Cost management for economic sustainability and competitiveness in viticulture: study in a Brazilian wine property

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Abstract

This research aims to demonstrate which of the vine varieties grown on a property in the southern region of Brazil is more profitable, in order to increase the economic sustainability and competitiveness of the business. Therefore, as a methodology, a descriptive-qualitative case study was carried out. The economic results show that the Moscato variety is the most profitable and, therefore, may be responsible for the viability and continuity of the property under study, since it is the variety that most contributes to the economic sustainability and consequent competitiveness of the enterprise.

Keywords: Costs. Economic Sustainability. Viticulture. Vines. Competitiveness

1. Introduction

Agribusiness is one of the Brazilian economic segments that is constantly advancing, generating income and employment for a large number of people in the population. According to the Center for Advanced Studies in Applied Economics (CEPEA, 2021), agribusiness had a

share of 26.6% in Brazilian GDP in 2020. In this listed segment of activities, income is generated through the viticulture branch in which many of the farms and enterprises of their viticulture produce. There are many cultivated in several Brazilian agricultural areas, but the great accumulator is concentrated in the state of Rio Grande do Sul, where its largest producing region is the Serra Gaucha (SECRETARIA DE PLANEJAMENTO DO RIO GRANDE DO SUL, 2020).

Viticulture is a sustainable economic generation system for family farming, where the vast majority are people of the same family who work in the maintenance of the cultivation. According to the Instituto Brasileiro de Geografia e Estatística - IBGE (2019), about 10.1 million people in 2017 worked in family agricultural. Thus, in the field of viticulture, according to Mello and Machado (2020), an area cultivated with vines in Brazil was 75,731 hectares in 2019, where the state of Rio Grande do Sul represented a total of 62.72% of this cultivated area.

Furthermore, according to the International Organisation of Vine and Wine (OIV), there was a wine production of 260 million hectoliters worldwide, corresponding to 7.40 million hectares of vineyards, in the 2019/2020 harvest, whereas Brazil produced 1.92 million hectoliters of wine in the same period (OIV, 2021). Considering the Brazilian production, at about 55 % of grape production is used for winemaking, 35 % is destined for in natura consumption, 6 % is used for juice production, 2 % for the production of raisins, and 2 % is used in the production of teas, infusions, and essences (MELLO, 2017).

The development and economic expansion of agribusiness, especially viticulture, means that the productivity of properties is exploited aiming profitability, however, without harming the environmental system, promoting sustainability. The economic sustainability dimension will be addressed with greater breadth in this research, showing how each variety impacts agricultural inputs and thus demonstrates financial balance with less interference in the environment. The objective in the search for economic sustainability is combined with environmental sustainability, seeking significant results for the entire society, where the natural environment is preserved for the next generations and rural properties with greater financial autonomy.

Therefore, an allied in this search is the management of the costs incurred during the processing of the harvest, in order to be aware of everything that is being disbursed and which management analysis would be the most suitable for the property. According to Megliini (2011) the costs are determined for reach the objectives related to the control of operations and for decision making.

In this research we will have a case study which is carried out in a family wine estate located in the Wine and Grape Region. According to the Secretary of Development and Tourism RS (2021), the region Wine and Grapes is characterized by the Italian architecture and gastronomy, where the slopes are designed by the vineyards and their charming wineries, which open their doors to the tasting of wines and sparkling wines. A large production of grapes is concentrated in this region, which generates economic sustainability for the cultivation properties.

The following property is located in the South of Brazil, which cultivates grapes of the following varieties: Bordo, White Moscato, White Niagara, Rose Niagara, Concord and Isabel. This study shows how cost analysis can contribute to the search for economic sustainability in rural activities.

In this context, the present research aims to evaluate the costs incurred in the production of grapes on a property in the Grape and Wine Region. The research question is: How is it possible to increase the economic sustainability of a rural property located in the South of Brazil that produces grapes of different varieties? To obtain the answer to the research question, the purpose of this study was to demonstrate which of the cultivated varieties of vines is the most profitable and the most productive on the property, in order to expand its economic sustainability and competitiveness.

The present research is important to put into practice all the concepts studied, and to help grape growers in decision making, when they want to expand or renew the cultivation of their vines, so they can use it as a basis to know which of the varieties under study is the most sustainable. This knowledge also servs as a basis of costs incurred during production and how they can be distributed, demonstrating how cost management can be a great ally in the economic expansion of an agricultural activity. Also, it is an allied tool for verification and observation of costs in rural accounting, in order to demonstrate how the management of an accounting professional can become a tool that helps producers in the expansion and sustainability of their crops.

2. Backgroud

2.1. Sustainability

Sustainability is a topic that has been worked very carefully because it’s importance to

have a life with natural and economic resources in the presente moment without compromising next generations. According to Costa (2013), the sustainability paradigm has been crossing most areas of knowledge and in addition promoting deep reflections on the way human society has been developing and how it relates to ecological and cultural diversities.

Considering agriculture, the Food and Agriculture Organization of the United Nations (FAO) has adopted, since 1989, a concept of "sustainable agriculture and rural development" based on environmental conservation (soil, water and animal and vegetal genetic resources), economic viability and social acceptance when aligned with the most-known concept of sustainable development from Report of Brundtland and the three pillars (or dimensions) of sustainable development: environmental, social and economic (FLORES, 2018).

According to Elkington (2012), the sustainability can be defined as a principle which limits a range of environmental alternative considering that today actions cannot limit the economic, social and environmental options available for future generations. Therefore, the concept of sustainability its similares with the sustainable development with can satisfy the needs of the current generations without compromisse the ability for futures genarations fuklfill it own necessities and aspirations (BOFF, 2016).

The economic term of sustainability linked to sustainable development emerged from the objective of creating cultures that promote the harmony between societies and nature, through the insertion of an environment dimension in all aspect of economic life and its planning indeed the creation of politics managments until patterns of production and consuption with an equitable distribution. (DAYS, 2015).

Sustainability accordantly Flores (2018) is a paradigm that affects many sectors due to an increasing pressure from customers and markets, for economic or political reasons, it is a relative consensus that to deal with sustainability is a necessary challenge, imposed to all society's sectors, considering the environmental degradation and its social consequences that affect even the economic dimension.

For the development and implentation of the sustainability Pasqualotto, Kaufmann and Wizniewsky (2019) report that it is necessary to consider several aspects, so that development does not occur in just one factor. These aspects, better known as dimensions according to Costa (2013), are determined as follows: Environmental, economic and social. Thus, the dimensions reported must always complement each other, in order to have a balanced development. According to Barbieri et.al (2010), it is not enough just to innovate constantly, but always to innovate considering the three dimensions of sustainability. Dias (2015) reports that it is important to analyze each of the dimensions, where they offer the

opportunity to go deeper into each aspect of the problem.

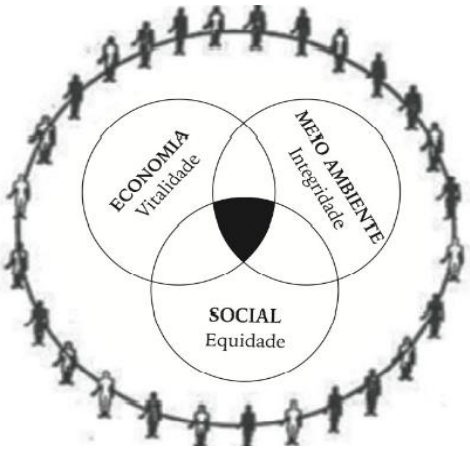

Figure 1: The three dimensions of sustainability

Source: Dias (2015 p. 45).

The environmental dimension, according to Elkington (2012), considers minimizing environmental impacts with actions that contribute to conscious consuption of natural resources, in addition to recycling and the elimination of unnecessary expenses, evaluating organizational operations that can significantly affect the access of future generations to these resources. Considering Oliveira, Cezarino and Liboni (2019, p.9) opinions the environmental sustainability "both the production model and the consumption model must be compatible with the natural environment and the available economic structure".

The economic dimension, according to Barbieri et.al (2010), means a concern with economic efficiency, where for entities it means obtaining profits and generating competitive advantages in their operate scenarios. For Scheuermann (2019), the purpose of the economic dimension is to observe and measure the viability of projects, making them attractive to investors aiming their efficient use of natural resources.

The social dimension accordantly Dias (2015) refers to the social conditions of life of different human populations, regarding their beliefs, values and characteristics, or at least survival conditions for an individual who must take into account their overcoming. For Scheuermann (2019), the social dimension is concerned about issues related to the benefits for societies in their well-being, their quality of life and also fair treatment of workers.

A simpler interpretation of the triple bottom line shows that each of the three componentes (economic, environmental, and social) must be of equal importance and interact evenly. Meantime to farmers the three components of environment, economics, and social do

not necessarily interrelate evenly, and triple bottom line assessment needed to take into consideration a minimum of three additional elements: i)trade-offs between those three components; ii) time; and iii) contexto (SANTIAGO-BROWN et al., 2015).

The basic idea is that the triple bottom line of economic, environmental, and social sustainability should be promoted by implementation of appropriate environmental sustainability programs, applied to production, transformation, warehousing, and packaging. Identification of environmentally sustainable activities should be based on an environmental risk assessment, and priority should be given to significant and unique risks in individual geographic regions where wineries and vineyards are located (MARIANI & VASTOLA, 2015).

In the present study, economic sustainability and its implementation in the properties will be considered, how this can improve the financial result through the knowledge of costs and sales price. According to Comunello and Correa (2017), as agricultural organizations have a direct relationship with sustainability, since the beginning of civilizations, food production is important for direct development of maintenance relationships with the environment, in order to extract from it the sources for activities.

Besides that, the wine industry is concerned about sustainability considering two main issues: it confronts threats from sustainability problems, such as climate change, chemical exposure and water and energy availability and, at the same time, its activities and their own impacts are not well explored by literature. On the other hand, in this industry sustainability can also be a competitive factor, a driving market strategy and a key to innovation process (FLORES, 2018).

The economic dimension in agricultural activities, according to Pasqualotto, Kaufmann and Wizniewsky (2019), assists the process of maintaining sustainable rural development, through agricultural families that improve their distribution channel for sustainable development. In the economic axis Comunello and Correa (2017), highlight the analysis need about the return that propertie provide for its owners, in order to actually have an account of the economic dimension regarding the place. Thus, an analysis is made of rural sustainability, which according to Potrich, Grzybovski and Toebe (2017), is considered a management model that contemplates the development of productive activities, through techniques wich preserv and create a at least a less impacto on natural resources and, at the same time, that produce economic and financial results to the rural owner and his family that works at the place in order to optmize the cultural production implemented the region and also satify the rural family necessities as weel as the community.

The rural sustainability according to Pot Grzybovski and Toebe (2017) occurr throughout transformation of the geographic space, in order to have a rural continuity of the small producer in social, economic and environmental life with a good quality. Costa (2013), portrayts the operationalization of the sustainability index, as a management tool, supporting the useful decision-making process, thus establishing a series of measures. Therefore, it can be concluded according to Pasqualotto, Kaufmann and Wizniewsky (2019), that sustainability in accordance with rural development can be understood as representing the maintenance of production, with the purpose of supplying the whole society, ensuring that the natural environment does not go through a process of intense degeneration and exploitation, for sustainable agriculture to take place.

2.2. Viticulture

2.2.1. Viticulture origin

Viticulture, according to Mello and Machado (2020), constitutes an important source of income in several regions of Brazil, largely cultivated in family farming on their small properties. The activity of the viticulture has contributed to rural sustainability, generating income for producers and employment for many people who are part of the process of transforming grapes into their final products.

The vines that support the generation of grapes arrived in Brazil in 1532, brought by the colonizing expedition of Martim Afonso de Souza, where the first owner who carried out the cultivation of the vine in Brazilian lands was Brás Cuba (ASSOCIAÇÃO BRASILEIRA DE ENOLOGIA- ABE, 2017). In the state of Rio Grande do Sul, as exposed by the small town of Bento Gonçalves (2021), the vines arrived in the year 1626, where the Jesuit priest Roque Gonzáles would have brought them, who became the forerunner and pioneer of the Rio Grandense viticulture. The first vine seedlings that were of Spanish origin did not adapt very well to the soil, but the production of wine was necessary for the realization of the masses, and with this factor, around the year 1840, the seedlings of American varieties arrived in the state, particularly Isabel type, becaming viticulture an expressive economic activity (ABE, 2017; MUNICPIPIO DE BENTO GONÇALVES, 2021).

Currently, Brazilian viticulture is concentrated in the states of Rio Grande do Sul, São Paulo, Santa Catarina, Minas Gerais, Bahia, and Pernambuco (MELLO AND MACHADO, 2020). The most favorable environmental conditions for vineyard development and

production occur in South Brazil, and this region has the biggest vineyard area in the country, totaling 55,501 ha, which represented 73.3 % of the Brazilian vineyard area in 2019. Rio Grande do Sul is the main producer in South Brazil, accounting for 62.7% of the entire vineyard area of the country, besides that, the Serra Gaúcha region stands out as the main regional and, consequently, as the national viticultural center (IBGE, 2020).

2.2.2. Grapes production

With the modernization of the workforce and studies carried out on the crops, the culture expanded, thus becoming an activity that grew strongly in its sector, both in the cultivation of vines and in the production of wines, juices and sparkling wines. Mello and Machado (2020) report that in 2019, vine cultivation in Brazil was 75,731 hectares, where the state of Rio Grande do Sul represented a total of 47,502 hectares, thus making it the state with the largest national viticultural area.

According to the IBGE (2021), the production of grapes in tons in the state of Rio Grande do Sul in 2021 was 950,230 tons, an increase of 29.2% compared to the 2020 crop. kilograms per hectare was 20,521 kilograms. Although the South stands out in its production of grapes, much of the production is destined for wines and juices and not for consumption in natura (DEBIASI, 2020).

According to Mello and Machado (2020), Brazilian viticulture has regional characteristics, due to particularities such as climate, location, cultivars and cultural practices. This can be divided into two parts, the first being the production of grapes for fresh consumption, and the other the production of grapes for processing, that is, in the elaboration of juices and wines. According to Debiasi, grape production is divided into two varieties, namely 'wine cultivars' (*Vitis vinifera*) which are intended for the production of wines and sparkling wines and 'American cultivars' (*Vitis labrusca and Vitis bourquina*), which are intended for table wines, juice and fresh consumption" (DEBIASI, 2020).

In the accounting sector, viticulture is classified as a permanent crop, which, based on Marion's (2020) statements, is one that remains linked to the soil and, in this way, provides more than one harvest or production. For Crepaldi (2019), permanent crops are those that are not subject to replanting after harvest.

2.2.3. Handling the vines

In order to obtain a good quality in the production of grapes, the vines must be well cared for from planting, until reaching the appropriate form for the generation of their fruits. The soil must be well prepared with all its necessary components, because, according to Henderson and Rex (2012), the soil must be tested to report its composition, and verify which correctives must be added in the place to achieve a required level of nutrients.The managing of the soil must be the use of protection plants where they protect from erosion and at the same time carry out the fertilization of this.

After the completion of soil adequacy, comes the part called pruning, which according to Giovannini (2014), is the removal of plant parts which affect its physiological behavior. In this way, during pruning, excess water and control accessories are removed, so that the vine can achieve good sprouting. Pruning, according to Henderson and Rex (2012), is performed during the vine's dormancy period, where it is less sensitive to cold. After an activity of tying the branches occurs, according to Leão (2004), it has as objective to fix the shoots to the wires of the conduction system, thus avoiding that they are harmed by the actions of the winds or that they are also overlapped, reducing their photosynthetic capacity.

For the vine to have a good sprouting and develop its fruits, it is necessary that it find all the nutrients in the soil for its sustenance. Faria and Silva (2004), emphasize that the necessary nutrients for the development processes of the vines are: Nitrogen; phosphor; potassium; calcium; magnesium; boron; copper and zinc. After the fructification pruning, the vineyard must be fertilized at each development cycle, with manure, phosphorus, potassium and nitrogen, always respecting the needs of the vines (FARIA; SILVA, 2004).

As soon as the vine sprouting process begins, in which this is the most sensitive stage to the spread of pests and diseases, the precautions to be adopted by the producer are to prevent their vineyards, in order to avoid the damage caused by these invaders. Giovannini (2014), reports the position of the viticulturist in the face of the problems mentioned above, will guarantee the phytosanitary of the vine and increase the safety of its cultivation. Still based on Giovannini's studies, the cultivation will be subject to diseases, pests, physiological disturbances and meteorological accidents, where these situations can harm the development of the vine as well as the production of grapes, making them unsuitable for consumption or industrialization.

In this way, the producer enters with inputs and pesticides to combat these agents, defending his culture. Souza (2005) reports that the use of the correct dose, with the ideal moment of application of the inputs, in addition to ensuring the lowest costs, preserves the

environment, both for those who handle it and for those who will consume the fruit at the end of the process.

The last part in the vine handling process is harvesting. To know if the fruit is at the point of harvest, Choudhury and Costa (2004) report that the main tributes to be observed are the color, texture, flavor and sugar content. Also to know if the grape qre in the ideal stage of maturation for the harvest, Giovannini (2014), highlights that changes in the bunches, such as the color change of the berries and stalks, must be observed. Harvesting in its traditional method, as exposed by Henderson and Rex (2012), is carried out in a way where the grapes are picked manually and placed in boxes, and these boxes are taken out of the vineyard and loaded into vans that will carry out the transport. to the winery, or to the producer's point of sale. In Serra Gaúcha, according to Ben and Canossa (2017), the harvest period is carried out in the months of January and February.

2.3. Cost accounting

Cost accounting was born with the Industrial Revolution in the 18th century, due to the advent of new inventions and the first automated processes, when mass production began (PADOVEZE, 2016). This branch of accounting that defines costs, according to Megliorini (2011), helps entities to comply with their legal requirements, in relation to the determination of their results of the activities carried out, the evaluation of their inventories, as well as for the knowledge of its costs for making correct decisions and exercising its controls. In this way, Padoveze (2016, p. 5), reports that cost accounting "is the segment of accounting science specialized in the economic management of costs and sales prices of products and services offered by companies". This branch of accounting, according to Martins (2018), has three relevant functions, which are: planning assistance; control and finally help in decision making.

In this context of cost accounting, it can be highlighted that with the help of rural accounting, the owner who has agricultural activities can increase their sustainability with the analyzes provided by these. Rural accounting, according to Marion (2020), is defined as generais accounting applied to rural companies. Crepaldi (2019), defines that rural accounting has the purpose of controlling the assets of rural entities, as well as determining their results (Denicol et al., 2016), and finally providing information about the assets and results to the various users of this accounting information.

2.3.1. Terminologies

To understand how cost accounting occurs, it is necessary to understand the terminologies used in the area. According to Megliorini (2011, p. 21), the cost "corresponds to the portion of expenses consumed in the manufacturing environment for the manufacture of products, for the acquisition of goods for resale and for the performance of services". For Martins (2018, p. 10), costs represent the "relative expense to a good or service used in the production of other goods or services". According to Ribeiro (2017), costs include the sum of expenses with goods and services applied or consumed in the manufacture process of other goods. Cost for Dutra (2017, p. 16) is the portion of the expense that is applied to production or any other cost function, whether spent or not.

These costs are subdivided into direct and indirect costs, where the direct, according to Padoveze (2016), are those that can be physically identified for a particular segment, that is, they can be allocated directly and objectively to the final products. On the other hand, indirect costs, to be incorporated into the products, are presented with some apportionment criterion, or some type of estimate (ARRUDA; SANTOS, 2017).

Still in the terminology of costs, there is the division of fixed and variable costs, where, as explained by Arruda and Santos (2017), it is considered fixed when they do not vary proportionally to the volume produced, specifically for a production area, in the other words, they occur even if there is no production. . For Crepaldi and Crepaldi (2023), fixed cost is a cost that, in a given period and production volume, does not change in its total value, but will become increasingly smaller considering unit terms with the increase in production volume. The total cost does not vary proportionally to the produced volume. Variable costs, according to Padoveze (2016), are costs whose amounts in monetary units vary according to the direct proportion of variations in the levels of activities to which they relate.

Also, according to Crepaldi and Crepaldi (2023), the variable cost is variable in relation to the total volume of production, but is fixed in relation to the unit produced. Unit variable costs are fixed throughout the production process. In a production line, they remain constant, whatever the production volume. Total variable costs increase or decrease as the quantity produced increases or decreases. These are those whose values vary depending on the volume of production or activities.

Expenses, according to Veiga and Santos (2016), are expenses to obtain revenue, where it is understood as a resource consumed outside the production process or the

elaboration of services to obtain the final revenue. For Ribeiro (2018, p. 16), expenses "are expenses incurred to obtain goods or services applied in the administrative, commercial or financial areas, aiming directly or indirectly the revenue obtaining".

Investments for Martins (2018), correspond to expenses activated depending on the useful life or benefits attributable to future periods, that is, they are all sacrifices for the acquisition of goods or services that will result in support for the generation of revenue. For Veiga and Santos (2016), investments are expenses made for the composition of the necessary structure for the development of activities, where they relate to goods intended for the company's use.

Expenses are understood as "the purchase of any product or services, which generate a financial sacrifice for the entity (disbursement), a sacrifice represented by the delivery or promise of delivery of assets (usually cash)" (MARTINS, 2018, p. 9). Expense, for Dutra (2017, p. 16), is the amount paid or assumed to obtain the ownership of a good, including or not preparation and marketing, considering the different quantities acquired, processed or sold.

Losses, for Padoveze (2016), are facts that occur in exceptional situations, which are outside the normality of the entity's operations, when these are characterized, they must be accounted for as expenses. Veiga and Santos (2016), consider losses as unforeseen events resulting from abnormal external factors, such as floods and fires. Also according to the authors, they may result from resources consumed involuntarily of the entity. According to Dutra (2017, p. 16), loss is an involuntary and abnormal expense that occurs without the intention of obtaining income.

2.3.2. Costing methods

The identification and classification of costs is important, but must be followed by allocation and measurement, in order to generate information for users who need it. For Megliorini (2011, p. 16), "costing methods determine the way in which cost objects are valued, which can be an operation, an activity, a set of activities, a product, a department, etc." Thus, the author cited above, determines that the traditional costing methods are those that focus on the calculation of costs, among these traditional methods are variable costing, absorption costing and full costing. As for contemporary cost methods, we bring new approaches to cost management, and we can identify the ABC cost. In this research the variable cost and the absorption cost will be worked.

Variable costing for Padoveze (2016), seeks the unit cost of the product or service, in terms of monetary measurement since it uses only variable elements, therefore it determines the unit value for each unit of product, it does not use the concept of average calculation. Variable costing can also be expressed according to Martins (2018, p 185), as the one considered "only variable costs are appropriated to products, making the fixed costs separate and as expenses for the period, going directly to the result".

In variable costing, according to Crepaldi and Crepaldi (2023), costs are classified by fixed and variable – there is no concern about classifying direct and indirect costs, so the results presented are directly influenced by sales volume. It is an internal, administrative and management criteria. In the variable costing criteria, only variable costs are appropriated to products, with fixed costs being separated and considered as expenses for the period.

Absorption costing "is the costing method by which all costs incurred in that period are appropriated to products manufactured incurred in this period, whether fixed or variable" (MEGLIORINI, 2011, p. 16). For Padoveze (2016), absorption costing encompasses all methods that use all costs or expenses, whether direct or indirect, fixed or variable, to determine the unit cost of final products and services. Absorption costing is one that meets the principles of accounting application that are generally accepted by the tax authorities.

Considering costing by decision, according to Crepaldi and Crepaldi (2023), all costs incurred in the period will be resolved by the production carried out, that means, they will be appropriated to the finished products (and in preparation, if applicable), regardless of whether they are fixed, variable, direct or indirect. The separation between cost and expenses is important, because in this case, the expenses go directly against the result for the period, while the costs of unsold products go to inventory.

2.3.3. Profitability and sustainability analysis

Debiasi (2020), reports that the profitability of the entity is focused on the sales potential, in order to bring results and returns on investments, identifying the earning power and the power of evolution of companies. The analyzes are generated through tools that use cost accounting, thus applied in its form, bring results and a lot of information for managers and owners, as well as for those who want to have access to this. These management tools provide a systemic view in general, allowing us to observe where the pending issues are that must be modified to improve the result. The management information for Crepaldi (2019), which can be obtained through the tools that will be mentioned below, is the result of the

reality that occurs in the enterprise, where they will indicate the results obtained and how they can be optimized.

We start by dealing with the Mark-up, which according to Padoveze (2016), is used in the formation of the product's selling price, where it addresses the issue of obtaining a desired selling price, where this price will cover all costs and expenses and also offer a safe margin. For Megliorini (2011), it consists of a margin expressed through an index or percentage that is added to the cost of the product. According to this author, we find the divisor Mark-up and the multiplier Mark-up, which for both criteria adopted are the same. According to Fontoura (2013), Mark-up can be used by all costing methods.

The contribution margin, according to Megliorini (2011), is the amount that will remain from the selling price of a product after deducting its fixed and variable costs, so this margin can be understood as the contribution of products to cover costs and fixed expenses and profit. For Ben and Canossa (2017), the analysis of the profitability of each item that the entity produces, the contribution margin is an efficient way to make decisions, considering that costs and revenues are properly presented by the business administrator, independente of the entity's field of activity. The contribution margin for Veiga and Santos (2016) is the difference between the selling price and the cost and variable expense, that is, it contributes to the amortization of fixed costs.

The break-even point is another tool used in the analysis of entities, regardless of their field of activity. For Martins (2018), the break-even point is the combination of total costs and expenses with total revenues. The break-even point evidences the volume that the company needs to produce or sell so that it can pay all its costs and expenses, whether fixed or variable, in this tool there is no profit or loss, and it is important to identify the minimum level of activity in which the company should operate, whether in global or unit values (PADOVEZE, 2016). Megliorini (2011) reports that depending on the analysis to be carried out and the decisions that will be taken, it is possible to determine at least three break-even points, which are: Accounting break-even point, economic break-even point and financial break-even point.

The accounting break-even point for Veiga and Santos (2016), is when the sum of the contribution margin is sufficient to cover all expenses and fixed costs, having neither profit nor loss, the formula of this break-even point can be seen in figure 2. The economic break-even point, “in addition to supporting fixed costs and expenses, the contribution margin of products sold must cover the opportunity cost of capital invested in the company” (MEGLIORINI, 2011, p. 164). Figure 3 represents the formula used to find the economic equilibrium point. The financial break-even point, according to Veigas and Santos (2016),

aims to identify the moment when revenues are equal to expenses and costs, but without considering the expenses that were recorded in the accounting, in which the effective disbursement for the payment of these. As for Megliorini (2011), this break-even point portrays that the contribution margin should support fixed costs and expenses without depreciation, in which in this case cost and expense are only considered out-of-pocket expenses in the period. Figure 4 presents the break-even formula.

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$$BEP = \frac{\text{Fixed Costs and Expenses}}{\text{Unit Contribution Margin}}$$

Figure 2: Financial break-even formula

Source: Veiga e Santos (2016 p. 118).

$$EBE = \frac{\text{Fixed Costs and Expenses + Opportunity Costs}}{\text{Unit Contribution Margin}}$$

Figure 3: Economic break-even formula.

Source: Veiga e Santos (2016, p. 120).

$$FBE = \frac{\text{Fixed Costs and Expenses (-) Non-Disbursable Expenses}}{\text{Unit Contribution Margin}}$$

Figure 4: Financial break-even point formula.

Source: Veiga e Santos (2016, p. 121).

Finally, we can mention the margin of safety, which according to Megliorini (2011), is the one that corresponds to the amount of revenue or products operated above the break-even point, where in turn the greater the margin of safety, the greater the profit-generating capabilities and that the entity will not have a loss. Veiga and Santos (2016) report that the margin of safety can be represented by the volume of sales, where these exceed those calculated together at the break-even point.

3. Methodological Aspects

3.1. Research design

Regarding the technical procedures, a case study was done in order to highlight the costs together with the revenues of the grape crops in a small rural property in the South of Brazil, in order to carry out an analysis and address how this owner can make their vineyards more economically sustainable, bringing greater profitability to the property. What is the one

that is studied according to (2017), because it is intensive, not which, in consideration of the analysis of the study, and its direction is through the study of study and understanding of the research relationships of the factors in each case. The case study is a modality widely used in research in the area of social sciences, and is defined as a deep study, which allows for a broad and detailed knowledge (GIL, 2018). In this way, the case study helped to know all the information on the property, in order to apply the cost methodology in order to show how we can achieve greater sustainability in your farming.

The typology in relation to the objectives is classified as descriptive, in order to describe all the costs incurred in the 2020/2021 harvest and also to report their revenues, leading to the description of how the costs combined with the analysis can generate results positive for the property. Descriptive research, according to Zamberlan et al (2019, p. 96), is characterized as one that "aims to identify, expose and describe the facts or phenomenon of a given reality under study, characteristics of a group, community, population or "social context".

As for the approach to the problem, it is a qualitative research that the methods do not require the same way of using the researcher or statistical techniques, the natural environment being the direct source to verify the data and the researcher, in which there is a dynamic relationship between the real world and the researcher (ZAMBERLAN et al. 2019). Qualitative research, according to Michel (2015), arises from the fact of empirical experimentation, from analyzes made in detailed, comprehensive, consistent and coherent ways in the logical argumentation of the ideas delimited by the author of the project, in this way, the reality of its study in its natural context, as it occurs in real life, giving meaning to phenomenons and interpreting them according to the meanings they have for the people involved in this context.

3.2. Data collection and analysis procedures

Initially, a review of concepts was developed, to have an analysis of the themes under study, this data collection was through websites, books, articles and periodicals, where they treated with concepts related to sustainability, cost accounting and handling of vines.

Subsequently, data were collected on a small rural property in the South of Brazil, where were highlighted the profitability and sustainability of the grapes that are grown on site, to put into practice the concepts previously presented. These data were made available by the

owner of the locality, through informal research, notes from the 2020/2021 harvest that he carried out in his control notebooks, the inputs were also collected through the producer's notebook of the winery where the grape is delivered and finally the producer's receipts that present the recipes and the quantity sold of each cultivated grape variety.

After the study and data collection, the information was gathered in electronic spreadsheets (Excel), to show the costs and compare them with the revenues, in order to obtain the objective of this work, which is to analyze the profitability of grape and how through cost indicators, the sustainability of the property can be promoted.

4. The Case Study

4.1. Property features

The small rural area in the South of Brazil which belongs to the state of Rio Grande do Sul, is located about 160 miles away from the capital Porto Alegre (NOVA ROMA DO SUL, 2021). This municipality is exclusive to the Grape and Wine region, and is characterized by keeping alive the old traditions brought by the Italian colonizers, in which the culture of the vineyards has always been maintained.

In this municipality, where the present work was developed, in one of its small rural properties. This family property has been passed down from generation to generation, always keeping alive the culture and love for taking care of the land.

Currently, the management of the property is done by three people, who are members of the same family. The territory of this property is delimited in 15.1 hectares, of where 8.0 hectares are destined for agriculture and the others are covered by native vegetation. The main agricultural activity developed by this family is the cultivation of vineyards, which make up a total of 3.99 hectares of plantation, the other arable hectares are destined for the production of inputs for family consumption.

These vineyards, today, are the main source of income for this family, which has several varieties in cultivation, where the following can be highlighted: Rose Niagara, White Niagara, Concord, White Moscato, Isabel and Bordô. In table 1 we can check the amount in cultivated hectares of each grape variety. Some of the vineyards listed above were planted by the current owner's father, having been in existence for 34 years. Others are more recent due to the expansion of the property and the renovation by more profitable cultures

Table 1: Varieties of grapes grown on the property

Varieties	Number of Hectares
Bordô	1,6
White Moscato	1,29
Concord	0,16
Rose Niagara	0,02
White Niagara	0,82
Isabel	0,1
Total	**3,99**

Source: Created by the author

The most expressive varieties of this property are Bordô and White Moscato, which make up a total of 2.89 hectares, with a percentage of 72.43% of the entire cultivated area. The other varieties correspond to the percentage of 27.57%.

4.2. Calculation of revenue

The 2020/2021 crop was characterized by a favorable climate for the vine. In the dormancy period that would be necessary the cold, this collaborated making the vines have their sprouting at the right time. The sprouting period occurred properly, with rain and no climatic eventuality that could cause significant losses quantitatively and qualitatively. Thus, the period of growth and maturation of the fruit was very relevant to the final results.

During the harvest period, there was an increase in irregular rains, better known as summer rains, which led to early harvest, resulting in a low level of sugar that caused a lower Babo degree than would be estimated for the fruit. Accordantly to Guerra and Zanus (2003), the Babo degree is defined as the one that represents the amount of sugar by weight of the grape, that is, the amount of sugar present in 100g of grape must. The Babo degree varies a lot from variety to variety, what for many is adequate for others is less than necessary. In table 2 we can see the quantity produced of each cultivar on this property.

Table 2: Gross revenue for the 2020/2021 crop

Variety	Quantity Produced (Kg)	Total Revenue (R$)	
Bordô	32.210	R$	41.887,80

White Moscato	42.220	R$	88.662,00
Concord	5.220	R$	5.742,00
Rose Niagara	1.700	R$	1.870,00
White Niagara	21.090	R$	23.199,00
Isabel	4.030	R$	4.030,00
Total	106.470	R$	165.390,80

Source: Created by the author

The quantities produced in the 2020/2021 crop exceeded the producer's estimates, due to weather collaboration. This property sells its production to wineries, where they process the grapes, turning them into juices, wines and sparkling wines. The grapes are delivered to three wineries, and to preserve their name, and for ethical reasons, in this research they will be mentioned as X, Y and Z.

4.3. Calculation of the costs

4.3.1. Fixed Costs

Fixed costs are defined as those that do not change through production, in the other words, that regardless of the quantity produced, they will remain the same. On the property under study, the fixed costs were delimited based on what the producer estimated would be necessary to cultivate it, even if there was no production in the period.

To approach these, it was necessary to know all the equipment on the property, as well as the period of its existence and the amount paid for the good cost. Table 3 lists the equipment, as well as its depreciation.

Table 3: **Property Depreciation**

Goods	Year	Acquisition Value (R$)	Life Expectancy in Years	Annual Fee (%)	Annual Depreciation (R$)
Ford Cargo Truck	2011	R$ 82.000,00	20	5	R$ 4.100,00
Yanmar Tractor	2008	R$ 43.000,00	20	5	R$ 2.150,00
Pulverizer	2008	R$ 7.000,00	20	5	R$ 350,00
Dumper	2018	R$ 14.500,00	10	10	R$ 1.450,00
Bucket	2008	R$ 500,00	10	10	R$ -
Plastic Boxes	2003	R$ 2.500,00	10	10	R$ -

Vines	1996	R$	60.000,00	40	2,5	R$	1.500,00
Total						**R$**	**9.550,00**

Source: Created by the author.

Having presented the depreciation table, considering the essence in the form of the property goods, it now follows for the other fixed costs including depreciation, as discussed in table 4.

Table 4: Property Fixed Costs

Description		**Value**
Agricultural Insurance Value	R$	4.040,16
Tractor Maintenance	R$	600,00
Truck Maintenance	R$	1.500,00
Vineyard Maintenance	R$	1.200,00
Equipment Maintenance	R$	300,00
RLT- Rural Land Tax	R$	4,40
Depreciation	R$	9.550,00
Prunning Scissors	R$	180,00
Labor	R$	12.402,00
Total	**R$**	**29.776,56**

Source: Created by the author.

When analyzing the fixed costs incurred on the property, it is possible to identify that 41.65% of these refer to the labor used on the property, this value of labor is classified as a cost because, even if there is no production, it is necessary when cultivating of the vineyards, followed by the depreciation that presented a percentage of 32.07%. For the distribution of these fixed costs, it was decided to use the apportionment basis for the total amount of production, where a fixed cost of R$ 0.28 was obtained for each kilogram of grape produced. This result was obtained by dividing the total fixed costs by the amount of grapes produced in the 2020/2021 harvest.

4.3.2. Variable Costs

Variable costs are distinct from fixed costs, because they are directly linked to production. As bigger the quantity produced, bigger the variable costs incurred. To recognize

these, the producer made notes in his notebooks of each quantity and times it would be necessary to apply the input, as well as the use of something that results in variable costs. The elements classified as variable costs were inputs, labor and rural funds. Table 5 shows the value of the variable cost incurred in each variety.

Table 5: Variable Costs of the 2020/2021 Crop

Variety	Rural Funds		Inputs		Labor		Total	
Bordo	R$	628,32	R$	2.609,81	R$	3.250,00	R$	6.488,13
White Moscato	R$	1.329,93	R$	6.421,96	R$	4.940,00	R$	12.691,89
Concord	R$	86,13	R$	563,83	R$	494,00	R$	1.143,96
Rose Niagara	R$	28,05	R$	228,43	R$	195,00	R$	451,48
White Niagara	R$	347,99	R$	2.322,43	R$	2.730,00	R$	5.400,41
Isabel	R$	60,45	R$	622,06	R$	286,00	R$	968,51
Total	**R$**	**2.480,86**	**R$**	**12.768,52**	**R$**	**11.895,00**	**R$**	**27.144,38**

Source: Created by the author.

The Rural Funds, listed in variable costs, is applied to the gross revenue of the sales invoice, with a rate of 1.5%, in which the buyer winery at the time of payment of the goods already deducts this value from the producer. The inputs used in this harvest were not on a large scale, compared to previous harvests, due to the weather being stable and no divergence occurred. The labor is carried out by three family members, and the value for the day was estimated at 130.00 reais, and the days were counted by the producer. It should be noted that inputs are the most used variable costs in production, with a percentage of 47.04% of costs incurred. The variety that had the highest production was also the one with the highest percentage in variable costs, being White Moscato with 46.76%, followed by Bordo with 23.90%.

Table 6: Unit Variable Costs for the 2020/2021 Crop

Variety	Quantity Produced (Kg)	Total Variable Cost R$		Unit Variable Cost	
Bordo	32.210	R$	6.488,13	R$	0,20
White Moscato	42.220	R$	12.691,89	R$	0,30
Concord	5.220	R$	1.143,96	R$	0,22
Rose Niagara	1.700	R$	451,48	R$	0,27
White Niagara	21.090	R$	5.400,41	R$	0,26

Isabel	4.030	R$	968,51	R$	0,24
Total	**106.470**	**R$**	**27.144,38**		-

Source: Created by the author.

The variable costs found for each variety are quite similar, and the variety that incurs the most costs is White Moscato. It is also worth considering that, regardless of the quantity produced, the costs vary a lot, for example, Rose Niagara, which had the least expressive quantity of production, presented a lot of variable cost.

4.4. Profitability analysis

4.4.1. Variable costing

Variable costing aims to allocate variable costs first, in order to recognize the contribution margin of how much each product helps to pay fixed costs, without using apportionment criteria. This method is not accepted by the tax authorities, but it is the most suitable for management analysis and for possible decision-making, due to having several variables in evidence and seeing how the entity, or in the case of the study, the property behaves with the most diverse situations. It is necessary to point out that this costing method is not accepted in the accounting and tax legislation in force, but used as a support tool for managers. Table 7 presents the variable costing in reais, and shows the property's profit in the 2020/2021 harvest.

Table 7: Variable Costing for the 2020/2021 Crop

	Bordo	White Moscato	Concord	Rose Niagara	White Niagara	Isabel	Total
Gross Operating Income	**41.887,80**	**88.662,00**	**5.742,00**	**1.870,00**	**23.199,00**	**4.030,00**	**165.390,80**
Sale of Products	41.887,80	88.662,00	5.742,00	1.870,00	23.199,00	4.030,00	165.390,80
(-) Revenue Deduction	**628,32**	**1.329,93**	**86,13**	**28,05**	**347,99**	**60,45**	**2.480,86**
Rural Funds (1,50%)	628,32	1.329,93	86,13	28,05	347,99	60,45	2.480,86
(=) Gross Operating Income	**41.259,48**	**87.332,07**	**5.655,87**	**1.841,95**	**22.851,02**	**3.969,55**	**162.909,94**

(-) Cost of sold Goods	**5.859,81**	**11.361,96**	**1.057,83**	**423,43**	**5.052,43**	**908,06**	**24.663,52**
Inputs	2.609,81	6.421,96	563,83	228,43	2.322,43	622,06	12.768,52
Labor	3.250,00	4.940,00	494,00	195,00	2.730,00	286,00	11.895,00
(=) Total Contribution Margin	**35.399,68**	**75.970,11**	**4.598,04**	**1.418,52**	**17.798,59**	**3.061,49**	**138.246,42**
(-) Fixed Costs	9.008,20	11.807,71	1.459,88	475,44	5.898,26	1.127,07	29.776,56
(=) Crop Net Profit	**26.391,48**	**64.162,40**	**3.138,16**	**943,08**	**11.900,33**	**1.934,42**	**108.469,86**
Profitability Analysis (%)							
(=) Crop Gross Profit	**84,51%**	**85,69%**	**80,08%**	**75,86%**	**76,72%**	**75,97%**	**83,59%**
(=) Crop Net Profit	**63,01%**	**72,37%**	**54,65%**	**50,43%**	**51,30%**	**48,00%**	**65,58%**

Source: Created by the author.

Após realizado o custeio variável é apresentado o resultado da safra 2020/2021, onde a empresa em estudo obteve um lucro de R$ 108.469,86 reais, totalizando percentual de 65,58% em relação a receita bruta.

After performing the variable costing, the result of the 2020/2021 harvest is presented, where the company under study obtained a profit of R$ 108,469.86, totalizing a percentage of 65.58% regarding to gross revenue.

4.4.2. Absorption costing

Absorption costing lists all costs incurred through an apportionment method, to show the unit cost of the final products. This costing method is accepted by current accounting and tax legislation. Table 8 shows the absorption costing method in reais for the 2020/2021 harvest.

Table 8: Absorption Costing of the 2020/2021 Crop

	Bordo	**White Moscato**	**Concord**	**Rose Niagara**	**White Niagara**	**Isabel**	**Total**
Gross Operating Income	**41.887,80**	**88.662,00**	**5.742,00**	**1.870,00**	**23.199,00**	**4.030,00**	**165.390,80**
Sale of Products	41.887,80	88.662,00	5.742,00	1.870,00	23.199,00	4.030,00	165.390,80
(-) Revenue	**628,32**	**1.329,93**	**86,13**	**28,05**	**347,99**	**60,45**	**2.480,86**

Deduction							
Rural Funds (1,50%)	628,32	1.329,93	86,13	28,05	347,99	60,45	2.480,86
(=) Sales Liquid Revenue	**41.259,48**	**87.332,07**	**5.655,87**	**1.841,95**	**22.851,02**	**3.969,55**	**162.909,94**
(-) Sold Cost Goods	**14.868,01**	**23.169,67**	**2.517,71**	**898,87**	**10.950,69**	**2.035,13**	**54.440,08**
Fixed Costs	9.008,20	11.807,71	1.459,88	475,44	5.898,26	1.127,07	29.776,56
Inputs	2.609,81	6.421,96	563,83	228,43	2.322,43	622,06	12.768,52
Labor	3.250,00	4.940,00	494,00	195,00	2.730,00	286,00	11.895,00
(=) Crop Net Profit	**26.391,48**	**64.162,40**	**3.138,16**	**943,08**	**11.900,33**	**1.934,42**	**108.469,86**
	Profitability Analysis (%)						
Fixed Costs	**21,51%**	**13,32%**	**25,42%**	**25,42%**	**25,42%**	**27,97%**	**18,00%**
Inputs	**6,23%**	**7,24%**	**9,82%**	**12,22%**	**10,01%**	**15,44%**	**7,72%**
Labor	**7,76%**	**5,57%**	**8,60%**	**10,43%**	**11,77%**	**7,10%**	**7,19%**
Crop Net Income	**63,01%**	**72,37%**	**54,65%**	**50,43%**	**51,30%**	**48,00%**	**65,58%**

Source: Created by the author.

As previously mentioned in the variable costing, the net income for the 2020/2021 crop was BRL 108,469.86, with a percentage of 65.58%. In absorption costing, we reach the same final result, but with different cost application methods. Fixed costs accounted for a total of 18% of harvest expenditures, followed by inputs with 7.72% and labor with 7.19%. The variety with the highest percentage of fixed costs was the Isabel variety with 27.97%, followed by the Rose Niagara, White Niagara and Concord varieties with 25.42%. In terms of inputs, the variety that had the most representation was Isabel with a percentage of 15.44% of incidence. As for the variable workforce, the White Niagara variety was the one that reached the highest percentage, with 11.77%.

4.4.3. Contribution margin

The contribution margin aims to identify how much each variety will contribute to the payment of fixed costs developed in the harvest. This is calculated through the price paid by the wineries in the commercialization of the grapes, subtracting the variable costs, thus arriving at the contribution of the respective variety. The calculation of the unit contribution

margin of all varieties of the property is shown in table 9.

Table 9: Unit Contribution Margin 2020/2021 Crop

Variety	Sale Price	Variable Cost	Contribution Margin (R$)	Contribution Margin (%)
Bordo	R$ 1,30	R$ 0,20	R$ 1,10	84,51%
White Moscato	R$ 2,10	R$ 0,30	R$ 1,80	85,69%
Concord	R$ 1,10	R$ 0,22	R$ 0,88	80,08%
White Niagara	R$ 1,10	R$ 0,26	R$ 0,84	76,72%
Rose Niagara	R$ 1,10	R$ 0,27	R$ 0,83	75,86%
Isabel	R$ 1,00	R$ 0,24	R$ 0,76	75,97%

Source: Created by the author.

Observing the unit contribution margin, we found that among the varieties under study, the White Moscato grape represented the highest percentage of contribution, being 85.69%. The Bordo variety had the second highest percentage of contribution, and Rose Niagara was the variety with the lowest percentage of contribution, resulting in 75.86%. In a broad analysis of the property, it appears that all varieties have a significant contribution margin.

4.4.4. Accounting Break-Even Point

The accounting break-even point is when we obtain neither profit nor loss, in other words, the contribution margin is sufficient to cover all costs and expenses. The calculation of the accounting break-even point is shown in table 10.

Table 10: Accounting Break-Even Point for 2020/2021 Crop

Variety	Total Fixed Costs	Contribution Margin	Break-Even (R$)	Sale Price	Break-Even (kg)
Bordo	R$ 9.008,20	R$ 1,10	R$ 8.196,52	R$ 1,30	6.305
White Moscato	R$ 11.807,71	R$ 1,80	R$ 6.562,07	R$ 2,10	3.125
Concord	R$ 1.459,88	R$ 0,88	R$ 1.657,35	R$ 1,10	1.507

White Niagara	R$	5.898,26	R$	0,84	R$	6.989,00	R$	1,10	6.354
Rose Niagara	R$	475,44	R$	0,83	R$	569,78	R$	1,10	518
Isabel	R$	1.127,07	R$	0,76	R$	1.483,63	R$	1,00	1.484

Source: Created by the author.

Observing the calculation of the accounting break-even point, it can be analyzed that the varieties do not need a large amount produced to cover production costs. It should be noted that if production is less than the accounting break-even point, there will be a loss. The variety that most requires production to cover fixed and variable costs is White Niagara.

4.4.5. Economic Break-Even Point

The economic break-even point, in addition to supporting costs and expenses, must contemplate the profit desired by the owner. In table 11, we find the economic equilibrium point.

Table 11: Economic Break-Even Point for 2020/2021Crop

Variety	Total Fixed Costs	Desired Profit	Contribution Margin	Break-Even (R$)	Sales Price	Break-Even (Kg)
Bordo	R$ 9.008,20	R$ 8.377,56	R$ 1,10	R$ 15.819,22	R$ 1,30	12.169
White Moscato	R$ 11.807,71	R$ 17.732,40	R$ 1,80	R$ 16.416,76	R$ 2,10	7.818
Concord	R$ 1.459,88	R$ 1.148,40	R$ 0,88	R$ 2.961,09	R$ 1,10	2.692
White Niagara	R$ 5.898,26	R$ 374,00	R$ 0,84	R$ 7.432,16	R$ 1,10	6.757
Rose Niagara	R$ 475,44	R$ 4.639,80	R$ 0,83	R$ 6.130,28	R$ 1,10	5.573
Isabel	R$ 1.127,07	R$ 806,00	R$ 0,76	R$ 2.544,61	R$ 1,00	2.545

Source: Created by the author.

Observing the calculation of the economic break-even point, we can conclude that compared to the accounting one, it obtains a high variation, all this, due to the profit that the producer wants to obtain in each variety of its production. This profit was calculated based on the percentage of 20%, which was established by the owner.

4.4.6. Financial Break-Even Point

This break-even point seeks to determine the moment when costs and expenses are in balance with the contribution margin, however, being deducted the non-disbursable costs, such as depreciation, are deducted. In table 12, we have the calculation of the financial break-even point.

Tabela 12: Financial Break-Even Point 2020/2021 Crop

Varietu	Total Fixed Costs	Non-disbursable Expenses	Contribution Margin	Break-Even(R$)	Sales Price	Break-Even (Kg)
Bordo	R$ 9.008,20	R$ 2.889,13	R$ 1,10	R$ 5.567,71	R$ 1,30	4.283
White Moscato	R$ 11.807,71	R$ 3.786,99	R$ 1,80	R$ 4.457,47	R$ 2,10	2.123
Concord	R$ 1.459,88	R$ 468,22	R$ 0,88	R$ 1.125,80	R$ 1,10	1.023
White Niagara	R$ 5.898,26	R$ 1.891,70	R$ 0,84	R$ 4.747,47	R$ 1,10	4.316
Rose Niagara	R$ 475,44	R$ 152,48	R$ 0,83	R$ 387,04	R$ 1,10	352
Isabel	R$ 1.127,07	R$ 361,48	R$ 0,76	R$ 1.007,79	R$ 1,00	1.008

Source: Created by the author.

The financial break-even point is the one that requires the least amount of production for the property to reach equilibrium, without profit, but also without loss.

4.4.7. Safety Margin

The safety margin shows production above the break-even point, where the property operates at a profit-generating level. It should be noted that as higher the safety margin, higher is the financial results the crops will obtain. Table 13 shows the safety margin with which the 2020/2021 harvest operated.

Table 13: Safety Margin for 2020/2021 Crop

Variety	Sold Amount (R$)	Account Break-Even Point	Safety Margin(R$)	Sale Price	Safety Margin (Kg)
Bordo	R$ 41.887,80	R$ 8.196,52	R$ 33.691,28	R$ 1,30	25.916
White Moscato	R$ 88.662,00	R$ 6.562,07	R$ 82.099,93	R$ 2,10	39.095
Concord	R$ 5.742,00	R$ 1.657,35	R$ 4.084,65	R$ 1,10	3.713
White Niagara	R$ 23.199,00	R$ 6.989,00	R$ 16.210,00	R$ 1,10	14.736
Rose Niagara	R$ 1.870,00	R$ 569,78	R$ 1.300,22	R$ 1,10	1.182
Isabel	R$ 4.030,00	R$ 1.483,63	R$ 2.546,37	R$ 1,00	2.546

Source: Created by the author.

Observing the safety margins, it appears that all varieties obtained a satisfactory level of production. The variety that presented the highest margin of safety was White Moscato, due to its production and its price being higher than the others.

4.4.8. Mark-up

Mark-up is a recognized tool for generating the optimal selling price of a given product, thus allocating variable and fixed costs as well as expenses and determining the desired profit. This index will be applied to variable costs, which will result in the appropriate selling price for each variety. Table 14 shows the Mark-up as well as the optimal selling price for each variety. In this research, the Mark-up divider will be used.

Table 14: Mark-up divider

Variety	Bordo	White Moscato	Concord	Rose Niagara	White Niagara	Isabel
Fixed Costs	29,14%	19,42%	35,73%	36,07%	35,07%	37,88%
Rural Funds	1,5%	1,5%	1,5%	1,5%	1,5%	1,5%
Profit Margin	20%	20%	20%	20%	20%	20%
Total	**50,64%**	**40,92%**	**57,23%**	**57,57%**	**56,57%**	**59,38%**
Mark-up	**0,51**	**0,41**	**0,57**	**0,58**	**0,57**	**0,59**
Variable Costs	R$ 0,27	R$ 0,33	R$ 0,15	R$ 0,28	R$ 0,25	R$ 0,32
Sale Price	**R$ 0,54**	**R$ 0,81**	**R$ 0,27**	**R$ 0,49**	**R$ 0,44**	**R$ 0,54**

Source: Created by the author.

Accordantly showned in the table, the Mark-up was calculated using information from previous harvests, to obtain the percentages used. Fixed costs, Ruran Funds and profit margin items are applied as percentages. In table 15, we will have a comparison of the sales prices of each variety with the prices generated by the Mark-up.

Table 15: Sales Prices omparison

Variety	Practiced Selling Price		Price through Mark-up	
Bordo	R$	1,30	R$	0,53
White Moscato	R$	2,10	R$	0,80
Concord	R$	1,10	R$	0,26
White Niagara	R$	1,10	R$	0,44
Rose Niagara	R$	1,10	R$	0,48
Isabel	R$	1,00	R$	0,54

Source: Created by the author.

Comparing the two sales prices, we conclude that the producer receives a value higher the ideal estimated, promoting economic sustainability for the property.

5. Conclusion

The present research sought, through its general objective, to verify which of the grape varieties was the most profitable on the property, in order to assist the owner in expanding economic sustainability. It also aimed to assess all costs incurred in the 2020/2021 harvest. Based on the case study developed, and with the help of the owner in providing the information, it was possible to reach the final conclusions.

The net income for the 2020/2021 harvest was R$108,469.86, with the White Moscato variety having the highest percentage of the entire harvest, with 59.12% of all net income. However, considering an estimated analysis, the net profit per hectare is used, where the variety that would have the most profitability would be White Moscato, with a net profit of R$ 49,738.30. Thus, the most profitable variety of the entire property is White Moscato, both in terms of the result of the property and the net profit per hectare. However, in terms of production per hectare, according to Rose Niagara variety would be the most productive.

In this way, the White Moscato variety is the one that provides more economic

sustainability on the property, and also the most suitable for expanding production. On the other hand, this variety is the one that most demands chemical inputs in its production, impacting the environment, thus considering the sustainability tripod is the least indicated.

The break-even points showed that all the varieties of the property operate with production above, so they result in profitability, they are able to pay their incurred costs and expenses. The safety margin showed that the varieties have a production well above the break-even point, providing higher security for the property considering possible weather conditions. The contribution margin showed that the White Moscato variety is the one that most contributes to the payment of fixed costs, with a percentage of 85.69%. The Mark-up defined in the survey resulted in sales prices below which the property sells its products, thus demonstrating profitability above the minimum expected.

It should be noted that climate is an important variable in production, as it influences not only quantity but also quality. A possible climatic interference could change the results presented, for this reason it is necessary to periodically monitor the costs involved as well as the production and the net result.

This research brought greater knowledge about the production of grapes on the property, demonstrating the cost of each cultivated variety and profitability. The owner did not manage this information and thus could have a more detailed view, taking knowledge of all the accounting tools that enable assistance on the rural property. The result of the research helped the producer to identify which variety presents better results and also contributing to the indication of possible expansion. Furthermore, this research and its results help producers who manage these varieties or who intend to cultivate them, showing how this branch of agribusiness should be studied and analyzed in its entire scope. The results obtained can be identified and used by other producers on their properties.

It is suggested after this research, to realize a study to find a variety that can reconcile the three pillars of sustainability, where the producer would have a good economic return, but promoting care for the environment, with more natural products that contribute more with quality of life for both the producer and the final consumer.

A measure that can be suggested is the cultivation of vines through the organic method, which is less harmful to the environment and promotes more health to all consumers involved, from the production to the end, so a study in this context would bring many contributions. The search for natural treatment methods that do not harm the environment can also be cited.

The development of this research was important, as it is possible to put in all the knowledge acquired throughout the academic trajectory and highlight even more how important the practice of information management made available by accounting is for all areas, but especially in rural accounting, where producers do not have a lot of access to this. The results presented, demonstrate the production costs that a farmer will incur even if there is no production and also how this research is innovative in agribusiness. In addition to the contributions already reported, this research also helps the community in general, which is thinking about growing grapes, or expanding how their productions can use this work.

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