FRUIT CROPS
SCIENCE JOURNAL

Brazilian Fruit Agribusiness

Henrique Belmonte Petry[1*], Ana Claudia Costa Baratti[2], Alberto Fontanella Brighenti[3], Mateus Pereira Gonzatto[4], Idemir Citadin[5], André Luiz Kulkamp de Souza[6]

[1] Empresa de Pesquisa Agropecuária e Extensão Rural de Santa Catarina, Urussanga-SC, and UNIBAVE, Fundação educacional Barriga Verde, Orleans-SC, Brazil.
[2] Departamento de Agricultura, Universidade Federal de Lavras, Lavras-MG, Brazil.
[3] Departamento de Fitotecnia, Universidade Federal de Santa Catarina, Florianópolis-SC,Brazil.
[4] Departamento de Agronomia, Universidade Federal de Viçosa, Viçosa-MG, Brazil.
[5] Universidade Tecnológica Federal do Paraná, Pato Branco-PR, Brazil.
[6] Empresa de Pesquisa Agropecuária e Extensão Rural de Santa Catarina, Estação Experimental de Videira, Videira-SC, Brazil.
*Corresponding author: *henriquepetry@epagri.sc.gov.br*

Abstract: Brazilian fruit farming stands out as a strategic activity for the country's economy, food security and sustainable development. With a wide diversity of tropical, subtropical and temperate species, Brazil has consolidated itself as the world's third largest fruit producer, with an annual production of 43 million tons and a Gross Production Value (GPV) of R$ 75 billion in 2023, benefiting from favorable climate conditions, vast territorial extension and abundant natural resources. The objective of this study is to present an updated overview of Brazilian fruit farming, highlighting its economic, social and environmental relevance, in addition to discussing the challenges and opportunities for strengthening the sector. Oranges lead Brazilian fruit production, followed by bananas, açaí, grapes and pineapples. The sector supplies the domestic market with fresh and processed fruits, and stands out in exports, mainly of mango, melon, papaya, grapes, lemons and limes, reaching demanding markets in Europe, North America and Asia. These are the result of investments in technology, sustainable management and innovation. Despite its success, the sector faces challenges such as climate change, pests, low adoption of technologies in some regions, irregularities in production, limitations in transportation infrastructure and high tax revenue. Nevertheless, Brazilian fruit farming plays an essential role in generating jobs, income and sustainable development, consolidating Brazil as one of the biggest players in global agribusiness.

Index terms: Fruit production; Fruit market; fruit exportation; trade balance.

O agronegócio da fruticultura brasileira

Resumo: A fruticultura brasileira destaca-se como uma atividade estratégica para a economia, segurança alimentar e desenvolvimento sustentável do País. Com ampla diversidade de espécies tropicais, subtropicais e temperadas, o Brasil consolidou-se como o terceiro maior produtor mundial de frutas, com produção anual de 43 milhões de toneladas e um Valor Bruto de Produção (VBP) de R$ 75 bilhões em

2023, beneficiando-se de condições climáticas favoráveis, vasta extensão territorial e recursos naturais abundantes. O objetivo deste trabalho é apresentar um panorama atualizado da fruticultura brasileira, destacando sua relevância econômica, social e ambiental, além de discutir os desafios e as oportunidades para o fortalecimento do setor. A laranja lidera a produção brasileira de frutas, seguida pela banana, açaí, uva e abacaxi. O setor abastece o mercado interno com frutas *in natura* e processadas, e destaca-se nas exportações, principalmente de manga, melão, mamão, limão e uva, alcançando mercados exigentes na Europa, América do Norte e Ásia. Esses resultados são fruto de investimentos em tecnologia, manejo sustentável e inovação. Apesar do sucesso, o setor enfrenta desafios, como mudanças climáticas, pragas, baixa adoção de tecnologias em algumas regiões, irregularidades na produção, limitações na infraestrutura de transporte e alta carga tributária. Mesmo assim, a fruticultura brasileira desempenha papel essencial na geração de empregos, renda e no desenvolvimento sustentável, consolidando o Brasil como um dos maiores protagonistas no agronegócio mundial.

Termos de indexação: Produção de frutas; Mercado de frutas; exportação de frutas; balança comercial.

Introduction

Brazilian fruit farming occupies a prominent place in the country's economy, food security, and social development (HORTIFRUTI BRASIL, 2025). The sector has a wide diversity of tropical, subtropical, and temperate species grown in different biomes, which has contributed to Brazil becoming the world's third largest fruit producer (LARA et al., 2021). This diversity is favored by privileged climatic conditions, territorial extension, and wealth of natural resources, which allow harvests throughout the year. This important segment of Brazilian agribusiness is responsible for a significant portion of the agricultural Gross Domestic Product (GDP), generating direct impacts on the national economy and exports (BORNAL et al., 2021).

The fruit sector significantly contributes to the generation of employment and income, especially in rural areas. The fruit production chain involves everything from small family farmers to large producers, in addition to a broad distribution, transportation, and trade network (PONTES et al., 2023). This enables the inclusion of communities that could be economically marginalized, leading to employment and income in rural areas and reducing rural exodus. Fruit farming, therefore, is a strategic activity in the fight against poverty and in the sustainable development of numerous regions of the country (ESTEVES et al., 2024).

In terms of food, fruits are essential for the health and well-being of the Brazilian population, as they are rich in vitamins, minerals, fibers and bioactive compounds. These foods are essential in preventing diseases and strengthening the immune system (VERRUCK et al., 2018; SANTOS et al., 2021; FAGUNDES et al., 2024). Access to fruits, combined with awareness about healthy eating, has gained prominence in public health and food security policies. In addition, the domestic market is widely supplied with fresh and processed fruits, meeting both popular consumption demands and those of specialized niches (LOPES et al., 2024).

Brazil also stands out as an important fruit exporter, with products such as mango, melon, papaya, lime and grape reaching demanding markets in Europe, North America and Asia (BORNAL et al., 2021). The quality and competitiveness of Brazilian fruits in the international market are the result of investments in technology, sustainable management and innovation in the field (COSTA; BASTOS, 2013; LARA et al., 2021). Exports generate important foreign exchange for the Brazilian economy and also consolidate the

country's image as one of the main players in global agribusiness.

Despite being a success story, Brazilian fruit farming faces significant challenges. Among the main obstacles are climate change, which affects fruit yield and quality, generating uncertainty for producers (KUDEN, 2020). Irregular production, low adoption of technologies in some regions, lack of technical assistance, and limitations in transportation and storage infrastructure make it difficult to access larger and more competitive markets (LIMA et al., 2022). The occurrence of pests and diseases, commonly associated with inadequate management, also poses a major risk to production sustainability. In the economic sphere, high tax revenue, price volatility, and international competition reinforce the need for public policies that encourage innovation, access to credit, and the strengthening of producer organizations.

Fruit farming is directly related to environmental sustainability and the rational use of natural resources. Proper management of orchards contributes to soil preservation, biodiversity protection, and the reduction in carbon emissions (ALKAABNEH et al., 2021). Sustainable farming projects have been gaining strength, associating economic production with environmental preservation practices. Thus, in addition to being an economically and socially relevant activity, Brazilian fruit farming reinforces its role as an ally in building a more sustainable future for the generations to come.

The objective of this study is to present an updated overview of Brazilian fruit farming, highlighting its economic, social and environmental relevance, in addition to discussing the challenges and opportunities for strengthening the sector.

Economic Scenario of Brazilian Fruit Farming

Brazil is one of the largest global food producers and exporters and is considered the major food supplier for the future. There is a growing demand for food, in terms of volume and quality, whether as a function of the increase in the world population, the increase in family income, or even the population's interest in a healthy and diversified diet (CNA, 2024). Brazil's status as a major food provider for the future is due to the areas still available for horizontal expansion of food production, since Brazil has used less than 8% of its territory for agriculture (MIRANDA, 2018) and also due to the 28 million hectares of degraded pastures in areas with high or very high agricultural potential, which can be converted to crops with a low investment (BOLFE et al., 2018). In addition, the increase in crop yield, as a function of the adoption of technologies developed by research and teaching institutions, suitable for tropical agriculture, expands Brazil's potential as a major food producer. This is an efficient and carbon-positive agriculture, with the potential to meet global demands for cheap, quality food, helping the globalized world to mitigate the damage caused by ongoing climate change.

Brazilian agriculture grew by approximately 50% in less than 40 years, expanding approximately 95 million hectares from 1985 to 2022 (MAPBIOMAS, 2024). In 2023, Brazilian agribusiness generated R$2.7 trillion, which represented 25% of this year's GDP, including goods and services. The agricultural sector generated R$1.9 trillion, 72% of this amount, and livestock farming accounted for 28%, approximately R$750 billion. With approximately US$166 billion exported in 2023, Brazil was the world's third largest exporter of agricultural products, behind the European Union and the United States. China is the largest trading partner of Brazilian agribusiness (36.2%), followed by the European Union (13.0%), the United States (5.9%) and Japan (2.5%) (Figure 1) (CEPEA, 2023).

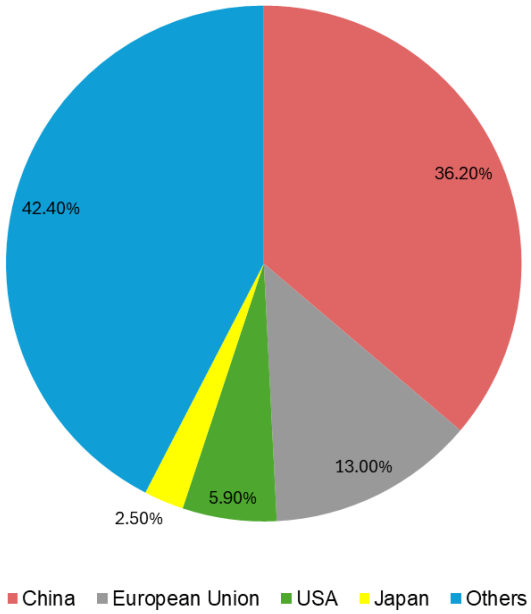

Figure 1. Main destinations for Brazilian agribusiness exports in 2023 (CEPEA, 2023).

This scenario was only possible due to the joint efforts of farmers and Brazilian agricultural research which, year after year, has generated surpluses of exportable food, helping Brazil generate trade surpluses (Figure 2), which are fundamental for the Brazilian economy in an increasingly globalized world.

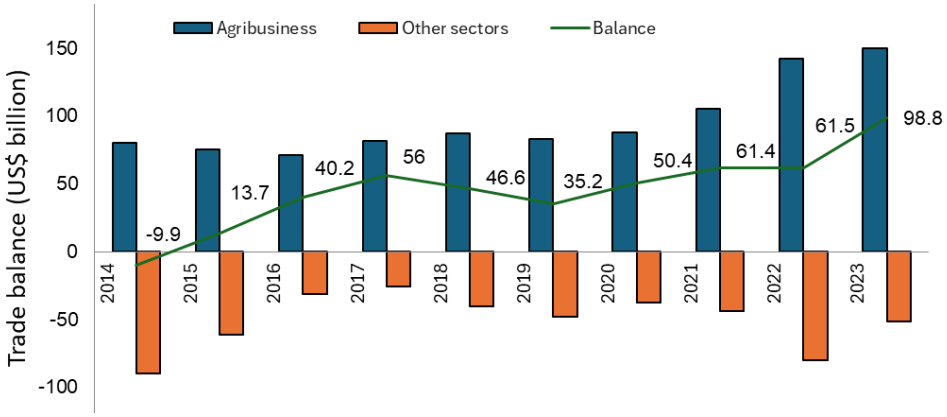

Figure 2. Brazilian trade balance from 2014 to 2023 (CNA, 2024).

In 2023, Brazil was the world's largest producer and exporter of soybeans, coffee, orange juice, and sugar. It is also the largest exporter of chicken and beef, being the second largest producer of both. In the ranking of Brazilian agricultural GPV, soybeans were the leader with R$368.34 billion, followed by beef cattle (R$183.31 billion), maize (R$144.74 billion), sugarcane (R$95.18 billion), and dairy cattle (R$83.84 billion). Chicken meat (R$75 billion), Arabica coffee (R$37 billion), pork (R$34 billion), cotton (R$30 billion), and eggs (R$24 billion) complete the list of the 10 most valuable products in Brazilian agriculture (CNA, 2024).

With a focus on grain and meat production, the country was also the third largest fruit producer in the world in 2022, behind only China and India. In Brazilian agribusiness, the gross value of fruit production generated around R$75 billion in 2023 (Figure 3), with 43 million tons produced (IBGE, 2024), which places fruit farming, along with chick-

en meat, as the sixth largest business in the primary sector in 2023, in terms of production value (Figure 4). The GPV growth of fruits was not accompanied by the volume produced, which showed a small growth compared to the strong increase in the value produced, demonstrating a great appreciation of fruits in the market, generating greater foreign exchange for Brazilian fruit growers. The production stability in recent years is probably a reflection of the high investment required for the installation and renovation of orchards, in addition to the demand for qualified labor, and in quantity, to perform tasks that are difficult to mechanize and/or automate.

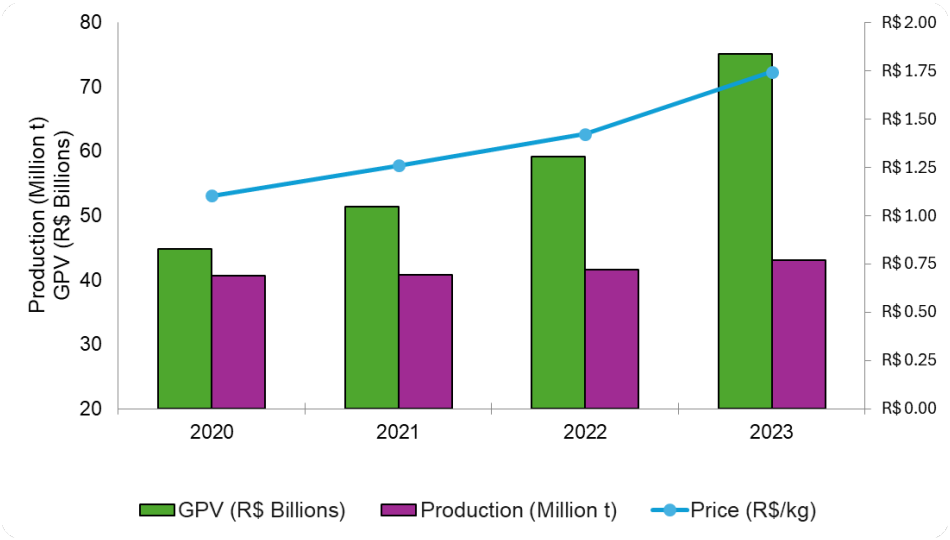

Figure 3. Production, Gross Production Value (GPV) and average fruit price in Brazil (adapted from IBGE, 2024)

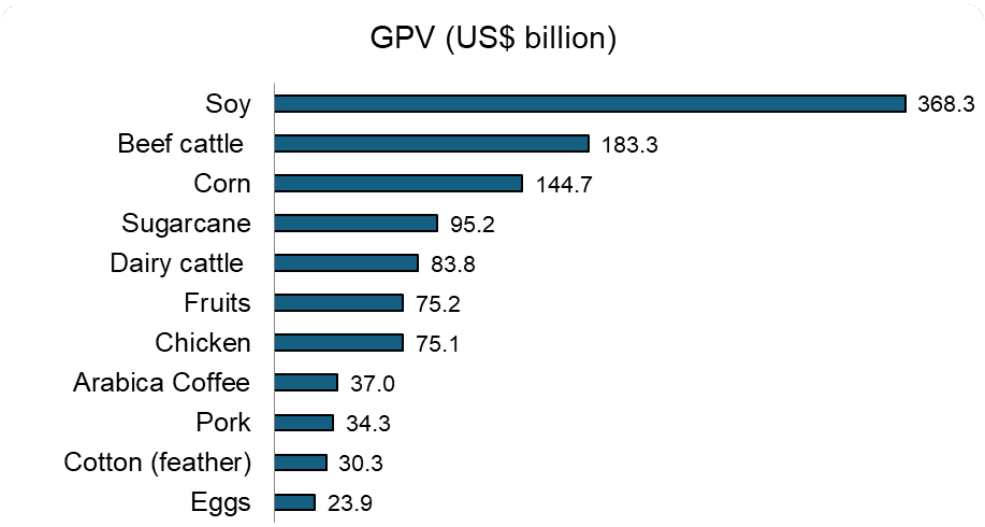

Figure 4 - Gross Production Value of the main products of Brazilian agribusiness (adapted from CNA, 2024).

According to data provided by the FAO (FAOSTAT, 2024), among the 20 largest GPV of Brazilian agribusiness in 2023, four fruits stood out among those with the highest value. Orange production ranked tenth, bananas ranked 15th, other tropical fruits appeared in 19th place, and finally, mango and guava combined in 20th place, which demonstrates the strength of national fruit production in Brazilian agribusiness. The ten most produced fruits are, respectively: orange, banana, açaí, grape, pineapple, mango, apple, papaya, lem-

on and passion fruit (Figure 5). Fruit production is responsible for around 18% of the agribusiness workforce in Brazil, in just approximately 3 million hectares cultivated by fruit trees, concentrated closer to the Brazilian coast, from the south to the northeast.

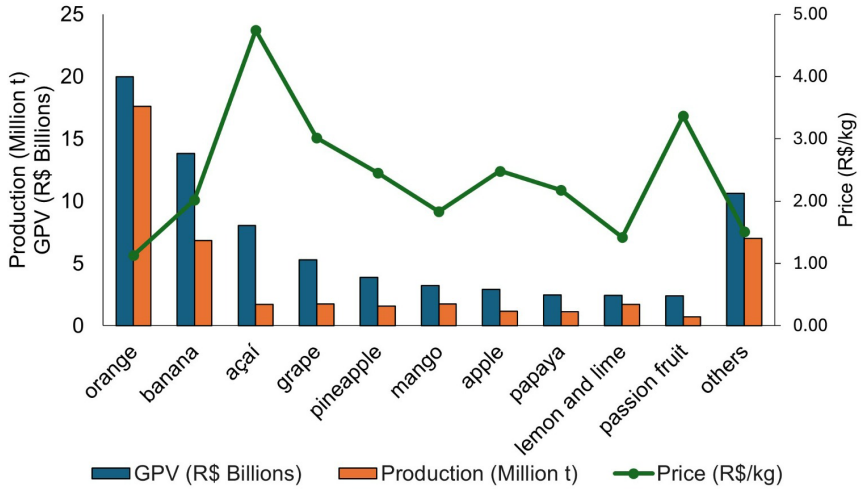

Figure 5 - Production, gross production value (GPV) and average price of the ten most produced fruits in Brazil in 2023 (IBGE, 2024).

Brazilian fruit production includes tropical, subtropical and temperate species distributed throughout the country. Despite the mild winters typical of the subtropical climate in the south of the country, in addition to the production of citrus, apples, grapes and stone fruits, banana and passion fruit production also stand out in this region in warmer coastal areas. In the Northeast, mainly in the semi-arid region, the production of high-quality seedless grapes stands out, along with orchards of coconut, banana, mango, papaya, passion fruit and pineapple, melon and watermelon crops. São Paulo stands out as the main fruit-producing state in Brazil, followed by Bahia, Pará, Minas Gerais, Rio Grande do Sul, Pernambuco, Santa Catarina, Ceará, Paraná, Rio Grande do Norte and Espírito Santo (Figure 6). Other fruits, such as coconut, tangerine, peach, melon, watermelon, avocado, pear, fig, persimmon and guava, accounted for the remaining 16% of the GPV in 2023 (IBGE, 2024).

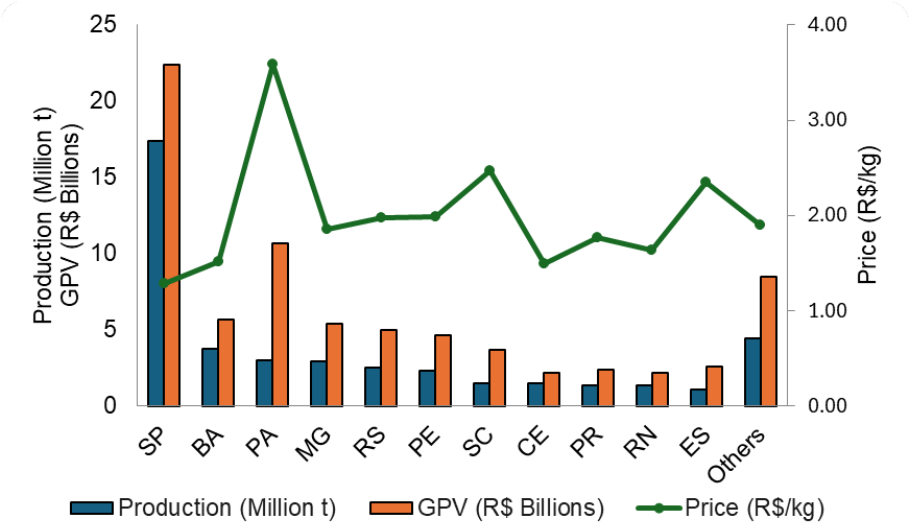

Figure 6 - Production, gross production value (GPV) and average fruit price in the Brazilian states that produced the most fruits in 2023 (IBGE, 2024).

Fruit production is more concentrated in the southern, southeastern and northeastern states, mainly due to high regional demand, as the country's highest population density is found close to the Brazilian coast (Figure 7).

Figure 7. Production map of the ten most produced fruits in Brazil in 2023, considering the five main producing states of each fruit (IBGE, 2024).

From 2020 to 2023, there was stability in production and an increase in GPV (Figure 8), due to the increase in prices paid to fruit producers in Brazil (CEPEA, 2024; IBGE, 2024). Orange production accounted for 26.5% of the GPV of Brazilian fruit production in 2023, with a production of 17.6 million tons and approximately 20 billion reais. Even with production reported in all federation units, with 77.5% of national production, the state of São Paulo is the largest producer, mainly to supply the juice industry, which is one of the main agro-industries in the country, with great importance for the country's export economy, totaling more than two billion US dollars traded abroad in the 2023/24 harvest, despite the reduction in the volume produced. Minas Gerais (6.4%), Paraná (4.2%), Bahia (3.5%) and Sergipe (2.2%) are the other producing states that make up the group of the five largest producers.

Banana production accounted for approximately 18.4% of the national fruit production GPV in 2023, being the second most important fruit, with a production of 6.8 million tons and 13.8 billion reais. It is a crop with production better distributed among the various states and regions of the country.

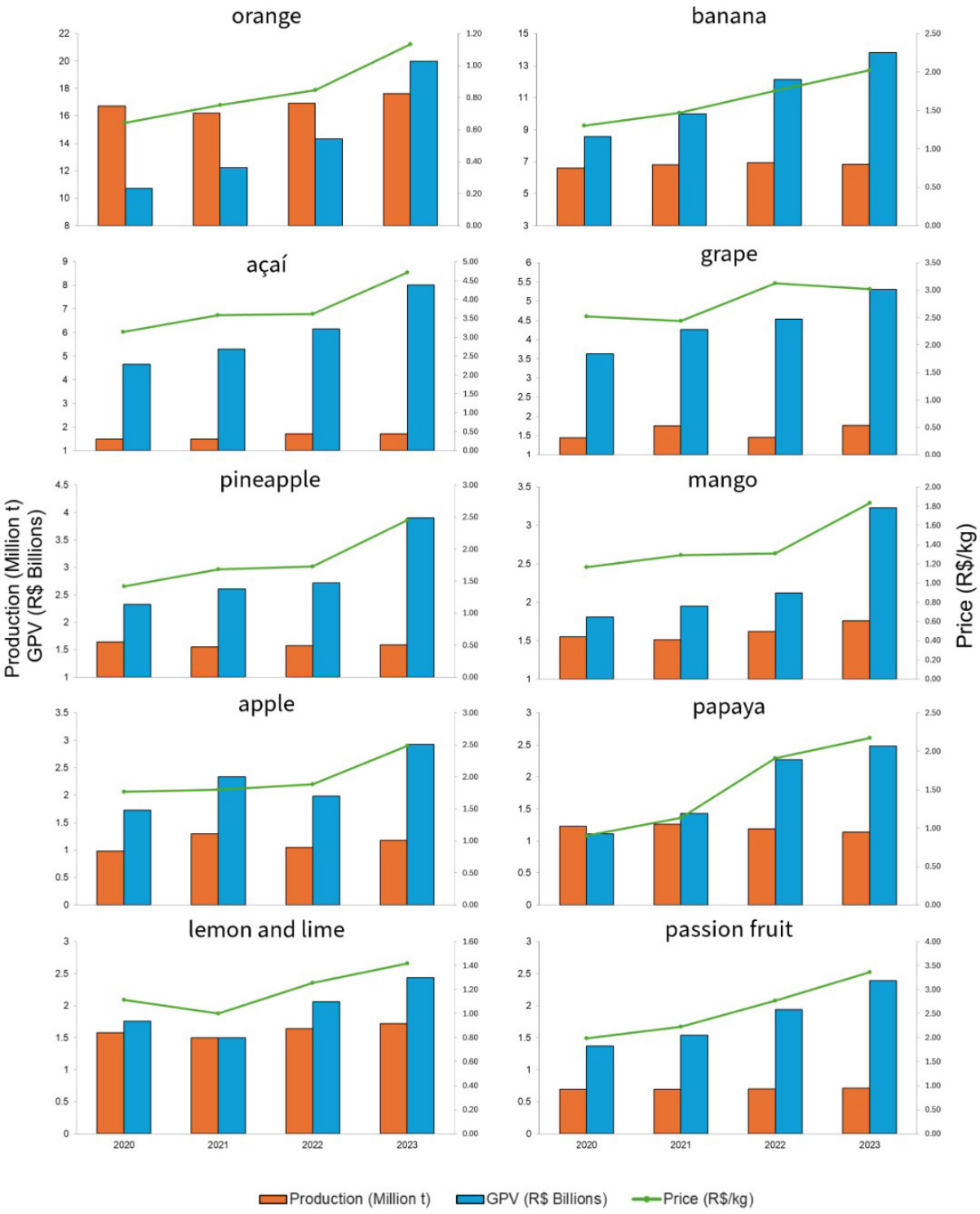

Figure 8. Production, gross production value (GPV) and average price paid to the producer for the 10 main fruits produced in Brazil (IBGE, 2024).

Production in São Paulo represented 14.3% of national production, followed by Bahia (12.6%), Minas Gerais (12.4%), Santa Catarina (10.1%), Pernambuco (7.1%), Pará (6.5%), Ceará (6.2%) and Espírito Santo (6.0%) as the main banana producing states in Brazil, showing the wide crop distribution and its importance for the economy of the various Brazilian regions (CEPEA, 2024; IBGE, 2024).

Açaí ranked third in the GPV of national fruit production, with 10.7%. Production is concentrated in the states of Pará, with 93% of production, and Amazonas, with 6%, totaling 1.7 million tons and more than 8 billion

reais. Brazilian production is intended for obtaining purees and other forms for marketing frozen pulp, intended for consumption as an energy food in the main capitals of Brazil. Exports have significantly grown in recent years, raising 45 million US dollars in 2023 (CEPEA, 2024; IBGE, 2024).

Grapes ranked fourth in the Brazilian fruit industry GPV, accounting for 7%, with a production of 1.8 million tons and R$5.3 billion in 2023. With over 50% of production in the state of Rio Grande do Sul, grapes are produced both for fresh consumption, with hybrid cultivars, as well as for the juice and wine industry. Pernambuco stands out in second place, producing 28% of the country's grapes, with emphasis on table grape production areas in the irrigated areas of the São Francisco River valley, where harvests are modulated according to pruning and are carried out two to three times a year in the same area. São Paulo (8.7%), Bahia (4.2%) and Santa Catarina (3.2%) complete the five states with the highest production in Brazil (CEPEA, 2024; IBGE, 2024).

Pineapple production accounted for 5.1% of the GPV of Brazilian fruit production in 2023. Pará was the largest producer with more than 340 thousand tons, which corresponded to 21.5% of national production. Paraíba (19.2%), Minas Gerais (10%), Tocantins (6.8%) and Rio de Janeiro (6.8%) complete the five states with the largest production in Brazil (CEPEA, 2024; IBGE, 2024).

Mango production accounted for 4.2% of the GPV of Brazilian fruit production in 2023. Bahia was the largest producer with more than 704 thousand tons, which corresponded to 40% of national production. Pernambuco (34.2%), São Paulo (12.1%), Minas Gerais (5.4%) and Ceará (2.4%) complete the five states with the largest production in Brazil (CEPEA, 2024; IBGE, 2024).

Apple production accounted for 3.9% of the GPV of Brazilian fruit production in 2023. Santa Catarina was the largest producer with more than 593 thousand tons, which corresponded to 50.1% of national production and Rio Grande do Sul, with 553 thousand tons, occupied the second position, with 46.8% of Brazilian production. Paraná (2.2%), Minas Gerais (0.5%) and São Paulo (0.4%) complete the list of apple producing states in Brazil (CEPEA, 2024; IBGE, 2024).

Papaya production accounted for 3.2% of the GPV of Brazilian fruit production in 2023. Bahia was the largest producer with more than 354.5 thousand tons, which corresponded to 31.1% of national production, closely followed by Espírito Santo, with 30.9% of Brazilian production and 552 thousand tons produced. Rio Grande do Norte (12.2%), Ceará (10.3%) and Minas Gerais (3.8%) complete the five states with the largest production in Brazil. There was a certain stability in production and an increase in GPV from 2020 to 2023, due to the increase in prices paid to papaya producers (CEPEA, 2024; IBGE, 2024).

Lemons and limes production also accounted for 3.2% of the GPV of Brazilian fruit production in 2023. In these fruits, Brazil mainly produces 'Tahiti' acid lime (*Citrus latifolia*), known as 'lemon' among Brazilian consumers. São Paulo was the largest producer with more than 1.28 million tons, which corresponded to 74.4% of national production. Minas Gerais (5.9%), Bahia (4.7%), Pará (3.9%) and Paraná (1.9%) complete the five states with the largest production in Brazil (CEPEA, 2024; IBGE, 2024).

Passion fruit production also accounted for 3.2% of the GPV of Brazilian fruit production in 2023. Bahia was the largest producer with 253.8 thousand tons, which corresponded to 35.7% of national production. Ceará (21.7%), Santa Catarina (6.6%), Minas Gerais (4.5%) and Pernambuco (4.3%) complete the five states with the largest production in Brazil (CEPEA, 2024; IBGE, 2024).

The export of fresh fruit represents a small fraction of the volume produced, but its importance has increased in recent years, mainly due to the economic movement of more than 1.24 billion US dollars traded in 2023 (Figure 9). However, if added to the 2.68 billion US dollars exported in 2023, in the form of juices, products of national fruit farming, it reaches approximately 4 billion US dollars. Fruit imports in 2023 were 877 million dollars, which generated a positive trade balance for national fruit farming, contributing substantially to the Brazilian economy (FERREIRA; SOUZA Jr., 2024).

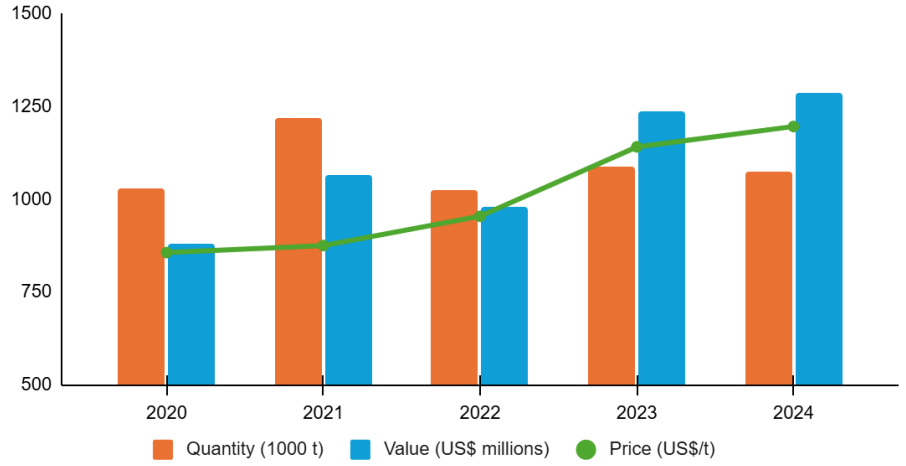

Figure 9 - Quantity, value and average price received for Brazilian fruits exported between 2020 and 2024 (ABRAFRUTAS, 2024).

Mango, melon, grapes, lime, and lemons are among the most traded fruits to European countries and the United States in recent years (Figure 10). The main destinations were the Netherlands (33%), the United Kingdom (15%), and Spain (10%). The dollar revenue of this sector increased by 24% in 2023 compared to 2022, due to the 5.9% growth in the quantity exported and the 16.6% growth in the average prices received by exporters. Among the products most exported by Brazil, orange juice is one of the highlights, with approximately R$1.5 billion in 2020, reaching more than 75% of the world exports of the product (CEPEA, 2024).

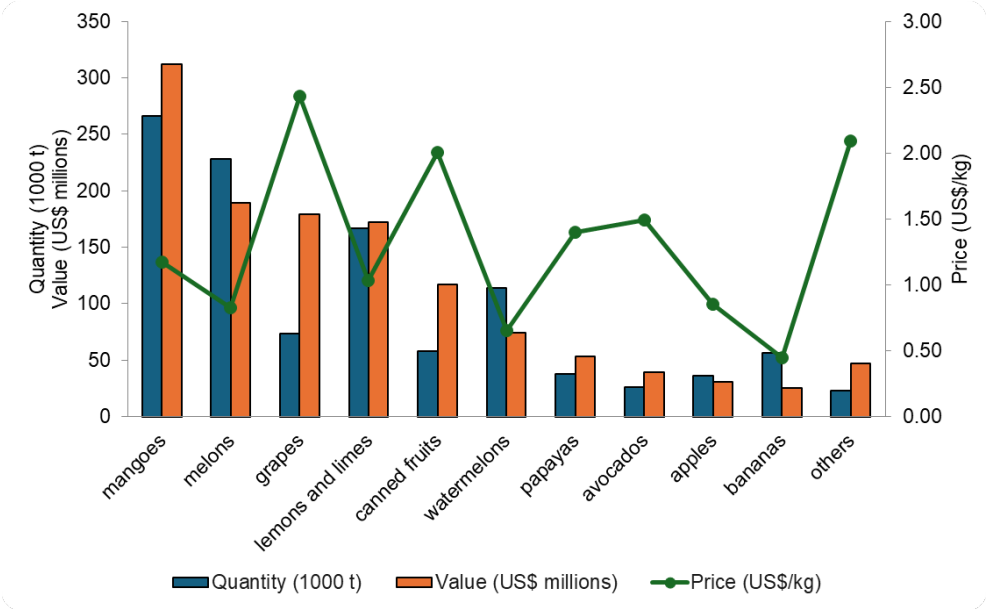

Figure 10 - Fresh fruits (t) most exported by Brazil and value received (US$), in 2023 (ABRAFRUTAS, 2024).

Challenges, Perspectives and Potential

Fruit farming is one of the mainstays of Brazilian agribusiness, playing a fundamental role in generating income and employment on small, medium and large properties, providing high-quality food to the national and international population. Production areas are generally planned for investments with long-term returns, reinforcing the strategic importance of the sector for Brazilian society. This planning ensures a constant demand for specialized labor, inputs and services, resulting in a sustainable and lasting economic stability.

However, for Brazilian fruit farming to become more stable and profitable, it is essential that fruit growers adopt intelligent and effective management practices.

Efficient management of orchards and properties, together with specialized technical assistance, is essential to reduce production costs. Furthermore, access to new markets, in addition to differentiated attributes such as flavor, appearance, safety and sustainability, can offer significant opportunities for producers. Packaging with private or collective brands emerge as strategies to build customer loyalty and reach foreign markets, contributing to the maintenance and expansion of the sector.

For more sustainable fruit farming, it is also essential to optimize the use of inputs and labor, leading to rapid decision-making based on technical criteria. Real-time warning and diagnostic systems, in addition to more accurate management tools, are essential to increase efficiency and achieve objectives. Investments in research and development are also necessary to improve the precision of actions and ensure that resources are used rationally. Fruit farming also needs to become more attractive through labor humanization, reducing physical effort and dependence on intensive labor. This can be achieved by increasing the operational yield of activities, automating complex tasks such as pruning, harvesting and application of inputs, and standardizing production practices, which also results in cost reduction.

Another highlight are the fruits that come from the forest, such as açaí, Brazil nuts and even pine nuts (*Araucaria angustifolia* (Bertol.) Kuntze) and the fruit of the juçara palm (*Euterpe edulis* Mart.), produced in agroforestry systems, without removing the forest, combining environmental preservation with income for traditional peoples. Several other native fruit tree species can increase their share of national fruit production in this cultivation system.

Following this line, native fruit plants are gaining important space, whether due to their nutritional characteristics (MARIN et al., 2004), which are increasingly valued, or due to their real potential to increase income for small rural producers (KAHANE et al., 2013). Their use also plays an important role in the biodiversity of natural or agroecological systems, since fruit species are closely related to the most preserved remnants of forests and other natural ecosystems (BARBIERI et al., 2014). Among native fruit plants, those of the Myrtaceae family are the best known, already used by part of the population and with records of being sold fresh in markets and farmers' fairs. Examples include pitanga (*Eugenia uniflora*), araçá (*Psidium cattleianum*), guabiroba (*Campomanesia xanthocarpa*), feijoa (*Acca sellowiana*) and jaboticaba (*Plinia peruviana*) (KÖHLER, 2014).

Fruit farming is also an activity that can have a high yield per area, which makes it viable for small properties. This characteristic also means that fruit farming can play an important role in environmental preservation, since it is possible to combine agricultural production with sustainable practices such as

preserving biodiversity; recovering degraded areas; controlling erosion and improving soil; storing carbon; integrating with agricultural and forestry landscapes; and adopting agroecological and organic fruit production systems.

Finally, with the growing demand for healthy food, both domestically and internationally, the sector finds unique opportunities to expand and consolidate its relevance. By integrating technology, sustainability and quality, fruit farming can not only meet current demands, but also set a global standard of excellence.

Conclusions

Innovation is essential to ensure the continuity of fruit farming in the face of the challenges posed, in order to motivate producers. Brazil, as the world's third largest fruit producer, has a vast market for innovative solutions adapted to different production realities. New technologies must be practical, accessible and focused on facilitating the work of fruit growers, ensuring production maintenance, reducing costs and improving the life quality of producers. Efforts must be concentrated on initiatives for innovation, sustainability and well-being in the fruit sector.

References

ABRAFRUTAS. **Painéis de produção.** Disponível em: *https://abrafrutas.org/paineis-de-producao/*. Acesso em: 16 out. 2024.

ALKAABNEH, F.M.; LEE, J.; GÓMEZ, M.I.; GAO, H.O. A systems approach to carbon policy for fruit supply chains: Carbon tax, technology innovation, or land sparing? **Science of The Total Environment**, Amsterdam, v.767, n.1, 2021. *https://doi.org/10.1016/j.scitotenv.2020.144211*

BARBIERI R.L.; GOMES J.C.C.; ALERCIA A.; PADULOSI S. Agricultural Biodiversity in Southern Brazil: integrating efforts for conservation and use of neglected and underutilized species. **Sustainability**, Basel, v.6, p.741-57, 2014. *https://doi.org/10.3390/su6020741*

BOLFE, E.; SANO, E.; MASSRUHÁ, S.; VICTORIA, D.; BAYMA, G. OLIVEIRA, A. Potencial de expansão agrícola em áreas de pastagem degradadas no Brasil. **Agroanalysis: A revista de agronegócio da FGV**, Rio de Janeiro, v.38, n.2, p.25-7, 2018. Acesso em: 16 out. 2024. Disponível em: *https://periodicos.fgv.br/agroanalysis/article/view/90934*

BORNAL, D.R.; SILVESTRINI, M.M.; PIO, L.A.S.; COSTA, A.C.; PECHE, P.M.; RAMOS, M.C.p.Brazilian position in the international fresh fruit trade network. **Revista Brasileira de Fruticultura**, Jaboticabal, v.43, n.5, p.1-13, 2021. *https://doi.org/10.1590/0100-29452021021*

CEPEA - Centro de Estudos Avançados em Economia Aplicada. **Índices**: exportação do agronegócio - janeiro a dezembro de 2023. Piracicaba, 2023. Disponível em: *https://cepea.esalq.usp.br/upload/kceditor/files/Cepea_Export_jan-dez_2023(2).pdf*. Acesso em: 16 out. 2024.

CEPEA - Centro de Estudos Avançados em Economia Aplicada. **PIB do agronegócio**: PIB do agronegócio sofre queda no primeiro trimestre devido aos baixos preços agropecuários. Piracicaba, 2024. Disponível em: *https://www.cepea.esalq.usp.br/br/pib-do-agronegocio-brasileiro.aspx* Acesso em: 16 out. 2024.

CNA - Confederação da Agricultura e Pecuária do Brasil. **Panorama do agro**. Brasília, 2002. Disponível em: *https://www.cnabrasil.org.br/cna/panorama-do-agro*. Acesso em: 16 out. 2024.

COSTA, F.M.; BASTOS, A.V.B. Transformações em organizações de fruticultura irrigada e a dinâmica do comprometimento organizacional. **REAd**, Porto Alegre, v.76, n.3, p.675-708, 2013. *https://doi.org/10.1590/S1413-23112013000300006*

ESTEVES, S.J.S.; CAMPOS, R.T.; CAMPOS, K.C.; COSTA, E.M. Análise social da aplicação de investimentos públicos em fruticultura: o caso da Cooperfam e dos fruticultores do município de Maranguape, Ceará. **Economia e Região**, Londrina, v.12, n.2, p.233-53, 2024. *https://doi.org/10.5433/2317-627X.2024.v12.n2.49469*

FAGUNDES, C.M.; BIASI, L.A.; TOFANELLI, M.B.D.; RODRIGUES, A.P.S.; FRANCISCON, V.G.; SIQUEIRA, A.F.C. Production, quality, bioactive compounds, and phenology of raspberry cultivars under an organic cropping system in a subtropical region of Brazil. **Revista Brasileira de Fruticultura**, Jaboticabal, v.45, n.2, e20230009, 2024. *https://doi.org/10.1590/1678-992X-2023-0009*.

FAOSTAT - Food and Agriculture Organization of the United Nations. **Data**. Rome, 2024. Disponível em: *https://www.fao.org/faostat/en/#data*. Acesso em: 20 out. 2024.

FERREIRA, D.; SOUZA Jr., J.R.C. **Comércio exterior do agronegócio em 2023** [carta de conjuntura, 62]. Brasília (DF): IEPA, 2024. Disponível em: *https://www.ipea.gov.br/cartadeconjuntura/index.php/2024/01/comercio-exterior-do-agronegocio-em-2023/*. Acesso em: 20 out. 2024.

HORTIFRUTI BRASIL. Anuário 2024-2025. **Revista Hortifruti Brasil**, Piracicaba, v.23, n.251, 2025. (edição especial). Disponível em: *https://www.hfbrasil.org.br/br/revista.aspx*. Acesso em: 12 dez. 2024.

IBGE - Instituto Brasileiro de Geografia e Estatística. **Produção agropecuária**. Rio de Janeiro, 2024. Disponível em: *https://www.ibge.gov.br/explica/producao-agropecuaria/*. Acesso em: 20 jan. 2025.

KAHANE R.; HODGKIN T.; JAENICKE H.; HOOGENDOORN C.; HERMANN M; KEATINGE, J.D.H.; HUGHES, J.A.; PADULOSI, S.; LOONEY, N. Agrobiodiversity for food security, health and income. **Agronomy for Sustainable Development**, Les Ulis, v.33, p.671-93, 2013. *https://doi.org/10.1007/s13593-013-0147-8*

KÖHLER, M. **Diagnóstico preliminar da cadeia das frutas nativas no estado do Rio Grande do Sul.** 2014. Trabalho de Conclusão de Curso (Bacharelado em Ciências Biológicas) - Universidade Federal do Rio Grande do Sul, Porto Alegre. 2014. 81p.

KUDEN, A.B. Climate change affects fruit crops. **Acta Horticulturae**, The Hague, n.1281, 2020. *https://doi.org/10.17660/ActaHortic.2020.1281.57*

LARA, L.M.; GEBLER, L.; LEITE JÚNIOR, M.J.; SOARES, A.L. Precision agriculture trends in fruit growing from 2016 to 2020. **Revista Brasileira de Fruticultura**, Jaboticabal, v.43, n.2, p.e-096, 2021. *http://doi.org /10.1590/0100-29452021096*

LIMA, D.M.; MARSOLA, K.B.; OLIVEIRA, A.L.R.; BELIK, W. Strategies for reducing the waste of fruit and vegetable supply chains: the search for sustainable wholesale systems. **Horticultura Brasileira**, Brasília, DF, n.40, p.334-41, 2022. *http://doi.org/10.1590/s0102-0536-20220313*

LOPES, I.S.; SILVA, L.V.; GOMES, A.R.; LOPES, F.S.; PRUDÊNCIO, C.v.Fruits of the brazilian cerrado: possibilities of uses for the manufacture of food products**. Brazilian Archives of Biology and Technology**, Curitiba, v.67, n.e24230266, 2024. *https://doi.org/10.1590/1678-4324-2024230266*

MAPBIOMAS. **Mapeamento anual de cobertura e uso da terra no Brasil entre 1985 a 2022** [coleção 8]. Disponível em: *https://brasil.mapbiomas.org/wp-content/uploads/sites/4/2023/10/FACT_MapBiomas_Agropecuaria_04.10_v2.pdf*. Acesso em: 16 out. 2024.

MARIN, R., PIZZOLI, G., LIMBERGER R., APEL M., ZUANAZZI, J.A.S., HENRIQUES, A.T. Propriedades nutracêuticas de algumas espécies frutíferas nativas do sul do Brasil. *In*: RASEIRA, M.C.B.; ANTUNES, L.E.C.; TREVISAN, R.; GONÇALVES, E.D. (ed.) **Espécies frutíferas nativas do sul do Brasil** [documentos, 129]. Pelotas: Embrapa Clima Temperado, Pelotas. 2004. 125p.

MIRANDA, E.E. Áreas cultivadas no Brasil e no mundo. **Agroanalysis**: a revista de agronegócio da FGV, Rio de Janeiro, v.38, n.2, p.25-7, 2018. Disponível em: *https://periodicos.fgv.br/agroanalysis/article/view/77453/74223*. Acesso em: 16 out. 2024.

PONTES, A.G.V.; SILVA, R.T.; SILVA, J.V. Cargas de trabalho, precarização e Saúde do Trabalhador no agronegócio no semiárido do Nordeste brasileiro. **Saúde Debate**, Rio de Janeiro, v.47, n.139, p.729-745, 2023. *https://doi.org/10.1590/0103-1104202313901*

SANTOS, R.D.S.; BIASOTO, A.C.T.; RYBKA, A.C.P.; CASTRO, C.D.C.; AIDAR, S.D.T.; BORGES, G.S.C.; SILVA, F.L.H. Physicochemical characterization, bioactive compounds, in vitro antioxidant activity, sensory profile and consumer acceptability of fermented alcoholic beverage obtained from Caatinga passion fruit (*Passiflora cincinnata* Mast.). **Food Science and Technology**, Haboken, n.148, n.111714, 2021. *https://doi.org/10.1016/j.lwt.2021.111714*

VERRUCK, S.; PRUDENCIO, E.S.; SILVEIRA, S.M. Compostos bioativos com capacidade antioxidante e antimicrobiana em frutas. **Revista do Congresso Sul Brasileiro de Engenharia de Alimentos**, Pinhalzinho, v.4, n.1, 2018. *https://doi.org/10.5965/24473650412018111*