

STUDY ON THE COST AND PROFITABILITY OF MAIZE PRODUCTION IN DOROHOI-DARABANI AREA, BOTOȘANI COUNTY

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Abstract

Plant cultivation has been considered an important industry since ancient times, providing raw materials for various industries and, not least, food for the world's population. This study presents aspects related to the analysis of profitability and production costs for one of the most important crops, corn cultivation. The research aimed to analyse the profitability of corn production in representative farms in Botoșani county, in order to highlight the current situation and establish methods and strategies for action to increase performance and market position. A series of criteria were established for the identification of farms, among which we mention: the area in which they carry out their economic activity - the Dorohoi-Darabani area, the size of farms between 1500-2500 ha and a homogeneous structure of agricultural crops. As for the methodology used in the research, it was based on the diagnostic analysis of the expenditure made at the farm level in 2019-2020. Research results have shown that the profitability and costs of an enterprise are of great significance to it, because with the help of indicators such as variable cost, fixed cost, total cost per hectare, economic profitability, financial profitability, etc. can determine the position of the enterprise in relation to the competition.

Key words: cost analysis, maize, profitability, corn, rentability, crop production

The literature review concluded that profitability and costs are the most important factors for a farmer when it comes to farming. These two indicators are crucial for a farm because the value of costs tells us about managerial efficiency and with profitability we can identify when income exceeds expenditure, resulting in profit for the farm.

The authors Zhichkin and his collaborators have made a significant contribution to the field with their paper "The agricultural crops production profitability in modern conditions" written in 2020, which highlights important details on production profitability and its classification.

The profitability of production is determined by dividing the profit from sales by the total costs associated with the production and sale of products. It is essential to understand the distinction between real (actual) and methodologically estimated profitability.

The real (actual) return on investment is determined for assessing the financial viability of the costs paid and for systematic monitoring of the development of the investment. The estimated profitability is assessed during the planning and justification of the investment as well as during the execution of specific activities.

A well-structured point of view on the notion of profitability is presented by the specialists Natalia Tcaci and Alexandru in the paper "*Peculiarities of production profitability analysis in agricultural enterprises*". In this article, it is emphasized that the opportunity to increase profitability in agricultural units should be based on an understanding of the unique characteristics of certain processes and, of course, on the fundamental significance of factors acting on the production process with different weights.

One of the particularities of analyzing profitability in an agricultural enterprise is the use of the indicator profit per hectare of arable land or productive area, which is a categorical dimension of profitability. This can be explained by the fact that land is the basic source of production in agriculture.

All the inputs required in the technological flow to generate a product are expressed financially as costs. According to researcher Upadhyaya, there are a variety of meanings assigned to the word 'cost' in different contexts and by different researchers. Regardless of the production sector, such as an industry, a factory, a corporation, or a small group of farmers, the cost is presented as one of the most important challenges.

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Traditional theory divides expenditure into short-term and long-term costs according to the length of the period. In the short run, certain costs are fixed; typically, capital equipment and contracting are considered fixed in the short run. Total costs are divided into two categories in classical business theory: total fixed costs and total variable costs. All factors are considered to become changeable over time. The long-run cost curve is a planning tool because it guides the business owner in deciding how to prepare for a potential increase in output.

Several authors have challenged the cost curves of classical theory in modern theory, based on a priori theoretical and empirical arguments. Modern microeconomics divides expenditures into short-run costs and long-run costs, as in classical theory.

MATERIAL AND METHOD

This research paper aims to answer the following question: What is the practical approach to cost and profitability for crop agricultural production in the Dorohoi-Darabani area?

The study on cost and profitability is carried out with the help of economic information viewed from several perspectives. To support the analysis of the economic information there are figures, which in turn are found in three forms: relative, aggregate, and absolute.

Relative data highlight economic situations from a percentage point of view, and the following are taken into account: rate of return, gross profit rate, net profit rate, current assets rate, etc.

Aggregate data allow the analysis of economic phenomena as a whole, given the existence of a multitude of elements that are part of it. Among the indicators identified, the most important ones, which are also the purpose of the research, are economic profitability and the cost of crop production. This paper has analyzed the indicators mentioned above, from the moment of their formation, where we find their constituent elements, to their analysis as a whole.

The absolute data bring to the forefront of the analysis the defining notions related to the rural economy, among which we list just a few, namely: production, income, area, and expenditure. These types of data are of major importance because the research carried out makes the results identified plausible and can be subjected to analysis with a high degree of simplicity.

For good and correct documentation we have accessed the database of Science Direct, Google Scholar, and ResearchGate websites.

In the circumstances of the present work, several methods were applied, namely:

- Analysis of statistical indicators;
- Economic analysis.

The analysis of statistical indicators is important because it provides a broad framework for everything that means cost and profitability in a vegetable farm in Botoșani county, more precisely in the Dorohoi-Darabani area.

Economic analysis is the most widely used analysis because it is based on a series of methods, tools, techniques, and concepts. These guarantee the assessment of data and information referring to the economic situation of the North-East region of the country, which is analyzed with the help of cause-effect relationships.

In the case of each phenomenon under analysis, we have placed great importance on discovering all the components that led to the creation of the indicator, to obtain a comprehensive and plausible result. To make it easier to understand, we give an example of how the unit cost of production analysis is formed, starting from the area of the farm, average production, variable expenditure, fixed expenditure, and ending with the number of employees, seasonal or permanent workers, etc.

RESULTS AND DISCUSSIONS

As part of the analysis, expenses were classified to better see which expenses have a positive or negative impact on the cost of production. To do this, the following expenditure was analyzed:

- I. Analysis of variable costs;
- II. Analysis of fixed costs.

I. ANALYSIS OF VARIABLE COSTS

The variable costs encountered in a company are those costs that can change in line with the dynamics of production. This group has two categories of expenditure: direct and indirect. When variable costs, referred to as per unit per product, i.e. lei per kg, remain on a constant trajectory, they are called specific costs.

The analysis of variable costs was carried out for maize cultivation, all the amounts being obtained when calculating one hectare of arable land. *Table 1* below shows the results of the analysis of variable costs per hectare.

Table 1

Variable costs per HA for maize

Agricultural works	U.M.	VALUE OBTAINED		
		FARM 1	FARM 2	FARM 3
Ploughing	Lei/ha	105.8	125.0	96.8
Fertilisation	Lei/ha	1,134.5	1,050.3	1,250.6
Sowing	Lei/ha	396.8	406.5	391.3
Plant treatment	Lei/ha	508.3	490.3	510.6
Mechanical slinging	Lei/ha	27.6	30.4	24.5
Harvesting	Lei/ha	396.4	410.2	391.4
Total variable costs per ha	Lei/ha	2,869.2	2,812.9	2,665.2

At first glance, it can be said that the three farms taken as a benchmark for the analysis of variable expenditure per hectare in maize cultivation are similar in terms of the amounts

obtained from the cultivation technology applied. The best-applied technology for maize cultivation is found in the case of FARM 2, where the variable expenditure reaches the value of 2.512.9 lei/ha.

On the other side with a not very pronounced difference of about 152 lei is identified the farm FARM 3, where it appears that although the technologies are similar, some expenses related to the crop were not managed and negotiated very well with suppliers, failing to obtain the necessary products at the lowest price.

The highest value obtained per work was fertilizer in all three cases, which shows that farmers put a lot of emphasis on chemical fertilizers.

II. ANALYSIS OF FIXED COSTS

Fixed costs are that category of costs that remain constant throughout the financial year regardless of the volume of production. This group includes several expenses such as promotion, overheads, and administration. When the fixed expenditure is reported on production lei/kg, it decreases as production increases.

The results of the analysis of fixed costs per hectare are shown in *table 2*.

Table 2

Fixed costs per HA for maize cultivation

INDICATORS	U.M.	VALUE OBTAINED		
		FARM 1	FARM 2	FARM 3
Amortization	Lei/ha	100	150	135
Rent	Lei/ha	500	550	600
Indirect work, TESA staff	Lei/ha	150	130	160
Financial costs, interest on long-term loans for the purchase of agricultural machinery	Lei/ha	150	140	100
Other indirect costs (distribution, overheads and administration)	Lei/ha	120	100	110
TOTAL FIXED COSTS PER HA	Lei/ha	1,020	1,070	1,105

Looking at the above table, we can see that the lowest value of fixed costs per hectare is recorded in the farm FARM 1, where the amount of 1,020 lei/ha was recorded. In the case of farm FARM 3, the situation is similar as in the case of variable expenses, i.e. it recorded the value of 1,105 lei/ha, which is also, in this case, the highest amount, comparing the 3 farms analyzed.

A factor leading to a lower total fixed expenditure is the payment of rent, which in the case of FARM 1 is the lowest amount, only 500 lei/ha, while the other two farms, FARM 2 and FARM 3, paid 550 lei/ha and 600 lei/ha respectively. Depreciation for fixed assets is 100 lei/ha for FARM 1, the lowest amount of all, compared to the other farms.

Even though FARM 3 has the lowest amount for financial expenses, interest on long-term loans taken out for the purchase of machinery, and FARM 1 is on the other side with 150 lei/ha, this does not influence the total fixed costs per hectare very much.

In addition to the two types of expenditure studied, another analysis carried out was that of the break-even point as shown in the table below.

Table 3

The break-even point for maize cultivation

INDICATORS	U.M.	Company name		
		FARM 1	FARM 2	FARM 3
Turnover	Lei	2,925,000	3,060,000	2,700,000
Fixed costs	Lei	1,510,000	1,535,000	1,552,500
Variable costs at 1.000 lei turnover	Lei	553.8	514.7	612.9
Unit selling price	Lei/kg	0.65	0.68	0.62
Variable unit cost	Lei/kg	0.36	0.35	0.38
Unit cost margin	Lei/kg	0.29	0.33	0.24
Break-even point	Kilograms	5,207	4,652	6,469

As can be seen from the results, the lowest threshold is recorded in FARM 2, with a value of 4,652 kilograms. In the case of profitability, a farm should have this value as low as possible, because from that point, it starts to produce profit. This is why FARM 2 is at the top of the league in this respect, as it uses a technology that allows it to have a low profitability threshold.

CONCLUSIONS

Many enterprises whose main activity is agriculture are based in the territory of Botoșani County. In this paper, an analysis of profitability and cost was carried out at the level of 3 firms in the Dorohoi-Darabani area, namely FARM 1, FARM 3, and FARM 2.

One of the most important reasons why it is necessary to calculate and analyze these indicators is to observe the weak points in the enterprise, followed by the identification of solutions that will lead to the maximization of profit and the minimization of expenses.

The best-applied technology for maize cultivation is found in the case of the FARM 2 farm, where the variable expenditure reaches the value of 2,511.5 lei/ha. On the other hand, with a not very pronounced difference of about 152 lei, the farm FARM 3 is identified, where it appears that although the technologies are similar, some expenses related to the crop have not been negotiated very well with suppliers, failing to obtain the necessary products at the lowest price.

The lowest value of fixed costs per hectare is recorded in FARM 1 farm, where the result is 1,020 lei/ha. In the case of farm FARM 3, the situation is similar to in the case of variable expenditure, i.e. it recorded the value of 1,105 lei/ha, which is also, in this case, the highest amount compared to the level of the 3 farms analyzed.

As can also be seen from the results, the lowest threshold is recorded in FARM 2, with a value of 4,652 kg. In the case of profitability, a

farm should have this value as low as possible, because from that point, it starts to produce profit.

Finally, the rate of return on permanent capital for FARM 1, FARM 2, and FARM 3, recorded the following values in the same order: - 1.07%, 11.28%, 4.80%. This indicator expresses the value of the gain obtained by enterprises from the long-term invested capital.

In conclusion, the data obtained showed that FARM 2 is more economically profitable than FARM 3 and FARM 1, representing a benchmark.

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REFERENCES

- Restuccia D., Tao Yang D., Zhu X., 2008** - *Agriculture and aggregate productivity: A quantitative cross-country analysis*, *Journal of Monetary Economics*, 55:234-250.
- Rickards L., Howden S.M., 2012** - *Crop and Pasture Science* 63(3): 240-250 (2012).
- Tcaci N., Alexandru, 2009** - *Peculiarities of production profitability analysis in agricultural enterprises*, *Academia de Studii Economice din Moldova*.
- Upadhyaya, 2016** - *Theory of cost, cost addition and cost leadership approach, application of production, and marketing cost in agriculture*.
- Zhichkin K., Nosov V., Zhichkina L., Dibrova Zh., Cherepova T., 2019** - *IOP Conference Series: Earth and Environmental Science* 315, 022023 (2019).
- Zhichkin K., Nosov V., Zhichkina L., Zhenzber V., Svetlana R., 2020** - *The agricultural crops production profitability in modern conditions*, rev. INTERAGROMASH 2020.