unit cost of flour products at "Dostlikgrainproducts" JSC according to the scenario\* (sum/ton)

Indicators		Scenarios			
mulcators	Actually	1	2	3	
Production volume of flour products, tn	1	1	1	1	
Amount of grain to be consumed, tn	43509,12	43509,12	43509,12	43509,12	
Wholesale price of grain	55,70	55,70	55,70	55,70	
Initial wholesale value of grain	1797826,0 0	2423253,02	2423253,02	2423253,02	
Transportation costs - total	87493,98	88368,92	89243,86	90118,80	
from this:					
a) railway costs	0,00	0,00	0,00	0,00	
b) car expenses	44950,99	45400,50	45850,01	46299,52	
c) domestic transportation costs	15575,99	15731,75	15887,51	16043,27	
g) savings percentage	26967,00	27236,67	27506,34	27776,01	
The total cost of the grain, including transportation costs	1885320,0 9	2511621,95	2512496,89	2513371,83	
Additional products - total	320169,01	323370,70	326572,39	329774,08	
from this:					
a) bran	292100,99	295022,00	297943,01	300864,02	
b) grain waste	28068,02	28348,70	28629,38	28910,06	
The total value of grain after the separation of by-products	1565151,0 8	1580802,59	1596454,10	1612105,61	
Grain value lost in transportation, storage and production	57507,00	58082,07	58657,14	59232,21	
Direct and indirect costs	416071.00	420231 72	424392.43	428553 14	
Fuel	2533.00	2558.33	2583.66	2608.99	
Spare parts	13927.00	14066.27	14205.54	14344.81	
Building materials	2004.00	2024.04	2044.08	2064.12	
Other materials - total	65862.00	66484.26	67142.52	67800.78	
from this:	,				
a) vitamin	28379.00	28662,79	28946,58	29230,37	
b) thread	250,00	252,50	255,00	257,50	
c) label	1105,00	1116,05	1127,10	1138,15	
d) sack	31143,00	31454,43	31765,86	32077,29	
e) others	4949,00	4998,49	5047,98	5097,47	
Expenses paid to suppliers and contractors	52825,00	53353,25	53881,50	54409,75	
from this:	· · · · ·	, , , , , , , , , , , , , , , , , , ,	,	, , , , , , , , , , , , , , , , , , ,	
a) electricity costs	39461,00	39855,61	40250,22	40644,83	
b) water costs	510,00	515,10	520,20	525,30	
c) gas costs	0,00	0,00	0,00	0,00	
d) others	12854,00	12982,54	13111,08	13239,62	

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	1	1		
Salary	187992,00	189871,92	191751,84	193631,76
Single social payment	22559,01	22784,60	23010,19	23235,78
Depreciation of fixed assets	68405,00	68405,00	68405,00	68405,00
Production cost - total	2038729,0	2059116,38	2079503,67	2099890,96
	9			
Period expenses - total	95681,86	96068,48	96455,10	96841,72
from this:				
a) administrative expenses	13648,00	13784,48	13920,96	14057,44
b) selling expenses	25014,00	25264,14	25514,28	25764,42
c) other operating expenses	57019,86	57019,86	57019,86	57019,86
from this:				
land tax	11337,00	11337,00	11337,00	11337,00
water tax	114,00	114,00	114,00	114,00
property tax	8301,00	8301,00	8301,00	8301,00
other expenses	37267,86	37267,86	37267,86	37267,86
Costs of financial activity	5064,00	5064,00	5064,00	5064,00
from this:				
loan interest	5064,00	5064,00	5064,00	5064,00
Total production costs - everything	2139474,9	2160249.96	2191022 77	2201706 69
	5	2100248,80	2181022,77	2201790,08
The benefit of the general economic activity	21395,05	22229,84	23064,63	23899,42
Profit before income tax	3209,26	3334,48	3459,69	3584,91
The wholesale value of the product	2160870,0	2192479 70	2204097 40	2225606 10
	0	2182478,70	2204087,40	2223090,10
Value added tax	570608,75	576314,84	582020,93	587727,01
Wholesale price of flour products (including	2731478,7	2759702 54	2796109 22	2012422 11
value added tax)	5	2130193,34	2780108,33	2013423,11
Net profit	18185,79	18895,36	19604,93	20314,50
Cost-effectiveness	0,89	0,92	0,94	0,97
Cost-effectiveness	0,85	0,87	0,90	0,92

According to the information in table 1, according to the scenarios, 2139474,95 soums, 2160248,86 soums, 2181022,77 soums and 2201796,68 soums may be spent on production costs at the enterprise for the preparation of 1 ton flour product unit. The cost of the product unit is 2038729,09 soums, 2059116,38 soums, 2079503,67 and 2099890,96 soums, respectively. As a result, the company's net profit from 1 ton of flour product is 18185,79 soums, 18895,36 soums, 19604,93 soums and 20314,50 thousand soums, respectively; the rate of return on cost is 0,89%, 0,92%, 0,94% and 0,97%; the rate of return on production costs increases by 0,85%, 0,87%, 0,90% and 0,92%.

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# Table 2. Calculation of production costs and unit cost of products according to the scenarios of fodder products at "Dostlikgrainproducts" JSC

(in soums/kg)

Indicators		Scenario			
	Actually	1	2	3	
Production volume of dry fodder	1	1	1	1	
products, tn	1	1	1	1	
Consumption of raw materials - total, tn	101,00	101,00	101,00	101,00	
a) bran, tn	54,44	54,44	54,44	54,44	
b) thus, tn	2,23	2,23	2,23	2,23	
c) corn grain, tons	0,00	0,00	0,00	0,00	
d) flour, tons	2,93	2,93	2,93	2,93	
d) lime flour, tons	2,00	2,00	2,00	2,00	
e) wheat waste (70-85%), th	1,41	1,41	1,41	1,41	
or) wheat waste (50-75%), tn	28,28	28,28	28,28	28,28	
g) barley, tn	4,90	4,90	4,90	4,90	
Price of raw materials:					
a) bran	925,45	934,70	943,96	953,21	
b) way	2200,00	2222,00	2244,00	2266,00	
c) corn kernels	3043,48	3073,91	3104,35	3134,78	
d) flour	1130,00	1141,30	1152,60	1163,90	
d) lime flour	390,00	393,90	397,80	401,70	
e) wheat waste $(70 - 85\%)$	876,16	884,92	893,60	902,44	
or) wheat waste $(50 - 75\%)$	626,16	632,42	638,68	644,94	
g) barley	2825,00	2853,25	2881,50	2909,75	
Cost of raw materials:					
a) bran	503804,64	508842,68	513931,11	519070,42	
b) way	26664,00	26930,64	27199,95	27471,95	
c) corn kernels	175213,03	176965,16	178734,81	180522,16	
d) flour	33097,70	33428,68	33762,96	34100,59	
d) lime flour	7878,00	7956,78	8036,35	8116,71	
e) wheat waste $(70 - 85\%)$	12388,86	12512,75	12637,88	12764,25	
or) wheat waste $(50 - 75\%)$	177078,05	178848,83	180637,32	182443,69	
g) barley	139809,25	141207,34	142619,42	144045,61	
Mechanical losses – 1%	0,00	0,00	0,00	0,00	
Total cost of raw materials	1075934,52	1086692,86	1097559,79	1108535,38	
Electricity	6696,00	6762,96	6829,92	6896,88	
Transportation costs - total	4967,46	5017,13	5066,81	5116,48	
from this:					
a) railway costs	0,00	0,00	0,00	0,00	
b) car expenses	3356,25	3389,82	3423,38	3456,94	
c) domestic transportation costs	1611,21	1627,32	1643,43	1659,54	
Spare parts	6800,10	6868,10	6936,10	7004,10	
Salary	76146,00	76907,46	77668,92	78430,38	

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Single social payment	9137,2	9228,90	9320,27	9411,65
Storage of equipment	14152,53	14152,53	14152,53	14152,53
Depreciation of fixed assets	19686,96	19686,96	19686,96	19686,96
Other expenses	15955,79	15955,79	15955,79	15955,79
Production cost - total	1229475,88	1241272,68	1253177,08	1265190,15
Period expenses - total	104035,58	104035,58	104035,58	104035,58
from this:				
a) administrative expenses	15743,68	15743,68	15743,68	15743,68
b) selling expenses	3938,58	3938,58	3938,58	3938,58
c) other operating expenses	84353,32	84353,32	84353,32	84353,32
from this:				
land tax	3232,35	3232,35	3232,35	3232,35
water tax	0,00	0,00	0,00	0,00
property tax	4092,00	4092,00	4092,00	4092,00
other expenses	77028,96	77028,96	77028,96	77028,96
Costs of financial activity	3577,58	3577,58	3577,58	3577,58
Total production costs - everything	1337089,03	1348885,84	1360790,24	1372803,31
The benefit of the general economic	63055,97	65260,61	67497,68	69767,49
activity				
Profit before income tax	9458,00	10404,23	11350,07	12295,91
The wholesale value of the product	1400145,00	1414146,45	1428287,91	1442570,79
Value added tax	210021,75	212121,97	214243,19	216385,62
The wholesale value of the	1610166 75	1626268 12	1642531 10	1658956 /1
product(including value added tax)	1010100,75	1020208,42	1042331,10	1038930,41
Net profit	53597,57	54856,38	56147,60	57471,57
Cost-effectiveness	4,36	4,42	4,48	4,54
Cost-effectiveness	4,01	4,07	4,13	4,19

According to the information in table 2, according to the scenarios, 1337089.03 soums, 1348885.84 soums, 1360790.24 soums and 1372803.31 soums may be spent on production costs for the production of 1 kg of fodder product at the enterprise. The unit cost of 1 kg of fodder product is 1229475.88 soums, 1241272.68 soums, 1253177.08 and 1265190.15 soums, respectively. As a result, the net profit from 1 kg of fodder product in the enterprise is 53597.57 soums, 54856.38 soums, 56147.60 soums and 57471.57 thousand soums, respectively; the rate of return on cost is 4.36%, 4.42%, 4.48% and 4.54%; the rate of return on production costs increases by 4.01%, 4.07%, 4.13% and 4.19%.

So, "Dostlikgrainproducts" JSC products According to empirical studies conducted at the jointstock company, the increase in the net profit of flour products from 0.89% to 0.97% and the net profit of compound feed products from 4.36% to 4.54% at the enterprise has a positive effect on the trend of increasing the volume of flour and compound feed products, and creates a positive trend in increasing the economic efficiency of the activity, and the impact of the cost factor on the trend of product production leads to an increase in the volume of products.

Now, with the help of artificial intelligence technologies and scientifically based optimal decision-making method, mid- and long-term forecast indicators until 2030 are presented for the

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financial strategy of distribution of production costs and cost calculation management of flour and coarse feed products of "Dostlikgrainproducts" JSC.

# Tab. 3. Retrospective and forecast indicators on the distribution of complex production costs of flour and feed products of "Dostlikgrainproducts" JSC<sup>\*\*\*</sup>

	Flour prod	ucts, one th	ousand sour	ns	Fodder prod	luct, thousar	nd soums	
	Flour	Producti	General	Net	Eat	Producti		
Year	volume	oncost	expenses	profit	carefully.	on cost	Comorol	Not
	of		_		volume of		General	Net
	producti				production		expenses	profit
	on				1			
2011	5790948	4272313	4483438	264010	10201201	1606175	1746753	700101
	7	8	9	364019	18291291	0	7	/00191
2012	5699708	4205000	4412799	250202	10002000	1580868	1719232	690150
	4	6	3	536265	18003099	5	3	089139
2013	5949539	4518316	4741598	272000	19702215	1650161	1794590	710266
	3	9	8	5/3900	18/92213	5	1	/19300
2014	6030456	4445244	4664915	270004	10047709	1672604	1818997	720150
	0	4	3	379094	19047798	5	4	729150
2015	5982473	4408007	4625837	276059	19906240	1659296	1804524	722240
	2	2	9	370038	18896240	0	1	125549
2016	6195605	4662271	4892667	200455	10560440	1718410	1868812	740110
	8	3	0	389433	19309440	4	4	/49119
2017	6545119	4818492	5056608	411426	206 72416	1815351	1974238	701270
	9	6	3	411420	200 / 3410	5	2	/913/9
2018	6407209	4523884	4747441	402757	20227911	1777100	1932639	774704
	1	6	6	402737	20237811	6	4	//4/04
2019	6724364	4913889	5156719	422602	21220577	1865066	2028304	912052
	3	7	6	422095	21239377	6	6	815052
2020	6539478	4613364	4841343	411071	20655506	1813786	1972536	700607
	3	7	6	4110/1	20033390	7	4	/9009/
2021	6908517	5077506	5328422	121260	20154762	1769808	1924708	771525
	5	9	3	434209	20134702	1	6	111323
2022	7001218	4933724	5177529	110006	22802465	2090109	2273051	011150
	8	4	4	440090	23802403	0	3	911139
2023	7092164	4997808	5244785	115912	24170242	2106880	2291282	019490
	6	6	5	443813	24170342	0	4	916469
2024	7233543	5106546	5358895	454700	24170314	2052153	2231766	925241
	0	5	5			6	1	
2025	7392232	5177916	5433792	464675	24351702	2106715	2291103	932184
	6	6	2			1	0	
2026	7517237	5220736	5478727	472533	24900304	2153222	2341680	951575
	2	2	6			2	7	
2027	7670458	5308044	5570349	482164	25615827	2209408	2402784	978685
	5	1	7			7	8	

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2028	7825322	5377471	5643207	491899	26364837	2267717	2466197	1007054
	2	7	9			7	3	
2029	7946371	5423662	5691680	499508	27025721	2317748	2520607	1032041
	6	2	7			5	0	
2030	8078393	5501905	5773790	507807	27745853	2372277	2579908	1059285
	4	9	6			5	6	

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\*\*\*Compiled based on financial and statistical data of "Doslik Grain Products" JSC.

According to the information in table 3, the total costs for the production of flour products from 2024 to 2030 are from 53588955 thousand soums to 57737906 thousand soums, the cost of production is from 51065465 thousand soums to 55019059 thousand soums, and the net profit is from 454700 thousand soums to 507807 thousand soums. can increase. The total costs for the production of feed products can increase from 22317661 thousand soums to 25799086 thousand soums, the cost of production from 20521536 thousand soums to 23722775 thousand soums, and the net profit can increase from 925241 thousand soums to 1059285 thousand soums.

Figure 3 shows a graph based on forecast data on flour production for the period from 2024 to 2030. The graph shows that the flour production function has the form y = 19793x2 + 84023x + 6e7, the correlation between the function and the factors is  $R^2 = 0.9763$ ; the function on the cost of production has the form y = 683884x + 4e7, and the correlation between the function and the factors is  $R^2 = 0.9283$ ; the function on total production costs has the form y = 651682x + 4e7, and the correlation between the function and the factors is  $R^2 = 0.9283$ ; the function on total production costs has the form y = 651682x + 4e7, and the correlation between the function and the factors is  $R^2 = 0.9283$  [1; 459 - 471].



Fig. 2.	Forecast	of indicator	s of flour	products
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Figure 3 shows a graph based on forecast data on the production of mixed feed flour products for the period from 2024 to 2030. In the graph, the flour production function has the form y = 13367x2 + 239893x + 2e7, the correlation between the function and the factors is  $R^2 = 0.9588$ ; the function on the cost of production has the form y = 459461x + 2e7, and the correlation between the function on total production costs has the form y = 422483x + 1e7, and the correlation between the function and the factors is  $R^2 = 0.9419$ ; the function and the factors is  $R^2 = 0.9419$ .



#### Fig. 3. Forecast of performance of dry feed products

Figure 4 shows a graph based on the forecast data for net profit on flour and compound feed products for the period from 2024 to 2030. In the graph, the net profit function for flour products has the form y = 503.78x2 + 9195.3x + 679528, the correlation between the function and the factors is  $R^2 = 0.9596$ ; the net profit function for compound feed products has the form y = 351053e0.0186x, and the correlation between the function and the factors is  $R^2 = 0.9851$ .



#### Fig.4. Forecast of net profit figures from flour and feed products

So, "Dostlikgrainproducts"**products**the joint-stock company has the opportunity to explore internal production resources, rationally use internal potential, increase the production volume of high-quality flour and compound feed products, and reduce overall costs in order to increase production efficiency and reduce costs.

ISSN: 2249-7137

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#### CONCLUSION

An empirical study conducted algorithms for the accounting of production costs and cost calculation of flour and compound feed products at grain processing enterprises were developed, the efficiency of a particular type of product was assessed, and a forecast for making scientifically based optimal decisions based on scenario forecast indicators was provided on the financial strategy for accounting of production costs per unit of flour and compound feed products and cost calculation management based on artificial intelligence technologies. According to the results of the study, compound feed products bring a larger amount of cash income to the enterprise compared to flour products and increase the amount of net profit.

Keeping track of production costs per unit of flour and fine feed products based on artificial intelligence technologies and making scientific-based optimal decisions on the basis of scenario forecast indicators for the financial strategy of cost calculation management, searching for internal reserves of production to reduce costs, increasing the production volume of quality flour and fine feed products provides an opportunity to increase the economic efficiency of the enterprise.

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