

PECULIARITIES OF COST MANAGEMENT: AGRICULTURAL ENTERPRISES UNDER NORMAL OPERATING CONDITIONS AND DURING THE CRISIS

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Abstract. The aim of the article is to investigate and formulate peculiarities of agricultural enterprises' cost management under normal operating conditions and during the crisis. The object of the research is the modification of the functional approach to the costs formation to determine the full cost of the resource on the base of its business processes passed. The analysis was based on the specifics of the agrosphere, including that one of the types of products is the main one (grain, root crops, marketable fish), the others are conjugate or secondary. A zonation of the production of marketable crop production has been formed. As a result of the research, the distribution of farms was carried out in accordance with the recommended zoning. It was discovered that the most promising method for achieving the maximum intensification of production, outstripping the growth of commercial output in comparison with the growth of production costs, is the improvement of equipment, technology and organization of production, breeding high-yielding varieties of agricultural crops and increasing the genetic potential of livestock and poultry. A method for the distribution of the main indicators of objective factors for reducing the cost of crop production and livestock industries is proposed.

The main results of the research can be applied in the practical activity of agricultural enterprises to minimize the risks of their functioning. Further research needs to address the general economic costs and their distribution by types of crop production, determination of the characteristic bases of distribution etc.

Keywords: costs, cost management, cost driver, agricultural companies, crisis management.

JEL code: G32, L65, M21, O13, Q14

Introduction

The exponential growth of the world's population correlates to a stark rise in the demand for food production and an unprecedented opportunity for agribusiness companies. World's agricultural sector recorded 39.4 % of the GDP in 2020 and in that 43 % of all exports include agriculture commodities. Productivity improvements will be key to feeding a growing global population – projected to reach 8.5 billion by 2030 – sustainably. For example, Ukraine's agribusiness sector remains the most promising sector of the economy. With 41.5 million hectares of agricultural land covering 70 % of the country and about 25 % of the world's reserves of black soil, agriculture is Ukraine's largest export industry. So, in 2020, Ukraine's agriculture sector generated approximately 9 % of GDP.

However, most agricultural enterprises in Ukraine have lost their sustainability, their ability to maintain optimal proportionality in the development of their production, to adapt to changing environmental conditions, especially when it's concerning with crisis facing. All this requires the introduction of an appropriate system improving the financial and economic sustainability of agricultural enterprises as the most important component of ensuring their competitiveness in the process of achieving strategic development goals not only of the owners, but also all society needs.

The most important indicator that affects the efficiency of production and economic activities of an agricultural enterprise or its structural units is the cost of agricultural products, which reflects the current costs associated with its production and distribution. Effective cost management is the tool of the

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management system, which can provide agricultural enterprise with a high economic result under normal operating conditions and help to survive even during the crisis.

The purpose of the article is to investigate and formulate peculiarities of agricultural enterprises' cost management under normal operating conditions and during the crisis. To achieve this aim, there are outlined several tasks: 1) to reveal the main directions of reducing production costs, zonation of the production of marketable crop production; 2) to formulate a method for the distribution of the main indicators of objective factors for reducing the cost of crop production and livestock industries. For achieving these goals, a set of methods are used in the paper: system analysis, synthesis, mathematical approach. Research findings are based on such information sources as scientific works of this field, statistical and analytical information from the agricultural enterprises and own conclusions. Novelty of the research is related with the formulating brief and consistent view of cost management aspects of managing an agricultural enterprise under the different conditions.

Literature review

There are many *scientific works* related to the cost management issues; however, only a small part of them are connected with agricultural enterprises or differences in cost management during the crisis and normal operating conditions. Firstly, it is necessary to concentrate on the works connected with crisis management and its peculiarities for agricultural enterprises.

A number of scientific works related to the aspects of managing an organization in a crisis conditions give us a good background for understanding that it is still important and there is no one common way to be successful for enterprises all the time. In this field it is worth mentioning such scientists as: Mikusova M. & Horvathova P. (2019) who identified the basic elements that must be taken into account when constituting the complete process of crisis management with the person/team responsible; Fedorkova K. (2018) who proposed to resolve the decline by the implementation of a company crisis management by using informal and formal procedures of a company crisis management; Zulkarnaini N. et al. (2020) who suggested that crisis management must be integrated with the high-level strategic integration between human resource development, organizational structure, culture, and strategy. Also, it is important to mention some other works in this direction such as Labeat M. (2015) (importance of managing crisis situations at the enterprise), Chupryna N. & Haievskyi V. (2017) (main aspects of crisis management system at the enterprise), Howell D. (2020) (complete guide to crisis management for every business). In authors' opinion, although these research works are well-grounded, their findings are rather general.

Crisis management is also closely connected with cost management. For instance, Dibrova A. et al. (2020) emphasized the importance of providing a strategy for improving financial support for agricultural enterprises' competitiveness.

Therefore, the authors studied a number of scientific works with valuable outputs and came to the conclusion that none of them had provided a brief and consistent view of cost management aspects of managing an agricultural enterprise under different conditions.

Research methodology

System analysis has been used for better understanding of the subject of this research, i.e., what cost management is; how crisis influenced cost management system; which cost management system is better for agricultural enterprises. Based on this analysis, several features have been identified in accordance with peculiarities of agricultural enterprises activity. Using *synthesis*, several conclusions were made to create

a clear concept of the cause-and-effect relationships between the results of agricultural enterprises activity and the way of its cost managing.

Using the *analysis*, a logical sequence of factors and their interrelationships was established within the entire process of cost management under different circumstances. The identified elements indicate the directions that need to be implemented at the agricultural enterprise for its stable functioning under different conditions.

Research results and discussion

The main purpose of the enterprise in market conditions is to increase the competitiveness of production and maximize its profit, the value of which is defined as the difference between income and current costs, so it is difficult to consider the role of costs and the need for its optimization. In this case, the analysis must consider the share of fixed and variable costs in the total costs of the enterprise, which will allow the company to optimize its costs depending on the activity needs.

Most thriving organizations have achieved their results through the introduction of an effective cost management system. However, it should be mentioned that reducing costs is an important task, but it shouldn't be the main purpose of cost management. The process of only reducing costs may be accompanied by decreasing the quality of manufactured products and customer service, abandonment of production that is in demand but requires significant costs for manufacturing.

One more thing that any management in a crisis also requires is financial costs. In this case, an enterprise will be faced with the challenge how to reduce costs or how to get profit. As a rule, they use such strategies as:

- reducing the production capacity;
- changing the schedule of employees working day, making use of the daylight hours;
- staff reduction. As an example, in Ukraine, one third of small and micro-businesses are reducing the number of employees during the Covid-19;
- reduction (closure) of sale points (which, among other things, provokes staff reduction also);
- reducing the number of purchases (materials, goods, raw materials etc.), which also provokes reducing the production capacity.

First of all, for example, in order to ensure the greatest efficiency for the main crops, it is necessary to determine the areas of various degrees of suitability in points, depending on the favourable conditions for the production and determine zonation of the production of commercial crop production (Table 1).

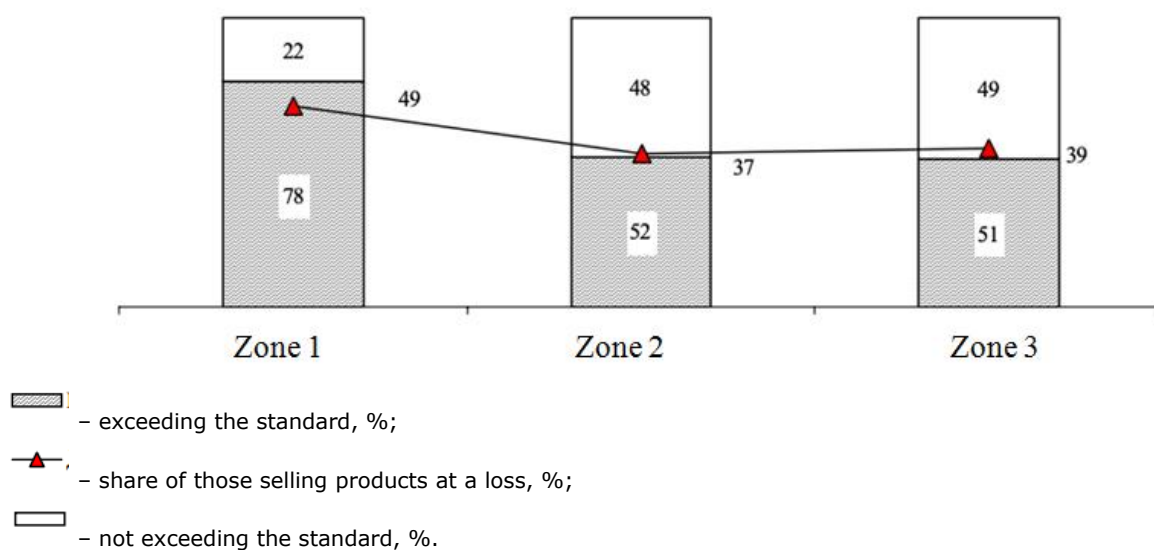
Table 1

World zoning of commercial crop production

Zonation		Condition level	Assessment, points	Characteristic
1	Favourable zone	With excellent conditions	Over 500	Meets the necessary requirements of culture in biological and agrotechnical terms.
2	Suitable zone	With good conditions	200-500	An area where not all biological requirements of crops are provided, but yields can still be obtained with high quality products.
3	Less suitable zone	With satisfactory conditions	10-200	Most biological requirements are not fully met, yields are much lower and product quality is worse.
–	Unusable zone	With unsatisfactory conditions	Less than 10	Yields are disastrously low and product quality leaves much to be desired.

Source: author's compilation based on the own analysis and Fitó-Bertran A. et al. (2018)

For better visualization, it is necessary to display the result in the form of a figure (Fig. 1).



Source: author's illustration based on Table 1

Fig. 1. World distribution of farms in accordance with the recommended zoning, %

Calculations indicate the existence of a close relationship between the number of farms in excess of the recommended level of production costs, and unprofitable selling these products.

However, nowadays crises can arise anytime – they can happen to any enterprise at any time (Howell D., 2020). It is also important to provide a complex embedded system analysis of early warning; that can help to see the features of the crises and make some preventive steps (Lin J., 2021). Crisis management plans are now very popular amongst corporations, large organizations, with 84 % having an individual strategy for their own peculiarities of activity. Deloitte (2020) found that availability of crisis management plans reduce financial fallout – less than a third of companies with a plan report a negative impact on financial performance compared to almost half of organizations without a plan. Therefore, in short, a solid crisis management plan expects the unexpected, which anyway can help at least at the beginning of a crisis

or in a way of reducing losses. Thus, implementation of the financial plan (based on effective cost management system) ensures continuous profitable activity of the enterprise (Bieliaieva N., 2017).

To face these challenges, agricultural enterprises should be innovative. This is viewed in the fact that such organizations use artificial intelligence (AI) – they put sensors in the fields, drones for crop monitoring, ever more potent or targeted chemical solutions and also the genetic modification of plants and even animals. The emergence of a new digital infrastructure, including wireless networks, mobile devices and technologies, contributes to a radical shift in information technologies, their integration into all manifestations of socio-political, economic life of society and even production cycle (Pimenova E., 2021).

Despite that digital technology will transform most industries, there are several challenges that need to be understood. These include factors such as the pace of changing customer expectations, cultural transformation, outdated regulation, and identifying and accessing the right skills, among others (Bieliaieva N. et al., 2021). Thus, it is necessary to integrate information technologies into enterprises activity in order to deal with the market development and keep all business processes under control (Ming L., 2011).

It is important to mention one peculiarity. If we are talking about agricultural enterprises, we are talking about agribusiness. The category agribusiness is actually related to farming, but agricultural enterprises (agribusiness companies) are not farms themselves. Instead, it just means any business related to agriculture, and allows a lot of leeway. For example, a company providing pesticides or agricultural machinery or even supplying seeds would be an agribusiness company. Most of the biggest agricultural enterprises have multiple businesses, with agriculture being a part of it. But is not a surprise how lucrative agriculture itself is, and can earn billions in revenue for these companies. Companies in multiple sectors are incorporating information technology partners to gain digital capabilities, improve their operations, and offer new value propositions. The digitalization deployment in well-established companies from traditional sectors enables the creation of specific strategic alliances (concentric) with IT providers (Fedorkova K., 2018).

The world's largest agribusinesses all the time develop methods to feed the world's seven billion humans while engaging with the sensitive food politics of the 21st century. The top ten agribusiness companies according to Sekulich in 2019 were: Cargill; DowDuPont; Archer Daniels Midland Company; Deere & Company (the USA); Bayer AG, BASF (Germany); CNH Industrial NV (the Netherlands); Nutrien (Formerly Agrium Inc. and PotashCorp) (Canada); Syngenta AG (Switzerland); Yara International (Norway).

Top Ukraine's largest agricultural landholders and their registered offices according to several information sources (Online rating, 2019; Pawlak K. et al., 2021) were: Kernel; IMC (Luxembourg); UkrLandFarming; MHP (Myronivsky Hliboproduct); Mriya; Agroton (Cyprus); Agroprosperis (New Century Holding) (USA); Ukrprominvest-Agro (Ukraine); AgroGeneration (France).

To determine the cost price more accurately, let's take an example. For this purpose, there are three processes and corresponding cost drivers, which form the basis for overhead distribution in marketing (Table 2).

Table 2

Processes and cost agents by ABC method after the example of Ukrainian agricultural enterprises

Processes	Cost driver	Value of cost driver				Total cost, USD	Cost of driver's unit, USD
		Total	including				
			Sunflower (1)	Corn (2)	Rapeseed (3)		
Order fulfilment	Number of orders	30	15	10	5	600	20
Rental	Square meter	300	100	70	130	4200	14
Delivery	Conventional t/km	80000	22000	25000	33000	20000	0.25
Total	x	x	x	x	x	24800	x

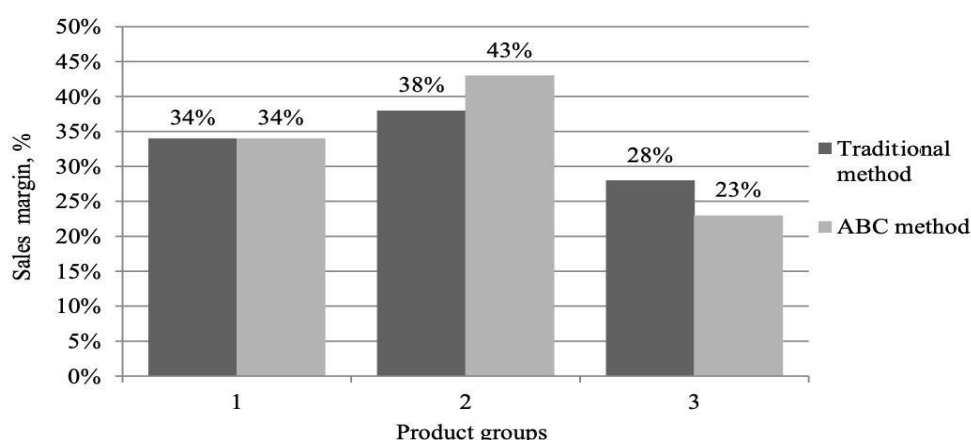
Source: author's calculations based on the own analysis and Pawlak K. et al. (2021)

The enterprise can reduce the cost of a unit of livestock production both by reducing the unit cost of feed (by 1 centner of milk, by 1 centner of weight gain, per 1000 eggs etc.), and by reducing the cost of feed produced on the farm. Based on a comparative assessment of feed, it is necessary to compose livestock feed rations from cost-effective feeds under the conditions of the enterprise in terms of the yield per 1 ha of feed units and digestible protein and their cost.

Among the reserves for reducing the cost of crop and livestock products, one should consider the reduction in labour costs due to the comprehensive mechanization of growing crops and automating the processes of obtaining livestock products. The low price of manual agricultural labour and the high cost of equipment in the absence of funds from enterprises for its purchase often make it ineffective to replace manual labour with mechanized ones.

According to ABC method, profit earned by each product group is different from the traditional method, which affects sales margin (Fig. 2).

It is worth noting that ABC method is rarely used by domestic enterprises. However, it is relevant for enterprises to have certain features of their activity: cyclical processes, which can be singled out, identified and formalized; wide range and different volumes of production as well as level of manufacturing complexity; business' strategic focus on cost optimization (Pushkar I., 2019).



Source: author's illustration based on Table 2

Fig. 2. Sales margin by outlined agricultural product groups in comparison with traditional and ABC methods

Thus, the authors have summarized the most important indicators of the objective factors of cost reduction in the agricultural sector, which are presented in Table 3.

Table 3

The main indicators of objective factors to reduce the cost of crop production and livestock industries

Cost reduction factors	Crop products	In livestock industries
Qualitative	Qualitative assessment of agricultural land in points.	Quality of livestock of a productive herd by average live weight of one head.
Quantitative	Equipping the enterprise with fixed assets per 100 hectares of agricultural land.	The level of feeding according to the annual consumption of feed on average per head, centners of feed units.
	Equipping enterprises with energy resources per 100 hectares of agricultural land in hp.	Cost price of 1 centner of feed units the annual ration of the productive herd; balance of feed in terms of digestible protein in kg per 1 centner of feed units.
	Provision of the enterprise with labour resources per 100 hectares of land.	Provision of the enterprise with labour resources based on the livestock of a productive herd.
Relative	The level of intensity of use of agricultural land by the specific value of all direct costs, including fertilizers per 100 hectares of land.	The level of concentration of production by the density of livestock of a productive herd per 100 hectares of agricultural land and per farm.
	The level of specialization of agriculture in terms of the specific value of proceeds from the sale of crop production in its total amount on the farm.	The level of specialization by the share of proceeds from the sale of the industry's products in the total proceeds of the farm.

Source: author's compilation based on the own analysis

Regarding the operating under the crisis conditions, this method also should be implemented by identifying important components (cost centres), agricultural enterprise do not need to reduce costs that are critical for its functioning. However, given the complexity of agricultural production, the company's managers must always link the obtained economic calculations, including the results of ABC analysis, with the actual agronomic conditions. Among the set of measures that can be used to transfer products from one class to another, it is worth noting a crop rotation as a way of alternating crops and steam in time and territory to obtain higher yields.

Conclusions

- 1) Reducing costs is an important task, but it should not be the main purpose of cost management. The process of only reducing costs may be accompanied by decreasing the quality of manufactured products and customer service, abandonment of production that is in demand, but requires significant costs for manufacturing. Among the reserves for reducing the cost of crop and livestock products, one should consider the reduction in labour costs due to the comprehensive mechanization of growing crops and automating the processes of obtaining livestock products.
- 2) Cost management of agricultural enterprises should be considered as an independent module in the system of economic management of the enterprise, the basis of which is the decision making process based on organizational and methodological system of formation, cost allocation and cost calculation of products in accordance with long-term goals at different levels of the agricultural enterprise.

- 3) In order to ensure the greatest efficiency for the main crops, it is necessary to determine the areas of various degrees of suitability in points, depending on the favourable conditions for the production and determine zonation of the production of commercial crop production
- 4) ABC method requires not only to determine the cost of marketable products of the agricultural enterprise, but also to manage costs for each type of product, in terms of structural units and the economy as a whole.
- 5) Given the complexity of agricultural production, the companies' managers must always link the obtained economic calculations, including the results of ABC analysis, with the actual agronomic conditions.

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