Cost Management in Small Rural Properties: a Study Tailored to Livestock Activity in a Family System

Gerenciamento de Custo em Pequenas Propriedades Rurais: Estudo Voltado à Atividade Pecuária em Regime Familiar

Artigo recebido em: 10/05/22 e aceito em: 26/09/22

Moévia Leandra G. Lopes
Patu –RN
Graduated in Accounting Sciences from UERN[1]
moevia_lopes@hotmail.com

Benedito Manoel do Nascimento Costa
Patu –RN
Master's in Accounting and Controlling from UFC[2]
Adjunct Professor at DCC/UERN[1]
beneditocosta@uern.br

ABSTRACT

Family farming has an expressive participation in the national economic scenario, being the main responsible for the production of food that is made available for the consumption of the Brazilian population. Small rural properties generally have management difficulties, especially in relation to cost control and planning. Rural accounting proves to be an essential tool for the management of rural properties, even those considered small, significantly assisting in decision making. The objective of this study is to propose a cost planning and control model applicable to small rural properties that develop family agriculture. For that, a case study was carried out in a small property, located in the interior of Rio Grande do Norte. Data were obtained through semi-structured interviews with the producer. From the data collected and analyzed, the variable costing method was suggested, and the necessary steps to implement it. With the application of the suggested model, we arrived at the result of the activity that most contributes to the property, being cattle, which compared to the others, presented a higher contribution margin.

Keywords: Rural accounting. Control. Variable Costing.

RESUMO

A agricultura familiar tem expressiva participação no cenário econômico nacional, sendo a principal responsável pela produção dos alimentos que são disponibilizados para o consumo da população brasileira. Pequenas propriedades rurais, geralmente, apresentam dificuldades de gerenciamento, especialmente em relação ao controle de custos e planejamento. A contabilidade rural mostra-se como uma ferramenta essencial para o gerenciamento de propriedades rurais, até mesmo as consideradas de pequeno porte, auxiliando de forma significativa na tomada de decisões. O objetivo deste estudo é propor um modelo de planejamento e controle de custos aplicável a pequenas propriedades rurais que desenvolvem agricultura familiar. Para tanto, foi realizado um estudo de caso em uma propriedade de pequeno porte, localizada no interior do Rio Grande do Norte. Os dados foram obtidos por meio de entrevista semiestruturada realizada com o produtor. A partir dos dados coletados e analisandos, foi sugerido o método de custeio variável, e as etapas necessárias para implementá-lo. Com a aplicação do modelo sugerido, chegou-se ao resultado da atividade que mais contribui para a propriedade, sendo ela a bovinocultura, que comparada as demais, apresentou uma margem de contribuição superior.

Palavras-chave: *Contabilidade rural. Controle. Custeio Variável.*

1 INTRODUCTION

Brazil is one of the most important exporters and producers on the agricultural scenario of the world today. According to the Center for Advanced Studies in Applied Economics (CEPEA, 2020), from Esalq/USP, the Gross Domestic Product (GDP) of Brazilian agribusiness is estimated to account for 26.6% of the total GDP. Even with the large and developed farms, small properties are still the vast majority in the interior of the country, providing the livelihood and sole source of income for countless families.

As indicated in the 2017–2018 agricultural census, family farming represents 23% of the country's total production, generating an average income of 106.5 billion reais. Based on data from the 2016–2017 census, it is possible to observe the participation of family farming

[1] DCC/UERN - Department of Accounting Sciences, State University of Rio Grande do Norte – Advanced Campus of Patu – Patu - RN - CEP: 59770-000.

[2] UFC - Federal University of Ceará - Fortaleza – CE - CEP: 60020-181.

in livestock and especially in horticultural production as being quite significant, which makes it indispensable in the current agricultural scenario of the country.

According to the Ministry of Agriculture, Livestock and Supply (2020), Family Farming is the main responsible for the production of the food that is made available for consumption by the Brazilian population. It is composed of small rural producers, traditional people and communities, agrarian reform settlers, foresters, aquaculturists, extractivists and fishers. The sector stands out for the production of corn, cassava root, dairy farming, beef cattle, sheep, goats, vegetable, beans, sugarcane, rice, pigs, poultry, coffee, wheat, castor beans, fruit crops and vegetables.

Although family farming is of significant importance to the national economic scenario, there are many difficulties in managing small properties. Factors that are independent of the producer cannot be ruled out, such as climatic and biological factors, accidents, seasonality, and demand, among others; however, management factors are also part of this context, since not using them can have negative consequences for the results, from decision-making to even the continuity of production.

In rural enterprises there are several factors that directly interfere with their performance, and many of these factors are difficult to control in production, but others, related to production management can be controlled (SIMIONATTO, et al., 2017).

However, it is observed that the vast majority of rural properties still do not have management and planning control, this is because producers are not aware of how much Rural Accounting would help in the success of their businesses, and it is very important for a good profitability.

Rural Accounting emphasizes cost management, assists in decision-making, control and management of production and pricing, enabling the producer to have a better financial return on their productivity, based on safe and accurate information.

Zambon and Bee (2015) argue that the rural sector needs to evolve in terms of cost controls and analysis in order to improve its economic and financial management. Callado and Callado (1999) state that producers face difficulties in managing their costs since these costs have specific characteristics conforming to the nature of the economic activities performed.

Cost management consists of planning the costs and tools used in the management process, with the aim of reaching final production with all the costs and expenses planned and with greater organizational control, which influences the financial health of the entity.

It is well known that a many small farms do not have an adequate method for accounting and recording the costs of their activities, which is harmful to the control of their earnings.

Thus, the general aim of this study was to propose a cost planning and control model applicable to small rural properties that develop family farming, considering the cost management of their property. Specifically, the study identifies the costs incurred in the development of operations related to family farming and defines management techniques and tools that can be used in the planning and cost control system for small rural enterprises.

This is a case study of a smallholding located in the interior of Rio Grande do Norte. Data collection was conducted by means of a semi-structured interview with the producer, from which the cost management model was drawn up.

The present work is justified by the importance of Accounting in rural areas and how its use can improve the management of small rural properties. Therefore, the aim is to help small producers with this example of cost management, because, in most cases, producers are unaware of the importance of accounting for the success of their activities or believe that it is only used on large properties.

2 THEORETICAL REFERENCE

This topic presents the references that provide a theoretical basis for the study and reflect approaches related to the topic, such as: characterization of production on small rural properties, cost management systems in rural activities and cost management tool techniques.

2.1 CHARACTERIZATION OF PRODUCTION IN SMALL RURAL PROPERTIES

According to Crepaldi (2009 apud BRAUM; MARTINI; BRAUN; 2013), agriculture is any activity that exploits land for the purpose of growing crops, of the most diverse cultivars, exploiting forests and raising several types of animals with the aim of satisfying human beings.

As indicated in the data from the latest Agricultural Census, for the years 2017-2018, conducted by the Brazilian Institute of Geography and Statistics (IBGE), about 76.8% of the 5.073 million rural establishments in the country are characterized as belonging to family farming, as established by Decree 9.064, of May 31, 2017, in which Article 3 characterizes Family Agricultural Production Unit (UFPA) and rural family enterprise those that meet the following criteria:

> *I - Own, in any form, an area of up to four fiscal modules;*
> *II - Use predominantly family labor in the economic activities of the establishment or enterprise;*
> *III - Earn at least half of their family income from the economic activities of their establishment or enterprise; and*
> *IV - The management of the establishment or enterprise is strictly family-based (BRASIL, 2017).*

As stated by Nogueira (2014), the strengthening of family agriculture is of fundamental importance for the development of Brazil, as it is a country of continental dimensions and with large extensions of land that are apt for cultivation and for generation and distribution of income.

For the country's economy, as reported by Cultivar magazine (2019), Family Farming contributes significantly to the Brazilian economy, generating around R$55 billion a year in the country. The

sector is responsible for more than 50% of the food that reaches the Brazilian's table and employs 70% of the workforce in the countryside. As stated by Crepaldi (2012 apud SASSO; BERNARDI, 2016) production in agriculture is constantly improving, making it necessary for the farmers to obtain knowledge and new ways of handling the cultivation of products. This is the case with pig farming, cattle farming, and crops, among others. In this context, production is improved pursuant to the intensified investment in each area, changes in planting methods, animal care, hygiene in the workplace, appropriate structures with standard models, among others. This generates costs for those farmers, and those who depend only on one branch of production suffer serious losses when prices fall.

Based on the 7th Rural Producer Habits Survey of the Brazilian Association of Rural Marketing and Agribusiness (ABMRA, 2017), the biggest challenges faced by rural producers are: first the climate (24%), followed by pests and diseases (11%), and then labor shortages (7%); operational costs represent 4% and problems with information for decision making occupies 16th place, with only 1% believing that it is the first most important factor for the good development of their property.

Based on the data cited above, it can be observed that management on farms is still absent, mainly due to the fact that producers do not prioritize the search for control on their properties, which is justified by the lack of interest in searching for information for decision-making.

For Souza Filho and Batalha (2005), the administration or use of management techniques, control or organization of rural property is still little accepted by producers, as many of them think that dedicating themselves to any activity other than livestock and agriculture would be a waste of time.

Producers who use some sort of control usually do so by writing it down on paper or just keeping the information in their memory, dispensing with any kind of notes. Few use more sophisticated methods, such as electronic spreadsheets or computerized systems.

As advised by Crepaldi (2009, apud VORPAGEL; HOFER; SONTAG, 2015), rural entrepreneurs need the aid of a professional to account for their activities. Having the reports, the administrator will have tools that indicate the best trends in the market and will be able to adequately explore its production cycle, in addition to conducting effective control of the inputs used in production, reducing waste and maximizing profit.

2.2 COST MANAGEMENT SYSTEMS IN RURAL ACTIVITY

Crepaldi (2006, apud MESSIAS, 2018) states that the purpose of Rural Accounting is to control the assets of rural companies, verify results and provide information on the assets and results of these rural companies to users of accounting information. Thus, as Rodrigues, Couto and Vespucci (2018) add, it is the responsibility of Rural Accounting to assist in the management of information for the planning and control of activities, with the aim of safeguarding assets by determining profit and controlling them.

Amaral Junior (2017) reports that Rural Accounting is based on the planning and monitoring of management information for rural companies. As a science, it seeks to highlight the needs of the property in relation to management.

Furthermore, as stated by Amaral Junior (2017), Rural Accounting is a tool that assists in the administrative functioning of the property and its purpose is to: control the assets of rural entities; determine the results of rural entities; provide information on the assets and results of rural entities to the various users of accounting information, highlighting its objective, which is to provide better performance in administration, allowing the producer to obtain a forecast of results, defining the current and future financial course of the companies.

As demonstrated by Silva and Anjos (2019), producing without having control of expenses is a risk that most producers incur, because they usually do not know the yield/profit of a given product, which results in them not recovering what was lost in a failed production.

Rural accounting comes in exactly for this, to account for expenses, costs, revenues, profits and whether it is bringing positive yields for the producer. For this reason, conforming to Kruger, Mazzioni and Boettcher (2009), Rural Accounting has several purposes related to the control and planning of activities in the rural environment, regardless of the activities conducted on the property. It becomes a support mechanism for decision-making, as it provides information on the conditions for expansion, the need to reduce costs or expenses, the need to seek resources, possibilities for investments, and so forth.

According to Crepaldi (2010, apud BORSOI, 2017) cost accounting is a technique used to identify, measure and report the costs of products and/or services, whose function is aimed at producing accurate information for decision-making. For Bruni and Famá (2012 apud BORSOI, 2017), cost accounting can be defined as an organized process that uses general accounting principles to record a company's operations, enabling, through the collection of data from all areas, the identification of total and unit costs of all products manufactured or services provided, with the aim of achieving rational and efficient management.

The Accounting Practices Center (IBRACON, 1999) states that costs are the sum of the expenses incurred and necessary for the acquisition, conversion and other required procedures to bring inventories to their current condition and location, and comprise all expenses incurred in their acquisition or production, in order to put them in a position to be sold, transformed, used in the preparation of products or in the provision of services that are part of the entity's corporate purpose, or accomplished in any other way.

In this way, costs are the sums spent on goods and services for the acquisition of other goods and services and are directly linked to the activity of the company and its production or stocks. They differ from expenses, which are sums spent on goods and services, but are more related to the administrative area and not linked to production.

Costs are divided into direct and indirect costs. Direct costs are those that are linked to the product and are therefore easy to identify. As demonstrated by Andrade et al. (2011), direct costs are those that can be allocated directly to products, without having to be apportioned. To do so, a measure of consumption must occur, which can be labor used in production, consumption of materials.

In relation to Rural Accounting, Crepaldi (2016 apud BORSOI, 2017) defines direct costs as those that have a unit of measurement and, thus, can be directly appropriated to the agricultural product. As examples he cites, direct labor , inputs, depreciation of agricultural machinery (when used in the production of just one type of product), and others.

Indirect costs are those that are not directly linked to the manufacturing process of the products, that is, they need to be apportioned where the indirect cost is allocated to the products. Still citing Andrade (2011), indirect costs must be allocated based on apportionment criteria, and must be apportioned due to not having an objective measurement condition, with the need for allocation to products and services based on estimates.

Following the conceptualization of costs, fixed costs are those that do not vary regardless of the quantity produced. As believed by to Fontoura (2013 apud BORSOI, 2017) fixed costs are those that do not vary conforming to the quantity produced, i.e. they will have to be disbursed regardless of whether there is production or not.

Variable costs, on the other hand, are those that vary conforming to the volume produced. Crepaldi (2010 apud BORSOI, 2017) demonstrates that variable costs are those that vary proportionally to the volume produced. He cites raw materials and packaging materials as examples. These costs will suffer an increase or decrease in their consumption, depending on production in the period.

Considering the scenario in the livestock sector, in which, most of the time, it takes longer to invest before making a profit, the control of costs linked to production becomes indispensable in the analysis. This is because, by classifying fixed, variable, direct and indirect costs, the analysis becomes more reliable and concrete for decision-making.

According to Silva et al (2015), measuring the cost of production is not always an easy task, as it involves costs with inputs; medicines; labor; pasture exhaustion; depreciation of equipment and infrastructure and others. The information is relevant for analyzing how financial resources are being used in the process of production and its profitability.

2.3 COST MANAGEMENT TECHNIQUES AND TOOLS

Accounting can play an important role as a management tool in rural properties, being able to provide information that assists in planning, control and decision-making, transforming rural properties into companies with the capacity to monitor the evolution of the sector, especially with regard to the objectives and responsibilities of financial management, cost control, crop diversification and comparison of results (HOFER; BORILLI; PHILIPPSEN, 2006).

Costing methods are tools that assist in the decision-making process. According to Abbas, Gonçalves and Leoncine (2012), these methods are used to, among many other pieces of information, determine the value of funding objects; reduce costs, improve processes; eliminate waste; decide whether to produce or outsource; and eliminate, create and increase, or decrease, the production line for certain products.

These methods include absorption costing, variable costing, and activity-based costing. According to Hernandez (2001, apud DELIBERAL et al., 2013) in absorption costing, all costs are allocated to the manufactured products. In this way, all costs, direct and indirect, are incorporated into the products: direct costs, through direct appropriation, and indirect costs, through allocation based on apportionment criteria.

Direct or variable costing, for Crepaldi (2004 apud DELIBERAL et al. 2013), is a type of costing that considers as production costs of the period only the variables that occurred, not considering fixed costs as production costs, but rather as expenses. Direct costing is based on the separation of expenses into fixed and variable, that is, expenses that fluctuate according to the volume of production/sales and expenses that remain stable, regardless of the volume of production.

For Reginato and Collattonesse (2005), in this method, production costs and expenses are separated into fixed and variable, with the aim of developing information to help managers in the performance of their duties and in decision-making. It therefore aims to record and report information for management purposes and to meet the requirements of internal users.

According to Almeida (2008), this tool is of great usefulness to managers, as its information helps in decision-making, offering objective possibilities for behavioral analysis of costs, the decision to be made in relation to the sales price in various situations as well as the profitability of the product for the company, and the improvement of planning and control.

By using variable costing, the contribution margin can be used, which is the revenue remaining after the sale of a certain product, i.e. through the contribution margin it is possible to know if the company is making a profit, even after paying fixed costs and expenses. According to Bernardi (1996), it is the difference between the amount of revenue and the variable sales costs. The formula for calculating the contribution margin is:

MC = Sales income – (Variable Cost + Variable Expenses) (1)

For Abbas, Gonçalves and Leoncine (2012), this tool makes it possible to evaluate how much each good or service contributes to paying fixed costs, fixed expenses, and generating profit. The contribution margin calculated by variable costing makes it possible to conduct a cost/volume/profit analysis, which helps in evaluating the results in relation to the established goals. With the use of the contribution margin, the Break-Even Point is reached, which is a valuable tool for operational results, in which the company's total income can be identified to match the total costs and expenses, without generating profits, however, without losses.

Finally, Activity-Based Costing (ABC), according to Mauss and Costi (2004), is a costing method that aims to accurately evaluate the activities conducted in a company, using drivers to allocate expenses and indirect costs of a more realistic approach to products and services. ABC assumes that it is not the product or service that consumes resources, but rather, resources are consumed by activities, and these, in turn, are consumed by products or services.

According to Crepaldi (2016, apud BORSOI, 2017), knowing the true cost of the product allows the producer not to make two common mistakes: the first is to sell the product at a much higher price than the market and thus not be able to compete; and the second is to offer the product at a much lower price than the market, which could lead to a loss of profitability and the risk of reaping the success of the business.

Setting the sales price in a company, regardless of its segment, is the basis for making a good profit because it needs to be higher than its costs and expenses, and in order to identify these, accounting must be used.

In the context of rural production, according to Gura (2018), the selling price can rarely be negotiated between the producer and the consumer, which makes cost management even more relevant for the producer, as through it, profits can be maximized.

3 METHODOLOGY

Methodology, at an applied level, examines, describes and evaluates research methods and techniques that enable the collection and processing of information, aiming to address and solve problems and/or research questions (FREITAS; PRODANOV, 2013).

The present study consists of the analysis of a rural property in the interior of the state of Rio Grande do Norte, and it seeks to deepen the knowledge of the study approached during the course of the study. This property has several branches of work, from the sale of goats, sheep, and cattle to the sale of meat. Data was collected through a semi-structured interview to gather information from the producer, which served as the basis for the definition of the appropriate cost management model for the property.

This research has a predominantly qualitative approach, as it will be based on the producer's narratives and experiences in order to obtain a better view and understanding of the property's behavior in relation to cost management, which will be used to build the cost model proposed in the study's objectives.

The main objective of creating this cost management model is to make it an accessible and easy-to-implement tool for small farms, where producers do not make much use of rural accounting and control techniques.

3.1 DATA COLLECT

The study was divided into two stages. First, we sought to identify the costing methods that the producer uses on his property through an interview and a table referring to the costs incurred; both were answered directly by the producer based on his knowledge. Then, based on the results, a cost model to be used was suggest to facilitate control and management of the property. The semi-structured interview took place online, on March 23, 2022, and was previously scheduled with the producer.

4 DATA PRESENTATION AND ANALYSIS

At first, the interview was brief, with questions about the property and the producer himself, who made it clear that he has experience in the area and has been farming for over 25 years.

The property is located in the west of the state of Rio Grande do Norte, in the rural area of the municipality of Mossoró, and has an area of 16 hectares. As stated by Law No. 8.629 of February 25, 1993 - the Agrarian Reform Law - art. 4, II, a small rural property is one with an area of up to four fiscal modules. In Brazil, each fiscal module varies between 5 and 110 hectares, a value set by INCRA (National Institute for Colonization and Agrarian Reform), which fluctuates for each municipality.

The activities conducted are varied and include planting corn, sorghum, and beans with the sole purpose of feeding the animals; there is also the sale of fat cattle and cattle for breeding and rearing, and sheep and goats for beef. The selling prices established vary conforming to the industry; for example, the fat cattle are sold at the market price, while the breeding cattle are sold to maximize profits.

The control done on the property is through notes in notebooks or even control done only in the head of the producer, who pointed out that he has access to the internet, but does not have a computer, and consequently spreadsheets and control and recording systems. Despite this, he has shown that his control is efficient with the little information he has. This includes the fact that the property's income and expenses are measured separately from his personal income and expenses, as well as the ease of identifying both and having an average of his profits.

When asked about his knowledge of cost management and its importance, the farmer replied that he had some understanding of cost management, saying that he does this by taking notes on the cost of planting, preparing and storing silage, as well as the cost of selling animals. The producer stressed the importance of identifying whether his activities are making a profit or a loss, pointing out that he is aware of the importance of knowing what he is spending, what he is producing, what comes in and out of his property and the financial return it is bringing in. He ended by emphasizing the importance of cost management on his property, even if to a lesser extent than others, because through it he has basic control of the profitability he is getting from the activities he conducts.

The information contained in Table 2 refers to costs incurred in just one month, except for the costs of producing fodder, which are costs incurred only once a year.

Table 2 – Monthly costs incurred on the property

COSTS INCURRED	VALUE R$
Direct labor	1.000,00
Fuel	1.500,00
Eletricity	250,00
Water	200,00
Medication	400,00
Number of people working	1
Cost of feed and additives	1.100,00
Internet	60,00
Machinery and equipment rental	1.500,00
Cost to produce forage (annual)	2.000,00
Materials and inputs (fertilizers, manure/insecticides)	600,00

Source: Author (2022).

In other words, the lack of rural accounting in these small establishments means that there is no guarantee that profits are actually being made, just as there are few management and decision-making tools. Thus, in accordance with the aim of this study, it is worth emphasizing how the profits and management of this property would be achieved using some kind of costing method.

4.1 MODEL PROPOSAL

In light of what was presented in the interview and the results of the costs incurred on the property, as well as the cost concepts covered in the theoretical framework, a cost method is proposed in order to answer the study's main question and its objectives.

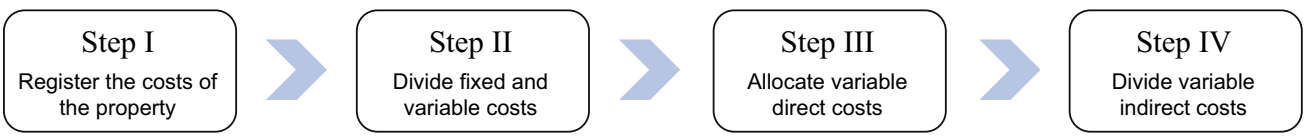
It should be noted that the proposed model is based on the data obtained from the answers given by the producer, and therefore considers the situation of the property in question. All costs, which are considered fixed or variable, were defined considering the activities conducted and the specific use of inputs in production.

The method of costing proposed is variable or direct costing because it allows costs to be divided into fixed and variable. Based on this division, the costs can be allocated to the respective activities (cattle, sheep or goat farming), in order to determine which will be the most profitable.

Other advantages of using this method would be the speed with which accounting information is obtained, the ease in controlling fixed costs, precision in profit planning and decision-making. Taking into consideration the advantages presented, it can be seen that variable costing will quickly and accurately provide the property manager with information considered relevant for management, on which this study is based.

To implement this method, the producer would need to follow some steps, which will be exposed and explained in Figure 1:

Figure 1 - Steps to implement variable costing method



Source: Author (2022)

The first step consists of recording the costs incurred within the property, because without the facts, nothing can be accounted for in order to assist in the management of the property. After identifying the costs, it is necessary to separate them into fixed costs and variable costs. Table 3 brings a brief example of both:

Table 3 – Fixed and variable costs identified on the property

FIXED COSTS	VARIABLE COSTS
Fuel	Water
Internet	Eletricity
Alterar para: Machinery and equipment rental	Feed and additives
Materials and inputs (fertilizers, manure/insecticides)	Direct labor
Cost to produce forage (annual)	
Medication	

Source: Author (2022)

The rental of machinery and equipment, which is considered a fixed cost, refers to the annual cutting of land for planting. As it only occurs once a year and in a specific area of the property for planting, it is considered a fixed cost.

The same applies to the cost of producing fodder, which would be the silos. After planting and harvesting, the fodder is turned into silage to feed the animals. As the area is small, planting is done regardless of the number of animals, and in the period in which it ends, the producer begins to increase the amount of feed and additives purchased. The same criterion applies to materials and inputs, as they are directly linked to planting.

Medicines are included in the fixed costs, as they are not linked to production; even though they are indispensable for management, their use or disuse does not alter production results.

Moving on to Stage III, it is necessary to allocate the Direct Variable Costs to the property's activities (cattle, sheep and goat farming), in this situation, including feed and additives, i.e. these are directly linked to production within the property; the more animals, the higher these costs will be and likewise for when you have fewer animals.

For indirect costs, the last stage, an apportionment basis must be set up so that these costs are allocated to each activity specifically.

Table 4 – Apportionment basis for indirect costs

INDIRECT VARIABLE COSTS	APPORTIONMENT BASIS
Water	Average water consumption/ animal
Eletricity	Percentage of activities/average energy cost

Source: Author (2022)

Water is included in the apportionment, as there is no way of knowing exactly how many liters are consumed by each species of animal, whether cattle, goats or sheep; therefore, an average is made of how much each small or large animal consumes per day and multiplied by the total number of animals on the property. It is worth noting that water is only used for this purpose, since there is no irrigation or any other activity that requires its consumption.

Energy, on the other hand, is included in the variable and indirect costs, as it is linked to the supply of food on the property, which has a forage crusher used to process feed for all the animals. Thus, the more animals there are, the greater the amount of feed and consequently the use of the crusher, increasing electricity costs.

As a basis for apportioning electricity, it will be necessary to calculate the average percentage share of each activity. For example, 70% of cattle and 30% of goats and sheep, so the producer would simply divide the total energy cost of the property by the proportion of each of the activities developed.

Direct labor can also be considered an indirect variable cost, but since there is only one employee on the property, there would be no apportionment basis, just a proportion based on to the number of animals, since it is understood that the more animals of a given species, the greater the number of working hours devoted to that specific activity.

By using the variable costing method, as described above, the producer will be able to know which of the activities developed on the property brings the most profitability to his business, how much each one contributes isolatedly, and thus be able to invest more in it. This is one of the many advantages that accounting information obtained through the use of cost accounting could bring to management and decision-making.

4.2 APPLICATION OF THE PROPOSED MODEL

The proposed model considers the use of indirect cost apportionment, which requires some quantitative information on the property, which is presented in Table 5.

It should be noted that information on water consumption varies conforming food intake, sex, temperature, and other external factors that cause this amount to increase or decrease, that is, the conditions in which the animals on the property are located. It was a partial average of what they consume daily.

Table 5 – Relevant information to calculate the Contribution Margin

APPORTIONMENT BASES	CATTLE FARMING	GOAT FARMING	SHEEP FARMING
Average number of animals	20	70	12
Average daily feed consumption	14Kg/day	1,2Kg/day	1,0Kg/day
Average daily water consumption	15L/day	3,0L/day	3,5L/day
Average monthly income from animal sales	29.000,00	5.500,00	650,00

Source: Author (2022)

The average feed consumption per day also varies according to the factors above and the period of the year; however, in the month studied, the consumption was as exemplified above, remembering that the feed considered is that which is purchased from third parties.

The sales income is also being calculated on a monthly basis, as indicated by the sales of the month studied, varying by weight, age, and race—a small estimate of what goes into the property.

With these values obtained, together with the others, the contribution margin of the activities conducted can be calculated.

Table 6 shows the incomes attributed to each of the activities, identifying the costs and the contribution margins. From this income statement, it is clear which activity contributes the most to covering fixed costs on the property.

It can be noted that when applying the concepts of variable costing, the activity that contributes the most is cattle farming, which could also be the one in which the producer invests the most, as it is the most profitable, as shown in the analysis. The one that contributes the least is sheep farming. This is considered in this particular month that the study was conducted.

It is important to emphasize that the results were obtained from the information provided by the producer, arriving at an estimate of the real values, as only what he records was analyzed. It is also important to remember that the results may vary conforming to the situation of the property during a given period and certain events that may occur. This is information specific to the property studied.

Table 6 – Result statement using variable costing

ACTIVITIES	MONTHLY INCOME	MONTHLY VARIABLE COSTS	CONTRIBUTION MARGIN
Cattle Farming	29.000,00	1.172,38	27.827,62
Goat Farming	5.500,00	1.179,30	4.320,70
Sheep Farming	650,00	197,25	452,75
Total	35.150,00	2.548,93	32.601,07
(-) Fixed costs			5.660,00
Fuel	1.500,00		
Internet	60,00		
Machinery and equipment rental	1.500,00		
Materials and inputs (fertilizers, manure/insecticides)	600,00		
Cost to produce forage (annual)	2.000,00		
(=) Net profit for the period	-	-	26.941,01

Source: Author (2022)

5 FINAL CONSIDERATIONS

Rural accounting is also present in small rural properties, even if it is the way in which producers record their information and make their decisions, showing its importance in managing such businesses.

This work aimed to study cost management in small rural properties and, based on the information obtained, propose a cost model to be used by the producer in order to assist in decision-making and property management.

The chosen property is located in the interior of the state of Rio Grande do Norte. It has 16ha and conducts livestock farming activities, such as cattle farming, sheep farming, and goat farming. The methodology used was a semi-structured interview conducted with the producer, and from this, based on the concepts covered, a costing method was proposed, the Variable Costing Method.

Variable costing is a method that considers only variable production costs and considers fixed costs as expenses. In this separation of costs, variable costs are divided into direct and indirect costs in order to make the information even more precise. After proposing the costing method, the steps that would be necessary were separated to make implementation possible.

With the proposed model chosen, it was possible to apply it, considering some information obtained. Among the three activities conducted by the producer (cattle, goat, and sheep farming), it was cattle farming that contributed the most, considering its contribution margin.

At the end of this study, its objective was achieved, and it was identified that the producer, even in a simple way, can have some control over income and expenses. However, through the proposed method, considering the information that would be available for use, the profitability of the activities conducted could increase, mainly through the use of the apportionment bases and the contribution margin of each one.

The proposed model covers the intention of serving other small properties, highlighting that each one is a specific case, and other factors would need to be taken into consideration.

During the research, some limitations were found, one of which was the fact that the producer did not record all his costs and did not have direct control over his incomes either, which in a way made it difficult to apply the model and obtain the results.

REFERENCES

ABBAS, K.; GONÇALVES, M. N.; LEONCINE, M. Os métodos de custeio: vantagens, desvantagens e sua aplicabilidade nos diversos tipos de organizações apresentadas pela literatura. **Contexto**, Porto Alegre, v. 12, p. 145-159, jun. 2012.

AGRICULTURA familiar movimenta a economia brasileira. Cultivar Revista. Disponível em: https://www.grupocultivar.com.br/noticias/agricultura-familiar-movimenta-a-economia-brasileira. Acesso em: 27 out. 2021.

AMARAL JÚNIOR, E. P. **A importância da contabilidade rural**. 2017. 21 f. TCC (Graduação) - Curso de Ciências Contábeis, Centro Universitário do Cerrado Patrocínio, Patrocínio – Mg, 2017.

AMBON, E. P.; BEE, D. Gestão de custos no agronegócio: um estudo de caso em uma propriedade rural em Ibiaça-RS. *In*: CONVENÇÃO DE CONTABILIDADE DO RIO GRANDE DO SUL, 15., 2015, Bento Gonçalves. **Anais** [...]. Bento Gonçalves: CRC-RS, 2015.

ANDRADE, M. G. F., *et al*. **Controle de custos na agricultura: um estudo sobre a rentabilidade na cultura da soja.** *In:* XVIII Congresso Brasileiro de Custos, 2011, Rio de Janeiro. **Anais** [...]. Rio de Janeiro: 2011.

BERNARDI, L. A. **Política e formação de preços**. São Paulo, 1996.

BORSOI, A. P. **Custos na atividade rural: um estudo de caso na produção de macieiras, ameixeiras e pessegueiros em uma propriedade familiar na serra Gaúcha**. 2017. 125 f. TCC (Graduação) - Curso de Ciências Contábeis, Universidade de Caxias do Sul, Caxias do Sul, 2017.

BRASIL, **Decreto nº 9.064**, de 31 de maio de 2017. Dispõe sobre a Unidade Familiar de Produção Agrária. Brasília, 2017. Disponível em: http://www.planalto.gov.br/ccivil_03/_ato2015-2018/2017/decreto/d9064.htm. Acesso em: 11 mar. 2022.

BRASIL**, Lei nº 8.629**, de 25 de fevereiro de 1993. Dispõe sobre a regulamentação dos dispositivos constitucionais relativos à reforma agrária. Brasília, 1993. Disponível em: http://www.planalto.gov.br/ccivil_03/leis/l8629.htm. Acesso em: 20 mar. 2022.

BRASIL. Ministério da Agricultura, Pecuária e Abastecimento. **Agricultura Familiar.** Disponível em: https://www.gov.br/agricultura/pt-br/assuntos/agricultura-familiar/agricultura-familiar-1. Acesso em: 13 set. 2021.

BRAUM, L. M. S. *et al*. Gerenciamento de custos nas propriedades rurais: uma pesquisa sobre o uso dos conceitos da contabilidade de custos pelos produtores. *In:* CONGRESSO BRASILEIRO DE CUSTOS, 20., 2013, Uberlândia, Mg. **Anais** [...]. Uberlândia, Mg: 2013.

DELIBERAL, J. P. *et al***.** Gestão de custos em propriedades rurais: estudo de caso no Rio Grande do Sul. *In:* ENCONTRO NACIONAL DE ENGENHARIA DE PRODUCAO, 33., 2013, Salvador, Ba. **Anais** [...]. Salvador, Ba: 2013.

GURA, A. **Gestão de custos: práticas utilizadas em propriedades rurais familiares**. 2018. Dissertação (Mestrado em Engenharia de Produção) - Universidade Tecnológica Federal do Paraná. Ponta Grossa, 2018.

HOFER, E. *et al.* Contabilidade como ferramenta gerencial para a atividade rural: um estudo de caso. *In*: ENCONTRO DA ANPAD, 30., 2006, Salvador, Ba. **Anais** [...]. Salvador, Ba: 2006.

IBRACON. **NPC 2 - Pronunciamento Instituto dos Auditores Independentes do Brasil - IBRACON nº 2 de 30/04/1999**. Disponível em: http://www.portaldecontabilidade.com.br/ibracon/npc2.htm. Acesso em: 28 out. 2021.

KRUGER, S. D., *et al.* **A importância da contabilidade para a gestão das propriedades rurais.** *In:* Congresso Brasileiro de Custos, 2009, Fortaleza. **Anais** […]. Fortaleza: CBC, 2009.

MAUSS, C. V.; COSTI, R. M. **O Método de custeio ABC como instrumento de gestão**. Rio Grande do Sul, p. 01-12. Disponível em: https://www.aedb.br/seget/arquivos/artigos06/784_Artigo%20Abc_Seget1.pdf. Acesso em: 29 set. 2021.

MESSIAS, E. P. **O controle de custos em empresas rurais**. 2018. TCC (Graduação em Ciências Contábeis) - Universidade Federal de Uberlândia. Uberlândia, 2018.

PIB DO AGRONEGÓCIO alcança participação de 26,6% no PIB brasileiro em 2020. **CEPEA**, Superintendência Técnica da Cna e *et al.* Disponível em: https://www.cnabrasil.org.br/boletins/pib-do-agronegocio-alcanca-participacao-de-26-6-no-pib-brasileiro-em-2020. Acesso em: 12 set. 2021.

PRODANOV, C. C.; FREITAS, E. C. **Metodologia do trabalho científico:** métodos e técnicas da pesquisa e do trabalho acadêmico. 2. ed. Novo Hamburgo: Editora Feevale, 2013. Disponível em: https://docente.ifrn.edu.br/valcinetemacedo/disciplinas/metodologia-do-trabalho-cientifico/e-book-mtc. Acesso em: 27 set. 2021.

ROSA NETO, C.; SILVA, F. A. C.; ARAUJO, L. V. **Qual é a participação da agricultura familiar na produção de alimentos no Brasil e em Rondônia?. Rondônia. 2020.** Disponível em: https://www.embrapa.br/busca-de-noticias/-/noticia/55609579/artigo---qual-e-a-participacao-da-agricultura-familiar-na-producao-de-alimentos-no-brasil-e-em-rondonia. Acesso em: 12 set. 2021.

SILVA, A. F.; ANJOS, M. A. D. A contabilidade rural e suas particularidades na agricultura familiar. **Repositório UNIFUCAMP**, 2019. Disponível em: http://repositorio.fucamp.com.br/bitstream/FUCAMP/494/1/Contabiliadaderuralsuas.pdf. Acesso em: 28 de set. 2021.

SILVA, C. T., *et al.* Custo de Produção em Pecuária de Corte com Aplicação do Custeio Variável. **ResearchGate**. Maringá: UEM, 2015. Disponível em: https://www.researchgate.net/profile/Kerla-Mattiello/publication/303288923_Custo_de_Producao_em_Pecuaria_de_Corte_com_Aplicacao_do_Custeio_Variavel_Production_cost_in_Beef_Cattle_Variable_Costing_Application/links/573b343f08ae9ace840ea185/Custo-de-Producao-em-Pecuaria-de-Corte-com-Aplicacao-do-Custeio-Variavel-Production-cost-in-Beef-Cattle-Variable-Costing-Application.pdf. Acesso em: 07 mar 2022.

SIMIONATTO, F. J., *et al.* **Indicadores econômico-financeiros da produção leiteira em propriedades rurais do município de São Lourenço do Oeste – SC.** *In*: XXIV Congresso Brasileiro de Custos, 2017, Florianópolis, **Anais** [...]. Florianópolis, 2017.

SOUZA FILHO, H. M.; BATALHA, M. O. **Gestão integrada da agricultura familiar**. São Carlos: Edufscar, 2005.

VORPAGEL, A. C. M. *et al*. Gestão de custos em pequenas propriedades rurais: um estudo aplicado no município de Marechal Cândido Rondon – PR. *In*: CONGRESSO BRASILEIRO DE CUSTOS, 22., 2015, Foz do Iguaçu, **Anais** [...]. Foz do Iguaçu, 2015.