

## STUDY ON COST ANALYSIS IN FARMS IN THE N-E AND S-E DEVELOPMENT REGIONS OF ROMANIA

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### Abstract

An important problem of Romanian agriculture is the fragmentation of land which correlates significantly with the diversification of household production. The evolution of agricultural production systems worldwide is influenced by the globalization of international trade in the current stage of socio-economic development, which amplifies structural interdependence for economies in different regions. The aim of the paper is to analyse costs on farms in the North-East and South-East regions of Romania. Field research was conducted in the agricultural year 2020-2021 on a representative sample, by size categories, of 60 farms in the NE and SE development regions, 30 in each region and 5 in each county. The 5 farms were selected by economic size (below 100 thousand SO; 100 thousand SO - 250 thousand SO; 250 thousand SO - 500 thousand SO; 500 thousand SO - 750 thousand SO; above 750 thousand SO). The economic size of the farms was pre-determined in the survey in order to accurately determine the costs in agriculture. The results suggest significant variability in costs by structure, farm size and area of activity. The sum of the influence of these factors can also be associated with a diversified management system.

**Key words:** cost analysis, output of main agricultural crops, sample of farmers, farm size

The cost is the monetary expression of all the inputs used in the technological flow to produce a product. According to Upadhyaya, the term 'cost' is used in different contexts (and by different individuals) with different meanings. Cost is presented as one of the most significant issues regardless of the sector of production, such as an industry, a factory, a firm or a small group of farmers. Using the *Merium-Webster* dictionary, the term cost is defined as follows: "Cost is the amount or equivalent paid or charged for something."

A well-supported description of cost is found in the paper "*Theory of cost, cost addition and cost leadership approach, application of production, and marketing cost in agriculture*", written in 2016 by Upadhyaya. According to Upadhyaya, there are many theories in the explanation of cost. Some of them are given below.

In traditional theory, costs are generalised into two parts based on time duration, which is the short-run costs and the long-run costs. The short run is the period in which some factors are fixed; usually capital equipment and entrepreneurship are considered as fixed in the short run. In traditional enterprise theory, total cost is divided

into two groups, which are total fixed cost and total variable cost. In the long run, all factors are assumed to become variable. The long-run cost curve is a planning one, in the sense that it is a guide for the entrepreneur in his decision to prepare for a possible expansion of his production.

Following the literature review, it was found that researchers show an increased interest in cooperation in Western EU agriculture and alternatives for its implementation in other spaces (Moraru R.A., 2019). Farmers overwhelmingly rely on their previous experience and inter-human relationships, such as colleagues/friends, progressive farmers, for agricultural information. Lack of timely access, inaccessibility, lack of awareness, infrequent visits by staff from extension institutions, low level of education and language barriers are primary barriers to information acquisition (Naveed MA., Hassan A., 2020).

Research has shown that interactions and exchanges of knowledge from multiple sources, particularly from actors in the production value chain, promote the adoption of new technologies and best practices that consequently improve

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farmers' productivity and incomes (Woodhill, J., 2014). Recent literature on technology adoption has established the role of innovation as an interactive process involving individuals and organizations possessing different types of knowledge in a given social and institutional context (Klerkx, L. *et al*, 2012).

Consequently, farmer participation in extension programs and technology adoption efforts has been described as "co-creating innovation" (Suvedi, M. *et al*, 2017; Stilgoe, J. *et al*, 2013) Farm-level information, in terms of product, process and practice, is now a critical aspect of development in general (Singh S., *et al*, 2015). Knowledge also provides tools to increase performance based on tax information analysis (Tenie B., Fintineru A., Smedescu D., Fintineru G., 2020).

The size and structure of expenses differs according to the type of production, the system used, the technologies used, etc., but whatever the situation, the main problem to be addressed is to optimise the structure of expenses so that their level has the maximum effect on production (Walter, C., Boeckenstedt, R., & Chase, C., 2007).

In another vein, *Rivera-Padilla* argues in his paper, "*Crop Choice, Trade Costs, and Agricultural Productivity*", written in 2020, that agricultural productivities are largely based on the idea of a puzzle, which is to say that in most cases, farmers increase their cost base even though labour productivity in agricultural crops are substantially higher.

In a world without trade costs, farmers would take urban market prices as given and decide which crop to produce based on the relative price; however, the existence of trade costs creates a wedge between regional prices and shifts the relative price between crops in the region's countryside. In particular, if farm-to-market trade costs are higher for fruit, then the relative price of fruit compared to maize is higher, which influences most farmers to grow maize.

Finally, linked to this context, trade costs can be seen as a barrier affecting the allocation of labour between regions and crop types. However, this is not a source of misallocation; on the contrary, agricultural decisions are efficient for the subsistence needs of staple foods and the level of trade costs in each sector. The potential for productivity gains from generating a movement of farmers from maize to fruit production stems from the fact that a large proportion of farmers in maize

production have relatively low productivity in this sector. In other words, farmers who have higher productivity for fruit production may decide to produce maize because the relative price of this crop is high.

Quantitative research aimed at cost analysis in the crop sector of national agriculture requires the use of consistent sampling procedures. The models of sampling structures proposed by international literature and EU bodies are unsuitable for in-depth research towards cost analysis. This phenomenon is due to the incomplete information system in small and medium-sized farms on the one hand and the fragmentation of economic entities or the integration of some processing and breeding chains within large farms on the other hand (Zaharia C. *et al*, 2010).

## MATERIALS AND METHODS

The field surveys were conducted in the 2020-2021 agricultural year on a representative sample by size categories of 60 farms in the NE and SE development regions, 30 from each region and 5 from each county. The 5 farms were selected by economic size (below 100 thousand SO; 100 thousand SO - 250 thousand SO; 250 thousand SO - 500 thousand SO; 500 thousand SO - 750 thousand SO; above 750 thousand SO). The economic size of the farms was pre-determined in the survey in order to accurately determine the costs in agriculture.

In order to achieve the highest possible accuracy, the Google Forms platform (<https://www.google.com>) was used to develop and administer the questionnaires.

Data analysis and interpretation of the results was carried out using Microsoft Office and IBM SPSS Statistics 23 applications to create the main databases and to validate and analyse the data.

The working methodology consisted of carrying out economic analysis reasoning and calculations supported by statistical analysis. The economic indicators analysed were: economic size of the farm (SO), farm area (ha), labour cost (lei/ha), input cost (lei/ha), depreciation cost (lei/ha), financial cost (lei/ha), other consumption cost (lei/ha), average production (kg/ha), total cost (lei/ha). This consists of analysing the data collected from the territory through technical, economic and financial analysis.

## RESULTS AND DISCUSSIONS

In quantitative research aimed at analysing costs in the crop sector of national agriculture,

consistent sampling techniques should be used. The sampling structure models presented in the literature worldwide and in EU organizations are not suitable for in-depth cost analysis research. Statistical processing of the information has produced the following indicators: labour cost, input cost, depreciation cost, financial cost, other expenditure cost, average output, total cost.

The analyses carried out for each cost category will be highlighted below:

**1. LABOUR COST ANALYSIS**

Labour costs are represented by employees' wages plus payroll contributions. The categories of employees that were taken in the research sample were: manager, accountant, engineer, supply manager, storekeeper, maintenance and repair mechanic, skilled worker, unskilled worker, driver, machinist, foreman, apprentice, labourer and watchman.

Calculations were based on the number of people employed, the rate (ron/month), net income and the number of hours worked/day.

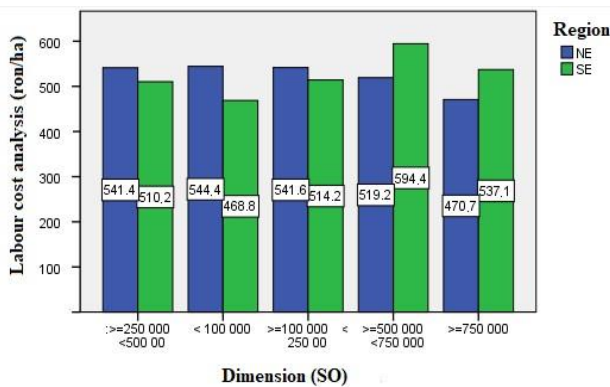


Figure 1 Labour cost analysis (RON/ha)

Within the sample surveyed (figure 1), labour costs ranged from a minimum of 468.8 RON/ha on farms with an economic size of less than 100,000 SO in the SE region to a maximum of 594.4 RON/ha on farms between 500,000 SO and 750,000 SO in the SE development region. The average value of the sample was 529.1 RON/ha.

**2. INPUT COST ANALYSIS**

Input costs were analysed for each crop according to the following components: liquid fertilizer, mineral fertilizer, organic fertilizer, insecticide, insect fungicide, diesel, nematicide, pesticide, seed, bale twine, seed treatment, adjuvant, amendments, herbicide, fungicide.

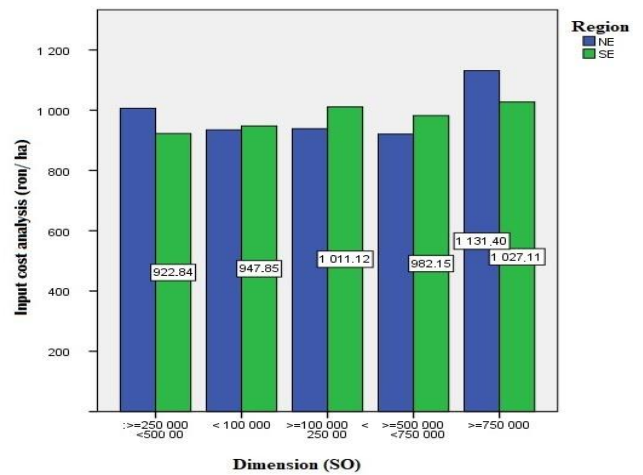


Figure 2 Input cost analysis (RON/ha)

Input costs (figure 2) in the sample surveyed ranged from a minimum of 922.84 RON/ha for farms with an economic size between 250,000 SO and 500,000 SO in the SE region to a maximum of 1,131.40 RON/ha for farms larger than 750,000 SO in the NE development region. The average value of the sample was 1,003.74 RON/ha.

**3. ANALYSIS OF DEPRECIATION COSTS**

Depreciation costs were requested from farmers by categories of machinery that were part of the agricultural production process. The amount of these costs was related to the specific cultivated area for each crop. This gave the capital input consumed per ha.

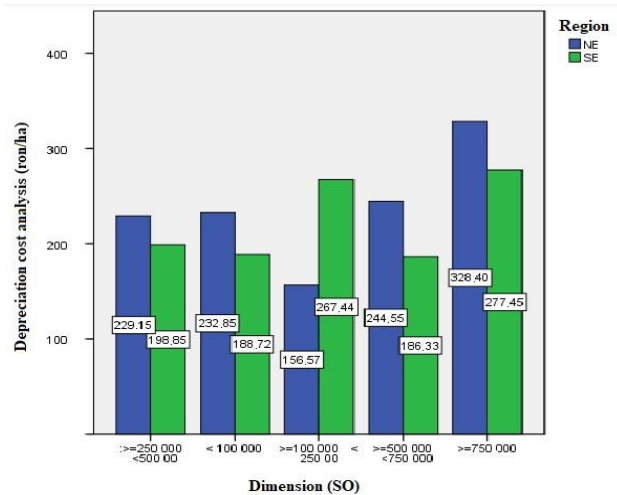


Figure 3 Depreciation cost analysis (RON/ha)

Depreciation costs (figure 3) in the sample surveyed ranged from a minimum of 156.57 RON/ha for farms with an economic size between 100,000 and 250,000 SO in the NE region to a maximum of 328.40 RON/ha for farms larger than 750,000 SO in the NE development region. The average value of the sample was 231.03 RON/ha.

#### 4. FINANCIAL COST ANALYSIS

Financial costs were represented by interest, commissions, penalties, etc. These are specific to the whole farm, but to determine the financial cost per ha, the total value of these costs was related to the cultivated area regardless of the production structure. This decision was taken because no credits were identified for the operational activity and no specific financial costs per crop were delimited.

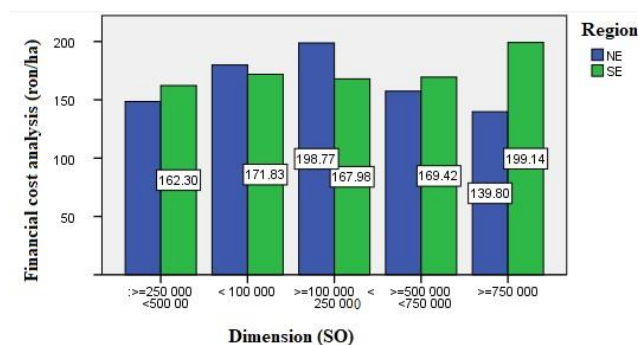


Figure 4 Analysis of financial costs (RON/ha)

Financial costs (figure 4) in the sample surveyed ranged from a minimum of 139.80 RON/ha for farms larger than 750,000 SO in the NE region to a maximum of 199.14 RON/ha for farms larger than 750,000 SO in the SE development region. The average value of the sample was 172.74 RON/ha.

#### 5. ANALYSIS OF OTHER CONSUMPTION COSTS

The other categories of expenditure were grouped under "other consumption" and represented expenditure on supplies (RON/year), expenditure on repairs and maintenance (RON/year), expenditure on rent (RON/ha), expenditure on third-party services (RON/year), expenditure on training and professional development (RON/year).

The farms surveyed had such costs (figure 5) with variations ranging from a minimum of 306.15 RON/ha for farms with an economic size between 250,000 SO and 500,000 SO in the SE and NE regions to a maximum of 329.12 RON/ha for farms larger than 750,000 SO in the SE development region. The average value of the sample was 315.12 RON/ha.

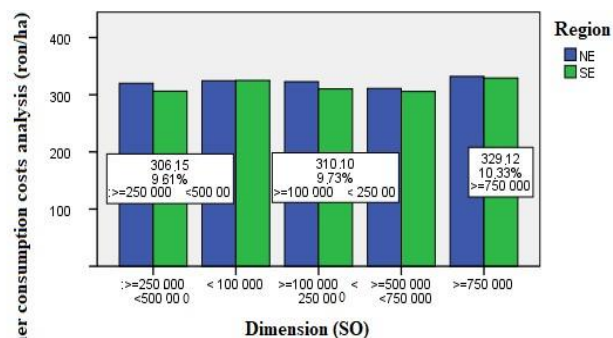


Figure 5 Analysis of other consumption costs (RON/ha)

#### 6. ANALYSIS OF TOTAL COSTS

Total costs summed up the costs presented above: labour costs, input costs, depreciation costs, financial costs and other consumption categories. These were determined at the level of area cultivated and per unit area (ha).

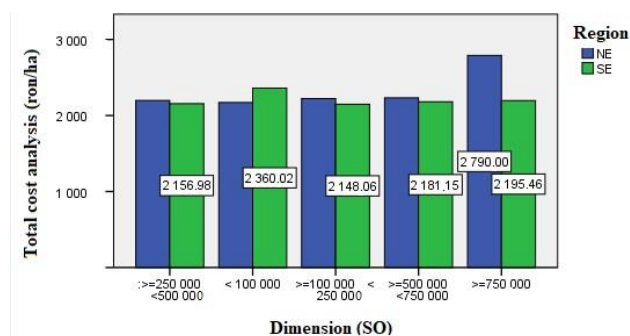


Figure 6 Analysis of total costs (RON/ha)

Total costs in the sample (figure 6) surveyed ranged from a minimum of 2,148.06 RON/ha for farms with an economic size between 100,000 SO and 250,000 SO in the SE region to a maximum of 2,790.00 RON/ha for farms larger than 750,000 SO in the NE development region. The average value of the sample was 2,305.27 RON/ha.

Thus, the indicators were analysed in direct relation to each other and resulted in Pearson indicator values of 0.23 for labour cost (RON/ha), 0.10 for input cost (RON/ha), 0.21 for depreciation (RON/ha), 0.23 for financial cost (RON/ha), 0.17 for other expenses (RON/ha) and 0.24 for total cost (RON/ha).

### CONCLUSIONS

The research carried out in this paper started from the premise that there are correlations between farm-specific process costs and economic outcomes.

Within the sample studied, labour costs ranged from a minimum of 468.8 RON/ha on farms in the SE area with an economic size of less

than 100,000 SO to a maximum of 594.4 RON/ha on farms in the SE development region with an economic size between 500,000 SO and 750,000 SO.

For farms between 250,000 SO and 500,000 SO in the SE region, input costs were found to be up to 922.84 RON/ha and up to 1,131.40 RON/ha for farms larger than 750,000 SO in the NE development region.

Depreciation costs also varied across farms, with minimum values of 156.57 RON/ha and maximum values of 328.40 RON/ha, resulting in a sample average value of 231.03 RON/ha.

From a minimum of 139.80 RON/ha in farms with an economic size greater than 750,000 SO in the NE development area to a maximum of 199.14 RON/ha in farms with an economic size greater than 750,000 SO in the SE development region, the financial expenses of the farms analysed fluctuated. These expenses varied according to the farms studied, the lowest being 306.15 RON/ha for farms in the SE and NE regions with an economic size between 250,000 SO and 500,000 SO, and the highest being 329.12 RON/ha for farms larger than 750,000 SO in the SE development region.

The average value of the sample for the total costs studied was 2,305.27 RON/ha, with the lowest cost per hectare in the SE region being 2,148.06 RON/ha and the highest cost per hectare in the NE development region being 2,790.00 RON/ha for farms larger than 750,000 SO.

The results suggest a significant variability of costs by structure, farm size and area of activity. The sum of the influence of these factors can also be associated with a diversified management system.

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