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CALCULATION OF PRODUCTION COSTS AT GRAIN PROCESSING ENTERPRISES OF THE REPUBLIC OF KAZAKHSTAN

The article describes the method of calculating the cost of flour, grains and animal feed as the most important indicators of economic efficiency of production and financial performance. Method of production costs grouped by calculation items and elements per 1 ton of product is presented.
Keywords: *costs; production costs; cost calculation.*

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КАЛЬКУЛЯЦІЯ ВИРОБНИЧИХ ВИТРАТ НА ЗЕРНОПЕРЕРОБЛЮВАЛЬНИХ ПІДПРИЄМСТВАХ РЕСПУБЛІКИ КАЗАХСТАН

У статі розглянуто методику розрахунку собівартості борошна, круп та комбікормів як найголовніших показників, що визначають економічну ефективність виробничо-фінансової діяльності підприємства. Представлено методику обліку витрат на виробництво продукції за статтями калькуляції та за елементами в розрахунку на 1 т продукції.
Ключові слова: *витрати; собівартість продукції; калькуляція.*
Рис. 1. Табл. 4. Літ. 28.

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КАЛЬКУЛЯЦИЯ ПРОИЗВОДСТВЕННЫХ ЗАТРАТ НА ЗЕРНОПЕРЕРАБАТЫВАЮЩИХ ПРЕДПРИЯТИЯХ РЕСПУБЛИКИ КАЗАХСТАН

В статье рассмотрена методика расчета себестоимости муки, круп и комбикормов как важнейших показателей, характеризующих экономическую эффективность производственно-финансовой деятельности предприятия. Представлена методика учета затрат на производство продукции по статьям калькуляции и по элементам в расчете на 1 тонну продукции.
Ключевые слова: *затраты; себестоимость продукции; калькуляция.*

Problem statement. In today's conditions of Kazakhstan's economy a significant emphasis is on agriculture, including enterprises engaged in processing agricultural products, which include grain processing. Currently, domestic grain processing firms are at the stage of development and progress, fueled by gradual increase in production and export of crops, increasing public demand for high-quality products made from flour. However, there are some obstacles to further development of grain processing: fluctuations in market prices for grain, obsolete equipment and technology. As a result, grain processing enterprises need to reduce production costs through efficient use of production resources and increase the profitability of production.

Current system of accounting and internal control over production spending in grain processing firms is far from being perfect and does not meet today's requirements to firms management. The survey conducted on accounting and control of resources at several plants shows that current accounting system reflects expenses made in the past, and this does not allow timely monitoring of production spending

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and does not correspond to efficient production management requirements. Production cost accounting is carried out for the whole company, i.e. without proper organization of analytical accounting by places of origin and centers of responsibility. During the estimation of overheads, the methods of their separate estimation for different types of goods and particular factories is not determined, which makes it difficult to precisely calculate the efficiency of each factory separately and check for reliability of estimating production costs for different types of goods.

Literature review. Problems of cost accounting organization and calculation of production costs in the industry are reviewed in the works of K. Drury (2005), L.N. Gerasimova (2011), T.E. Gvarliani et al. (2007), G.N. Kazakov et al. (1971), K.K. Keulimzhayev and N.A. Kudaibergenov (2011), V.S. Levin (1990), G.M. Lisovich and I.Y. Tkachenko (2000), A.S. Margulis (1979), I.S. Matskevichyus (1997), J.K. Nurgazina (2014), P.F. Paliy (1987), B. Pikuren (2012), I.I. Poklad (1966), M.S. Pushkar (1991), O.B. Samoilenko (2000), J.K. Shim and J.G. Siegel (1996), V.T. Slabinsky (1982), S.A. Stukov (1990), K.T. Taygashinova et al. (2014), V.I. Tkach and M.V. Tkach (1994), M.A. Vahrushina (2000), A. Yarugova (1991). Theoretical aspects of the organization of production cost accounting at grain-processing enterprises have not been previously studied, accounting problems and control of individual cost items are not developed either: accounting and distribution overheads; calculating the cost of flour, grains, animal feed. All of the aforementioned issues, as well as the lack of theoretical and practical elaboration of issues have led us to the choice of this topic.

The research objective. Research objective is consideration the method of calculating the cost of flour, cereals and animal feed as the most important indicators of the level of economic efficiency of production and financial performance. And also reflected methods of accounting production costs grouped under calculation and elements per 1 ton of product are reflected.

Key research findings.

1. Choices of cost accounting methods. A significant emphasis is given by enterprises to the method of production costs calculation and pricing in general. Grain processing enterprises are not an exception. A uniform method of cost accounting and calculation does not exist. Issues related to cost accounting and production costs calculation (works, services) are investigated by many prominent domestic and foreign scholars such as: L.N. Gerasimova (2011), K.K. Keulimzhayev and N.A. Kudaibergenov (2011), G.M. Lisovich and I.Y. Tkachenko (2000), I.S. Matskevichyus (1997), V.F. Paliy (1987), I.I. Poklad (1966), M.S. Pushkar (1991), V.T. Slabinsky (1982), S.A. Stukov (1990), V.I. Tkach and M.V. Tkach (1994), A. Yarugova (1991).

The cost of flour, grains and animal feed is considered to be the most important indicator of economic efficiency of production and economic performance in general. Calculation of costs at the investigated companies is influenced by technical and economic factors that are associated with the rational use of material and labor resources. Therefore, proper organization of accounting and operational control of grain processing costs is necessary, basing on the reasonable approach to the choice of enterprise techniques and cost accounting system that will meet the requirements of management system.

Calculation is one of the elements of accounting methods. Currently, economic literature (Paliy, 1987; Yarugova, 1991; Nurgazina, 2014) gives the following definition: Calculation is a system of economic calculations of costs for certain types of products (works, services). In the process of costs calculation expenses should be commensurated with production volume and unit costs.

It is known that the choice of method for cost accounting calculation of production costs depends on the characteristics of a production technology, goals and objectives of management at grain processing enterprises.

In general, similarities and differences of cost accounting and costing are shown in Table 1.

Table 1. **Similarities and differences of cost accounting for production by the sectors of economy,** *compiled by the authors on the basis of studying the characteristics of production cost calculation*

Similarities and differences	Flour production	Animal feed production	Clothing industry	Cement production	Paper and packaging production	Construction industry	Polyethylene and polypropylene production	Mining (gold)	Leather production
1. Items costing	1	1	1	1	1	1	1	1	1
2. Costs that are included in the cost of production	0	0	0	0	0	0	0	0	0
3. Object of cost accounting	0	0	0	0	0	0	0	0	0
4. Object of calculation	0	0	0	0	0	0	0	0	0
5. Bills of cost accounts	1	1	1	1	1	1	1	1	1
6. Documentation	1	1	1	1	1	1	1	1	1
7. Types of calculation	1	1	1	1	1	1	1	1	1
8. The method of cost accounting and allocation of overheads	0	0	0	0	0	0	0	0	0

Note: 1 – similarity; 0 – differences.

Table 1 shows that the similarities are associated with common characteristics and rules of cost accounting, and specifics of production processes imposes changes on the method of cost accounting and directly affects its formation.

In the study of national accounting practices in grain processing, it was found that the most acceptable method of cost accounting is process costing. This method involves cost accounting and calculation of production costs by process stages, the quantity of which depends on technological processes, equipment, automation systems, and the nature of production in general. Thus, in grain processing there are several process stages such as grain drying, processing into flour, that is first goes elevator, second – mills and then – feed mills.

A number of economists stress (Slabinsky, 1982; Keulimzhayev and Kudaibergenov, 2011; Nurgazina, 2014) that "direct costs are included for each process stage and indirect – for the shop floor and manufacturing as a whole, followed by distribution between the cost of production of process stages according to adopted accounting policies".

Process costing is organized either for semi-finished, or for finished goods. The latter is used at grain processing plants in the production of all kinds, the reason for which is the simultaneous production of several species and varieties of flour, grains and animal feed. This is due to the fact that production process is in-line. Thus, during processing, from a certain quantity of grain mass several sorts of flour are obtained simultaneously in multigrade production. Based on this production process the quantity and quality of raw material is taken into account in operational records.

As any other cost accounting method, process costing and calculation of production cost has advantages and disadvantages. The advantages include the possibility of costing intermediaries after each stage of processing, which allows identifying cost overruns in production process and determining with great certainty the cost of semi-finished products sold on the side, the possibilities of organizing planning and accounting costs stages, and systematic identification of deviations of actual costs from current standards. When using finished goods version the actual cost of production is determined by the end of the reporting period, making it impossible to monitor the compliance of the actual costs of regulatory costs, by means of which production profitability is determined to establish sales prices (Samoilenko, 2000).

Thus, the main features of flour and animal feed production and the current system of drawing up recipes on products allow free use of process costing method combined with the elements of standard method of cost accounting and calculation of production costs.

2. Method of calculating the cost of flour production. Production costs are grouped under items costs and elements. The final grouping costs characterize their economic contents. Items costs are divided by areas, shops and the cost of 1 ton of product determined. This method of grouping is important for the control and analysis of cost reduction and has a considerable value in terms of determining the cost of a particular product type.

During the calculation of production costs at these enterprises units of calculation are (Resolution of the USSR Ministry of procurement, 13.01.1975, #398):

- in the flour industry – 1 ton of flour types and grades; bran and husking bran; 1 ton of packaged flour and cereals;
- on cereal plants – 1 ton of cereals of types and varieties, embryos, husking bran, regrind and broken rice, 1 ton of packaged cereals.

When calculating the production cost for grain processing enterprises production cost is determined by first grinding a whole, and then the production cost of 1 ton of flour and grains by species and varieties, bran, husking bran, embryo, regrind and broken rice.

Thus, these enterprises use the coefficient calculation method, the essence of which lies in the fact that the total cost is allocated between individual classes and types of products at a predetermined ratio.

In the flour industry costs for all products accounted for item costs are distributed across varieties of products in the following order:

a) the amount of conventional units for production of milling is determined (the number of each kind of product multiplied by the coefficient assigned);

b) the cost per standard units determined (the entire amount of costs of milling divided by the total amount of conventional units);

c) the cost of production of each class of products is determined (cost per standard unit multiplied by the number of conventional units of each class).

Conversion of products into a conventional unit is one of the features of the investigated companies. For example, at the JSC "Concern "Tsesna-Astyk" calculation of standard production units at 3 quality grinding of wheat is illustrated in Table 2.

Table 2. **Calculation of standard units of products,** *compiled on the basis of* (Resolution of the USSR Ministry of procurement, 13.01.1975, #398) *and own calculations*

Flour type	Quantity, t	Conditional factor	The amount of production
Flour of the highest grade	1036	7.1	7355.6
Flour of the first grade	1148	6.5	7462
Flour of the second grade	291	5.7	1658.7
Semolina	3.22	8.6	27.7
Bran	999	1.0	999
Total	3477.22	-	17503

For example, the total cost of milling production is 53,433,333.44 KZT. The cost of a conventional unit is 3052.81 (53,433,333.44 / 17503). Distribution by sorts is as follows (Table 3).

Table 3. **The cost price of the highest grade flour,** *compiled on the basis of* (Resolution of the USSR Ministry of procurement, 13.01.1975, #398) *and own calculations*

Flour type	Sum of conditional units of production	Grade prices at con. unit 3052.81 KZT	The actual weight of product, ton	Production cost of 1 ton, KZT
Flour of the highest grade	7355.6	23491300	1036	22675

Currently, products at flour and cereal plants are packaged into smaller packages than 10 years ago. Shallow container packaging is from 0.5 to 2 kg. In the studied plants where packaging of flour and cereals are put in small containers, calculations for packaging services are compiled. These calculations are made for each weight of flour or cereals (0.5, 1, 2 kg). Cost of packaging services for 1 ton of flour or cereals is determined by dividing the expenses by weight across the entire volume of packaged products of specific weight (Resolution of the USSR Ministry of procurement, 13.01.1975, #398).

Grain processing calculates the total cost of production by classifying costs into variable and fixed ones, but at the same time, a truncated cost, calculated on the basis of the cost of such a division is used to form the full cost calculation and sale price of products. Calculation of truncated cost for variable and fixed costs must conform to the principles of "direct costing" which does not imply the calculation of full cost.

Table 4 shows the calculation of full cost for the highest grade flour "Tsesna" at the manufactory "Concern "Tsesna-Astyk", July 2013.

In Figure 1, the calculated net cost of the highest grade wheat flour "Tsesna" produced by JSC "Concern "Tsesna Astyk" in July 2013 is illustrated.

Thus, using cost calculation subdivided into variable and fixed costs can strengthen monitoring and analytical capabilities to determine and analyze accounting and profit margins for each product.

Table 4. **Calculation of cost for highest grade flour, "Tsesna", July 2013,** *compiled by the author based on data from the financial statements of companies under study*

Index	Per 1 ton
1. Variable expenses:	**32689.1**
- raw materials and supplies	30073.9
- fuel, energy and water	1372.9
- packaging	948
- salary of personnel	215.7
- deductions from pay	78.6
2. Fixed expenses:	**7084.1**
- secondary materials	736.7
- salaries of employees	2033.3
- deductions from pay	382.5
- depreciation	3336.6
- utilities	304.6
- other expenses	290.4
3. Cost of flour production	**39773.2**
- administrative expenses	2008.04
- costs of product sales	754.4
- interest expenses	139.36
4. Net cost of flour	**42675**

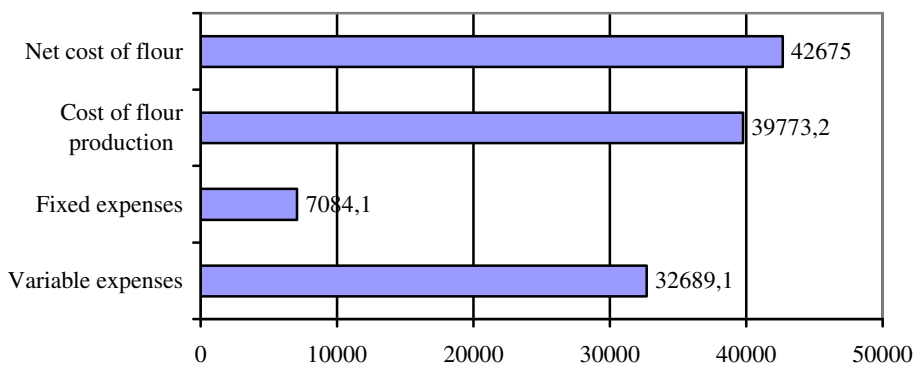

Figure 1. **The net cost of the highest grade wheat flour "Tsesna" split by variable and fixed expenses, July 2013, per 1 ton,** *compiled by the author based on data from the financial statements of companies under study*

Feed costs are determined by the same expenditure items as milling. Share of raw materials costs in production is similarly high (95–97%). The composition of animal feed includes other expensive components such as fish meal, vitamins, antibiotics, trace elements for their enrichment. Raw material costs are determined basing on the cost of the ingredients needed to produce 1 ton of feed, taking into account the natural decrease caused by the limits established at feed enterprises.

Expenditures on other items of production cost of animal feed and separately on premixes for production are distributed according to the prescription of these products proportionally to their number.

The cost of 1 ton of animal feed, feed mixes, PVA and premixes are determined by summing the costs of raw materials and expenses a certain the period (Kazakov et al.,1971).

Calculation units at feed producing enterprises are: 1 ton of loose feed, feed mixes, protein-vitamin additives, premixes and 1 ton of granulated feed, 1 ton of dirt. Calculations are drawn on each recipe of feed, feed mixes, protein-vitamin additives and premixes. In cases where animal feed is produced by unintended recipes, additional calculation is drawn for these recipes.

3. Results and discussion. For the organization of effective cost control for process stages during grain processing elements, we suggest using the standard method in terms of resources to ensure the effective use of main raw materials – grain, because production of flour, cereals and animal feed is material-intensive.

At grain processing enterprises for fully exploiting normative principles of cost accounting it is necessary to begin with the compilation of production program, which will be determined by consumption of raw materials, wages and overheads. Production program will serve as the basis for estimating production cost and definition of regulatory cost per 1 ton of production. In compiling the estimates several factors are taken into account such as production technology, engineering estimates and calculations, consumption forecast data, type and quality of materials used, net weight and wastes, standard time and costs for labor, overhead ratios.

Normative method (Poklad, 1966; Levin, 1990; Pikuren, 2012) of cost accounting is carried out with the unit of actual expenses for costs within the existing norms, deviation from them and changing norms are under separate control. One of important things is the precise organization of accounting irregularities and changes in regulations. It is necessary to organize the places of production costs, types of deviations from the norm, their causes, perpetrators, and the time of commission costs and summarize them in primary documents (reports). Norm changes are systematically prepared, so that there is a timely notification about new rules and terms of their implementation to comply with the norms of resource expenditures. In addition, the most important part of the standard method is to analyze the deviations from norms and standards changes according to shifts and the place of origin, causes and perpetrators, which helps to identify the areas of efficiency (inefficiency) and to take appropriate actions to address this problem.

It is believed that in order for the standard method of cost accounting and production costs calculation to become the basis for proper monitoring and analysis of raw material costs, proper calculation of actual production cost, monitoring compliance with and improvement of standards, terms of information on the expenditure of raw materials should be determined by decades or weeks. This will ensure timely identification of savings or additional costs owing to deviations from the process and changes in the composition of raw materials consumed; elimination of various losses and finding the ways to reduce costs.

Conclusion. Calculation is one of the elements of accounting methods and management system, not only for production cost, but also for production processes of an enterprise in general.

Investigation into the practices of production accounting and the process of cost formation in various sectors of the economy has demonstrated that for most organi-

zations it is typical to calculate full production cost, which includes all the resources spent on the entire production process.

Objects taken for accounting are: in the flour industry – millings; for cereals – types of processed grain; for animal feed – types of animal feed, PVA, premixes and feed mixtures. Organization of cost accounting by technological processes suggests the use of the process costing principles. In order to better control the costs of process stages during the processing of grain elements in terms of spending the main raw materials – grains, wages and other productive resources are to be used.

The use of the elements of the standard method of cost accounting will provide timely detection of savings or additional costs due to deviations from the processes and changes in the composition of consumed raw materials; elimination of various losses and finding new ways to reduce costs.

In the near future we will consider alternatives to the existing domestic approaches to calculating the cost as to determination of incomplete or truncated cost.

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