

ADDING VALUE IN THE PRODUCTION OF TABLE GRAPES IN SÃO FRANCISCO VALLEY THROUGH SUSTAINABLE PRACTICES AND TECHNOLOGIES PROMOTED BY THE ABC+ PLAN

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Abstract: The São Francisco Valley has established itself in recent years as one of the most important fruit production centers in Brazil. Among the most produced crops in this region, grape production stands out in the economic aspect, due to its participation in the export basket, in addition to the internal consumption of the product. Faced with a major challenge in producing grapes for the current market, is it possible to be a global reference in food production and, at the same time, be sustainable? This study aimed to identify opportunities for adding value in the production of table grapes in São Francisco Valley, through the adoption of sustainable practices and technologies promoted by the ABC+ Plan. At the same time, it analyzed producers' expectations in relation to the demands of conscious consumers who seek products produced with low environmental impact. In this context, qualitative research was carried out with producers located in the Submédio valley, in São Francisco region. The results show great adherence to the theme of sustainability, as producers are convinced of caring for the environment, where they showed great interest, in some cases very committed to environmental practices.

Keywords: Sustainable practices; ABC+ PLAN; Sustainable Agriculture; Sustainability.

INTRODUCTION

Fruit production in Brazil encompasses a wide variety of species, grown in all regions of the country and in different climates. The good performance of Brazilian fruit production can be explained, in part, by the comparative advantage in relation to natural resources (BUSTAMANTE, 2009).

In the world ranking of fruit production, Brazil occupies third place, with around 45 million tons produced, with a 4.4% share of world production. Of this total produced, around 65% is consumed domestically

and 35% is exported to various countries. Although the participation in international sales is small, around 2%, the data shows the strength of the Brazilian market in fruit consumption. (EMBRAPA, 2021).

Grape production is practically throughout the national territory, with its production concentration in the South region, in the states of Rio Grande do Sul and Santa Catarina, where it is responsible for around 80% of Brazilian production. Secondly, the region of the state of Pernambuco and Bahia, in the fruit production hub in Submédio São Francisco Valley. The Petrolina-Juazeiro region accounts for 27% of national grape production, which, due to the region's climate and soil conditions, highlights its annual production, which can reach 2.5 harvests of this product. Furthermore, the Northeast region is the second largest region in grape production in Brazil, responsible for 99% of Brazilian grape exports. (LEÃO, 2021; COMEXSTAT, 2022; MELLO and MACHADO, 2021).

Bustamante (2009) states that the increase in federal government investment in the region brought great incentive for the development of an irrigation infrastructure with all the technical-scientific apparatus that makes up the fruit production ecosystem in São Francisco Valley. Irrigation technology provided many advantages for the São Francisco Valley Production Hub, as there were gains in scale of production and income contributions to regional economic development.

Currently, the global market shows a growing demand for products from sustainable agriculture, driving value addition in this sector. Conscious consumption is also driven by the habits of new generations. According to Porpino and Bolfe (2020), in Brazil, 42% of consumers said they were changing consumption habits to reduce environmental impact.

Given the context presented, the present work aimed to identify the perspective of table grape producers in Submédio São Francisco Valley region in relation to the topic of sustainability in grape production and its added value to products. Furthermore, SWOT analysis was used to identify the weaknesses, strengths, threats and opportunities for the table grape production chain in São Francisco Valley.

Therefore, this research considers the following hypotheses: can fruit growing play an important role in mitigating greenhouse gases (GHG), through good environmental practices? Does the producer believe that there is a market that will pay a premium for this product that includes environmental preservation? Is the producer convinced that environmental practices can guarantee a competitive advantage for his product on the foreign market? Is it possible to be a global reference in food production and, at the same time, be sustainable? Is the producer aware of these public policies for mitigating and adapting to climate change, such as the ABC+ Plan? Is the producer aware of the impact of his product on the environment?

In view of this, the aim is to understand that the use of sustainable production practices can generate good results for society, the producer and the regional economy. Based on reading the carbon footprint of the production of seedless table grapes, investigating the opportunities, challenges, strengths and weaknesses of sustainable production, thus making it possible to establish a trend in this consumer market. When analyzing the viticulture sector, we can consider environmental, institutional factors and cooperation as fundamental pillars for the success of this cooperative model, which makes this region of the São Francisco Valley so distinct and competitive, with a strong presence in the external market and internal.

FRUIT GROWING IN BRAZIL

Fruit growing is a branch of agriculture that has gained prominence over recent years, providing a wide variety of fruits for domestic consumption and exports to different countries. Fruit growing has 30 Fruit Production Centers that are located from the southern region of the country, reaching the Amazon, with emphasis on banana, orange, grape and apple crops, contributing with 6 million direct jobs, which represents more 27% of the workforce employed in the country's agriculture. (IEA, 2019)

According to Souza and Flauzino (2022), Brazilian fruit production exceeded 41 million tons, with an occupation of 2.6 million hectares, which represented 0.3% of the planted area in Brazil. Family farming is present in the sector, which occupies an area of around 80.9 million hectares, accounting for 23% of the total area of establishments.

As an example of the dynamism of fruit growing, the irrigated fruit growing hub of Submédio São Francisco Valley stands out, which serves as a model to exemplify its full potential. Another prominent fruit production hub in fruit farming is the apple production hub in the São Joaquim region, in Santa Catarina. Currently, this state accounts for around 48% of the planted area in Brazil. 80% of wine estates are concentrated in the South region, where around 87% of Rio Grande do Sul's grape production is obtained (BUAINAIN and BATALHA, 2007; MELLO; MACHADO, 2017; EPAGRI, 2022).

We can also mention the Mossoró/Açu fruit farming hub. This region is located in Chapada do Apodi, between the Açu (RN) and Jaguaribe (CE) rivers, and stands out in melon production, where it accounts for around 76% of Brazilian production. Melon is the second product in the export list of Brazilian fruit growing and the first in the export list of the state of Rio Grande do Norte (IBGE, 2022).

THE HISTORY OF VITICULTURE

The introduction of the vine in Brazil dates back to the 16th century, when the Portuguese arrived. Through Martim Afonso de Souza, in what is now the state of São Paulo, viticulture began in the country and thus expanded to other regions. The presence of grapes can be seen in the Brazilian Northeast, more precisely on the coast of Bahia and Pernambuco and thus advancing towards the interior of these states, reaching São Francisco valley region. Initially, there were great challenges in implementing this new crop, due to the climate, soil conditions and phytosanitary problems characteristic of the tropical semi-arid climate (PROTAS, CAMARGO and MELLO, 2011; CAMARGO, TONIETTO and HOFFMANN, 2011).

Viticulture remained restricted to the southern and southeastern regions of Brazil. From the 1990s onwards, the wine industry was driven by technological advances, through agricultural research and, for the most part, by large investments in the production of new grape varieties adapted to the Brazilian climate.

With research and new technologies, the sector developed and new cultivars were adapted to different regions of Brazil. The enterprises, attracted with public incentives, were focused on wine exploration. With the entry of business groups into the region in the 1980s, the cultivation of various crops was encouraged, including the production of table grapes. In the 1990s, there was an expansion and strengthening of technological winemaking, bringing the diversification of cultivars (PROTAS, CAMARGO and MELLO, 2002; LEÃO, 2013).

ECONOMIC AND SOCIAL IMPORTANCE OF VITICULTURE

According to Mello and Machado (2020), viticulture is the science that studies the production of grapes. Viticulture is a temperate climate crop and has adapted to the different regions of the Southeast and South of Brazil and due to the hot and dry climate of the Northeast region, it has achieved success with irrigated agriculture.

World grape production in 2021 was around 73,524,196 million tons with a planted area of 6,729,198 hectares. The world leader in grape production in tonnes is China, which accounts for around 15.23%, followed by Italy (11.08%), Spain (8.28%), the United States (7.46%) and France. (6.9%). In this ranking of world production, Brazil occupies thirteenth place with a production of 1,748,197 tons of grapes produced in 2021, accounting for 2.38% of world grape production (FAO, 2021).

Table 1 presents the ranking of the largest grape producing countries in the world.

Ranking	Area	Quantity of tons	%
1	China	11.200.000,00	15,23%
2	Italy	8.149.400,00	11,08%
3	Spain	6.086.920,00	8,28%
4	United States	5.488.470,00	7,46%
5	France	5.073.580,00	6,90%
6	Türkiye	3.670.000,00	4,09%
7	India	3.358.000,00	4,57%
8	Chile	2.581.108,26	3,51%
9	Argentina	2.241.419,72	3,05%
10	South Africa	2.000.297,00	2,72%
11	Iran	1.888.801,93	2,57%
12	Australia	1.885.536,52	2,56%
13	Brazil	1.748.197,00	2,38%
	Total	55.371.730,43	

Table 1: Ranking of Grape Producing Countries - 2021.

Source: FAO, 2021.

Brazil produced a total of 1,450,805 thousand tons with a production value (VPB) of around R\$4,536,903. Grape production has Rio Grande do Sul as the largest national producer with 843,129 thousand tons, 60.46% of national production, although its production is directed towards wine production. In second place is the Northeast region with 416,536 thousand tons, which represents 28.73% of table grape production basically destined for export (IBGE, 2022).

Table 2 details the performance of quantities produced in the last ten years.

Regions	Quantity produced (tons)	Value of production (thousand reais – brazilian currency)
North	79	460
Northeast	416.761	2.011.052
Southeast	186.063	858.313
South	843.129	1.635.900
Midwest	4.773	31.176
Total	1.450.805	4.536.903

Table 2: Quantity produced and value of grape production in different regions - Brazil 2022.

Source: Developed by the author based on SIDRA-IBGE, 2023.

Brazil is a large producer of grapes, but suffers from many seasonal fluctuations in the supply of the product to the consumer market. In the Northeast region, although it also suffered from seasonality, the highest growth was observed in the period of around 67.67% (COMEXTAT, 2022)

Countries	2022 – FOB value (US\$)	%
Netherlands	\$72.690.634,00	42,87%
United Kingdom	\$28.569.636,00	16,85%
United States	\$26.805.893,00	15,81%
Argentina	\$16.207.280,00	9,56%
Spain	\$12.044.594,00	7,10%
Ireland	\$6.350.974,00	3,75%
Germany	\$2.426.606,00	1,43%
Canada	\$1.497.880,00	0,88%
Uruguay	\$673.342,00	0,40%
Norway	\$594.883,00	0,35%
United Arab Emirates	\$401.362,00	0,24%
Singapore	\$281.786,00	0,17%
Belgium	\$191.076,00	0,11%
Bolivia	\$134.794,00	0,08%
Lithuania	\$130.518,00	0,08%
Denmark	\$101.856,00	0,06%
Hong Kong	\$81.767,00	0,05%
Saudi Arabia	\$53.675,00	0,03%
Marshall, Island	\$50.525,00	0,03%
Others		
TOTAL	\$169.577.347,00	100%

Table 3 details the ranking of destinations for Brazilian exports in 2022.

Source: MDIC/SECEX, 2022.

TABLE GRAPE PRODUCTION CHAIN IN BRAZIL

The functioning of the chain can be analyzed in the dynamics of the agents in their context, from production to distribution of products and the entire organization of the chain, as shown in Figure 1. Table grape production involves several segments starting with suppliers of seedlings, inputs, machinery and equipment. The production is heavily commercialized by large cooperatives, however there are cases in which many producers send their production to wholesalers who assume responsibility and transport costs and thus intermediate the commercialization between Supply Centers, large supermarket chains and also carry out exports. (MELO, 2020).

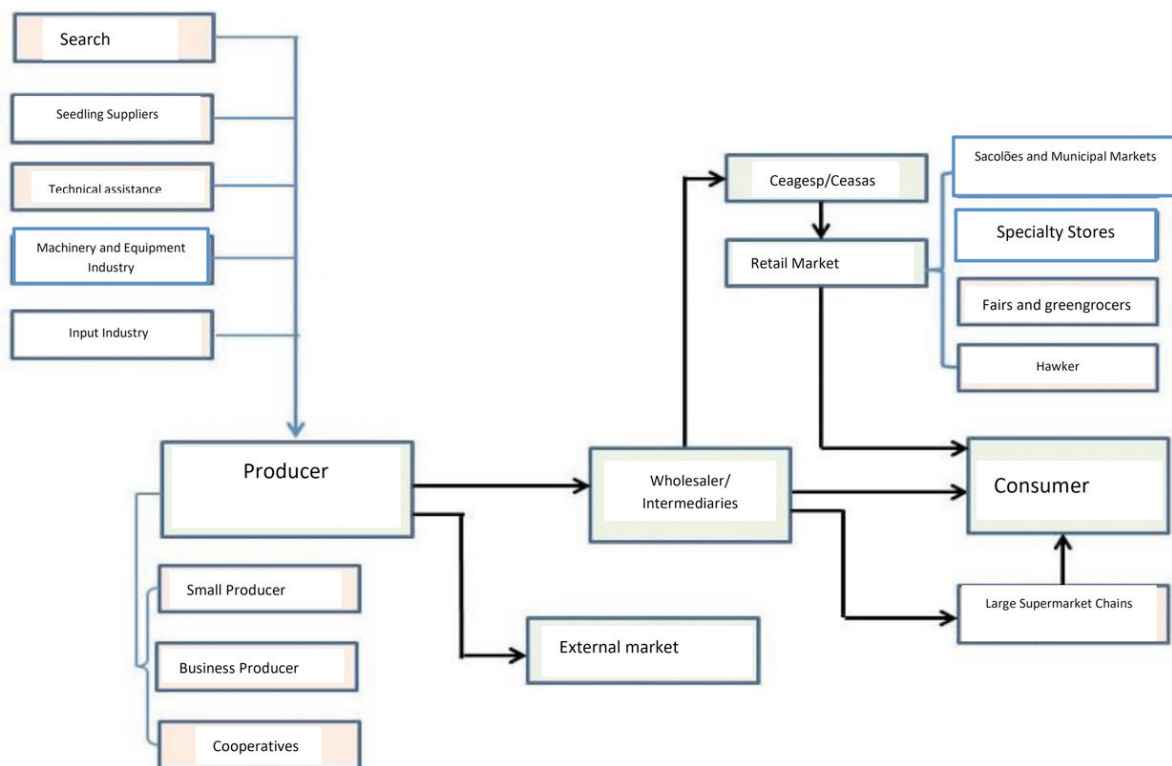


Figure 1: Table grape production chain in Brazil.

Source: Mello, 2020.

SUSTAINABILITY CONCEPT

From the second half of the 20th century onwards, discussions about nature, social responsibility and economic issues intensified and began to be the subject of meetings of world leaders. Great historical tragedies such as the Second World War, the atomic bombs of Hiroshima and Nagasaki, the nuclear accident at Chernobyl, highlighted the fragility of the planet and the need to rethink man's attitudes towards nature (LIMA et al., 2019).

According to Souza and Ribeiro (2013), the concept of sustainability was introduced at the international meeting The World Conservation Strategy in 1980. The notion of sustainability is established in modern society, with its concept being used more frequently and covering environmental aspects, economic and social.

In the 1980s, with the Brundtland Report, during the World Commission on the Environment, the term sustainability gained

space in academic, political, institutional and civil society discussions. The aforementioned report was built based on a narrative that stated that the lack of coordination between administration, the environment and sustainable development would threaten all countries (GRISA; CHECHI, 2016).

Agricultural production is no longer a purely technical issue and is now seen as a process combining social, cultural, political and economic dimensions. Sustainable agriculture goes beyond the technological challenges of production, understanding the entire dynamics of production in each region, to get a sense of the local reality (BESSA; VENTURA; ALVES, 2016).

In short, sustainability is a concept that takes into account the growing needs of the population, and can be divided into five different categories, namely: ecological, environmental, social, economic and political (SACHS, 2009).

The details of each of the aforementioned categories are presented below in Table 1.

Category	Features
Ecologic	Physical basis of the growth process and aims to maintain stocks of natural resources, along with productive activities.
Environmental	Maintenance of the sustaining capacity of ecosystems, implying the absorption and restoration capacity of ecosystems in the face of human aggression.
Social	Its objective is to improve the population's quality of life. For countries with problems of inequality, it involves adopting distributive policies and universal assistance in health, education, housing and social security issues.
Political	Process of building citizenship in order to guarantee full incorporation of individuals within the development process.
Economic	Efficient management of resources in general, characterized by the regularity of public and private investment flows.

Table 1: Sustainability categories

Source: Sachs, 2009.

THE ABC PLAN

The Sector Plan for Mitigation and Adaptation to Climate Change for the Consolidation of a Low Carbon Emission Economy in Agriculture (ABC Plan) is one of the main instruments of agricultural policy in the country for promoting sustainability, including the reduction of carbon emissions. GHG and coping with the adverse effects resulting from climate change in agriculture. According to Decree Number: 7,390, of December 9, 2010, which regulated articles 6, 11 and 12 of the National Policy on Climate Change (PNMC), established by Law No. 12,187 of December 29, 2009 (MAPA, 2023a).

The so-called ABC Plan is a public policy made up of a set of actions to promote the expansion of the adoption of sustainable agricultural technologies, with important potential for mitigating greenhouse gas (GHG) emissions and combating global warming (EMBRAPA, 2023).

The ABC Plan was approved in May 2011 and published in 2013, with a proposal for implementation for the period from 2010 to 2020, with a strong characteristic of national development and transformation towards more sustainable agriculture. Its structuring included a set of systems, technologies, products and processes, called “ABC Technologies”, namely: Direct Planting System (SPD), Recovery of Degraded Pastures (RPD), Crop-Livestock-Forest Integration (ILPF), Biological Nitrogen Fixation (BNF), Planted Forests (FP) and Animal Waste Treatment (TDA), focusing on increasing rural producer income and increasing environmental, economic and social sustainability (MAPA, 2023a).

Table 2 details the objectives of each of the ABC Plan technologies.

Table 3 presents the results in area (in millions of hectares) of the six “ABC Technologies” in the period from 2010 to 2020.

Technologies	Goal	Result	Reach
Recovery of Degraded Pastures	15	26	179%
Crop-Livestock-Forest Integration	4	10,76	269%
Direct Planting System	8	14,59	182%
Biological Nitrogen Fixation	5,5	11,78	214%
Planted Forests	3	1,88	63%
Animal Waste Treatment	4,4 milhões de m ³	38,34 million of m ³	871%
Total ABC Plan	35,5 milhões de hectares	54,03 million hectares	152%

Table 3: Results from 2010 to 2020 of “ABC Technologies”.

Source: MAPA, 2023b

Technology	Goals
Recovery of Degraded Pastures	The recovery of degraded pastures and maintenance of pasture productivity contribute to mitigating greenhouse gas emissions.
Crop-Livestock-Forest Integration	Sustainable production strategy that integrates agricultural, livestock or forestry activities carried out in the same area. They contribute to the recovery of degraded areas, maintenance and reconstitution of forest cover, promotion and generation of employment and income, adoption of good agricultural practices, reduction of GHG emissions, recycling of nutrients, soil bioremediation, etc.
Direct Planting Systems	It contributes to soil and water conservation, increased fertilization efficiency, increased organic matter in the soil, increased benefit/cost ratio, reduced use of pesticides, GHG mitigation, etc.
Biological Nitrogen Fixation	It reduces production costs, reduces risks to the environment by reducing GHG emissions, increasing the organic matter content in the soil and improving soil fertility.
Planted Forests	Implementation of a long-term source of income for the producer; increase in the supply of wood for industrial, energy and civil construction purposes, among others; reducing pressure on native forests and capturing CO ₂ from the atmosphere.
Animal Waste Treatment	It contributes to the reduction of methane emissions, increases producers' income, reduces production costs and reduces GHG emissions.

Table 2: Detail of the objectives of the ABC Plan technologies.

Source: MAPA, 2023b.

ABC+ PLAN

The success of the ABC Plan made the government strive even more towards the goals of the so-called ABC+ Plan. The defined objective is related to expanding the adoption of activities to at least 72.68 million hectares, thus mitigating 1.1 billion tons of carbon by the year 2030. Given this, new objectives were established with the ABC+ Plan, being they: maintenance and adoption of conservationist production systems; strengthening the use of technologies and assistance to producers; encouraging research and development and adoption of sustainable practices; recognition and appreciation of rural producers who use sustainable practices; improving ABC+ information management and encouraging the environmental regularization of rural properties (CROP LIFE, 2022).

Renamed as the Sector Plan for Adaptation to Climate Change and Low Carbon Emissions in Agriculture, with a view to Sustainable Development (2020-2030) – ABC+, or in its short form Adaptation Plan and Low Carbon Emissions in Agriculture – ABC+, it configures as a national strategic agenda of the country's government that continues the

sectoral policy to combat climate change in the agricultural sector, with the intention of being implemented between 2020 and 2030, aiming to consolidate agriculture with regard to sustainable systems, seeking to continue promoting promotional actions to establish sustainable agriculture, capable of controlling GHG emissions, in addition to guaranteeing food supply, conserving natural resources (MAPA, 2023c).

METHODOLOGY

The present research has as its study area the region of Submédio São Francisco Valley, in the city of Petrolina, a municipality located in the western region of the state of Pernambuco, and the city of Juazeiro, located in the northern region of the state of Bahia. This region gained national prominence in fruit production, mainly in the production of seedless table grapes. With an area of 11,114 hectares, producing 396.7 thousand tons and 1.95 billion reais in Gross Production Value (VPB).

To investigate and identify the perspective of table grape producers in relation to sustainability and adding value to their

products, a literature review was adopted. It includes data collection, through exploratory semi-structured qualitative research, in which multiple case studies of researched producers were carried out. The research questionnaires were sent, using the online medium, conducted individually. Seven producers participated in the research and responded via Google Forms.

All content was transcribed in full by the researcher, with authorization from the participants. Qualitative data analysis was carried out using Atlas.ti software (software for qualitative data analysis).

Data collection took place during the months of January and February 2024, with the participation of producers aged between 45 and 60 years old, using a semi-structured research questionnaire. The target audience for the selected sample was table grape producers in São Francisco valley region, preferably from Cooperativa Agrícola de Juazeiro (CAJ), located in the municipality of Juazeiro, Bahia, and ``Cooperativa do Vale do São Francisco`` (Copexvale), located in the state of Pernambuco, in the city of Petrolina. There was participation from independent local producers. These interviews aimed to collect data and direct perceptions from those involved, allowing a more complete understanding of the context and factors that affect commercialization. The SWOT Matrix analysis tool (Strengths, Weaknesses, Opportunities and Threats) was used to systematize and analyze the information collected.

The questionnaire was organized into four blocks, with Block I asking questions involving the assessment of knowledge about sustainability and environmental issues. Block II seeks to assess the impacts of climate change on each business, involving issues that highlight climate change and how to combat it. Block III highlights issues involving the knowledge of research participants regarding

public policies and GHG mitigation, in order to assess the knowledge of research participants regarding the ABC+ Plan, Carbon + Green Seal and Environmental Conformity Seal, among other issues. Finally, the fourth block of questions addresses consumer knowledge about sustainability, grapes with low carbon production and demand trends for this type of product.

Tables 5, 6, 7 and 8 detail the aforementioned blocks that guided the questionnaires applied and their respective themes.

BLOCK I - Assessment of knowledge about sustainability and environmental issues
Sustainability
Challenges implementing sustainable practices
Implantação práticas sustentáveis
Sustainable practices applied
Viable sustainable practices

Table 5: Block I specification.

Source: Prepared by the author, 2024.

BLOCK II - Assessment of the impacts of climate change on each business
Barreiras impeditivas na produção de uvas de baixa emissão de carbono
Impact of climate change
Measures to combat climate change
Implications of climate change on grape production
Opportunities in the production of grapes with low carbon emissions
Producers' perspectives on climate change

Table 6: Block II Specification

Source: Prepared by the author, 2024.

BLOCK III - Knowledge about public GHG mitigation policies
Knowledge about the ABC+ Plan
Knowledge about public GHG mitigation policies
Credibility of public GHG mitigation policies
Knowledge about the Carbon + green seal
Environmental compliance seal credibility

Table 7: Block III Specification.

Source: Prepared by the author, 2024.

BLOCK IV - Knowledge about the new conscious consumer
Conscious consumer
Consumer attraction to low-carbon grapes
Low-carbon grape consumption demand trend
Marketing strategies - sustainable attributes

Table 8 - Block IV Specification.

Source: Prepared by the author, 2024.

In order to analyze the strengths, weaknesses, opportunities and threats regarding grape production in São Francisco Valley, the so-called SWOT analysis was used.

The analysis using the Strengths, Weaknesses, Opportunities and Threats (SWOT) instrument is, in principle, an abbreviation of four analysis focuses, considering successes, deficiencies, potentials and obstacles. It is the combination of the analysis of the external and internal environment, seeking to analyze two levels of impact and their consequent evaluation, so that an opportunity is an external situation that gives the company the possibility of facilitating the achievement of objectives or improving its competitive position and/ or profitability; threat is an external situation that places the company facing difficulties in achieving its objectives, loss of market share and/or reduced profitability; strength is shown as an internal characteristic or asset that gives the company some competitive advantage over its competitors; weak point is shown as an internal characteristic or limitation in an asset that places the company at a disadvantage in relation to competitors (APPIO; VIEIRA, 2006).

RESULTS AND DISCUSSIONS

To analyze the results, the following notes must be taken into consideration: Due to the long distances between the properties and the difficulty in contacting the producers, the questionnaires were sent via email. Contacts were made through Cooperatives and people linked to the sector in the region; Most producers were extremely resistant to answering questions related to the topic of Sustainability.

When asked about the definition of the concept of sustainability from their personal perspective and in the context of table grape production, the majority of research participants (85.7%) responded that they know the importance of sustainable practices and their positive impact on the production process and the production chain itself. Figure 2 illustrates the behavior of research participants when faced with such questioning.

Do you believe that sustainable practices can positively influence the table grape production chain in the São Francisco Valley?
7 answers

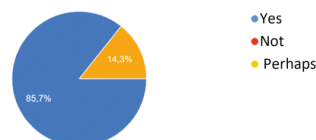


Figure 2: Influence of sustainable practices in the table grape production chain.

Source: Prepared by the author, 2024.

When asked about which sustainable practices producers believe are viable in the production of table grapes in São Francisco Valley, answers such as the adoption of a more efficient irrigation system, including generating water savings, stood out; treatment of spray mixtures and green manure, with local biomass production. Regarding specific examples of how such practices could be implemented, we highlight the sowing, irrigation and management of fertilizer

species, use of organic matter, stress readers on the vines to apply only the necessary water, in addition to the rational use of the soil and water, in addition to inputs.

Regarding the current use of environmental protection practices during the production of table grapes, the participants highlighted that all production areas that serve the external and internal markets need to be certified, observing all the required environmental and social prerequisites. Water conservation or good agricultural practices are fundamental initiatives.

When asked if they know companies in their area of activity that apply sustainable practices in fruit production, it is noteworthy that all participants responded yes.

Finally, regarding the biggest challenges for implementing good sustainable production practices in table grape production in São Francisco Valley, participants highlighted Education/Information, Access to external markets and commercialization. According to the responses obtained: 90% of the São Francisco valley does not access exports, as it does not have adequate marketing. Furthermore, lack of knowledge, high production costs that lead to immediate returns were some of the items highlighted by the interviewees.

In the block of questions (block II) involving the assessment of the impact of climate change on each business, the question about climate change and how it affects the table grape production activity in São Francisco Valley was highlighted. responses such as “Climate changes have limited production in general in the Valley, which impacts sales on the external and internal markets”, “irregular rainfall”, and responses that “There has not yet been a direct impact on production” of certain survey respondents.

With regard to the future of table grape production in the region, considering the

climate panorama, responses highlighted the fact that the São Francisco Valley has technology as one of its strongest points. The most modern grape production in the world is present in daily production in São Francisco Valley. Small businesses that do not access new markets, although they are the majority, and therefore do not see the term sustainability in the production process from the same perspective, tend to continue to suffer much more.

Regarding strategies to be used in the long term to guarantee the sustainability of the sector, research participants highlighted the search for knowledge, simplification of management and investments in technology. Regarding barriers to the production of table grapes with low greenhouse gas emissions, the responses highlighted the lack of barriers, however, there is a lack of better credit lines and incentives for updating the fleet and irrigation and refrigeration equipment.

Regarding opportunities associated with the production of table grapes with low greenhouse gas emissions, responses regarding opportunities in Europe stood out, highlighting the fact that respondents believe that in the country there is still no aggregation of value with regard to the aforementioned topic.

The block of questions (block III) addresses knowledge about public policies to mitigate greenhouse gases, in which 100% of interviewees claim to have no knowledge on the aforementioned topic.

When asked if they are familiar with the ABC Plan, it is highlighted that the interviewees do not have knowledge about the aforementioned Plan. The same responses (lack of knowledge on the topic) appeared when interviewees were asked about their opinions on greenhouse gas mitigation policies.

Block IV of questions addresses knowledge

about the new conscious consumer, with the first question addressing the interviewee's perception of the consumer's search for sustainable products from an environmental point of view. Responses that indicate that in Brazil the topic is still incipient, a niche market without expansion, still with a lot of time to mature, stand out. Regarding the potential of products with low carbon emissions to reach a new conscious consumer, responses stand out that address that this phenomenon does not yet occur in Brazil, only in small market niches. Regarding the interviewees' perception of the demand for sustainable products, responses stand out that point out that abroad it is necessary to meet all requirements, otherwise the merchandise will not go on the shelves, demonstrating that Europe is a mature market when it comes to this topic. Regarding the creation of an environmental compliance seal issued by the Federal Government, the interviewees' perception was one of disbelief regarding the functioning of such a seal, in addition to questions about criteria and details of a possible new seal.

Figure 3 presents the interviewees' perception of the fact that conscious consumers are willing to pay a premium for products produced in a sustainable way from an environmental point of view.

Do you believe that conscious consumers are willing to pay a premium for products produced in an environmentally sustainable way?
7 answers

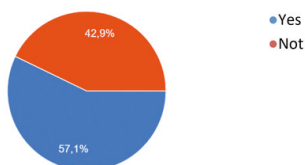


Figure 3: Consumer willingness to pay a premium for sustainable products.

Source: Prepared by the author, 2024.

Regarding how prices and marketing strategies are being adjusted to reflect consumers' willingness to use sustainable

products, interviewees stated that they seek cooperatives, that they must seek marketing and that they are still in the early stages of change. When asked about the European Green Deal, which seeks to make the European continent a carbon neutral continent by 2050, interviewees responded in accordance with what can be highlighted in Figure 4.

Are you aware of the European Green Deal, which seeks to make the European continent a carbon neutral continent by 2050?

7 answers

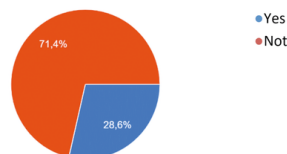


Figure 4: Knowledge about the Environmental Green Pact.

Source: Prepared by the author, 2024.

Next, the strengths, weaknesses, opportunities and threats for table grape production in São Francisco Valley, through SWOT analysis. Table 8 details the strengths, weaknesses, opportunities and threats of the study object.

FINAL CONSIDERATIONS

Developed countries are increasingly demanding in relation to Brazilian products. The use of non-tariff barriers, which can be sanitary or phytosanitary, can make it even more difficult for national products to enter the European and American continents. Certainly, regulatory measures like this could pose serious difficulties for the entry of table grapes into Europe. On the other hand, it is necessary to expand exports, viticulture has great growth potential for exports in the coming years, but issues of fruit health, quality standards, certifications and environmental issues will be topics increasingly demanded by large consumer markets.

In the analysis of the research, great adherence to the theme of sustainability

Matrix SWOT	<i>It contributes to the company's strategy</i>	<i>It hinders the company's strategy</i>
Internal Environment	S (Strengths) The edaphoclimatic conditions of the in São Francisco Valley for grape production; Labor production factors, availability of abundant water and land; Investment in production technologies has improved the cultivation of seedless grapes, which allows for up to two harvests per year; Exports of table grapes from the São Francisco Valley are well established; Well-organized institutional environment with large companies and cooperatives active in exporting production.	W (Weaknesses): Intensive use of labor in various stages of cultivation from planting to harvesting, which may be costlier in the final composition of the product cost; Dependence on grape imports from producing countries, mainly from Mercosur; The small resources structure of small producers to sell their family production at better prices; Little familiarity among producers with the topic of sustainability and production practices.
External Environment	O (Opportunities): Great potential for growth in domestic demand for table grapes and the search for sustainable products; Propensity to consume table grapes, with great influence on growth of the concept of sustainability, supply of new cultivars and economic growth; Environmental certifications such as Fair Trade that strengthen the sustainability image of São Francisco Valley products; Intensive investments in innovation and technologies as a way to increase productivity and obtain certifications.	T (Threats): Increased competitiveness of neighboring countries such as Peru, Chile and Colombia on the international stage; Crisis of qualified labor that is used in viticulture in the in São Francisco Valley; Climate Change can bring even more serious challenges, such as extreme weather events, changes in weather patterns; Even more stringent environmental regulations and limitations on sustainable agricultural practices;

Table 8: SWOT analysis for table grape production in São Francisco Valley.

Source: Prepared by the author, 2024.

is identified. Producers are convinced of caring for the environment, where they have shown great interest, in some cases very committed to environmental practices. Quality certifications for export and the Integrated Production Program brought some processes in line with the research theme. It is clear that producers consider issues related to sustainability positive, due to the impact it can have on business. Although the role of public GHG mitigation policies is important for the decarbonization of the production chain, a total lack of knowledge is perceived when asked about the real effect on its implementation in viticulture. A total lack of disclosure of these public policies was identified in the sample studied.

During the research, a great reluctance was identified in the participation of producers in answering questions related to the topic of sustainability. The lack of knowledge of public policies for mitigating greenhouse gases may be one of the reasons why producers refuse to participate in the research. The group of producers is very conservative, which also contributes to resistance to participating in

research and changes.

The promotion of government communication policies could contribute to a positive and more incisive change in the participation of producers regarding sustainability. The promotion of seminars and dissemination of educational materials on the effects of climate change and the benefits of sustainability can contribute to increasing producers' awareness.

This study faced some significant limitations that affected its scope and depth. The first limitation was the difficulty in conducting the interviews in person, which would have allowed for a broader collection of information through direct observation on the farms.

Another limitation highlighted was the low participation of producers in the research, with only seven of them contributing information. This may have impacted the representativeness of the results, as such a small sample may not reflect the diversity of experiences and perspectives that exist among agricultural producers. These limitations can impact the analysis of studies that depend on

the collaboration and active participation of participants.

In general, the motivation for this study was to bring to light the debate within fruit growing producers, a sector of great relevance

in the economic and social development of producing regions, and which can contribute to reducing the impact of conventional agriculture on the environment.

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