

Determination of the production cost structure in agricultural micro, small, and medium-sized enterprises (MSMEs)

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Agricultural micro, small, and medium-sized enterprises (MSMEs) in the La Maná canton face difficulties in identifying and controlling their production costs due to the use of informal record-keeping or the absence of organized systems, a situation that limits their understanding of investment and profitability. The overall objective of this research is to determine the production cost structure of these MSMEs by identifying and classifying the resources used in their production processes, with the aim of strengthening economic planning, expense control, and decision-making. A quantitative approach with a descriptive-correlational design was applied, using a structured questionnaire of ten questions. The census sample consisted of 253 plantain, cassava, and banana producers. The results showed that a lack of cost control and informal record-keeping predominate; furthermore, chemical inputs constitute the main direct resource, while transportation represents the most frequent indirect cost. Most producers use little machinery and perceive a limited return on their investment. It is concluded that the proposed matrix allows for the classification of direct and indirect costs, the calculation of total and unit costs, the estimation of profit, and the support of decisions with organized and relevant information.

Keywords: production costs; agricultural SMEs; cost structure; profitability; La Maná

Introduction

The structure of production costs is an indispensable tool to know how much resource each stage of agricultural activity consumes. Its determination is not limited to the registration of payments made, as it requires classifying raw materials, labor, indirect costs, equipment depreciation, transportation, maintenance, as well as the value of family work (Zambrano, 2024). This task becomes more complex in agricultural

MSMEs due to the length of production cycles, yield variations, crop seasonality, climatic risks, and price fluctuations.

At the global level, the problem reaches a considerable dimension because there are about 608 million farms, of which more than 90% are managed by individuals or families; despite their small scale, they contribute about 80% of the food produced in terms of value (FAO, 2024).

However, these units face constant increases in essential inputs. During the first five months of 2026, international fertilizer prices increased by 35% compared to the same period in 2025, without the market reaching complete stability (Banco Mundial, 2026).

In Ecuador, the problem is relevant due to the size and economic importance of the sector. During 2025, 1,471,725 hectares of permanent crops were registered, in addition to 742,606 hectares corresponding to transitional crops and fallow (INEC, 2026a). However, in 2024, only 28.2% of the national agricultural area was irrigated, so the remaining 71.8% remained exposed to greater productive variability associated with climatic conditions (INEC, 2026b). Although agriculture, livestock, and forestry grew by 3.1% in 2024, while the national economy contracted by 2%, this aggregate behavior does not reflect the administrative difficulties of smaller units (Banco Central del Ecuador, 2025).

In Cotopaxi, specifically in the canton of La Maná, the situation deserves attention due to the concentration of 531 agricultural production units: 45.83% are located in El Carmen, 34.73% in Guasaganda, 13.88% in El Triunfo and 5.56% in Pucayacu (Mendez et al., 2026). Despite this productive presence, a study applied to 153 banana farmers determined that 41.2% considered their activity unprofitable, while 13.7% rated it as unprofitable; overall, 54.9% expressed an unfavorable assessment. Likewise, labor represented 62% of the total cost, indirect production costs reached 26.11%, other indirect costs concentrated 10.53% and raw material participated with 1.36% (Bravo-Mera et al., 2026).

The general objective of the research is to determine the structure of the production costs of agricultural MSMEs in the canton of La Maná, through the identification and classification of the resources used in their production processes, with the purpose of strengthening economic planning, control of expenses and decision-making. To achieve this purpose, it is proposed to diagnose the current situation of the registration and control of production costs, considering the procedures applied by the producers; to identify

the direct and indirect, fixed and variable components that intervene in the different stages of the production process; finally, to establish a cost structure that allows calculating the total and unit cost of production, as well as to evaluate the profit margin of the agricultural MSMEs of the canton of La Maná.

This research is directly related to the Accounting program's community engagement project entitled "Cost-Volume-Profit Model for Agricultural and Agro-industrial Production Processes and Social Enterprises in the Areas of Influence of La Maná Canton", since it provides relevant information for the achievement of Objective 2: to establish the production cost structure for each productive process within the areas of influence of La Maná Canton. In this regard, the study makes it possible to identify, classify, and analyze the costs involved in productive activities, such as raw materials, labor, and indirect costs, which facilitates a more accurate determination of the actual cost of production. Likewise, this information provides a basis for improving accounting control, setting selling prices in accordance with the conditions of each activity, and supporting decision-making among local producers and entrepreneurs. Therefore, the research is relevant because it links academic work with the economic and accounting needs of the local productive sector, while also contributing to stronger financial management and the sustainability of productive units in La Maná Canton.

Theoretical development

Production Costs

According to Corvo (2020) This type of cost refers to those expenses related to the production or acquisition of goods intended to generate income for an organization, covers the disbursements necessary to produce a certain amount of a product and includes the main components associated with the productive factors, which are essential for the production process in an efficient way. Within the agricultural field, it includes all the resources used to obtain a product, such as inputs, labor, machinery, and energy. These costs are classified as direct, which is fertilizers, indirect, which includes the

maintenance of equipment or rental of land for plantations.

Classification of costs

It is recognized that business costs can vary depending on their purpose, use and nature, that is, costs can take various forms, according to the objective analyzed or the application within the administrative and accounting process, so it is essential that in the accounting field organize into different categories, depending on the various approaches analyzed.

In an organization, costs can be grouped based on different factors, highlighting the following:

- According to their accounting nature or modality: this classification includes all the elements that represent an economic outlay essential to operate such as the acquisition of raw materials, additional supplies, payments by persons, external service contracts, depreciation of assets, amortizations, financing interest, provisions or contingencies.
- According to their degree of allocation to specific products or processes: from this perspective, costs are divided into direct costs and are clearly and precisely related to a product, activity, or area (Alarcón, 2024).

Direct cost

An indirect cost is assigned in a precise and objective way to a specific product, process or area in an organization, which means that there is a clear knowledge of the cost corresponding to each activity executed because there is a direct and measurable relationship, for example, the raw material used in the production of a good.

Indirect cost

According to Urquiza (2023) This type of cost cannot be allocated equitably and accurately within the elaboration or manufacture of a specific product, service or activity, because it participates within the production process in a general or shared way, that is, it does not have a direct relationship with a unit of the product, so they must be distributed through an appropriate allocation method.

The agricultural product

These are those goods generated through activities in the agricultural sector, especially within the primary sector of the economy, these products are generally obtained in rural areas, far from urban centers, where the resources of the environment are used for the cultivation and harvest of food (Westreicher, 2020).

Types of agricultural production

For Lama (2022), agricultural production encompasses various systems and practices that vary according to factors, whether climatic, soil, or available resources or market needs.

Traditional Agriculture: This system is basically based on ancestral techniques that have been passed down since time immemorial, this system uses simple tools and relies heavily on human and animal labor (Folio3 AgTech, 2024).

Subsistence Agriculture: This is very similar to traditional agriculture as it focuses on producing the necessary amount to ensure the food sustainability of a family or community, with little or no surplus for sale (Folio3 AgTech, 2024).

Commercial Agriculture: Market-oriented, seeks to maximize production and economic benefits, uses machinery, chemical fertilizers, and pesticides to increase plantation yields (Folio3 AgTech, 2024).

Organic Agriculture: Focused on producing organic and synthetic-free food, in addition to promoting environmentally friendly activities that maintain soil health and biodiversity, this type of agriculture uses composting, crop rotation, and biological pest control (Folio3 AgTech, 2024).

Methodology

Methodological route

The research was developed under a quantitative approach, because it allowed the collection and analysis of numerical information related to the production costs of agricultural MSMEs in the canton of La Maná. Through this approach, the disbursements corresponding to raw materials, labor, indirect costs, fixed and variable expenses present in each production stage were quantified. Likewise, the data obtained facilitated the calculation of the total cost, the unit cost and the profit margin, which provided objective results on

the economic situation of the units studied. Finally, the statistical processing made it possible to identify the participation of each component within the cost structure, compare the values recorded among the MSMEs and establish conclusions based on measurable information.

The research adopted a descriptive design, since it allowed to characterize the structure of the production costs of agricultural MSMEs in the canton of La Maná without modifying the conditions in which they carry out their activities. Through this design, the procedures used to record the disbursements, the resources used in each production stage and the composition of the direct, indirect, fixed and variable costs were described. In addition, the total cost, the unit cost and the percentage share of each component were determined, which allowed to present an orderly vision of the economic reality of the units analyzed. In this way, the results facilitated the identification of the items with the greatest impact on production and the main limitations existing in the control of resources.

The research presented a correlational scope, because it allowed to examine the relationship between the structure of production costs and the profit margin of agricultural MSMEs in the canton of La Maná. To this end, the costs of raw materials, labor, indirect costs, fixed and variable

expenses were analyzed, in order to establish their association with the economic results achieved by the productive units. The statistical analysis made it possible to determine the intensity and direction of this relationship, without affirming causality between the variables. In this way, it was possible to know if the variations in costs are linked to changes in the level of profitability, which provided objective information for financial planning and decision-making.

Population and sample

The universe population of this research is detailed below: According to the information obtained through the DEVELOPMENT AND TERRITORIAL PLANNING PLAN OF THE CANTON OF LA MANÁ, it was known that the canton of La Maná has 5 parishes, 3 urban and 2 rural, of which some sectors are the areas of influence on the cultivation of bananas, bananas and cassava; among these agricultural areas we have the following: San Antonio de Manguila, La Libertad Campus, Las Orquídeas Campus, San Pedro Campus, Los Laureles Campus, Chipe Hamburgo 2 Campus, El Triunfo Campus and Diez Mandados Neighborhood. These sectors represent a total of 253 agricultural producers who base their economy on the production and marketing of Plantain, Cassava and Banana.

Table 1. Population of the areas of influence of La Maná canton crops

SECTORS	POPULATION
San Antonio de Manguila Enclosure	39
El Triunfo Venue	30
Las Libertad Campus	23
Chipe Hamburg 2 Venue	39
Los Laureles Enclosure	33
Ten Commandments Neighborhood	29
Las Orquídeas Enclosure	29
San Pedro Campus	31
Total	253

Source: List of beneficiaries of linkage with society.

For the study sample, the sample was made up of all the farmers who made up the study population

in the areas of influence of the canton (253), since this population was clearly defined in the context

of the research. The selection of this sample allowed the analysis of production costs to be carried out more efficiently, ensuring the representativeness of the total population. To determine the sample size, the 253 agricultural producers from the different areas of influence of the La Maná canton of banana, cassava and banana crops were taken into account, to whom the respective survey was applied.

Instrument Design

To collect information, a structured questionnaire of ten questions was designed, aimed at the owners or managers of agricultural MSMEs in the canton of La Maná. The instrument was organized into three sections: the first allowed to characterize the productive activity through location, the crops developed, the inputs used, the number of workers and the type of machinery; the second addressed indirect costs, monthly expenditure on inputs and investment in marketing; the third examined the perceived profitability and the methods used to record or control costs. The questions were closed, single-choice and multiple-choice, with categories expressed in quantities, percentages or monetary intervals. This structure facilitated the coding of

the responses and the statistical analysis of the data, in addition to providing information related to the diagnosis, the identification of the cost components and the determination of the economic situation of the productive units.

Results

In the results section, the information collected through the questionnaire applied to 253 agricultural producers in the canton of La Maná was organized and analyzed. First, the sociodemographic profile of the participants was described according to sex, age and educational level; subsequently, the location of the productive units, the predominant crops, the inputs used, the number of workers and the use of machinery were examined. The main indirect costs, the monthly expenditure on inputs, the perceived profitability, the control methods used and the investment destined to marketing were also identified. Finally, the components identified were classified into direct and indirect, fixed and variable costs, as a basis for establishing a matrix to calculate the total cost, unit cost, profit and profitability margin of the agricultural MSMEs studied.

Table 2. Sociodemographic profile

Variable	Category	Frequency (n)	Percentage
Sex	Male	145	57%
	Female	108	43%
Age	From 18 to 29 years old	45	18%
	From 30 to 39 years old	69	27%
	From 40 to 49 years old	75	30%
	50 years or older	64	25%
Educational level	Primary education	101	40%
	Secondary Education	103	41%
	Higher Education	43	17%
	Postgraduate	6	2%
	Total	253	100%

Note: number of agricultural producers surveyed. The percentages were calculated on a sample of 253 participants. The distribution is referential; before presenting it as a real result, it must be verified against the research database.

The sociodemographic profile of the 253 producers surveyed shows a majority participation of men, with 57.31%, while women represent 42.69%, which shows a significant presence of both groups in the agricultural activities of the canton of La Maná. Regarding age, the group of 40 to 49 years of age predominates with 29.64%, followed by people from 30 to 39 years of age with 27.27% and those aged 50 or over with 25.30%; in contrast, participants from 18 to 29 years of age reach 17.79%. In terms of educational level, 40.71% have secondary education and 39.92% primary education, while only 17% have higher education and 2.37% have postgraduate studies. This composition reflects

that a large part of the producers have a basic or secondary education, a condition that could influence the use of informal records and the difficulties in identifying, classifying or controlling production costs. Therefore, the proposed cost structure must be simple, understandable and adjusted to the administrative capacities of the agricultural MSMEs studied.

Current situation of the registration and control of production costs, considering the procedures applied by producers

To diagnose the current situation of the registration and control of production costs, a structured questionnaire was applied to 253 producers of agricultural MSMEs in the canton of La Maná. The information made it possible to know the location of the production units, the main crops, the number of workers, the perceived profitability and the methods used to manage costs.

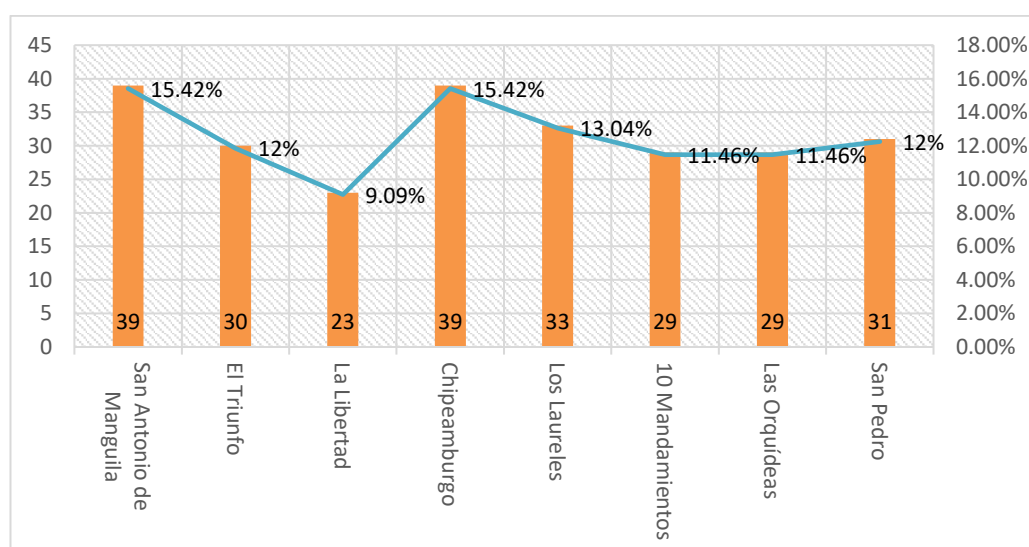


Figure 1. In which of the following sectors is your agricultural production located?

Prepared by: The Authors

The results show that agricultural production is distributed in a relatively balanced way among the sectors analyzed, although San Antonio de Manguila and Chipe Hamburgo have the highest participation, with 39 producers each, equivalent to 15.42%. Next, Los Laureles concentrates 13.04%, while El Triunfo and San Pedro reach

about 12% in each case. For their part, 10 Mandibles and Las Orquídeas register 11.46%, respectively. La Libertad has the lowest representation, with 23 producers, which correspond to 9.09%. This distribution shows that agricultural activity is not concentrated in a single place, but is part of the economic dynamics of several communities in the canton of La Maná.

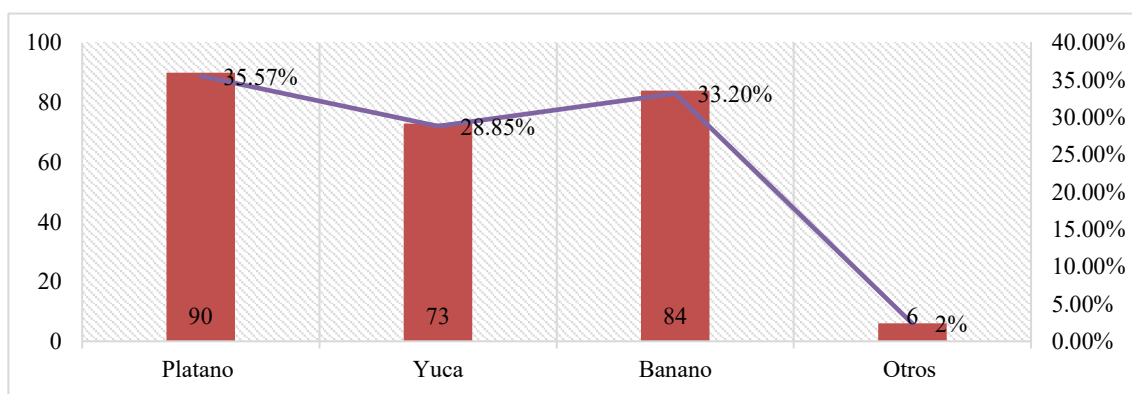


Figure 2. What are the crops it produces?

Prepared by: The Authors

The results show that bananas are the crop with the highest presence among the agricultural MSMEs studied, with 90 responses, equivalent to 35.57%, followed by bananas with 84 producers, representing 33.20%. Cassava ranks third with 73 cases and a share of 28.85%, while other crops barely gather 6 responses, close to 2%. This composition confirms that the productive activity of the canton of La Maná is mainly concentrated

in bananas, bananas and cassava, although each crop requires different amounts of inputs, labor and resources during its cycle. Therefore, the identification of the product is necessary to diagnose the costs used by farmers, recognize its direct and indirect components and avoid the use of a general structure that ignores the particularities of each activity.

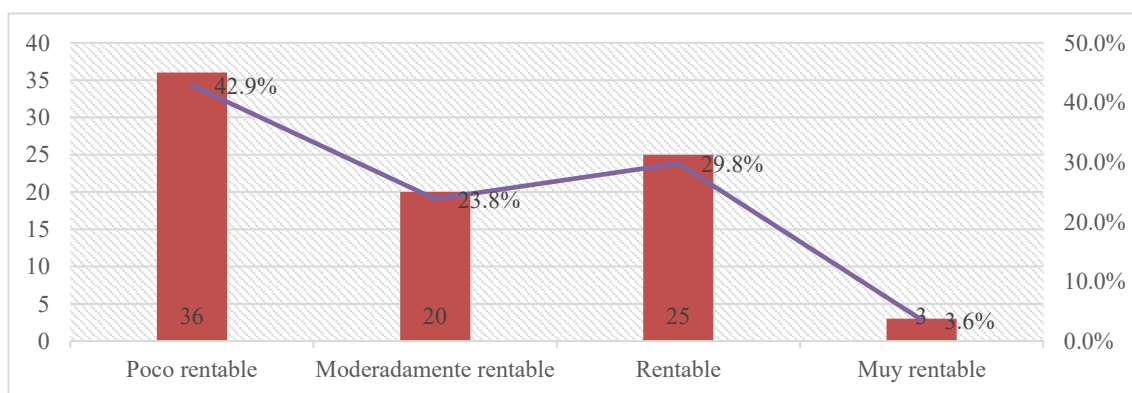


Figure 3. How profitable do you consider your crop to be in relation to the costs invested?

Prepared by: The Authors

The results show that 42.9% of the producers consider that their crop is unprofitable compared to the costs assumed, while 23.8% qualify it as moderately profitable. Together, both categories represent 66.7% of the responses, which reflects that a significant part of MSMEs obtain limited benefits or do not receive sufficient compensation for the investment made. On the other hand, 29.8% consider their activity profitable and only

3.6% identify it as very profitable. This situation can be related to the weight of chemical inputs, labor and transportation within the total cost, in addition to variations in marketing prices. Based on the objectives of the research, these data confirm the need to establish a structure that allows the calculation of the unit cost and the profit margin.

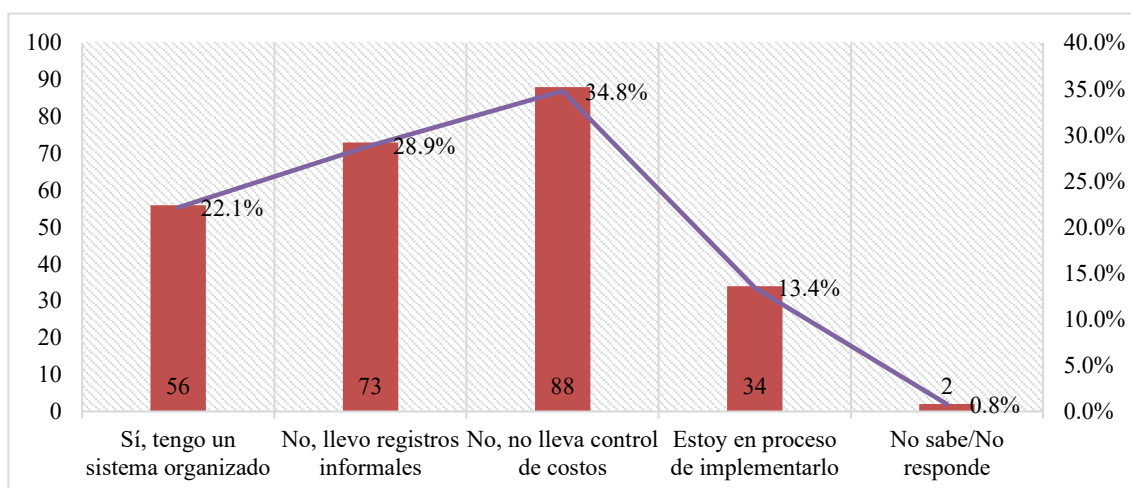


Figure 4. Do you use any cost control methods to manage your production?

Prepared by: The Author

The results show a significant weakness in the management of economic information, since 34.8% of producers do not keep any cost control and 28.9% use informal records. Overall, 63.7% of agricultural MSMEs manage their resources without an organized system, a situation that makes it difficult to know how much is actually invested in each crop. On the other hand, 22.1% have a structured method, while 13.4% are in the process of implementing it and 0.8% do not identify the procedure used. These data respond to the objective of diagnosing the registration and control of costs, as they reveal that most producers do not have enough information to differentiate inputs, labor, indirect expenses or marketing disbursements.

Direct and indirect, fixed and variable components involved in the different stages of the production process

To identify the direct and indirect components present in the production process, inputs, labor, machinery, transportation, energy, administrative expenses, and disbursements related to marketing were analyzed. Subsequently, these elements were classified according to their relationship with production and their economic behavior. This procedure made it possible to establish that chemical inputs are part of the main direct costs, while transportation represents the indirect cost with the greatest presence.

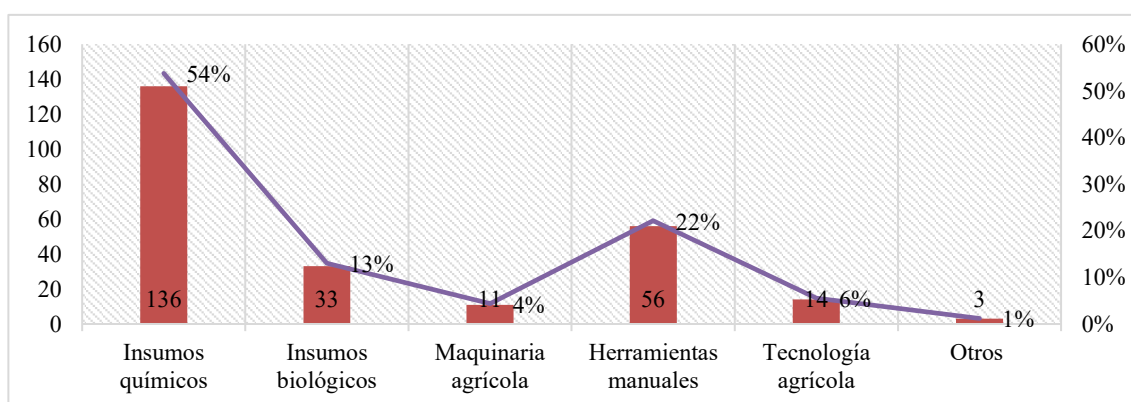


Figure 5. What are the main inputs you use in the production of your crops?

Prepared by: The Authors

The results show that chemical inputs are the most used resource by agricultural MSMEs in the

canton of La Maná, with 136 responses, equivalent to 54%, which reflects a high

dependence on fertilizers, herbicides and pest control products. In second place, hand tools account for 22%, while biological inputs account for 13%. On the other hand, agricultural technology accounts for only 6%, machinery for 4% and other resources for 1%. This distribution allows us to identify that chemical inputs are an

important part of direct and variable costs, because they must be acquired during each production cycle. In turn, the frequent use of hand tools, in the face of the limited presence of machinery or technology, can increase the need for labor.

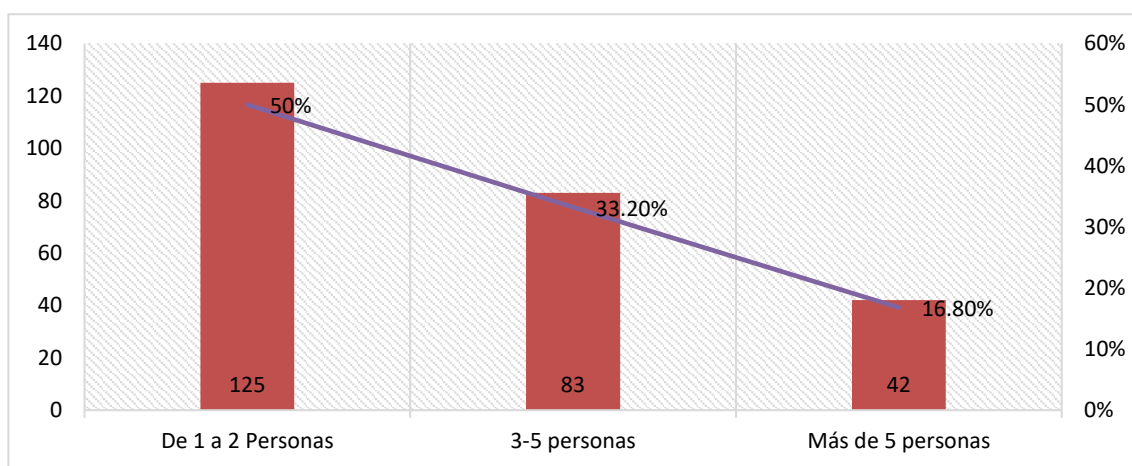


Figure 6. How many people do you employ in agricultural production?

Prepared by: The Authors

The results indicate that 50% of agricultural MSMEs employ between one and two people in their productive activities, a percentage that corresponds to 125 units analyzed. On the other hand, 33.20% have a workforce of three to five workers, while only 16.80% use more than five people. This composition confirms the predominance of small production units, in which

a small number of workers must perform tasks such as land preparation, planting, maintenance, phytosanitary control, and harvesting. In addition, it is necessary to assign a value to the work contributed by owners or family members, even if there is no direct payment, since its exclusion would artificially reduce the calculated cost.

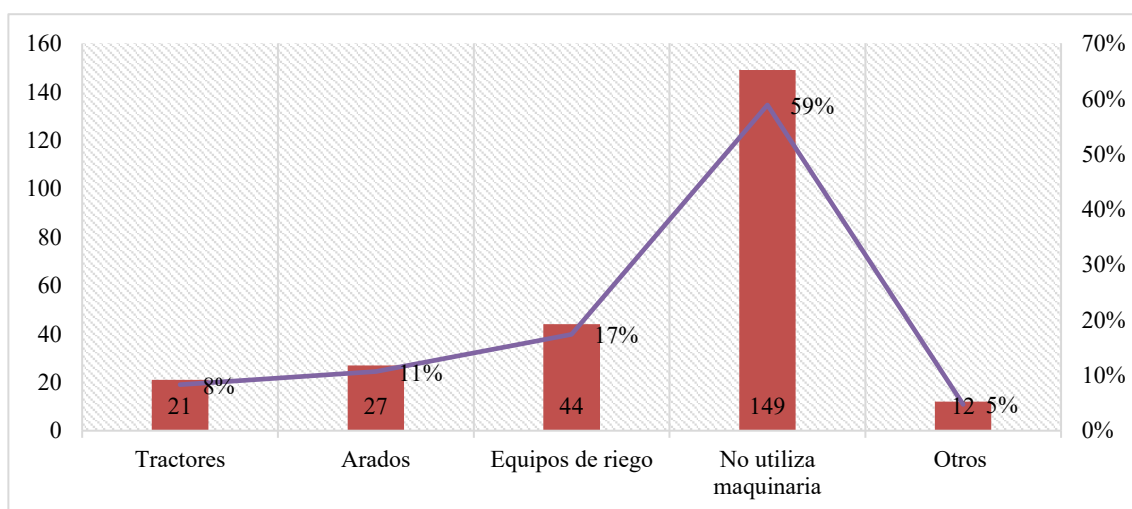


Figure 7. What type of machinery do you use in your agricultural production?

Prepared by: The Authors

The results reflect a low level of mechanization in agricultural MSMEs in the canton of La Maná, due to the fact that 149 producers, equivalent to 59%, state that they do not use machinery during the production process. On the other hand, 17% use irrigation equipment, 11% use plows, 8% have tractors and 5% use other equipment. This

behavior is related to the predominance of small units and the frequent use of hand tools, which can increase the participation of labor within the total cost. Therefore, these disbursements must be correctly classified to avoid indirect costs being left out of the calculation and to establish the real cost of agricultural production.

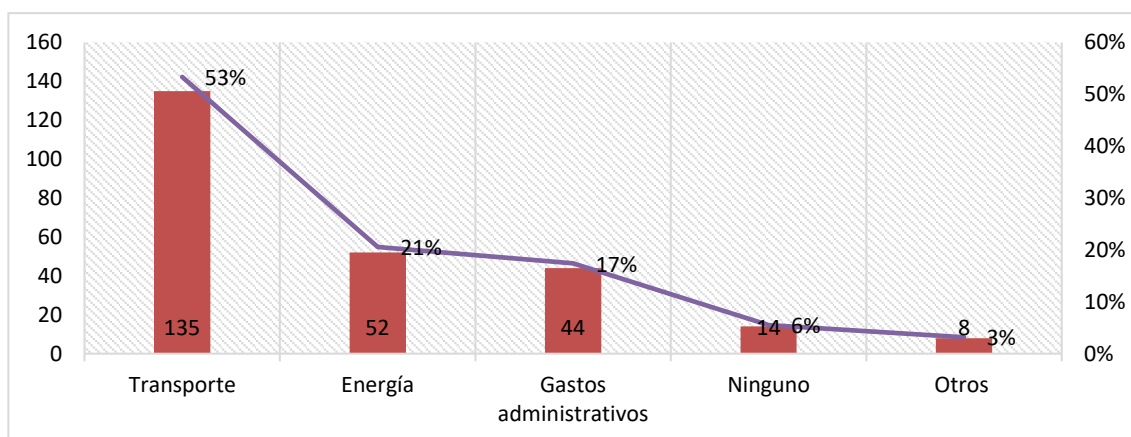


Figure 8. What are the indirect costs related to your agricultural activity?

Prepared by: The Authors

The results show that transportation is the main indirect cost of agricultural MSMEs in the canton of La Maná, with 135 responses, equivalent to 53%, which reveals the economic weight of the transport of inputs, crops and products to the places of commercialization. In second place is energy with 21%, followed by administrative

expenses with 17%, while other costs represent 3%. In addition, 6% of producers indicate that they do not incur indirect costs; however, this response could be related to the lack of identification or registration of certain disbursements, rather than to their total absence.

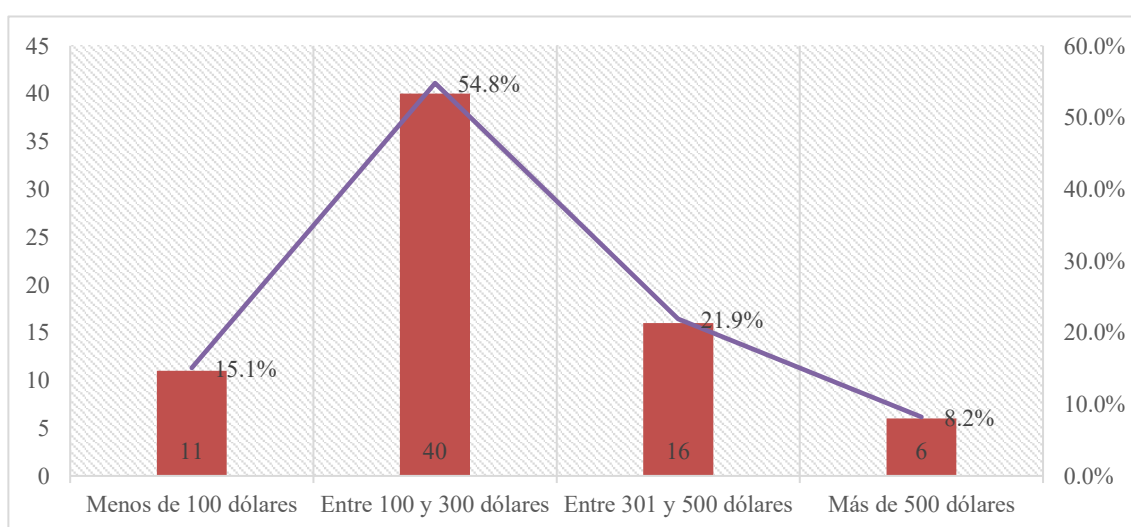


Figure 9. What is the average monthly cost of inputs (seeds, fertilizers, pesticides) in your banana crop?

Prepared by: The Authors

The results indicate that 54.8% of banana producers spend between US\$100 and US\$300 per month on the purchase of seeds, fertilizers and pesticides, so this interval concentrates most of the responses. Likewise, 21.9% register costs of between US\$301 and US\$500, while 15.1% invest less than US\$100 and 8.2% exceed US\$500 per month. These differences may be associated with the area cultivated, the management applied, the frequency of fertilization and the phytosanitary needs of each production unit. In relation to the

objectives of the study, the results allow us to recognize that inputs constitute a direct and variable component within the banana cost structure. However, the monthly value should not be analyzed in isolation, since a high investment does not necessarily imply lower profitability. For this reason, it is necessary to relate these expenditures to the number of hectares cultivated, the volume obtained and the sales income to calculate the unit cost and evaluate the economic efficiency of each MSME.

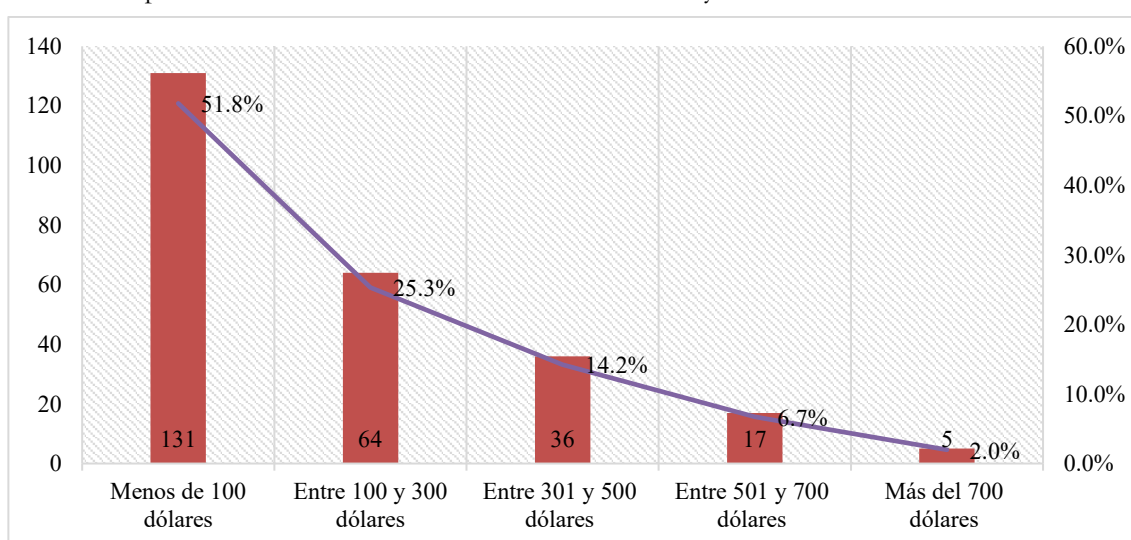


Figure 10. What percentage of your total costs do you invest in the marketing process?

Prepared by: The Authors

According to the categories represented, 51.8% of producers allocate less than \$100 to the marketing process, while 25.3% invest between \$100 and \$300. For their part, 14.2% register disbursements of \$301 to \$500, 6.7% are between \$501 and \$700, and only 2% exceed \$700. These results show that most MSMEs maintain relatively low business expenses, although these values must be related to the volume sold, the distance to the markets, and the income obtained. Depending on the objectives, this item should be incorporated into indirect costs to determine the total cost and profit more accurately.

Cost structure that allows calculating the total and unit cost of production, as well as evaluating the profit margin of agricultural MSMEs in the canton of La Maná

In order to respond to the third specific objective, a cost matrix was established adapted to the productive characteristics of agricultural MSMEs in the canton of La Maná. The structure grouped the disbursements according to the stage of the process, their relationship with the crop and their economic behavior. To this end, inputs and labor related to land preparation, planting, maintenance and harvesting were considered as direct costs. On the other hand, transportation, energy, administration, equipment maintenance and marketing were classified as indirect costs.

Table 3. Matrix for determining the agricultural cost structure

Stage	Cost component	Classification	Unit of Measure	Quantity	Unit cost (USD)	Total cost (USD)
Preparation of the land	Cleaning, ploughing and adaptation	Direct-variable	Wage/service			
Sowing	Seeds or plant material	Direct-variable	Unit/kg			
Sowing	Labor	Direct-variable	Salary			
Maintenance	Fertilizers	Direct-variable	Kg/litre			
Maintenance	Pesticides	Direct-variable	Kg/litre			
Maintenance	Labor	Direct-variable	Salary			
Harvest	Labor	Direct-variable	Salary			
General process	Machinery, maintenance and depreciation	Indirect	Month/cycle			
General process	Energy and irrigation	Indirect	Month/cycle			
Marketing	Transportation and distribution	Indirect-variable	Trip/cycle			
Administration	Registrations and procedures	Indirect-fixed	Month/cycle			
	Total cost of production					USD

Note. To complete these tables you need exact values for labor, indirect costs, volume produced, and revenue.

Table 4. Economic summary by type of crop

Indicator	Banana	Bananas	Cassava
Input cost per hectare			
Labor cost per hectare			
Indirect costs per hectare			
Total cost per hectare			
Volume produced			
Cost per unit produced			
Sales revenue			
Profit obtained			
Profit margin			

Note. To complete these tables you need exact values for labor, indirect costs, volume produced, and revenue.

The indicators will be calculated using the following expressions:

$$\text{Costo total} = \text{Costos directos} + \text{Costos indirectos}$$

$$\text{Costo unitarios} = \frac{\text{Costo total}}{\text{Volumen producido}}$$

$$\text{Utilidad} = \text{Ingresos por ventas} - \text{Costo total}$$

$$\text{Margen de utilidad} = \frac{\text{Costo total}}{\text{Ingresos por venta}} \times 100$$

The established matrix makes it possible to overcome the general and informal record identified in the diagnosis, because it separates the resources consumed in each production stage. Its application makes it easier to recognize the items with the greatest economic impact, compare the costs of bananas, bananas and cassava, in addition to establishing whether the income obtained covers the investment made. In this way, agricultural MSMEs can have understandable information to control their resources, set prices with greater foundation and make decisions aimed at improving their profitability.

Discussion

The concentration of production in bananas (35.57%), bananas (33.20%) and cassava (28.85%) confirms that agricultural MSMEs in La Maná specialize in tropical crops with different production needs. This result makes it impossible to apply a uniform structure, because each product demands different amounts of inputs, working hours, and maintenance periods. In addition, 54% of the responses point to chemical inputs as the main resource, well above biological inputs, which reached 13%. In this regard, Valverde Jalca and Revelo Salgado (2025) argue that productivity depends on the proper management of seeds and agrochemicals, although they warn that some herbicides can negatively affect yield. On the other hand, Estrada-Zhagui et al. (2025) identified productivity gaps between small and large

Ecuadorian agricultural companies. Consequently, the high use of chemical products does not guarantee better economic results; Their contribution depends on the dose, the price, the yield obtained and the administrative capacity of each producer.

The labor structure presents another important limitation, since 50% of MSMEs employ only one to two people, while 59% do not use agricultural machinery. These data describe small-scale units, with processes that depend mainly on manual labor. In this context, family labor can be left out of the records when there is no direct payment, although it represents a resource consumed during land preparation, maintenance, and harvesting. Hamilton et al. (2022) showed that mechanization can complement human labor and increase the productivity of each employee, so it should not always be understood as a replacement of the worker. Similarly, Mdoda et al. (2022) found that access to machinery improved the productivity and returns of small farmers. From this perspective, the low mechanization observed in La Maná can limit productive efficiency; however, the purchase of equipment is not an automatic solution either, since the costs of acquisition, rent, maintenance, and depreciation must first be compared with the expected labor savings.

The results also show that indirect costs have a relevant weight, despite the fact that they tend to receive less attention than inputs. Transportation was indicated by 53% of producers, followed by energy with 21% and administrative expenses with 17%. In addition, 51.8% reported less than \$100 allocated to marketing. These findings coincide with Moreno-Miranda and Dries (2026), who explain that transaction costs and coordination mechanisms influence the performance of Ecuadorian agri-food chains. Similarly, Tapia-Guato et al. (2024) point out that the calculation of the real cost must incorporate production, distribution, and marketing. Therefore, transportation cannot be treated as a secondary outlay, because it connects the farm with the market and affects the final margin. However, the result on marketing should be interpreted with caution, because the question asks for a percentage, while the alternatives are

expressed in dollars. This inconsistency makes it impossible to know their exact share within the total cost.

The perception of profitability reinforces the existence of economic difficulties: 42.9% rated their crop as unprofitable and 23.8% as moderately profitable; in contrast, only 3.6% considered it very profitable. In banana cultivation, 54.8% allocate between 100 and 300 dollars per month to inputs, while 21.9% invest between 301 and 500 dollars. Suárez Mena et al. (2025) argue that production costs have a direct impact on profitability, although an efficient investment in fertilizers and pesticides can increase yields. In turn, Tenemaza Guala et al. (2025) found that adequate financial management is positively related to the profitability of agricultural companies in La Maná. Consequently, the problem lies not only in how much is invested, but also in the capacity of expenditure to generate production and income. Even so, the assessment expressed by the respondents is perceptive; To verify the relationship between costs and profitability, exact data on volume produced, sales price, revenues and profit are required.

Finally, the most critical finding corresponds to cost control: 34.8% do not use any method and 28.9% keep informal records. This means that 63.7% of MSMEs lack organized information to determine how much it costs to produce, a situation that may explain the uncertainty observed regarding profitability. The result coincides with López Mera et al. (2026), who identified in La Maná that the lack of formal accounting records limits cost management and profit maximization. Likewise, Zambrano Morales et al. (2024) argue that a costing system adjusted to agricultural characteristics improves the understanding of direct and indirect

disbursements. For this reason, the proposed matrix is relevant, as long as it records quantities, unit prices, family labor, indirect costs, production, and income of each crop. The intervals of the questionnaire allow diagnosing the current situation, but they are not enough to accurately calculate the unit cost or the profit margin; therefore, they must be complemented with a cost sheet applied per hectare and production cycle.

Conclusions

It is concluded that agricultural MSMEs in the canton of La Maná have weaknesses in the registration and control of production costs, due to the predominance of informal procedures or the absence of organized systems. This situation limits the knowledge of the real investment, makes it difficult to set prices and generates uncertainty about the profitability obtained in each crop.

It is determined that the economic structure of agricultural production is mainly made up of inputs, labor, machinery, transportation, energy, administration, and marketing. The correct classification of these components into direct, indirect, fixed, and variable costs is essential to avoid incomplete calculations, especially when no value is assigned to family work or to the own resources used.

It is concluded that the proposed cost matrix responds to the characteristics of the agricultural MSMEs studied, since it organizes the disbursements by production stage and type of crop. Its application allows determining the total and unit cost, estimating the utility, knowing the profit margin and having reliable information to strengthen economic planning and decision-making.

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