



Kingdom of the Netherlands



# Brazilian Fruit Production

Opportunities for Business and Investments



Brasília, Federal District  
December de 2020

## Introduction

The Netherlands and Brazil have longstanding good relations when it comes to agriculture and agri-business. We are both among the largest producers and exporters of agricultural products in the world and our common goal is to increase sustainable productivity to continue feeding the world with healthy, nutritious and safe food. Sustainable production while respecting people, nature, our environment and the carrying capacity of our planet is extremely important.

The Netherlands embassy in Brazil has identified the fruit and vegetable value chains in Brazil as sectors with a large potential for innovation, bilateral cooperation, trade and investment. This includes all stages of the chain; from production, transport, processing and cold storage to local marketing, import and export. Improving agro-logistics is one of the focus topics of the program because by optimizing the logistics of fruit and vegetables, (food) losses, which in Brazil now amount to more than 50%, can be greatly reduced and the quality of the products improved.

Also in Brazil the fruit and vegetable sector is on the priority list which is why at the end of 2019 the Brazilian ministry of agriculture (MAPA) launched a national program aimed at the modernization of all distribution centers of fruit and vegetables; with the objective to improve the infrastructure and management, increase effectivity and quality, and reduce food loss. At these so-called CEASAs of which 70 are distributed across the country, around 70% of the total fruit and vegetable production is marketed.

In February of 2020, just before start of the Covid 19 pandemic the Netherlands Embassy organized a fruit and vegetable/logistics mission to the Netherlands to demonstrate the Dutch system. Brazilian government including MAPA and CONAB, CEASAs, and fruit and vegetable traders participated in this successful and learning mission.

This mapping study is the next stage in the program and gives an overview of in the fruit sector in Brazil. It is primarily intended for (Dutch) companies working in the fruit sector with an ambition to improve or start business in, or with Brazil in this area. The study provides invaluable market information and opportunities along the whole fruit value chain.

Although the report is already quite comprehensive, in discussions with Abrafrutas, which is the association representing the entire fruit sector in Brazil, it has become clear that they can deliver even more, detailed and tailor made information for interested companies. The fruit sector is receptive for and welcomes innovation, technology, partnerships and business.

This report is first in a trilogy. The second report covers the vegetable value chain and the third provides insights, good practices and possible circularity in both the fruit and the vegetable value chains.



**Bert Rikken**  
Conselheiro Agrícola  
Embaixada do Reino dos Países Baixos no Brasil





The association was founded in 2014 through an initiative led by 24 entrepreneurial growers and exporters of fruit and fruit products. Its mission is to coordinate the sector and collaborate jointly in order to advocate issues that are of collective interest to producers and exporters, respecting consumers and offering safe, healthy products and produced while imparting respect for the environment and the people who directly and/or indirectly interact with this vital supply chain of agriculture and food production in Brazil.

The association has a strategic partnership with Apex-Brasil, the Brazilian Trade and Investment Promotion Agency. The agency works to promote Brazilian products and services abroad, and to attract foreign investment to strategic sectors of the Brazilian economy.

The Agency's efforts comprise trade and prospective missions, business rounds, support for the participation of Brazilian companies in major international trade fairs, arrangement of technical visits of foreign buyers and opinion makers to learn about the Brazilian productive structure, and other select activities designed to strengthen the country's branding abroad.

Apex-Brasil also plays a leading role in attracting foreign direct investment (FDI) to Brazil, by working to identify business opportunities, promoting strategic events and lending support to foreign investors willing to allocate resources in Brazil.

At the moment, Abrafrutas has 78 members, including private companies, cooperatives, suppliers and regional fruit associations. It represents the major Brazilian Fruit Exporters and it has been recognized by the society as the legitimate representative of the fruit sector in Brazil.

More: <https://abrafrutas.org/>

For more information on business opportunities within the fruit and vegetable value chains in Brazil, please contact:

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# **Brazilian Fruit Production and its Business and Investment Opportunities**

# Brazilian Fruit Production and its Business and Investment Opportunities

## 1. Introduction and Overview of Fruit Production in Brazil

**1.1.** The fruits that will be analyzed in this report include Avocados, Bananas, Oranges, Lemons, Apples, Papayas, Mangoes, Melons, and Grapes.

**1.2.** Based on data from the FAO of 2017 (Table 1), Brazil is the third-largest fruit grower (Avocado, Banana, Orange, Lemon, Apple, Papaya, Mango, Melon, and Grape) in the world with a total production of 31.51 million tons and gross income from production estimated at US\$ 8.4 billion.

Tabela 1. Principais produtores de frutas no mundo - 2017

País	Toneladas	%	Área (ha)	%	US\$	%
China	94,6 mi	20,6%	5,0 mi	16,6%	32,8 bi	16,7%
Índia	72,2 mi	15,7%	4,5 mi	15,1%	32,2 bi	16,4%
Brasil	31,8 mi	6,9%	1,4 mi	4,6%	8,4 bi	4,3%
EUA	18,4 mi	4,0%	827,6 mil	2,7%	7,4 bi	3,8%
México	16,4 mi	3,6%	1,1 mi	3,6%	3,3 bi	1,7%

Fonte: FAOStats, 2017. Elaboração: ABRAFRUTAS, 2020.

**1.3.** The total planted area for fruit is approximately 1.3 million hectares (Table 2). This area employs around 16% of the total labor used in the food production chains of all Brazilian agribusiness, providing roughly 5 million direct jobs, considering that each hectare of fruit planted requires an average of 2 full-time laborers

**1.4.** Fruit production in Brazil ranges from the northern to southern regions of the country and boasts a wide diversity of species and varieties. Figure 1 illustrates the areas that have the highest production of fruit.

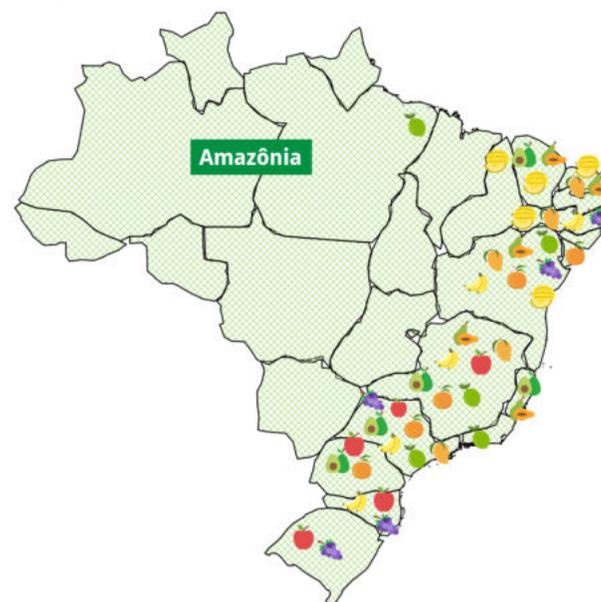
**1.5.** In the production of both fresh and processed fruits, the Brazilian fruit production chain is divided by scholars, entrepreneurs, agencies, and other stakeholders in different segments using the following terminology: players/links "before the farm", players/links "within the farm" and players/links "after the farm".

Tabela 2. Produção de Frutas no Brasil - 2019

Fruta	Toneladas	%	Área (ha)	%	US\$	%
Abacate	242,9 mil	0,8%	15,3 mil	1,1%	91,8 mi	1,3%
Banana	6,8 mi	21,6%	461,8 mil	34,3%	1,9 bi	27,4%
Laranja	17,1 mi	54,2%	589,6 mil	43,8%	2,4 bi	34,7%
Limão	1,5 mi	4,8%	56,5 mil	4,2%	398,2 mi	5,7%
Maçã	1,2 mi	3,9%	32,4 mil	2,4%	460,3 mi	6,6%
Mamão	1,2 mi	3,7%	27,6 mil	2,0%	268,6 mi	3,9%
Manga	1,4 mi	4,5%	67,3 mil	5,0%	415,5 mi	6,0%
Melão	587,7 mil	1,9%	22,1 mil	1,6%	146,7 mi	2,1%
Uva	1,5 mi	4,7%	74,6 mil	5,5%	850,9 mi	12,2%
<b>Total geral</b>	<b>31,5 mi</b>	<b>100,0%</b>	<b>1,3 mi</b>	<b>100,0%</b>	<b>6,9 bi</b>	<b>100,0%</b>

Fonte: PAM/IBGE, 2019. Elaboração: ABRAFRUTAS, 2020.

Figure 1. Leading Producers of Fruit in Brazil - 2019



Fonte: PAM/IBGE, 2019. Elaboração: ABRAFRUTAS, 2020.

Figure 2. Production Chain of Fruit Production



**1.6.** The analogy suggests that the "before the farm" links are more about the structuring surrounding the production process and the suppliers of products and services, including inputs, agricultural equipment, genetics and breeding, seed and seedling production, packaging, rural credit and insurance, technical consulting and precision agriculture, certifications, and others.

**1.7.** On the other hand, the link referred to as "within the farm" is comprised of producers who, depending on the size of their agricultural venture, may act alone or grouped in cooperatives and production consortia. It is important to note that Brazilian fruit production contains a large contingent of small and medium-scale rural producers in its productive base that, in most cases, act individually and are not affiliated with an associative or cooperative. It is a complex cultural issue that has brought on a paradigm that this way of working together does not function very well.

**1.8.** The third group referred to as "after the farm" includes the sectors responsible for the distribution, marketing, and sales activities related to production and of fruit processing companies in the agro-industrialization process. Some of the businesses that comprise this segment include logistic operators, public and private wholesale distribution centers, trading companies, large and small-scale retail organizations, supply centers, and agro-industries.

## 2. Production and Processing Technologies

**2.1.** Fruit production is fairly divergent when analyzed under the perspective of production technology. Brazil is on the cutting-edge when it comes to developing innovative and effective production technologies. This encompasses basic technology and more widespread use, as well as more sophisticated and developed technologies for precision fruit farming.

## Brazilian Fruit Production and its Business and Investment Opportunities

**2.2.** Such development is conducted by public research agencies like Embrapa - Brazilian Agricultural Research Corporation, which is affiliated with the Ministry of Agriculture, Livestock and Supply (MAPA) or private companies, including genetics and breeding companies, pesticides and fertilizers, equipment, processing and packaging, and others.

**2.3.** Universities also play a prominent role in building knowledge and new technologies within the fruit production chain and have developed extensive research and valuable scientific studies for the segment. There are also research associations such as the Brazilian Society of Fruit Production (SBF) that assemble experts from the public and private sectors where structural issues are discussed concerning everyone who is involved in research and development.

**2.4. This full technological package is not uniformly applied in plantations and orchards throughout the country,** and it is not uncommon to encounter situations where there are extremely technical-minded growers for a crop, like bananas for example, and at the same time, there are still producers employing outdated practices and procedures that have numerous opportunities for improvement.

**2.5. Heterogeneity takes place between producing regions and between the species produced.** There is a trend in which grape producers tend to use more technology than a banana producer, for example. In another example, grape producers in Petrolina are, on average, more tech-minded than someone cultivating the same fruit in Minas Gerais.

**2.6.** Typically, the more tech-savvy producers are responsible for supplying large urban centers with a highly concentrated population, while lesser technology-minded growers end up selling their fruits more regionally. Both, however, are important in the supply chain.

**2.7.** In Brazilian fruit production, the presence of organic production, which is in high demand throughout the world, is somewhat discreet.

**2.8.** The global organic food and beverage market generated around USD 162 billion in 2019, 5% higher than revenues in 2018 according to Research Dive (<https://www.researchdive.com/346/organic-food-market>). This performance and growth, led by fruits and vegetables, is tied to the demand for healthy living and sustainable consumption throughout the globe.

**2.9.** There have been some regulatory initiatives aimed at supporting organic foods, primarily in Europe. These measures should have a positive influence on the worldwide increase in demand for this class of foods and beverages, improving the supply chain and the quality of organic products.

**2.10.** Growing fruit through the organic model in most regions around the world is a major challenge from a technical perspective and, above all, even more challenging in countries and territories with a tropical climate. **The same factors of heat, humidity, and abundant sunshine that prove advantageous for the development of plants also apply to the proliferation of pests and diseases. As a result, production that lacks the use of high-risk pesticides has a significant impact on the productivity and quality of the food produced.**

**2.11.** Although this situation is a concern for organic fruit production in Brazil, it is also a great opportunity for new technologies in both the field of fertilization as well as in the area of bio-pesticides and in the genetic development of new varieties that are more resistant to pests and diseases. In fact, there are terrific opportunities for research and development of the full technological package for growing organic fruits. In Brazil, this represents only 3% of the gross value of the output for all domestic fruit production.

### 3. Social-economic Impact of Fruit Production

**3.1.** Brazilian fruit farming generates and distributes income. Consequently, it induces regional development in countless productive hubs spread throughout the domestic territory. In the areas with extensive fruit production, education, income, sanitation and living conditions for the inhabitants are much better.

**3.2. The mechanization level in fruit production is lower than grain production, for example, and there is a need to hire a high number of specialized laborers.** In regions where there are major fruit-producing hubs in Brazil, like in the São Francisco River Valley, there was clear development and improvement seen in the socio-economic conditions of the semi-arid region where poverty had prevailed before fruit farming was instilled.

**3.3.** These fruit growing clusters created jobs, improved per capita income, education through initiatives involving workforce training, basic sanitation and other socio-economic indicators, thereby establishing a virtuous circle of regional development.

**3.4.** The most relevant measure that exemplifies this situation comes with a comparison of the HDI (Human Development Index) in these regions before and after fruit growing projects were implemented. Taking the 10 leading fruit-producing municipalities in Brazil, 6 recorded an HDI growth that was higher than what was seen in the rest of the country between 1991 and 2010. It should be pointed out that the municipalities with the lowest HDI in 1991 were the ones that posted the most expressive growth.

**Table 3. HDI - Fruit Hubs**

Municipality	IDH 1991	IDH 2010	%
Jaíba (MG)	0,288 Muito baixo	0,638 Médio	122%
Lagoa Grande (PE)	0,289 Muito baixo	0,597 Baixo	107%
Casa Nova (BA)	0,280 Muito baixo	0,570 Baixo	104%
Buri (SP)	0,379 Muito baixo	0,667 Médio	76%
Juazeiro (BA)	0,396 Muito baixo	0,677 Médio	71%
Petrolina (PE)	0,471 Muito baixo	0,697 Médio	48%
<b>Brasil</b>	<b>0,493 Muito baixo</b>	<b>0,727 Alto</b>	<b>47%</b>
São Joaquim (SC)	0,491 Muito baixo	0,687 Médio	40%
Vacaria (RS)	0,535 Baixo	0,721 Alto	35%
Caxias do Sul (RS)	0,594 Baixo	0,782 Alto	32%
Casa Branca (SP)	0,560 Baixo	0,730 Alto	30%

Source: Atlas IDH Brasil, 2020. Elaboração: ABRAFRUTAS, 2020.

**3.5. Another meaningful contribution of fruit production from a socio-economic perspective is that it stimulates the production chain, such as logistics,** as production needs to be distributed to urban centers in Brazil and abroad. The logistics infrastructure of fruit production centers functions in a way that requires continuous improvements, creating opportunities for new projects and new employment opportunities for this link in the production chain. The same reasoning applies in the areas of marketing, sales, technical assistance, and so on.

## Brazilian Fruit Production and its Business and Investment Opportunities

### 4. Agro-industrialization

**4.1.** Except for frozen concentrated orange juice (FCO), where Brazil ranks firmly among the top global producers in terms of volume and quality, it could be argued that the level of fruit agro-industrialization in Brazil is not very expressive and, when there is activity, is focused almost exclusively on the domestic market.

**4.2.** These are generally small-scale agro-industrial businesses that produce sweets, jams, and pulps originating from value-added programs promoted by public technical assistance and rural extension agencies such as EMATERs or institutions like SEBRAE that work small and medium-sized businesses. The products are normally available for sale in the domestic and regional markets.

**4.3. Compared to similar businesses in the United States and the EU, there are much fewer companies that work with more sophisticated agro-industrial processes** such as frozen fruits, dried fruits, flour made from fruit, and other food production ingredients in bakeries or other industries. But it is these limited number of companies that also end up fulfilling the needs of the international market and who were responsible for USD\$ 71 MM in exports in 2019.

**4.4.** The poor level of involvement in cooperatives and associations in the sector has played a role in this lackluster performance when compared to developed countries. Some examples of critical success factors for an agro-industrial venture include planning that is focused on the agro-industry with studies about production scale, varieties that are more adapted to agro-industrialization, and the profile and education of rural producers. This is where the presence of cooperative and/or consortium would help greatly in developing this integrated concept of production and sales strategies for products with higher added value. This is an area that also offers plenty of opportunities for developing new businesses, and is critical to the sustainability of small-scale farmers.

### 5. Sustainability of Brazilian Fruit Production

**5.1.** Brazil's image globally is generally not very positive when it comes to the issue of agribusiness sustainability in the wider context of the environment, people and the economy.

**5.2.** Given the environmental diversity, high population base, unequal income distribution and varying socio-economic levels in Brazilian society, these issues are usually only publicized in the international media, thereby promoting a much more negative perception than the reality on sustainability issues.

**5.3.** In terms of the environment and its relationship with food production chains, Brazil has established a **Forest Code, a specific law that addresses land use and the preservation of biomes**. The conservation-related requirements and best practices outlined in the law are unique in the world and are based on the principle of establishing the need for **environmental reserves on each property, ranging from a minimum of 20% to a maximum of 80% of the total area of the property**, depending on the biome where it is located.

**5.4.** The Forest Code is a highly important legal mechanism, ensuring that Brazil's forests are protected and that 66% of its entire lands are preserved, despite being an agricultural power. All Brazilian farmers are required to adhere to the legal provisions contained in the Forest Code, including fruit producers. **It should be noted that fruit production in Brazil is primarily located in the Caatinga and Cerrado biomes and not in the Amazon forest biome, making the sector even more independent in terms of instigating deforestation.**

**5.5.** There is also legislation related to labor issues that ensure workers' rights within international standards of best practice in the social domain. The legislation addresses numerous aspects in the field of labor, including the issue of the employer's responsibility for the employee's health and minimum conditions for guaranteeing fair labor and well-being on the job.

**5.6.** All fruit exporters possess international certification (Global G.A.P., Rain Forest Alliance, Fair Trade, SMETA, etc.) according to best agricultural and sustainability practices. A lot of fruit producers focused on the Brazilian domestic market are also pursuing certifications that guarantee traceability and the adoption of best practices, including private certifications from the leading supermarket chains in the country.

**5.7.** In Brazil, as in other countries, the establishment of private standards of sustainability is expanding. Supermarkets are increasingly establishing their standards to be aligned with being more concerned with conservation as well as the ecological and social maturity of their customers.

**5.8.** As a result, fruit production in Brazil has framed itself within the best examples of sustainable agricultural practices that global audiences demand related to protecting the climate and the diversity of species.

**5.7.** É crescente no Brasil, à exemplo do que também ocorre em outros países, o estabelecimento de padrões privados de sustentabilidade. Cada vez mais, supermercados definem seus padrões alinhados com o desenvolvimento de uma mentalidade mais conservacionista e de maturidade ecológica e social de seus clientes.

**5.8.** Dessa forma, o segmento de produção de frutas no Brasil enquadra-se nos melhores exemplos de exploração agrícola sustentável existentes nos mais exigentes mercados globais para essas práticas de proteção ao clima e à diversidade de espécies.

**5.9. The notion of a "safe product for consumption" can be found in Brazilian fruit production** and is highly relevant in international markets where customer demand has not compromised the consumption of food within the confines of chemical and biological waste.

**5.10. Within the domestic market, there have been government requirements concerning traceability for fresh products since 2018.** Implemented and coordinated by the Ministry of Agriculture, Livestock and Supply (MAPA), traceability is now a legal requirement for fruits and vegetables. Alongside this obligation, ANVISA - the National Health Surveillance Agency, performs a service where samples of fresh products are systematically collected at points of sale and analyzed for pesticide residues, testing for their compliance with Brazilian legislation and the concept of safe food for consumption. The results are published annually and all Brazilians are granted access to the data by species and the level of compliance with public health standards.

**5.11.** Traceability programs may be private, with certifiers offering services to producers as local representatives of Global G.A.P. and other international certifications. There are also other options for certification through MAPA Production) or services related to associations like the Brazilian Confederation of Agriculture and Livestock (CNA), which provides traceability for all unionized rural producers in the country for almost no cost. Regional associations of producers can also create collaborative brands and apply private traceability systems.

**5.12.** Public policies and legal provisions for sustainability and safe food are applied to all fruits throughout the country, and any cases of non-compliance are penalized according to the law. These penalties range from fines, suspension of product sales and even imprisonment for offenders.

## Brazilian Fruit Production and its Business and Investment Opportunities

### 6. Trend of Organic Fruits in Brazil

**6.1.** Brazilian customers have increased their consumption of organic products, including fresh fruit and derivatives, following the global trend for those products. Despite the high demand, production has not been enough on volume and quality to supply distributors and retailers.

**6.2.** Main reason is because the same favourable tropical climate conditions for crop production are also very positive for pest development, becoming the production of organic food extremely challenging and, therefore, requiring substantial technological efforts to succeed on that objective.

**6.3.** However it has been observed significant efforts on developing new technologies and agricultural practices in order to increase production and quality of organic food and fruits, improving the market supply.

**6.4.** The Brazilian Ministry of Agriculture, Livestock and Supply has recently launched the Brazilian Programme of Bio-Inputs in order to incentivate, regulate and create a positive business environment for the development of those new technologies.

**6.5.** The initiative will strongly contribute to leverage organic food production and it will also redesign the several farming practices in the country, including fruits. Other agronomic technologies like Integrated Pest Management concept will also support the efforts on producing higher volumes of organics in general.





# AVOCADO



This page presents the main indicators related to the cultivation and commercialization of avocado in Brazil and in the world.

## KPIs 2019

No. of Establishments  
**4,4 mil**

Direct Jobs  
**21,0 mil**

GPV US\$  
**91,8 mi**

Qty. Produced (tons)  
**242,9 mil**

Harvest Area (ha)  
**15,3 mil**

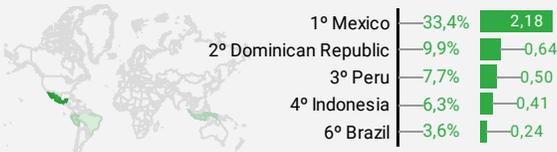
Prod. Avg (tons/ha)  
**15,9**

Exports in US\$  
**19,5 mi**

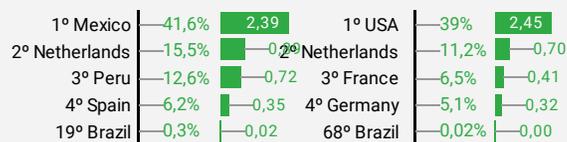
Exports (tons) % Prod.  
**10,2 mil 4,2%**

## World (FAO - 2018)

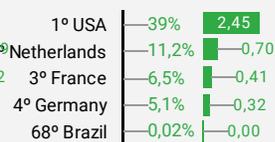
Production - millions of tons (5+)



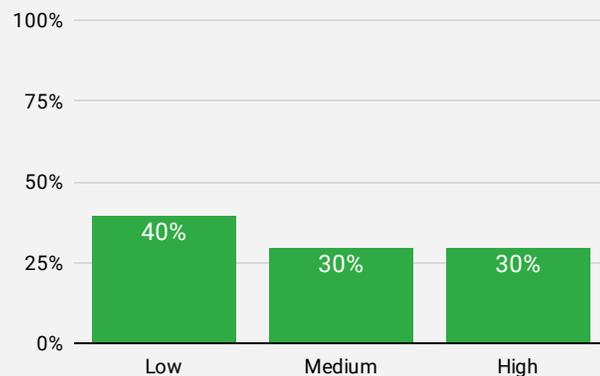
Export Bilions US\$



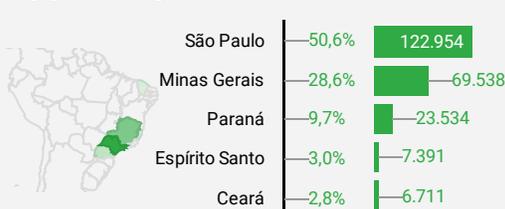
Import Bilions US\$



## Technological Profile of the Producer - BR



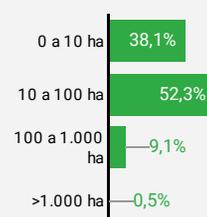
## Top producing FUs (tons)



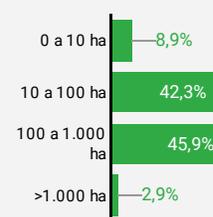
## Major Production Centers

- 1- Patos de Minas (MG)
- 2- Ribeirão Preto (SP)
- 3- Araxá (MG)
- 4- Mogi Mirim (SP)
- 5- Limeira (SP)
- 6- Ourinhos (SP)

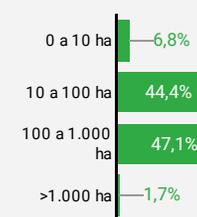
## Facilities (un.)



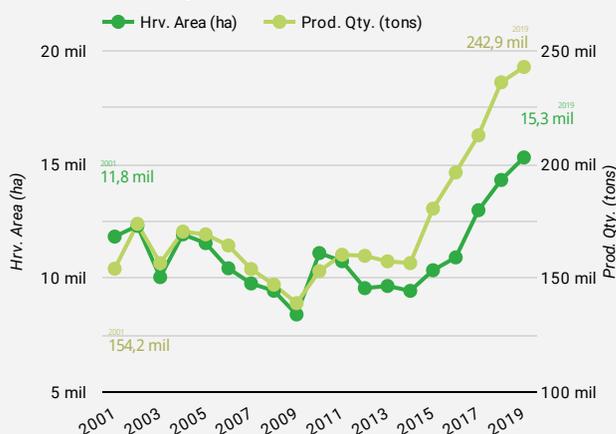
## Harvest Area (ha)



## Production (th. tons)

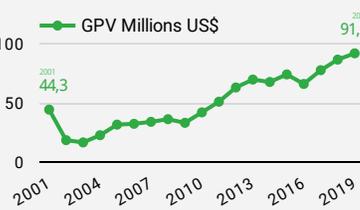
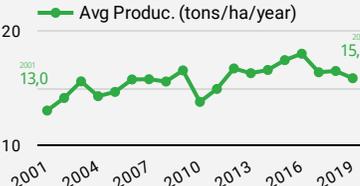


## Performance of production Brazil - 2001-2019



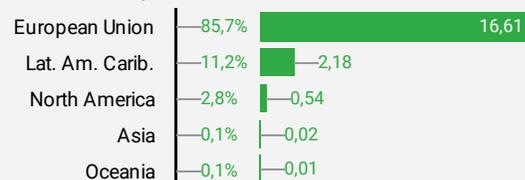
Change 2001-2019

Harvest. Area (ha): +29,7% Qty. Produced (tons): +57,5% Average Productivity (ton/ha): +22,3% GPV US\$: +107,2%

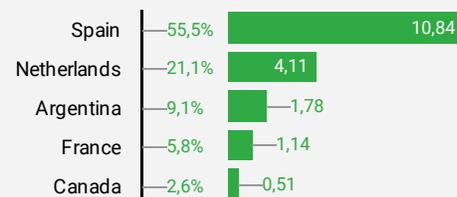


## Exports Brazil in 2019 - Millions US\$

### Major Blocks



### Top Countries

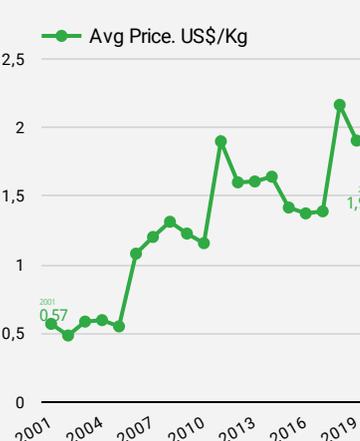


## Exports Brazil - 2001-2019



Change 2001-2019

Volume (thousand tons): +1590,4% Revenue (thousand US\$): +6400,0% Avg Price (US\$/kg): +235,1%



## Data Summary

A partir de 2014, forte tendência de alta na produção e exportação.

Outros destaques:

-[2019] Brasil é 6° maior produtor mundial e o 19° exportador de abacate.

-[2019] 4,2% da produção de abacates é exportado na forma da fruta fresca.

-[2001-19] Aumento de 22,3% na produtividade média, passando de 13,0 para 15,9 ton/ha.

-[2017] Maior parte da produção (47,1%) em propriedades entre 100 a 1.000 ha.

-[2018] Maior parte (40%) dos produtores com baixo grau tecnológico de produção.

-[2001-19] Aumento de 235,1% no preço médio, passando de 0,57 para 1,91 US\$/kg.

-[2019] União Europeia é o principal destino das exportações de abacates, com 85,7% da receita total.



## 1. Current Outlook and Agricultural Production

**1.1.** The total avocado production area in Brazil is 15,300 hectares, distributed over 4,400 properties with an average area and average productivity of 15.9 tons per hectare. According to the IBGE, avocado production in Brazil generates approximately 21,000 direct jobs in the fields of fruit production.

**1.2.** There is a wide diversity in commercial varieties that, given their respective harvests and production seasons, permit a supply schedule for consumers throughout the year. **Some of the most popular varieties include 'Fortuna', 'Geada', 'Quintal' and 'Margarida' and, more recently, the Hass variety** has become more common in Brazil as a product to be consumed in salads and savory dishes. This variety is not only well-known and enjoyed, but already entrenched in the international market.

**1.3. With the tropical varieties, avocado production in Brazil does not generally employ a lot of technology for growing and processing.** According to a study conducted by the Brazilian Association of Producers and Exporters of Fruit and Fruit Products (Abrafrutas), in partnership with the Brazilian Confederation of Agriculture and Livestock (CNA), only 30% of producers possess a high technological level. However, it has been a sector that is moving quickly towards an ideal and promising sectoral restructuring designed for the future of this vital production chain. The more tech-savvy producers are the main drivers of professionalizing the activity and are attracting followers who also attempt to improve the management of their business. Those producers who are more technically proficient have invested in plantations growing the Hass variety in an effort to introduce this new product to the domestic market, while also taking advantage of the countless opportunities in the international market that has seen increasing demand for this variety.

**1.4. The "Abacates do Brasil - ABPA" (Brazil Avocados) association was created in 2006 and is a non-profit civil organization that is structured by rural producers and other links in the production chain.** The purpose of the association is to improve the way the productive sector is organized and to conduct institutional promotional activities related to the fruit. The ABPA operates throughout the country and has shown to be highly efficient in activities involving production, logistics, commerce and industrialization in the sector. It promotes all the nutritional, nutraceutical, cosmetic and other benefits of the fruit while consistently associating the productive capacity of the sector to the concepts of environmental and social sustainability.

**1.5. In 2019, Brazil produced 242,900 tons of avocado. Most of the sales were in the domestic market (95.8%)** and featured mostly tropical varieties, given that the Hass variety is still not heavily produced and is geared more towards the international market.

## 2. Major Production Centers

**2.1.** 18 states and the Federal District produce the fruit in Brazil, with the State of São Paulo representing the largest grower (122,900 tons). Other states with significant commercial production are Minas Gerais (69,500 tons), Paraná (23,500 tons) and Espírito Santo (7,400 tons).

**2.2.** The production revenue generated by the avocado in Brazil last year was US\$ 91.8 million. Three states accounted for 85.7% of the total: São Paulo (49.8%), Minas Gerais (25.4%) and Paraná (10.4%).

**2.3. Orchards that use irrigation are rare because the major hubs are** located in regions that have a sufficient amount of annual average rainfall to satisfy the watering needs of the plants.

## 3. Logistics

**3.1. The logistics for distributing avocados in the domestic market occurs mostly through land transport.** However, given the extent of the national territory and the distances between the production centers and the regions of consumption, a process of continuous improvement needs to be implemented concerning the infrastructure of roadways, either through the maintenance of existing highways or in the construction of new ones. There are several Brazilian models of public-private partnerships in consortia for executing projects to improve and/or boost the highway network.

**3.2. 3.2. In the export process, avocados are generally transported by sea in Controlled Atmosphere (CA)** refrigerated containers that regulate the gases inside the unit to provide the proper conditions for prolonging the transit time of the fruit, reducing oxygen and increasing the carbon dioxide inside the container in order to better control the fruit ripening process.

**3.3.** While the costs are higher than they are for a traditional reefer container, the high price of the fruit in the realm of international trade has allowed this technology to be used with ample room for profits. This transport method does not affect the conservation of avocados which, when harvested green, can be transported when they are not yet ripe, thereby improving their resistance to transport. The fruit ripens naturally in the final phase of commerce when they arrive on the shelves of supermarkets and fruit stores or even in the fruit bowls of consumers' homes.

**3.4. In the domestic market, there is no structured cold chain to deal with the overall fruit production chain,** and avocados do not possess this technology in their distribution process.

## 4. Commerce

**4.1.** Sales of the avocado produced in Brazil remain primarily in the domestic market (95.8% of the total produced) and are generally part of the tropical variety. **It is interesting to note that the fruits of the tropical varieties are consumed in Brazil as a dessert, usually in sweet combinations with honey or sugar, in the fresh natural form, or in mousses and creams.** It has enjoyed high popularity and nutrologists and human health professionals, who consider this fruit to have a high impact on the health of its consumers, have encouraged its consumption.

**4.2.** As is the case with other fruits, supermarkets are important channels for avocado sales in the domestic market, but street markets and large retailers specializing in fresh products are also part of this chain of fruit commerce.

**4.3. The Hass variety of avocado has still seen limited consumption in the domestic market.** Up to 2015, the fruits were imported. National producers gradually began to plant and make the product available for the domestic market during the harvest period, which is the first half of the year. **However, the majority of Hass grown in Brazil is exported to many different countries, primarily countries on the European continent. It should be pointed out that the cultivation of the Hass avocado is growing rapidly in Brazil, with a growth of 500% in the available volume projected from 2023 onwards.**

**4.4. Despite the success of the Hass variety, there is also an effort underway in this segment to promote and export the tropical varieties.** While still not very well known in foreign destinations, any growth in sales of these varieties in the overseas market is contingent on effective promotions for the fruit that, because it is very flavorful and nutritious like the Hass avocado, has a real opportunity to be accepted by consumers. For example, its production costs are lower than the Hass variety and it can be sold at more attractive prices, especially for consumers in lower-income brackets. Early initiatives to exhibit these varieties at international fairs revealed that consumers liked the taste and texture of these fruits.



## 5. Sustainability

**5.1. The commercial production of avocados in Brazil adheres to the stringent sustainability requirements in production established for agribusiness.** This sector is well-organized with a solid level of corporate maturity. The links in the chain are well aware of the importance of sustainability for business success in the domestic and international markets.

## 6. Future Outlook

**6.1.** There is a growing trend for avocado consumption in both Brazil and the rest of the world. Sales of the fruit in Europe have climbed an average of 30% per year, and the demand in Asia increases year on year at rates of over 20%.

**6.2.** Consumption in Brazil, following the trend of the fruit's popularity, has also been growing, although at reduced rates. This is primarily due to the numerous companies promoting consumption of the fruit, generally on social media with influencers who expound on all the health benefits of avocado consumption. Various recipes have been published, and the fruit is being recommended by all health professionals as an essential part of well-being and a healthy diet.

**6.3.** The worldwide trend towards healthier eating has led to the avocado becoming a prominent fruit that is preferred for consumption. Avocado is a fruit that is useful in terms of food, health, and beauty. This versatility in benefits, combined with a powerful message promoting sustainable and planned production, ensures that the product holds a prominent place in the future of sales for fresh food.

**6.4.** It is worth mentioning that the World Avocado Organization (WAO) has contributed greatly in promoting the benefits of avocado and, in this way, has encouraged its consumption worldwide.

**6.5.** With demand increasing in the domestic and international markets, the avocado (particularly the Hass variety) is now a very attractive segment for investments related to fruit production in Brazil. Several projects are being put in place in the Southeast, a region boasting the best climatic conditions for maximizing productivity and success of the activity.

**6.6.** Given the interest in fruit consumption in the aforementioned markets and that international interest has favored conditions for opening new markets for Brazilian avocado in countries like the USA and China, **the future of this production chain looks promising, as these markets consume avocados and can offer them for sale at more stable and attractive prices.** Even with the growth of the planting area, the market is still projected to have a higher demand than production, at least for the next five years.

**6.7.** With a growth predicted in the domestic and foreign markets, the products and services that will be needed to support this production chain – including inputs, equipment, credit, specialized logistics services, packaging, and others – are also quite attractive.





## 7. SWOT Analysis

### S Strengths

- The diversity of avocado varieties that are suitable for the Brazilian soil.
- Year-round production calendar; Organization of the productive sector; Increasing production technology.
- The sector's competitiveness in the production and quality of fruit.

### W Weaknesses

- The available volume of the Hass variety of avocado for the domestic and international markets is still somewhat low.
- Commercial competition in the domestic market from producers that are still low-tech (producing tropical varieties).

### O Opportunities

- Represented by the Hass variety, the avocado enjoys the highest demand for any fruit in the international market and has a strong added value; US and China markets opening up within the next 3 years.
- Growth of avocado consumption in the domestic market due to the nutritional and functional properties of the fruit.
- Agro-industrial applications of avocado (olive oil), including the cosmetics industry.
- Bio-inputs like fertilizers and pesticides for conventional and organic production.
- Technology and equipment designed for precision agriculture; Technology and packaging for e-commerce.

### T Threats

- Unchecked increase in the planting area, which could result in volumes that are above demand over the long run.
- New entrants to the international market, increasing competition and pushing prices lower.
- Climate change triggering disruptions in the supply chain.

**7.1.** Avocado farming is undoubtedly the crop that has the best future outlook among all the fruits produced in Brazil. **Production optimization and accelerated world demand for the fruit, which is successful throughout the world, are the cornerstones for this positive outlook.** There are already international groups that are investing in this production chain in Brazil, affirming that this vision is shared by other experts in fruit production.

**7.2.** These opportunities can be found in avocado growing through conventional and organic methods, in the sector of inputs (development of biological products), in the offer of products and services for precision farming and in the technology for packaging and e-commerce. Avocado by-products such as olive oils, cosmetic products, and others are also in great demand and represent a very promising area for investments.

**7.3.** Market trends for this fruit reveal that Brazil can become one of the world's largest avocado suppliers because it has a number of advantages, including **being able to supply the fruit all year round**, combining varieties and providing a wide range of flavors, textures, as well as competitive prices.

**7.4.** **China and India possess all the prerequisites to become leading consumers of avocado and its products**, with a huge contingent of consumers who can provide a high return on invested capital. There are plenty of excellent e-commerce opportunities in these territories as well. Distribution channels are already well entrenched, as is the case with the Alibaba group in China.



# BANANA



This page presents the main indicators related to the cultivation and commercialization of Bananas in Brazil and in the world.

## KPIs 2019

No. of Establishments  
**202,5 mil**

Direct Jobs  
**758,8 mil**

GPV US\$  
**1,9 bi**

Qty. Produced (tons)  
**6,8 mi**

Harvest Area (ha)  
**461,8 mil**

Prod. Avg (tons/ha)  
**14,8**

Exports in US\$  
**24,6 mi**

Exports (tons)  
**80,0 mil** % Prod.  
1,2%

## World (FAO - 2018)

Production - millions of tons (5+)



1° India	-26,5%	30,8
2° China	-10%	11,58
3° Indonesia	-6,3%	7,3
4° Brazil	-5,8%	6,8
5° Ecuador	-5,6%	6,5

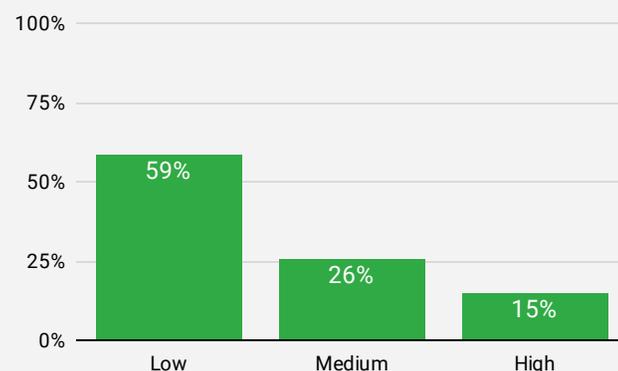
Export Bilions US\$

1° Ecuador	-25,7%	3,11
2° Philippines	-12,4%	1,51
3° Costa Rica	-8,5%	1,02
4° Belgium	-7,8%	0,93
41° Brazil	-0,17%	0,02

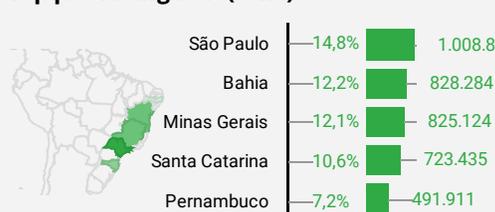
Import Bilions US\$

1° USA	-16,9%	2,59
2° Belgium	-8,6%	1,31
3° Russian	-7,5%	1,15
4° China	-6,2%	0,95
102° Brazil	+0%	0,0005

## Technological Profile of the Producer - BR



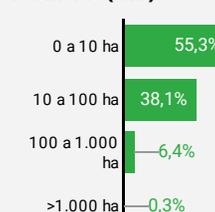
## Top producing FUs (tons)



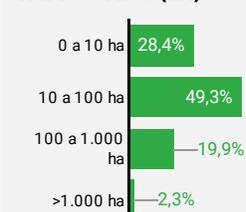
## Major Production Centers

- 1- Registro (SP)
- 2- Joinville (SC)
- 3- Janaúba (MG)
- 4- Ilhéus-Itabuna (BA)
- 5- Bom Jesus da Lapa (BA)
- 6- Blumenau (SC)

## Facilities (un.)



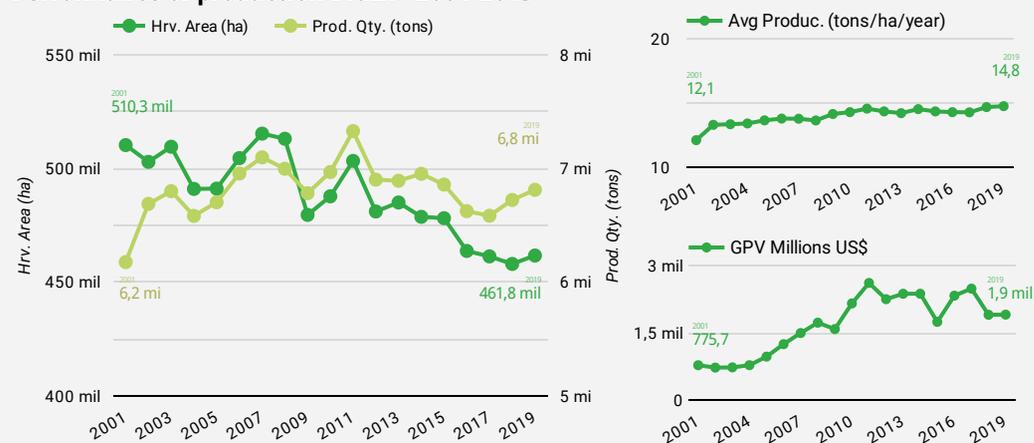
## Harvest Area (ha)



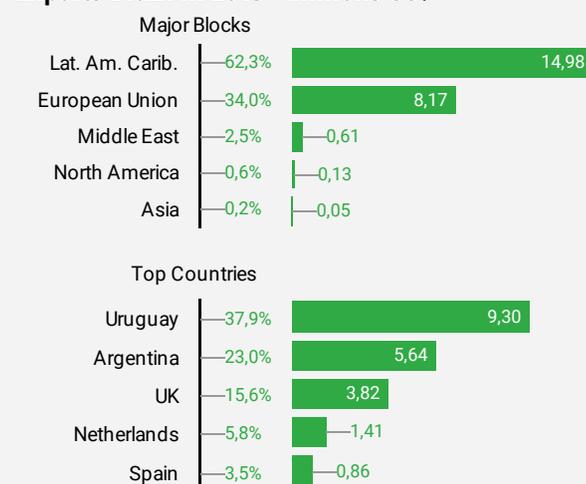
## Production (th. tons)



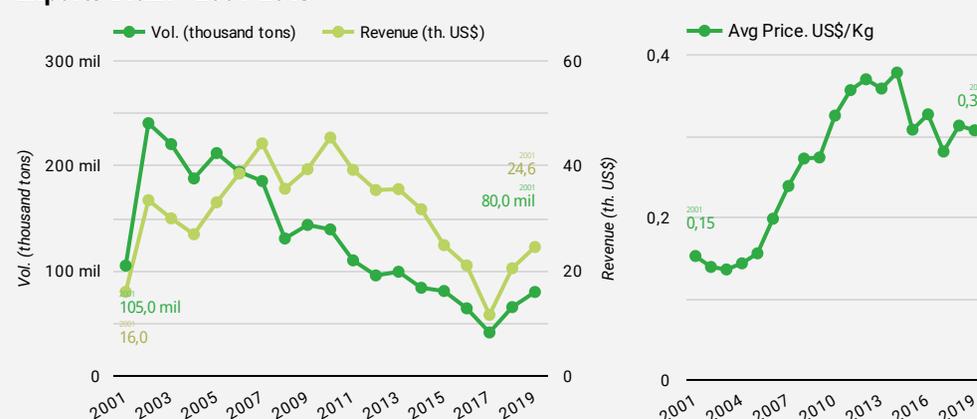
## Performance of production Brazil - 2001-2019



## Exports Brazil in 2019 - Millions US\$



## Exports Brazil - 2001-2019



## Data Summary

Diminuição da área colhida acompanhada de aumento da produtividade. Entre 2009 e 2019, queda das exportações da fruta fresca. Produção com baixo grau de tecnificação.

Outros destaques:

- [2019] Brasil é 4° maior produtor mundial e o 41° em exportação de bananas.
- [2019] 1,2% da produção de bananas é exportada na forma da fruta fresca.
- [2001-19] Aumento de 22,3% na produtividade média, passando de 12,1 para 14,8 ton/ha.
- [2017] Maior parte da produção (51,1%) em propriedades entre 10 a 100 ha.
- [2018] Maior parte (59%) dos produtores com baixo grau tecnológico de produção.
- [2001-19] Aumento de 106,6% no preço médio, passando de 0,15 para 0,31 US\$/kg.
- [2019] América Latina e Caribe são o principal destino das exportações de banana, concentrando 62,4% da receita total.



## 1. Current Outlook and Agricultural Production

**1.1.** Brazil farms around 500,000 hectares of bananas, yielding a total production of 7.3 million tons and plantations throughout the country. **Brazil was the world's fourth-largest fruit producer in 2019**, behind India (1st) with 30.8, China (2nd) with 23.75 and Indonesia (3rd) with 9.61.

**1.2.** Although it is produced throughout the country, there are some production hubs with a concentrated area and a distinct technology that produce and distribute the fruit to the most prominent urban regions such as capitals and large cities in the States. **The accumulated planted area in these hubs covers around 100,000 hectares, but because of the high production technology adopted, represents 45% of the national production.** The rest is thinly spread throughout the entire Brazilian territory and caters mainly to the smaller cities that are closer to them. Undoubtedly, the banana is the most dispersed fruit in the Brazilian territory from the point of view of cultivation areas.

**1.3.** Another interesting aspect is that Brazil features a unique characteristic in the global banana-growing industry is the cultivation and marketing of two distinct varieties - bananas in the Cavendish group (50% of the national production) and bananas from the Prata group (another 50%). The Cavendish variety is the most popular and most consumed banana in the world. However, Silver (Prata) occupies a prominent place in the Brazilian domestic market, accounting for approximately 45% of the total volume produced and thereby becoming a major differential concerning the global market dominated by the Cavendish banana.

## 2. Major Centers for Irrigated Banana Production

**2.1.** Another notable difference is the production technology at these banana production hubs pertaining to the intensive use of irrigation. **Banana growing in the northern area of Minas Gerais, one of the northernmost regions of Brazil for production, needs to be irrigated because the climate is semi-arid in these zones.** Given this significant distinction, production regions will be analyzed separately - with irrigation and without irrigation.

**2.2.** The key production hubs in the Northeast region are located in the Açu region, Rio Grande do Norte and in the Apodi region in Ceará. Few companies in these regions export Cavendish bananas. There is also a banana cultivation center in the Petrolina (PE) region. However, banana production is not the primary fruit growing activity in that region and plantations are usually located in marginal irrigated areas. The strategic location close to ports and target markets, especially the US, ensures that bananas produced in the Northeast are more competitive in the international market.

**2.3.** There are production centers in Bahia in municipalities in the São Francisco River valley like the Bom Jesus da Lapa region. This hub chiefly supplies the regions of Brasília and Goiânia in the Midwest of the country. Additionally, in the São Francisco River valley, the Jaíba-MG Region is a major producer hub with over 20,000 hectares of banana plantations. It boasts a high amount of production technology and supplies Belo Horizonte (the state capital) as well as the markets for Rio de Janeiro and particularly São Paulo. In this region, 80% of producers grow the Silver (Prata) variety. There are almost no exports from these production hubs in Bahia and Minas Gerais.

**2.4.** Another center that is going through rapid development is in the Delfinópolis region in Minas Gerais, near the Triângulo Mineiro, which now has a planted area of 5,000 hectares divided among the two aforementioned varieties. Closer to major areas like São Paulo, the region has become a prime option for buying fruit by distributors and supermarket chains in the capital of São Paulo.

## 3. Major Centers for Non-Irrigated Banana Production

**3.1. The largest banana growing hub in Brazil is located in the Registro (SP) Region, covering a planted area of approximately 50,000 hectares.** The predominant variety is Cavendish, and the fruits are distributed throughout Brazil, highlighted by the markets of the city of São Paulo and Curitiba in Paraná.

**3.2.** This region does not require irrigation as rainfall levels are high due to the more sub-tropical climate. On the other hand, plants are also more susceptible to the spread of diseases such as Black Sigatoka, requiring a higher number of applications of fungicides. The region has kicked off efforts to increase exports, mainly to Uruguay and Argentina. One of the chief disadvantages of banana plantations located in this center comes from the risks associated with low temperatures and frost during the Brazilian winter.

**3.3.** Lastly, there is a production hub in the region of Corupá in the state of Santa Catarina, where approximately 13,000 hectares of the Cavendish and Silver (Prata) varieties are grown, with the latter being most prevalent. Bananas produced in this region are the most commonly imported by countries in the Southern Cone of South America, including Argentina, Uruguay and Paraguay, due to their proximity and lower logistical costs for exports. Santa Catarina also supplies major domestic markets such as Curitiba (PR), Florianópolis (SC) and Porto Alegre (RS).

## 4. Logistics

**4.1. Road transport is primarily used for the domestic transport of bananas.** Bananas are transported by truck in wooden, plastic and, in rare cases, cardboard boxes. The weight ranges from 15 to 20 kg per box with distances of up to 900 kilometers without a cold chain. The logistics for bananas runs well despite the great distances traveled by trucks. With the lack of a cold chain, trucks travel at night to prevent the fruit from quickly deteriorating.

**4.2.** The fruits are ripened in units designed for this purpose and are maintained by the private sector at large centers for consumption (cities with over 500,000 inhabitants).

**4.3. Maritime shipping is used for exports**, with transport in reefer containers that come directly from the farms, are loaded and then sent to the ports in trucks. These ports can be up to 600 km away, and the cost of road transport is often close to the cost of maritime transport, which is one of the reasons that Brazilian bananas have not been very competitive in international markets. The principal ports used are Fortaleza (CE) and Natal (RN).

## 5. Commerce

**5.1. The vast majority of sales are handled by supermarket chains spread throughout Brazil and street fairs and markets**, highlighted intermediaries and/or wholesalers who buy the production from farmers and resell it to these retail channels.

**5.2. There are relatively few producer cooperatives in the sector, accounting for less than 10% of the total volume traded.** Producers generally keep 33% of the value chain for this fruit, and the rest is distributed among wholesalers (20%) with the remainder to retailers.

**5.3.** Major chains usually use bananas for promotional purposes by lowering prices in order to attract customers to supermarkets. It would seem that the added value of the fruit is not recognized by distributors, wholesalers and consumers. This situation is detrimental to producers, whose profitability is greatly impaired in this business.



**5.4.** The existing paradigm within the banana sector related to the competitiveness of the national banana industry is based on the fact that **costs in Brazil are higher than in other countries (like Ecuador) due mainly to social and labor issues as well as taxes and logistics.** Specific provisions in Brazilian legislation and the way the national production chain is designed to add a few cents to the cost of bananas, making this fruit less profitable in terms of the average price range applied in the international market. Considering that the banana is undoubtedly the one high volume fruit in the global market that behaves most like a commercial commodity, the sector has not matured as an exporter because it believes that it cannot compete internationally.

**5.5.** Some statistics exemplify the situation: the banana from the Cavendish group is sold on the international market at a variable price of USD\$ 0.35-0.45 a kg depending on the destination and the period and/or harvest. The standard 18 kg box comes to a price per box between USD\$ 6.30 - 8.00. These amounts approximate the profitability of the exported banana with that sold in the domestic market.

**5.6.** But this relationship has become rather unstable over the last five years. It has been a downside for producers due to the volume of production above demand, making this paradigm questionable and prompting reflections in the productive sector on how this strategy urgently needs to be revised. In addition, the supply of bananas over the last five years in the international market has become less stable due to climatic conditions in the Americas and diseases in Asia, making prices more variable and, in some cases, improving the competitive position of the Brazilian banana.

**5.7.** Potential volumes of bananas exported by Brazil would help to regulate the flow and price of fruit during the harvest and sales to the domestic market, resulting in improved revenue for producers who would have further grounds to negotiate better prices with more balanced volumes. The favorable exchange rate, geopolitical difficulties affecting international trade (for example, Russia x USA), are other upsides for increasing exports. Choosing whether or not to export may be a commercial decision, but possessing the expertise and know-how on exporting is a requirement for this industry.

**5.8.** It is worth noting that, in Brazil, **around 50% of the domestic market consumes the Silver (Prata) variety, and introducing this product in the international market would be an effective innovation and could turn into an excellent business.** A number of promotional activities involving the Silver (Prata) variety have recently been conducted in the USA and Europe (England, Germany and Portugal) and the commercial reception of this innovative fruit has been positive. The productive sector would need to truly establish this objective as a priority in order to turn this opportunity into a reality.

## 6. Sustainability

**6.1.** Like other fruits, Brazilian banana farming is aligned with labor regulations and the Forest Code regarding social and environmental sustainability issues.

**6.2.** 6.2. The banana orchards located in the Northern region of the country, where the tropical forests are found, only the supply local population and do not accommodate the major consumption centers. Even with this regional role, these crops are also subject to the effects of prevailing legislation. **There are no reports from the government or NGOs about deforestation in the Amazon in order to establish banana production activities or any other fruit other than the native fruits that are sustainably harvested by local populations in the tropical rain forest.**

**6.3.** In Brazil, chemical controls using pesticides in banana production are lower than other traditional producers in Latin America. Thanks to the drier climate in the Northeast region, there are not as many problems with leaf diseases, so fungicides are only applied 2-3 times a year. But in the more humid climates found in the southeast region, there could be as much as 14 applications per year. In other typical banana-producing countries throughout Latin American, such as Ecuador and Costa Rica, the number of applications per year can reach as high as 50.

**6.4. Brazil has not received any reports of non-compliant MRLs on exported bananas, or even from local supermarket chains that systematically conduct verification and control tests on chemical contamination.** The lack of non-conformities proves that producers have acted within the parameters of best agricultural production practices and that the bananas produced are a secure food.

**6.5.** From a socio-economic point of view, **banana farming employs an average of 2 permanent workers per hectare. This activity generates many jobs and distributes income throughout all regions of the country.** There are an estimated one million direct and indirect rural workers engaged in the production of bananas in Brazil; about 17% of all labor in fruit production.

## 7. Future Outlook

**7.1. Future expectations for this vital production chain see annual growth in the planted area of around 1% and 3% in production.** There will be further opportunities to increase the irrigated area in the Northeast of Brazil as civil transposition work on the São Francisco River is concluded. This will act as a stimulus for banana farming in that region, including for exports.





## Banana

**7.2.** Climatic risks and pressure from phytosanitary problems in the Southeast are expected to inhibit the entry of new producers, particularly medium and small-scale producers that face investment challenges in adopting more sophisticated technologies to mitigate these risks.

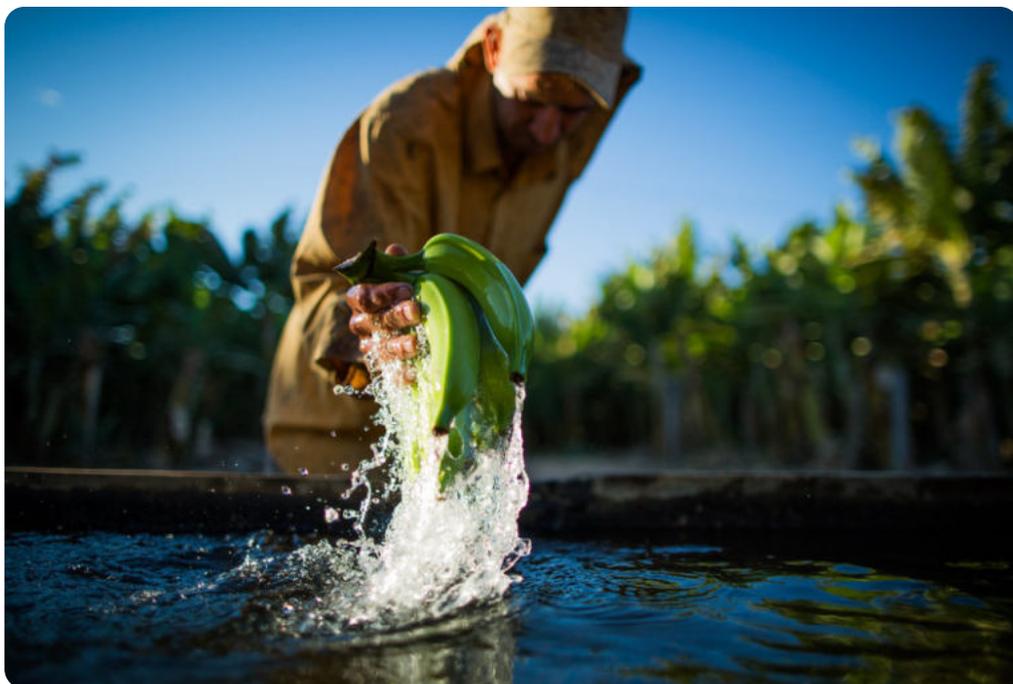
**7.3.** The sector has been debating about the possibilities of improving the quality of the fruit produced in terms of how the product looks (cleaner skin, lack of visible damage), and a cost reduction through increased productivity and scaling up production to dilute structural costs. Moving forward on these issues will be crucial to addressing the current profitability problems in the sector. This progress would also help with exports.

**7.4.** Regarding logistics for the domestic market, there are few changes projected for roadway transport. Although Brazil is investing in infrastructure for logistics in agribusiness, investments are much more focused on catering to the production of grains and meat than those fruits. The production regions are not the same in these segments.

**7.5. The outlook for the future in commerce is to increase the percentage is dominated by supermarket chains to the detriment of small-scale fruit businesses.** This is a result of consumer behavior, which increasingly seeks comfort, practicality and security in their purchases, especially during the pandemic.

**7.6.** On the other hand, large chains are unlikely to invest in infrastructure for ripening bananas. Work related to this is expected to remain under the responsibility of wholesalers, due to the fact that there are no major trends toward the formation of new cooperatives and/or producer consortia within the segment.

**7.7. The opportunities existing in the international market for both the Cavendish variety and for the innovative Silver variety are likely to be better leveraged.** Some groups of grain and cotton producers with extensive technological and investment capacity established banana plantations for both varieties in the Northeast region. They are investing in certification and modern packing houses and are expected to initiate pilot tests for exports in 2021. This initiative has a high possibility of success and will open doors for growth in exports.





## 8. SWOT analysis

### S Strengths

- Production is year-round.
- Production is done throughout the country (dilution of risk); Two commercial varieties with scale.
- Percentage of farmers that have more technical knowledge and are organized (33%).
- Minimal use of pesticides in the Northeast.

### W Weaknesses

- The vast production area and the difference in technology for production, as well as the business maturity of the producer, make it difficult to organize the sector.
- Low export culture in the sector.
- Production volume above demand, depreciating prices.

### O Opportunities

- International market for conventional and organic Silver (Prata) bananas.
- Development of new varieties.
- Space for large business groups to enter into the business with the Silver variety.
- Increase in the irrigated area in the backlands (sertão) of the Northeast (transposition of São Francisco).
- Technology and equipment designed for precision agriculture; Fertilizers and biological pesticides.
- Innovations in agro-industrial products derived from bananas (flours, dried fruit, snacks, etc.)

### T Threats

- New diseases such as Fusarium race 4 being introduced in Brazil.
- Availability of water for irrigation (climate change).
- Concentration of retailers.
- New players in Africa.

**8.1.** One of the most expressive business opportunities in the Brazilian banana industry is, unquestionably, **introducing the Silver (Prata) variety to an international audience.** The international market for bananas has not gone through any genuine product innovation for decades and the introduction of a new, innovative product that features texture, flavor, suitability for fresh cut and food for children and the elderly could be a real novelty that has a great chance for success. There are opportunities for conventionally produced fruit and a great deal more for those that are organically produced.

**8.2.** Of course, some substantial challenges are not excluded from this analysis, including the cost of introducing a new product, logistical challenges and positioning the product in the market. These challenges are manageable and can be resolved.

**8.3.** Because plantations growing Silver (Prata) bananas produce much less than the Cavendish variety (40%), the cost of production is higher. This product needs to be positioned in the market not as a direct competitor of the Cavendish variety, but as a premium product which, due to its organoleptic characteristics, caters to a specific market segment that is looking for more flexibility in the use of the food and more features, such as improved digestibility.

**8.4.** This position would enable a distinct price and the ability to maintain the margin. Another important factor is that the possibility of exporting any sort of volume would have positive effects on commerce in the domestic market, especially at times when there is a high supply. This positive effect from exports on sales in the domestic market is also applicable to the Cavendish variety, which does not have to face the challenges that the Silver (Prata) variety does in the export market. Increasing exports would bring a two-fold benefit: in the international market for direct sales and in the domestic market as a result of the positive indirect effect on prices.

**8.5.** **There is an aggressive program for the development of new varieties from Embrapa - the Brazilian Agricultural Research Corporation that, combined with the opportunity for leading professional groups to enter the Brazilian banana industry and through the expansion of the irrigable area in Northeast Brazil, could facilitate a new and quite profitable business model for new investors.** These improvement programs are mostly aimed at neutralizing threats with the introduction of new diseases such as Fusarium race 4 that decimated commercial plantations in China and Indonesia. However, it should be pointed out that the banana business is now designed throughout the world to be even more viable than larger in scale, meaning to behave like a commodity. Potential new investors in this business must also consider their aptitude for this entrepreneurial role in the world of commodities.

**8.6.** Adopting effective cost management and using precision farming techniques combined with production scale (most likely success in large agricultural ventures) will be key to being competitive in the domestic and foreign markets. The ability to use biological inputs to make production more organic will be an extremely positive differential to adding value to this production chain. By transforming this business, there would be a natural boost in large-scale enterprises involving bananas, which would also open spaces for new sales of equipment (like irrigation and packing houses), packaging and ripening controllers, in addition to opportunities abroad for distribution and commercial representation of exporters.

**8.7.** **Brazil's presence in the international market for banana by-products from agro-industrialization is non-existent.** Products such as pulp, flour, dried fruit and snacks are widely consumed throughout the world and could be a great alternative for fruits that have perfect pulp but lack the visual quality needed for the fresh food market.



# ORANGE



This page presents the main indicators related to the cultivation and commercialization of Orange in Brazil and in the world.

## KPIs 2019

No. of Establishments  
**55,9 mil**

Direct Jobs  
**687,3 mil**

GPV US\$  
**2,4 bi**

Qty. Produced (tons)  
**17,1 mi**

Harvest Area (ha)  
**589,6 mil**

Prod. Avg (tons/ha)  
**29,0**

Exports in US\$  
**1,6 mi**

Exports (tons) % Prod.  
**2,9 mil** 0,02%

## World (FAO - 2018)

Production - millions of tons (5+)



1° Brazil	22,1%	16,71
2° China	12,2%	9,25
3° India	11,1%	8,37
4° USA	6,4%	4,83
5° Mexico	6,3%	4,74

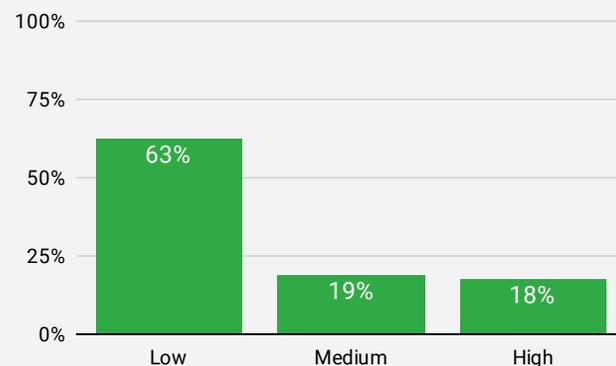
Export Bilions US\$

1° Spain	24,3%	1,32
2° South Africa	14,9%	0,81
3° Egypt	12,2%	0,67
4° USA	11,5%	0,63
24° Brazil	0,2%	0,01

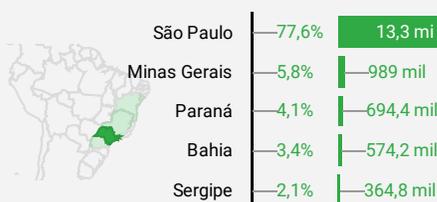
Import Bilions US\$

1° China	13,5%	0,83
2° France	7,4%	0,46
3° Netherlands	7,3%	0,45
4° Germany	7%	0,43
45° Brazil	0,3%	0,02

## Technological Profile of the Producer - BR



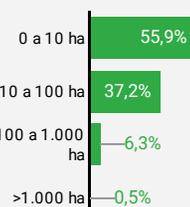
## Top producing FUs (tons)



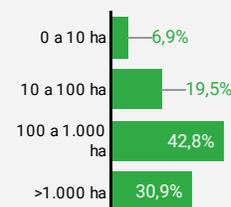
## Major Production Centers

- 1- Avaré (SP)
- 2- Bauru (SP)
- 3- São José do Rio Preto (SP)
- 4- Araraquara (SP)
- 5- São João da Boa Vista (SP)
- 6- Jaboticabal (SP)

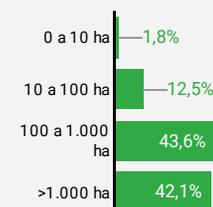
## Facilities (un.)



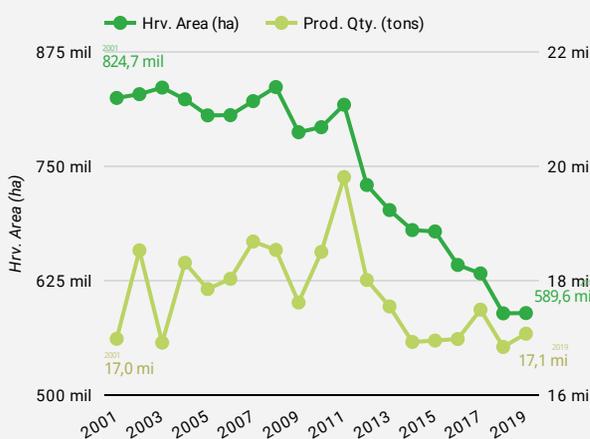
## Harvest Area (ha)



## Production (th. tons)



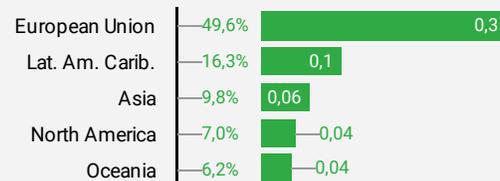
## Performance of production Brazil - 2001-2019



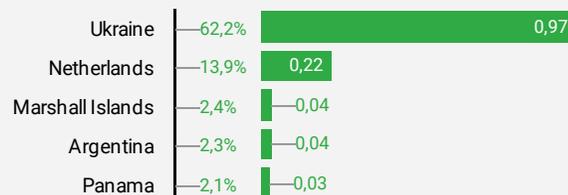
Change 2001-2019  
Harvest. Area (ha): -28,7% Qty. Produced (tons): +0,6% Average Productivity (ton/ha): +40,8% GPV US\$: +118,2%

## Exports Brazil in 2019 - Millions US\$

### Major Blocks



### Top Countries



## Exports Brazil - 2001-2019



Change 2001-2019  
Volume (thousand tons): -97,1% Revenue (thousand US\$): -94,2% Avg Price (US\$/kg): +165,0%

## Data Summary

Diminuição da área colhida acompanhada de aumento da produtividade. Após 2017, forte queda das exportações da fruta fresca.

### Outros destaques:

- [2019] Brasil é o maior produtor mundial e o 24º exportador de laranjas frescas.
- [2019] Apenas 0,02% da produção de laranjas é exportada na forma da fruta fresca.
- [2001-19] Aumento de 40,8% na produtividade média, passando de 20,6 para 29,0 ton/ha.
- [2017] Maior parte da produção (85,7%) em propriedades acima de 100 ha.
- [2018] Maior parte (63%) dos produtores tem baixo grau tecnológico de produção.
- [2001-19] Aumento de 165,0% no preço médio, passando de 0,20 para 0,53 US\$/kg.
- [2019] União Europeia é o principal destino das exportações de laranjas frescas, com 49,6% da receita total.



## 1. Current Outlook and Agricultural Production

**1.1.** The orange is an extremely important product in the Brazilian agricultural economy and is responsible for Brazil's ranking as the largest supplier of concentrated and frozen juice in the world. Orange farming is also responsible for the income of thousands of small-scale Brazilian producers who survive on fruit cultivation and is one of the most significant production chains from an economic point of view in the production of national fruits.

**1.2.** Brazil currently yields around 17 million tons of oranges in a planted area representing approximately 590,000 hectares. **Juice is the main product produced from oranges in the country. However, the consumption of fresh oranges is also quite popular, along with other food products where orange is one of the ingredients.** The nutritional composition of the fruit contains a range of vitamins and minerals, including calcium, potassium, sodium, phosphorus, and especially vitamin C, which is why it has been widely consumed in 2020 thanks to the pandemic and consumers attempting to adopt a healthier diet.

**1.3.** The "citrus belt" in São Paulo is primarily responsible for Brazil's top position in the global orange juice market. **Three out of every five glasses of the beverage consumed in the world are produced in São Paulo. Production output is year-round but is stronger in the second half of the year when there is a higher concentration of volume produced.**

**1.4.** **The orange juice concentrate industry accounts for approximately 70% of the total volume produced and the remaining 30% is consumed by the domestic market in the form of fresh fruit and also in the form of fresh juice.** Exports of fresh oranges still take place at modest volumes that are well below the sector's potential. It supplies the international market, primarily for consumers that consume fresh juice and not concentrate.

**1.5.** **Despite the lushness of Brazilian citrus farming and its orange production, the country is not recognized at an international level as a traditional producer of table fruit.** The volume normally exported reaches 25,000 tons annually, with revenues of around 11 million dollars. Due to production problems, Brazil did not export fresh oranges in 2019 (only 2,900 tons with revenues of US\$ 1.5 million).

**1.6.** **Citrus farming provides 687,000 direct and indirect jobs in Brazil with an annual salary mass of USD\$ 125 million.** The practical effects of growth in this sector can be felt in the municipalities where citrus production occurs. These are modern cities housing prestigious Colleges and Universities, with well-equipped health and education facilities and high quality of life. Proof of this can be found in the latest IBGE survey on the Human Development Index (HDI) conducted in 2010. The study pinpoints citrus-growing cities with some of the highest HDI rates within the State of São Paulo and within the overall ranking in Brazil. Some of the cities included Araraquara (0.815), Botucatu (0.800), Bebedouro (0.780), Limeira (0.775), and Matão (0.773). The parameters analyzed to calculate the HDI include the average lifespan of the population, education indicators and per capita income of residents.

## 2. Major Production Centers

**2.1.** Oranges are found in all regions of the country, particularly in the citrus belt that spans from Paraná to Sergipe, crossing through São Paulo, Minas Gerais, and Bahia. The state of São Paulo is by far the largest fruit producer, accounting for 77% of production.

## 3. Logistics

**3.1.** The orange production chain in Brazil features a complex design for its logistics sector. First of all, there is a significant transit of trucks on the road

to transport the fruits harvested from the field to the concentrated juice industries, as well as the fresh fruit processing centers. **There is an estimated 850,000 truck journeys to transport the 17-18 million tons produced for 2020.**

**3.2.** In terms of concentrated orange juice, there are logistical activities for maritime exports to nearly all regions of the globe. Transporting juice from the factory to the ports is also done via roadways.

**3.3.** The logistics involved in the 30% of production, representing slightly more than 5 million tons, is mainly done via roadways and fruit transported from production hubs to supply centers throughout the country, corresponding to 255,000 extra truck journeys for fruit that has already been cleaned and packaged. Total roadway transports exceed 1 million trips.

## 4. Commerce

**4.1.** **The business process for oranges in Brazil basically follows an agro-industrial concept, meaning the concentrated juice industries draw up contracts with rural producers and acquire 70% of all production under pre-defined conditions for both volumes and prices.** There are a few variations in contracts, but it is important to remember that this market is dominated by 4-5 large-scale agro-industrial groups.

**4.2.** Fruit that is not destined to the industry is handled by large supply centers in the CEASAs system at wholesale and by supermarket chains in retail, representing 30% of the total sold. Street fairs are also a significant retail channel in some regions of the country, but their relevance has been declining, especially in capital cities and large urban centers.

**4.3.** **Exports of fresh fruit are still rather underwhelming, both in terms of volume and revenue, considering that Brazil does not traditionally produce premium oranges.** One of the most prominent reasons for this is the importance of concentrated juice in the market, which is so competitive and relevant that it makes the good opportunities for fresh fruit in the international market unattractive.

## 5. Sustainability

**5.1.** **The entire Brazilian citrus industry adheres to the official rules and procedures stipulated in the law related to environmental and social sustainability issues.**

**5.2.** The most significant production centers located in the citrus belt (Paraná, São Paulo, Minas Gerais) continually monitor data related to legal reserves inside and outside plantations in this region. Given that its agricultural production is rather old, it is included in the category of 20% mandatory preserved area within the properties. The sector is highly committed to the issue of social and environmental sustainability.

**5.3.** Production also has traceability in place, complying with legislative requisites from the Ministry of Agriculture on this matter, as well as addressing requirements from international certification systems regarding fruit shipped for the production of concentrated juice.

## 6. Future Outlook

**6.1.** Orange juice consumption had dropped somewhat over the last decade throughout the globe, particularly in the US, basically due to competition with other similar products. The sector invests a lot in promotions and communication in order to reverse this situation, but the truth is that the results have thus far been more towards reducing the intensity of sagging consumption than increasing it.



## Orange

**6.2. However, during the Covid-19 pandemic in 2020, this downward trend was disrupted and an increase was seen in the demand for sources of vitamin C.** While oranges are no longer the leading sources of the vitamin in this category (there are fruits today that have a higher percentage of vitamin C than oranges, most notably acerola), the consumption of juices and fresh fruit are expected to show an increase when the sector is still unsure if it will be sustainable post-pandemic. **This trend can be observed in FCOJ exports to the US which increased by 12% up to October 2020 compared to the same period last year (CitrusBR, 2020).**

**6.3.** The market is trending towards the consumption of even more diversified products that lack chemical additives and preservatives produced in sustainable systems that ensure food safety. The concentrated orange juice industry needs to reinvent itself through communications and technology in order to stay on top of these trends.

**6.4.** However, the orange is still a prominent fruit that is widely consumed in Brazil and throughout the world. This is an important point for predictions and assessments of potentials for business growth. **Brazil is, and will continue to be, highly competitive in the production of oranges because it possesses efficient farming technology and the territorial expanse to produce at a large scale without resorting to activities that harm the environment, such as deforestation.** Proper organization of the industry is now seen as being extremely important for establishing an outlook that ensures solid profitability for this sector, both for juice and fresh fruit.

**6.5.** Fresh fruit in Brazil and in the international market cannot be treated as just a mere surplus of raw material from the agro-industrial process. Consumers need to be heard and their expectations have to be fulfilled. This strategy for fresh fruit that is currently in place will be instrumental in ensuring the viability of table fruit in the future.

**6.6.** Pest control and battling diseases in orange production represent 30% of the operational cost of production today, and that number is trending upwards due to diseases such as greening, citrus canker, Black Spot, CVC, and other phytosanitary hazards. A promising future for the sector calls for new technologies to control these diseases, which are very restrictive in terms of production. New, more resistant varieties, intensive use of molecular biology in genetic improvement, developing new products that are less detrimental to health and the environment will all be essential in achieving this outcome.





## 7. SWOT Analysis

### S Strengths

- Favorable climate and soil conditions for oranges.
- Production scale.
- Sectoral trade groups (agro-industry); Technology for production and processing; Production schedule.

### W Weaknesses

- Marginal production for table fruit.
- Unattractive varieties for fresh fruit sales; Agricultural x agro-industrial business model.
- Export culture for fresh fruit.

### O Opportunities

- Development of new varieties, primarily for table fruit.
- Demand from the international market for quality conventional and organic table fruit; Biological inputs for organic production.
- Technologies and equipment for precision agriculture.
- Innovations in formulations of agribusiness products from oranges.

### T Threats

- Greening and sudden death (diseases); Other products are competing with orange juice.
- New entrants into the international market for table fruits (African countries).

**7.1.** The concentrated orange juice trade is a consolidated business, although the future is not as promising as this report has described. This business can be thought of as an oligopoly in Brazil, considering that five companies are responsible for the production and sale of 80% of the total volume of juice produced. They are giants in the sector that wield a vast amount of technological and business power. **Public health issues resulting from the Covid-19 pandemic in 2020 could become a watershed moment in reversing this downward trend.** Seizing this opportunity will necessitate a shift in the strategic position of the FCO industry.

**7.2.** In the table (fresh) fruit market, the orange has a consolidated domestic market but offers opportunities to consume a better quality of fruit in terms of taste and appearance. The pursuit of improved immunity to tackle public health issues is also an opportunity for this segment. But, in order to be properly capitalized and taken advantage of, it will require a strategic redesign of the sector.

**7.3.** The biggest business opportunity in this production chain is innovation. This innovation can be incremental in existing products and services, making them more effective and more in tune with consumer demands or through the launch of truly new products such as whole fresh orange juice containing no added sugars and preservatives, superseding what we have today in fresh grapes and apples and table fruits like the best worldwide producers.

**7.4.** New varieties of orange that are resistant to greening and sudden death would lead to a revolution in the sector, not just in Brazil but also in other countries like the United States of America, where the threat is very serious.

**7.5.** Investing in the production of high-quality table oranges in regions outside the citrus belt due to phytosanitary problems and less conducive climatic conditions for fruit coloring could also be a very attractive business, both for the domestic market and the international market.

**7.6.** Countries like Spain export their fresh citrus, including oranges, to Brazil, demonstrating that there are consumers in this country who appreciate flavor and quality.



# LIME



This page presents the main indicators related to the cultivation and sale of lemon in Brazil and in the world.

## KPIs 2019

No. of Establishments  
**19,1 mil**

Direct Jobs  
**94,0 mil**

GPV US\$  
**398,2 mi**

Qty. Produced (tons)  
**1,5 mi**

Harvest Area (ha)  
**56,5 mil**

Prod. Avg (tons/ha)  
**26,8**

Exports in US\$  
**90,9 mi**

Exports (tons) % Prod.  
**104,6 mil 6,9%**

## World (FAO - 2018)

Production - millions of tons (5+)



1° India	-16,2%	3,15
2° Mexico	-13,1%	2,55
3° China	-13,0%	2,52
4° Argentina	-10,2%	1,99
5° Brazil	-7,6%	1,48

Export Bilions US\$

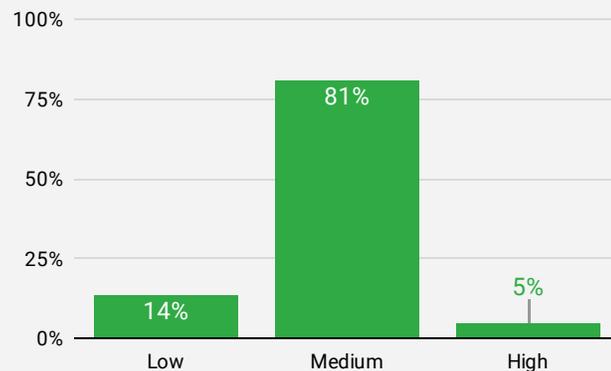
1° Spain	-22,8%	0,85
2° Mexico	-14,7%	0,53
3° Netherlands	-11,0%	0,41
4° Turkey	-8,8%	0,33
10° Brazil	-2,4%	0,09

Import Bilions US\$

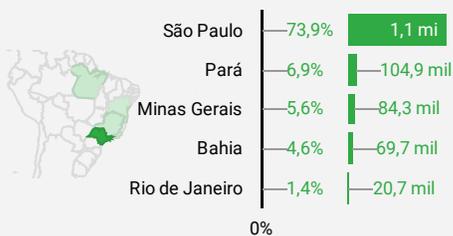
1° USA	-15,7%	0,65
Netherlands	-9,1%	0,38
2° Germany	-9,1%	0,38
4° France	-6,5%	0,27
60° Brazil	-0,1%	0

## Main varieties in Brazil: Tahiti.

## Technological Profile of the Producer - BR



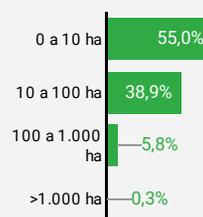
## Top producing FUs (tons)



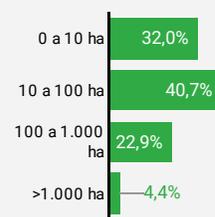
## Major Production Centers

- 1- Novo Horizonte (SP)
- 2- Jaboticabal (SP)
- 3- Catanduva (SP)
- 4- Jales (SP)
- 5- Guamá (PA)
- 6- Araraquara (SP)

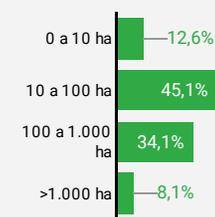
## Facilities (un.)



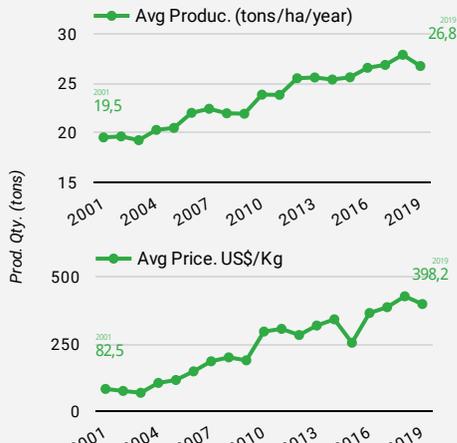
## Harvest Area (ha)



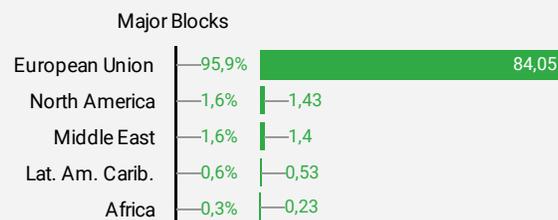
## Production (th. tons)



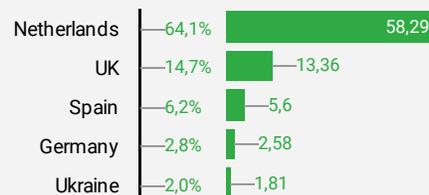
## Performance of production Brazil - 2001-2019



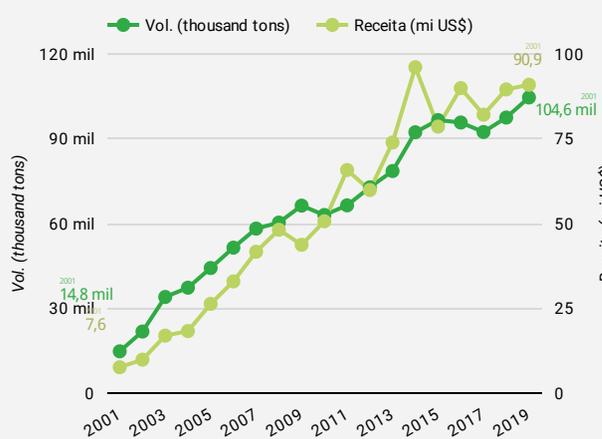
## Exports Brazil in 2019 - Millions US\$



## Top Countries



## Exports Brazil - 2001-2019



## Data Summary

Desde 2001, contínuo aumento das exportações. Produção concentrada em São Paulo e exportações concentradas para a União Europeia.

### Outros destaques:

- [2019] Brasil é o 5° maior produtor mundial e o 10° em exportação de limões e limas frescas.
- [2019] 6,9% da produção de limões é exportada na forma da fruta fresca.
- [2001-19] Aumento de 37,4% na produtividade média, passando de 19,5 para 26,8 ton/ha.
- [2017] Maior parte da produção (45,1%) em propriedades entre 10 e 100 ha.
- [2018] Maior parte (81%) dos produtores tem médio grau tecnológico de produção.
- [2001-19] Aumento de 67,3% no preço médio, passando de 0,52 para 0,87 US\$/kg.
- [2019] União Europeia é o principal destino das exportações de limões e limas frescas, com 95,9% da receita total.



## 1. Current Outlook and Agricultural Production

**1.1.** The Persian Lime or, Limão Tahiti as it's popularly known in Brazil, is a citrus variety widely grown in Brazil and Mexico. Seedless and juice-rich fruits are characteristics of this variety, which is highly consumed in the domestic and foreign markets.

**1.2.** Brazil produces around 1.5 million tons of limes (IBGE) and 90% of that volume, or 1.4 million tons, is the Persian variety. Of the total volume produced, 105,000 tons were designated for the international market and the difference was sold on the domestic market. The harvested area covers 56,500 hectares and is predominantly located in the Southeast region of the country.

**1.3.** Production occurs throughout the year, with the peak harvest during the first half of the year. The production technology is sound, with irrigation used extensively in regions with more erratic rainfall patterns, such as the northern part of the State of Minas Gerais and some regions in Bahia. The partial use of irrigation in production facilitates the floral induction of the species, thereby playing a role in year-round production.

**1.4.** The most common profile among growers of this fruit is that of medium-scale rural producers on properties that cover 50-200 hectares. **Harvesting is performed manually and requires a specialized workforce to be carried out within best agricultural practices.**

**1.5.** **The crop faces a series of phytosanitary challenges during its production cycle, with the most notable being the canker** caused by the *Xanthomonas* bacteria and greening (huanglongbing/HLB), the most devastating disease in citrus culture. But with the proper technology, high-quality fruit can be produced. However, this has a detrimental impact on the costs of mitigating the risks of these pests.

**1.6.** The Persian (Tahiti) lime is used in Brazil for cooking, mixing drinks and cocktails, as raw material for fresh juices and concentrates, and also for supplying the cosmetics industry with oil removed from its peel. Of the total volume produced, 95% is consumed fresh and 5% is used for agro-industrialization.

**1.7.** **In the international market, the predominant use of fruit is in the foodservice sector for preparing drinks and cocktails.** The use of the Persian variety in cooking is still somewhat modest in consumer regions like North America (except Mexico), Europe and Asia, where limes are more popular for this purpose.

**1.8.** The productive sector is reasonably organized, with several regional associations of producers that are primarily found in the Brazilian citrus belt. There is some Cooperativism as well, but this only represents 5% of total production.

## 2. Major Production Centers

**2.1.** The major production hubs for Persian limes are in the citrus belt in São Paulo, which is responsible for 74% of the total production, followed by Pará (7%), Minas Gerais (6%), and Bahia (5%). Production in São Paulo and Pará is mostly carried out without irrigation, while irrigated production predominates in Minas Gerais and Bahia.

## 3. Logistics

**3.1.** **The transport and distribution of production is done via roadways.** Trucks transport the fruit from the farm to the packing houses where, after processing (washing, sorting, and packaging) the fruits are then transported by trucks to the distribution centers such as CEASAs, and even directly to the major supermarket chains.

**3.2.** **Maritime transport** with temperature control is generally used for exports (reefer containers).

**3.3.** In the domestic market, the most popular packaging is the 20 kg bag while for exports, it is the 4.5 kg cardboard box.

**3.4.** **There is no consolidated cold chain** for this product in Brazil. In exports, reefer containers are used to ensure continuity in the cold chain.

## 4. Commerce

**4.1.** **The Persian lime production chain is a segment that has to deal with commercial challenges in the domestic market, basically due to the fall in prices during the harvest period.** This price fluctuation is sudden and the market is very sensitive to any changes in production volume. Despite these drawbacks, the 220 million-consumer Brazilian market carries Persian limes in their weekly shopping basket and consumes a lot of them. **The fruit is one of the primary ingredients in the most famous and popular Brazilian drink – the “caipirinha”.**

**4.2.** In the domestic market, sales are carried out indirectly at distribution centers like CEASAs, where wholesalers and distributors are based and/or directly with major retail chains.

**4.3.** **The alternative employed to minimize any negative effects from large volumes during the harvest season has been the use of technology to induce the flowering of the plant outside the natural season, distributing production more evenly throughout the year.** It is not uncommon to find producers who plan their production in a more staggered way – mainly through irrigation – minimizing the adverse price effects in the first half of the year.

**4.4.** **There is fierce competition in the international market with countries like Mexico** during the first half of the year, and other competitors like Vietnam, Guatemala and Colombia participate in the global market but have volumes that are well below Mexico and Brazil. Although some Mediterranean countries are beginning to produce Persian limes, Brazil still boasts the best conditions for global supply because it has volume, a flexible production schedule, and quality.

**4.5.** Brazilian exports of Persian limes in 2019 were represented by 105,000 tons yielding revenues of US\$ 91 million. This is an excellent alternative to regulate the volume and price in the domestic market. Producers who simultaneously operate in the domestic and foreign markets are those who generally manage to be the most profitable in the business.

**4.6.** **Europe is the primary destination for exports, and the key points of entry for products are in the Netherlands through the Port of Rotterdam and in the United Kingdom, another area that has a high consumption of the fruit outside Brazil.** Significant volumes are also shipped to Ukraine. The Middle East began importing more Persian limes starting in 2018 and may turn into an important market in the future since the juice from this product is high quality and suits the warm climate and habits of that region where very little alcohol is consumed for drinks due to religious reasons.

## 5. Sustainability

**5.1.** Like other fresh fruit production chains in Brazil, the lime production chain is required to adhere to the legal requirements in the Forest Code, state environmental policies, and the labor laws currently in place in Brazil.

**5.2.** The collection of rules and procedures stipulated in these laws ensures compliance with the concepts of environmental and social sustainability. In



addition to these requirements, INC ordinance number 02/2018, drafted by the National Health Surveillance Agency (ANVISA) and the Ministry of Agriculture, Livestock and Supply (MAPA) and in effect since February 2018, is mandatory for the lime crops and also guarantees compliance with issues related to traceability and secure food for consumption.

**5.3.** For exporting producers of limes, there is also an obligation to adopt certifications for best agricultural practices that establishes compliance with environmental, labor, and production traceability legislation, especially by the member states of the European Union. As such, no fruit shipped to the EU leaves Brazil without a guarantee that it comes from a sustainable and safe production process. The most common certification among exporters is Global G.A.P. /GRASP.

## 6. Future Outlook

**6.1. The future outlook for the production of Persian limes in Brazil is rather promising from a profitability point of view within this segment.** The Covid-19 pandemic has raised awareness among people around the world about the importance of a healthy life that facilitates a proper immune response.

**6.2.** A product that is rich in vitamin C, limes are also a fruit that plays a role in good circulation (lowering blood pressure), is beneficial for digestion, prevents some types of cancer, reduces cholesterol levels, and can act as an astringent, antibacterial and antiviral. **It is a fruit destined to be more widely used in people's daily diets.**

**6.3.** Moreover, the culinary properties of the Persian lime are still little known in many countries and, with the right amount of promotional publicity, will undoubtedly see its consumption volume increase through awareness of the diversity of culinary uses that confer a new and pleasant flavor to a number of recipes. Ceviches and guacamoles are current popular recipes beyond their countries of origin that use Persian limes as an ingredient

**6.4.** The lime, in addition to the qualities and desirable properties previously mentioned, it is also a product that is widely used in the cosmetics industry, primarily through oil extracted from the peels, and this industry has been increasing on a global level. Use in natural drugs is another solid opportunity for growth.

**6.5.** There are, of course, some challenges that must be surmounted in order to ensure that this fruit enjoys positive growth and success in the markets. **Some of the most significant challenges include the continual improvement of production technology and the control of certain pests and diseases that affect the productivity of crops,** such as greening and citrus canker, and the continuous organization of the productive sector, ensuring an appropriate supply and demand, thereby contributing to the sustainability of this production chain.





## 7. SWOT Analysis

### S Strengths

- Favorable climate and soil conditions for Limes.
- Production scale.
- Growing sectoral organization.
- Technology for production and processing.
- Year-round production schedule.
- Multi-use feature of the fruit.

### W Weaknesses

- Production hubs concentrated in certain regions (agricultural risk).
- Lack of control in the planted area with potential for excess production.
- Lack of resistant varieties for greening.
- Lack of complete technology for organic production.

### O Opportunities

- Development of new varieties that are more tolerant to diseases.
- Generating demand in the international market through the promotion of limes for culinary use.
- Biological inputs and new molecules for pesticides.
- US market opening for the Brazilian lime, with growth in the Middle East; Technology and equipment for precision agriculture.
- New and innovative nutraceutical and cosmetic formulations.

### T Threats

- New players in the international market.
- Climate change affecting productivity and increasing costs.
- Worsening phytosanitary problems such as greening.

**7.1. The clearest and most tangible market opportunity for the lemon production chain is undoubtedly being able to open the American market for Persian lime.** The USA is the largest world market for the Persian variety. Brazil's stake in this market, even if it is only during the off-season months in Mexico (which is the leading supplier with a 98% share), would mean a potential for over US\$ 100 million in revenues from Brazilian exports of this fruit.

**7.2. The US imported 662,000 tons of Persian limes in 2019, with a turnover of USD\$ 477 million. The Mexican harvest begins in April and runs until September. Brazil could supply a good part of that market in the off-season from October to March with another 100,000 tons without major investments in new production areas, operating during the Mexican inter-harvest.**

**7.3. There is an ongoing process to open the American market for Persian limes, and authorities in Brazil and the USA are still holding negotiations on the establishment of phytosanitary standards.** A complex but feasible negotiation could end up well for Brazil. There are other outstanding opportunities in the lime production chain, such as the use of high technology and molecular biology approaches in the development of varieties that are resistant or tolerant to greening, a disease that has affected citrus in numerous countries. New and more disease-resistant varieties would be adopted by producers instantly.

**7.4. Another prominent opportunity is the development of pesticides and fertilizers featuring a biological product profile for the production of organic limes.** The demand for organic fruits is on the rise around the globe and this industry has demonstrated a strong level of profitability for producers and investors. However, current production technology remains a limiting factor for the growth of the crop area with organics, including limes. Good organic products have played a definitive role in the success of this type of organic cultivation.

**7.5. Last but not least, there are the agro-industrial formulas based on lime which include concentrated juice and cosmetics containing lime oil.** These areas have been growing all over the world, especially in Asia, and Brazil could not only be a supplier of raw material but also a developer of lime-based products, adding value and marketing the tropicality and positive aspects of the Latin and Brazilian culture. The same rationale and opportunity apply to natural medicines. The lime has been an ingredient in Brazilian home medicine for years and has been shown to be somewhat effective against some organic disorders.



# APPLE



This page presents the main indicators related to the cultivation and marketing of Apple in Brazil and in the world.

## KPIs 2019

No. of Establishments  
**3,1 mil**

Direct Jobs  
**56,5 mil**

GPV US\$  
**460,3 mi**

Qty. Produced (tons)  
**1,2 mi**

Harvest Area (ha)  
**32,4 mil**

Prod. Avg (tons/ha)  
**37,7**

Exports in US\$  
**42,5 mi**

Exports (tons) % Prod.  
**56,5 mil** 4,7%

## World (FAO - 2018)

Production - millions of tons (5+)



1° China	45,5%	39,24
2° USA	5,4%	4,65
3° Poland	4,6%	4
4° Turkey	4,2%	3,63
13° Brazil	1,4%	1,2

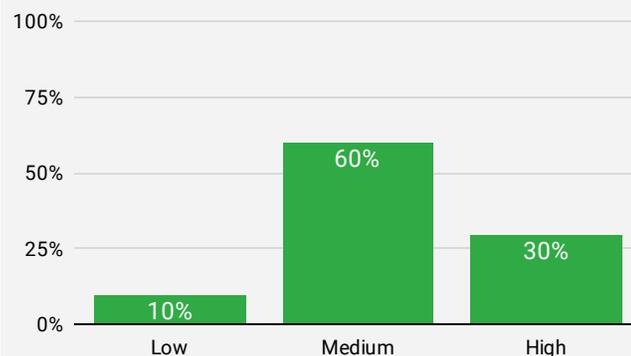
Export Bilions US\$

1° China	17,3%	1,34
2° USA	13,1%	1,02
3° Italy	10,5%	0,81
4° Chile	9,1%	0,7
20° Brazil	0,7%	0,05

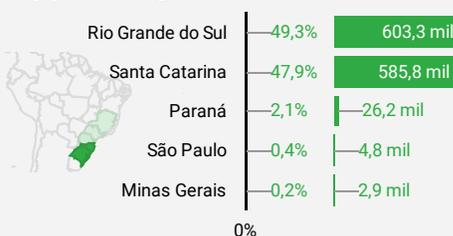
Import Bilions US\$

1° Germany	8,2%	0,73
2° China	6,2%	0,55
3° Russian	5,8%	0,52
4° UK	5,5%	0,49
31° Brazil	0,8%	0,07

## Technological Profile of the Producer - BR



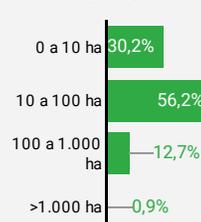
## Top producing FUs (tons)



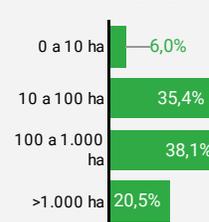
## Major Production Centers

- 1- Vacaria (RS)
- 2- Campos de Lages (SC)
- 3- Caxias do Sul (RS)
- 4- Joaçaba (SC)
- 5- Curitiba (SC)
- 6- Lapa (PR)

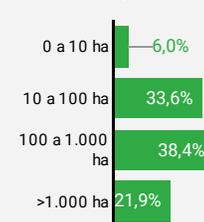
## Facilities (un.)



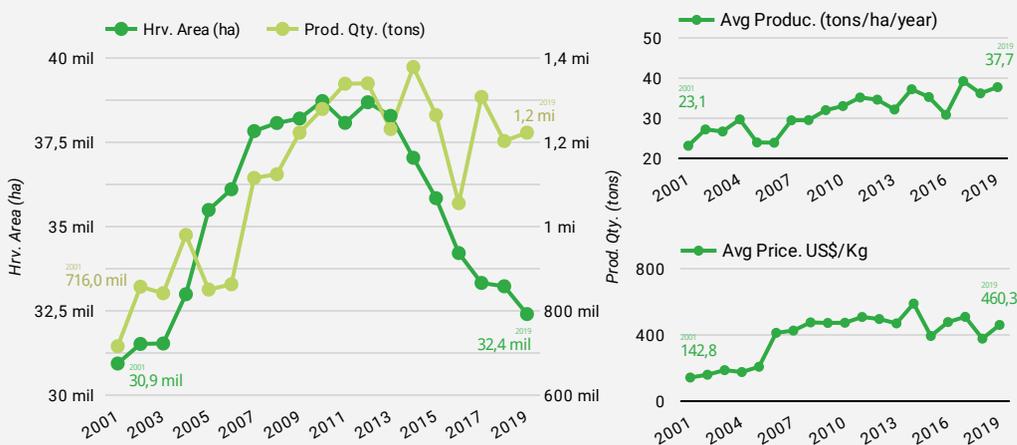
## Harvest Area (ha)



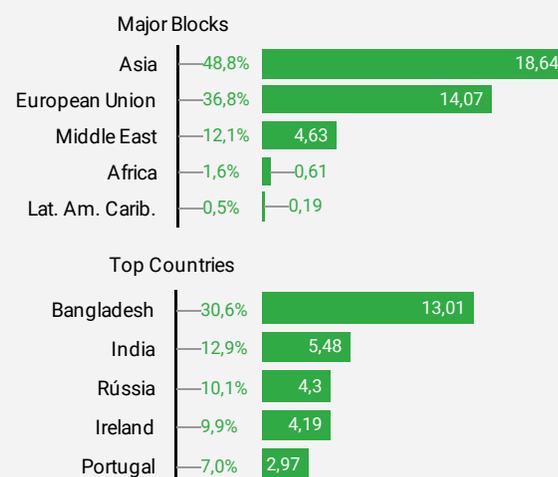
## Production (th. tons)



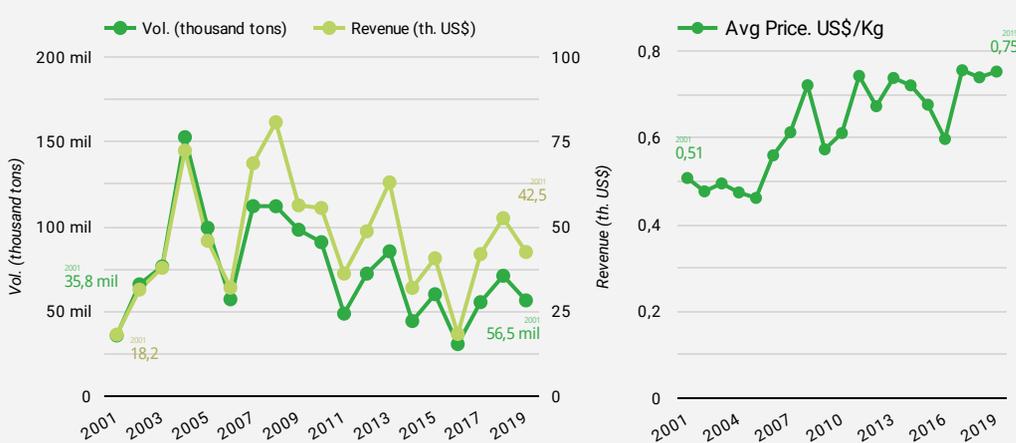
## Performance of production Brazil - 2001-2019



## Exports Brazil in 2019 - Millions US\$



## Exports Brazil - 2001-2019



## Data Summary

High growth in productivity, which maintained the volume produced even while the harvested area diminished between 2013 and 2019.

Other highlights:

- [2019] Brazil is 13th largest global producer and 20th in fresh lemon and lime exports.
- [2019] 4.7% of the apples produced are exported as fresh fruit.
- [2001-19] 63.2% increase in average productivity, from 23.1 to 37.7 ton per ha.
- [2017] Most of the production (60.4%) is on properties over 100 ha.
- [2018] A majority (60%) of producers have a low technological level of production.
- [2001-19] Increase of 47.1% on average, from 0.51 to 0.75 US\$/kg.
- [2019] Asia is the main destination for exports of fresh apples, with 48.8% of total revenue.



## 1. Current Outlook and Agricultural Production

**1.1.** Brazil has been producing approximately 1.1 million tons of apples per year, covering a production area of 32,400 hectares and responsible for creating 56,500 direct jobs. Brazil accounts for 1.4% of world apple production, ranking among the 13 leading fruit producers in the world.

**1.2.** Productivity varies greatly depending on the varieties, climate, production system and technologies applied. Brazil averages around 37.7 tons per ha. However, this average also includes young orchards, which do not produce yet, as well as older areas that have diminishing production or less technically equipped. Hence, it is possible that yields could reach up to 80 tons per ha in the major producing regions and in orchards that have the optimal age group for production.

**1.4.** Apple production in Brazil is concentrated into two varieties, Gala and Fuji, which represent around 90% of the planted area. Other varieties that are cultivated include Eva, Golden Delicious, Brasil, Anna, Condessa, Catarina, and Granny Smith.

**1.5. Genetic improvement programs have been creating varieties that have reduced stress in the cold and are resistant to diseases,** particularly the Empress, Daiane, Baroness, Catarina, and Joaquina. The last two are resistant to scabies, a major fungal disease that attacks the leaves and fruits of apple trees (SEBRAE, 2018).

**1.6.** In addition to its wide consumption, the apple is useful for various types of processing, producing products such as sweets, jellies, jams, drinks, and vinegar. Apple juice is considered to be one of the primary products in the processing industry. In addition to being consumed directly, apple wine also serves as the basis for cider, a sparkling beverage, and for the production of aged distillates.

## 2. Major Production Centers

**2.1.** Appletree orchards in Brazil are largely concentrated in the southern region of the country, primarily in the states of Rio Grande do Sul and Santa Catarina, due to the region's temperate weather and compatibility with the climate needs of the most widely cultivated varieties. The municipalities of Fraiburgo, São Joaquim in Santa Catarina and the region of Vacaria in Rio Grande do Sul are well-known hubs for the production and processing of the fruit.

**2.2. One interesting factor is EMBRAPA's research efforts in the semi-arid region of the Northeast, where a number of fruit production initiatives have been conducted to find fewer varieties that are less demanding in cold weather that can flourish and, consequently, bear fruit.** The initial results from the pilot runs are promising and, in the future, commercial apple production areas may grow in that territory.

## 3. Logistics

**3.1.** Apples produced in the Southern region are intended for consumption in all other regions of the Country and are mostly distributed through wholesalers by way of Supply Centers (CEASAs), the Company of Warehouses, and General Stores of São Paulo (CEAGESP), and major supermarket chains.

**3.2. The harvest is handled using manual labor between February and April** when the fruit reaches its ripeness. The apples in the orchard are stored in bins, wooden containers with an average capacity of 330 kg, and taken to the packing-houses by tractors in the shortest possible time. When production is done by small-scale producers, there is a common issue involving a lack of storage structures on the plantations due to the high investment they pose. As such, bins are normally taken to external packing houses, often on rural roads that, if not properly maintained, can damage the quality of the fruit.

**3.3.** The packing house is the location used for the classification, storage, packaging, and shipping of products. Apples are primarily stored in cold chambers at temperatures from zero to 2 degrees Celsius, with or without a controlled atmosphere, depending on the planned storage period.

**3.4. Studies conducted by the Brazilian Association of Apple Producers (ABPM) suggest that there are around 220 packing houses in Brazil,** with 90 of them in Santa Catarina, 110 in Rio Grande do Sul, and 19 in Paraná. The country has a refrigerated apple storage capacity of 765,000 tons, 75% of the average production over the last five years, a figure suggesting that some of the producers should use their fruits for sale right after their harvest or even stock them in conventional warehouses without refrigeration.

**3.5.** Commercial transport is primarily done via roadways. The primary highway used for apple distribution is BR-116. Apples require refrigerated transportation to ensure there is no reduction in quality. But because of the high cost and limited availability for this type of transport along with shortcomings related to the cold chain in the country for fruit, a portion of the production is still transported by trucks that lack refrigeration.

**3.6.** Logistics for exports are done in compliance with the requirements established by international certifications. Maritime transport is utilized through the ports located in the Southern region of Brazil (PR, SC, and RS), which is where production is centered and is always done using refrigerated containers (reefers).

## 4. Commerce

**4.1. The primary destination for apples is fresh consumption.** Various types of fruit processing are feasible, producing products such as sweets, jellies, jams, juices, drinks, and vinegar.

**4.2.** Apples are annual fruits and the harvest lasts from mid-January in the earliest crops until the end of April for the later ones. **The supply is usually higher during the harvest period. But thanks to the ability to store apples for longer periods than most other fruits, distribution can be planned and controlled throughout the year.** Prices naturally tend to be lower during the harvest period and they increase as the product becomes scarcer towards the end of the storage period.

**4.3.** Sales in the domestic and foreign market are done through major retailers or distributors located in the target countries or in the main supply centers in Brazil.

**4.4.** The consumer market is highly particular about both the price and the quality of the fruit. This requires processing that is capable of carefully selecting the fruits that have the potential for the fresh market according to disease infestations and physical defects, which has led to the disposal of around 30% of national production over the last few years.

**4.5.** This disposal is usually redirected to industrialization. This percentage of industrialization in the country is likely to increase due to the growing demand in the domestic market for whole juice free of added sugars and preservatives and ready for consumption.

**4.6.** The bagasse is used in Brazil for the soil as organic fertilizer or as animal feed. A series of studies has assessed its use for producing alcohol, alcoholic beverages, fibers for enriching foods, and other products.

**4.7.** In addition to being consumed directly, apple wine also serves as the basis for cider, a sparkling beverage, and for the production of aged distillates like calvados or for the production of blends such as pommeau.



**4.8. Brazil exports apples to 66 countries worldwide**, Including Bangladesh (new market), Russia, Ireland, Portugal, United Kingdom, India, France, the Netherlands, Saudi Arabia, UAE, Oman, and Sweden.

**4.9.** In addition to fresh fruit, Brazil also exports fruit juice to 49 countries, most notably the United States (with almost 63% of the total), as well as Japan, Germany, and South Africa. There was a drop in fruit imports in 2019 of 4.3% in quantity and 7.6% in money paid. The product came mostly from Chile and Argentina.

## 5. Sustainability

**5.1.** In accordance with the sustainability model of the sector **as a whole, the apple production chain boasts an organizational and business maturity within the sector** and is a model when it comes to environmental, social sustainability, and commitment to the concept of food safety.

## 6. Future Outlook

**6.1.** The industry's corporate governance envisions a solid opportunity for distinction and added value in establishing a geographical designation for crops planted in different regions. The Santa Catarina Agricultural Research Corporation (Epagri) has been working to obtain the Denomination of Origin (DO) for Fuji in the São Joaquim region (Fuji Serrana) from the National Institute of Industrial Property (INPI).

**6.2.** This "seal" is granted to products found in certain areas that, because of their natural, cultural and historical traits, thrive in these areas, such as the case with the Fuji apple in the São Joaquim region. Another trend seen in some areas is that old rootstocks are being replaced by new rootstocks when replanting orchards, which are expected to improve the productivity of the areas, the resistance of the plants and the quality of the fruits.

**6.3. There is a distinct technical possibility that apple varieties that are less demanding in cold weather and that can be produced outside the sub-tropical region can be produced.** This technological innovation could improve the security of production and the sector may be more ambitious concerning the volumes produced, besides stabilizing the supply variations per harvest.

**6.4.** Because the flavor of Brazilian apples is popular in the international markets, exporting producers could map out a strategy to supply markets around the world and increase the volume exported considerably.

**6.5. Organizations for apple production are among the best compared to other Brazilian fruits. This particular strong point is a definitive factor in the promising future outlook for the sector, from the perspective of both the domestic market and/or international markets.**





## 7. SWOT Analysis

### S Strengths

- Robust governance and organization in the sector.
- Production technology and packing house infrastructure.
- Companies that are designed to operate in the domestic and foreign markets.
- Production area located near the ports.
- Flavor of Brazilian apples.

### W Weaknesses

- The production region is still limited to the southern region of Brazil with a high concentration of producers and agricultural risks.
- Only two varieties are taking up 90% of the volume produced.
- Protected crops are still under expansion; Uneven volumes produced per year.

### O Opportunities

- International demand for Brazil's apples has been increasing annually.
- Wide variety of countries interested in importing Brazilian apples.
- Potential for sales growth in the domestic market.
- New production regions in Northeastern Brazil with different varieties.
- Biological inputs for organic fruit.
- Protected farming in the south (technology and equipment).
- Technology and equipment for precision agriculture.
- New and innovative formulas for agribusiness products made from apples.

### T Threats

- Climatic changes and weather-related risks such as hail, lack of cold certain years, etc.
- Geopolitical issues with Russia may resume European shipments to that country, affecting demand.
- Logistical challenges, and costs for shipping to more distant destinations.

**7.1. One of the key opportunities for the apple sector in Brazil is to increase sales and profitability based on the industry's exceptional organization, which enjoys a mature and professional governance process.**

**7.2.** Growing international market demand, the appealing quality and flavor of the fruit, wide diversity of markets with a consequent dilution of commercial risk, the organic market, in addition to a potential increased consumption in the domestic market, are all current opportunities that only have one barrier to be crossed: irregularity in production and supply due to adverse weather conditions.

**7.3.** Some factors that should be worked on include developing new varieties with a broader geographical adaptation and are less sensitive during cold spells, increasing crops protected from hail in the South and applying effective organic production technology. Entrepreneurship and organization within this productive sector would do everything else on the path to success while increasing sales and profitability in this branch of fruit farming.

**7.4.** If the issue of production instability can be resolved, there is domestic and international demand for products derived from apples, including whole juice, dried fruit, raw material compounds for the food industry, and others. Stable production would allow the sector to securely plan for production and sales of these derivatives.



# PAPAYA



This page presents the main indicators related to the cultivation and marketing of Papaya in Brazil and worldwide.

**Main varieties in Brazil:** Papaia/Havaí e Formosa.

## KPIs 2019

No. of Establishments  
**7,8 mil**

Direct Jobs  
**60,7 mil**

GPV US\$  
**268,6 mi**

Qty. Produced (tons)  
**1,2 mi**

Harvest Area (ha)  
**27,6 mil**

Prod. Avg (tons/ha)  
**42,2**

Exports in US\$  
**47,3 mi**

Exports (tons)  
**44,2 mil** % Prod. 3,7%

## World (FAO - 2018)

Production - millions of tons (5+)



1° India	-44,6%	5,99
2° Brazil	-7,9%	1,06
3° Mexico	-7,7%	1,04
4° Dominican Republic	-7,6%	1,02
5° Indonesia	-6,6%	0,89

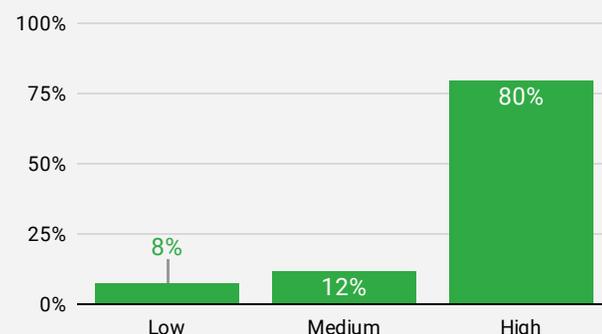
Export Bilions US\$

1° Mexico	-30,1%	0,09
2° Brazil	-16,8%	0,05
3° Guatemala	-11,1%	0,03
4° Netherlands	-7,7%	0,02
5° USA	-7,4%	0,02

Import Bilions US\$

1° USA	-36,4%	0,13
2° Germany	-8,2%	0,03
3° Portugal	-6,8%	0,02
4° Canada	-6,2%	0,02
-Brazil	-0,0%	0

## Technological Profile of the Producer - BR



## Top producing FUs (tons)



Espírito Santo	-34,7%	403,3 mil
Bahia	-33,6%	390,1 mil
Ceará	-10,2%	118,7 mil
Rio Grande do Norte	-6,8%	78,9 mil
Minas Gerais	-4,4%	51,6 mil

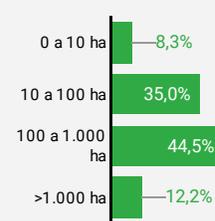
## Major Production Centers

- 1- Porto Seguro (BA)
- 2- Montanha (ES)
- 3- São Mateus (ES)
- 4- Linhares (ES)
- 5- Santa Maria da Vitória (BA)
- 6- Barreiras (BA)

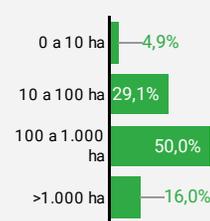
## Facilities (un.)



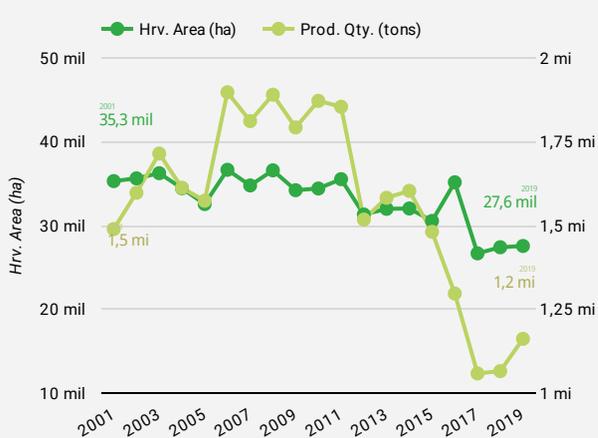
## Harvest Area (ha)



## Production (th. tons)



## Performance of production Brazil - 2001-2019



Change 2001-2019

Harvest. Area (ha): -21,8% Qty. Produced (tons): -20,0% Average Productivity (ton/ha): 0% GPV US\$: +54,0%



## Exports Brazil in 2019 - Millions US\$

### Major Blocks

European Union	-90,7%	41,13
North America	-7,7%	3,49
Lat. Am. Carib.	-1,1%	0,5
Middle East	-0,3%	0,15
Asia	+0,0%	0,02

### Top Countries

Portugal	-23,2%	10,96
Spain	-17,1%	8,08
Germany	-16,4%	7,77
UK	-11,3%	5,32
Netherlands	-9,4%	4,42

## Exports Brazil - 2001-2019



Change 2001-2019

Volume (thousand tons): +93,6% Revenue (thousand US\$): +155,7% Avg Price (US\$/kg): +32,1%



## Data Summary

Instability in productivity and production volume. Exports on the rise from 2012 onwards.

### Other highlights:

- [2019] Brazil is the 2nd leading global producer and 2nd in fresh papaya exports.
- [2019] 3.7% of the papayas produced are exported as fresh fruit.
- [2001-19] Maintenance of productivity, with a positive and negative variation.
- [2017] Most of the production (50.0%) on properties between 100 to 1,000 ha
- [2018] A majority (60%) of producers have a low technological level of production.
- [2001-19] Increase of 32.1% on average, from 0.81 to 1.07 US\$/kg.
- [2019] European Union is the main destination for exports of fresh papayas, with 90.8% of total revenue.



# Papaya

## 1. Current Outlook and Agricultural Production

**1.1. Papaya is grown in nearly all Brazilian states**, but the primary fruit production hubs in Brazil are in the Southeast and Northeast regions, and the States of Bahia and Espírito Santo are responsible for around 70% of the area and of papaya production in the country.

**1.2.** Boasting a harvested area of 27,600 hectares, with a production volume of approximately 1.2 million tons and average productivity of 42.2 tons per hectare, **papaya is one of the leading fruits consumed by Brazilians and is included on the export list from Brazil, although at more modest levels than the fruit's potential in the international market.**

**1.3.** Papaya is harvested commercially on over 7,800 properties spread among small, medium, and large-scale farms and is responsible for generating 60,744 direct jobs throughout the production chain, making this one of the leading activities in terms of socioeconomic importance for the country.

**1.4.** The fruit is extremely flavorful and features a unique texture with functional properties that are highly valued by nutrologists and health and food professionals. One example of these properties is papain (papaya proteinase) which, due to its proteolytic enzyme, is similar to human pepsin and is widely used to aid in digestion, particularly for meat. Its effect is especially useful for digestive disorders such as gastritis, in cases of pancreatotomy, exocrine pancreatic insufficiency, and in other intestinal disorders where there is some type of enzymatic deficiency.

**1.5.** In addition, the consumption of papain directly affects fibrinolytic activity on blood clots, preventing the emergence of thrombi. Papain appears to stimulate healing for wounds and as such, it helps in post-operative recovery, elimination of edema, and recovering from various sports injuries.

**1.6.** Meanwhile, papain is also used in the cosmetic and pharmaceutical industry to manufacture creams and other products for dermatological use, such as healing, skin depigmenting, insect bites, products to soften skin texture, help in treating fever blisters and eliminating dead epithelial tissues.

**1.7.** With so many positive nutritional, pharmacological and overall healthy applications for people, quality papaya and its by-products (like papain) are also enjoyed on the international market and recognized as being a genuinely exotic fruit in markets in the Northern Hemisphere.

## 2. Major Production Centers

**2.1.** On the domestic front, papaya production is primarily concentrated in the States of Espírito Santo (403,300 tons), Bahia (390,100 tons), Ceará (118,700 tons), Rio Grande do Norte (78,900 tons), and Minas Gerais (51,600 tons). According to Embrapa, papaya production in the regions of Brazil is represented by the Northeast region, with 53.3% of the planted area, followed by the Southeast region with 39.3%, with the North at 5.5%, Mid-West with 1.6%, and South with only 0.6%.

**2.2.** The supply to large Brazilian cities is done through the production centers in the previously mentioned states. Other production states sell their crops locally and are not very significant at the national level.

## 3. Logistics

**3.1.** Since the papaya is a highly perishable fruit that is sensitive to temperatures and whose commercial value decreases significantly when subjected to poor logistical processes, papaya logistics rely on efficient management that seeks to ensure the quality of the fruit and a reduction of losses and waste by adopting a more efficient distribution and marketing logistics chain.

**3.2. In the domestic market, a large portion of the papaya cargo is still sent to distributors and retailers in bulk or in unrefrigerated trucks, which ends up resulting in losses ranging from 15% to 20%** information obtained by Cepea HF points out that these losses do not exceed 3% when transported in refrigerated trucks.

**3.3. Transport in the domestic market is done entirely via roadways, and conditions depend on the variety being sold.** The Hawaiian (Havaí) papaya is a more sensitive variety and usually requires refrigeration and is packaged in cardboard boxes, which is the export standard. The Formosa (Taiwanese) variety tends to be transported as dry cargo, and often in bulk. When the Formosa cargo is refrigerated and packed, it is usually the best fruit and is targeted towards more demanding shoppers, as are found in supermarkets in major Brazilian cities.

**3.5. Currently, about 90% of the papaya exported by Brazil uses air transport to ship to consumer markets.** The main issue exporters face is the land transport logistics from the production/packing house area to the airport the product is being shipped from. Because a majority of the cargo is transported in commercial passenger aircraft, the number of airports with flights scheduled to the main destinations for Brazilian papaya is reduced. The average distance from the major production centers to the airports is 1,000 km. This not only increases travel time and makes freight costs more expensive, but it also considerably increases the risk of visual damage to fruits. This logistical challenge has been somewhat resolved by a still minor portion of producers and is one of the reasons why Brazil exports only 3.5% of the total volume produced.

## 4. Commerce

**4.1. A vast volume of papaya produced by Brazil (96.3%) is sold on the domestic market** and these sales have occurred more commonly with supermarkets and Distribution Centers (CEASAs and others), which are the major wholesale supply terminals.

**4.2.** There are a number of channels for papaya sales in the domestic market, including: the direct sale from the producer to the consumer, without any intermediary; from the producer to the retailer (supermarket, fruit shops, fruit stands, and others); from the producer to the destination wholesaler, located near the supply center, and from the producer to the original wholesaler, located close to the production area. It is the producer's responsibility to decide on one of these options, choosing the one that best suits their circumstances.

**4.3.** It should be noted that, according to a study conducted by the Brazilian Confederation of Agriculture and Livestock (CNA), about 80% of fruit and vegetable commerce in Brazil is done in supermarkets and retail stores. These points of sale are assuming even more space in the sales of fruits in an effort to update their commerce system to satisfy the increasing demands of consumers. This trend also holds true for papayas, but the fruit has resisted more to the older and more conservative models of commerce, probably due to its popularity.

**4.5.** In the foreign market, the papaya trade saw its highest volumes in the European Union and the United States, and the vast majority is done through distributors and major supermarkets. The most widely sold varieties on the foreign market are the Solo group (fruits with 350 and 600g), commonly known as "papaya or Hawaii" and the Formosa (Taiwanese) group, with larger fruits at between 800 and 1,200g.

**4.6.** In 2019, Brazil exported around 3.7% of the total volume produced. Based on the substantial promotional efforts and the ever-growing process of opening new markets for Brazilian fruits, it is quite clear that there is a great growth potential for Brazilian papaya in the foreign market.



## Papaya

### 5. Future Outlook

**5.1.** The outlook for the future of the papaya production chain today features two different scenarios. The first, more optimistic scenario based on the premise that the sector will resolve the issues plaguing its internal organization of production, there is an expectation for opportunities when considering the attributes of this typically tropical fruit like the unique flavor, the nutritional and functional properties, and consumption options such as fresh fruit or processed as an ingredient in different recipes (like papaya cream).

**5.2.** Having the productive sector organized with the management of planting areas, volumes and standardizing a number of commercial policy elements, would consolidate the competitiveness of the fruit in the domestic market. The proper promotion of a fruit that possesses so many positive characteristics and is based on a reliable and organized production would facilitate growth in export volumes.

**5.3.** The second, less optimistic scenario foresees many struggles in the sector related to profitability, basically due to a supply of products above demand and depreciation in prices. In this scenario within the scope of the domestic market, there is also the role of intermediaries in the business that participate in the value chain without adding anything to the product and/or services, draining profitability, especially for rural farmers. The result would be the bankruptcy of the current business model and the entry of other more mature groups from an entrepreneurial point of view, acquiring businesses and assuming management over this segment.

**5.4.** In light of these circumstances, it is obvious that the sector fundamentally depends on a shift in the governance of agricultural production, using regional associations to help organize the planted area, the volume produced, and the promotional efforts for the domestic and international markets by employing professional marketing firms, and finally, redesigning the production chain for this fruit. Business opportunists need to have their business lives hindered in order to force more professionalism at the cost of leaving the market.

**5.5.** It is also highly important that there are improvements made in production technology, especially in the control of viruses that attack papaya, which can increase production costs. Universities and research centers can make considerable contributions to the development of these technologies. Leaders in the sector need to assume this role through firm sectoral associations that have clear goals that need to be reached.





## 6. SWOT Analysis

### S Strengths

- Extensive adaptation of papaya in the Brazilian territory, offering numerous options and opportunities for production.
- Intrinsic quality of the fruit like taste, texture, nutrients align it with the concept of healthiness.
- Production technology fulfills the requirements for the fruit in the international market.

### W Weaknesses

- Lack of alignment and organization in the sector with fragmented governance and a great amount of internal predatory competition.
- Crop's susceptibility to viruses with difficult phytosanitary control; Short shelf life with numerous logistical challenges in the domestic and international markets.

### O Oportunidades

- International demand for exotic tropical fruits and unique flavors like papaya.
- Consumers in domestic and international markets open to increasing consumption through a solid communication and publicity program.
- Great demand for organic fruit.
- Organic fertilizers and pesticides for organic production.
- Technology and equipment for precision agriculture.

### T Threats

- New competitors in the international market coming from the Americas, Asia, and the African continent.
- Unprofessional intermediaries in the domestic market, which promote predatory competition.
- Weather changes provoke instability in production.

**6.1. It is absolutely crucial for this productive chain to gain strong sector-related governance that can unify producers and help them to mature more business-wise in order to make adjustments in the market that will be necessary for the profitability of the business.**

**6.2.** There are opportunities that can be seized in the domestic market by increasing consumption through publicity campaigns spotlighting the nutritional and functional quality of papaya, in addition to its unique and unrivaled flavor, creating a perceived value by the consumer that is not that strong today. It is more consumed for its flavor and due to tradition.

**6.3.** In the international market, exporters and distributors of papaya need to better manage the promotional efforts for the fruit and its inclusion in a healthy daily diet. There also needs to be a focus on the post-harvest quality of the product by, for example, adopting appropriate papaya preservation and storage temperatures. It is not uncommon to find fruit stored the same way as grapes, for example, are stored with temperatures close to zero degrees Celsius and damaging its appearance and flavor. Attention and management of these two concerns would surely increase exports and the volumes consumed abroad.

**6.4.** Importers and distributors that are specialized and familiar with the management of perishable fresh products and their distinctive characteristics, supported by a robust program of information and promotion about the papaya involving health professionals and digital influencers who are focused on well-being, could potentially result in higher returns for this sector.

**6.5. Another opportunity worth noting involves advancements in the technology for organic fruit production.** Both the sector of biological inputs and the production of organic papaya would well-received in the domestic and international markets. Under this challenge, precision agriculture technologies and equipment would also be critical factors for the success of this initiative.

**6.6.** Expanding studies on the qualities and characteristics of papain as well as other papaya derivatives would be an excellent alternative for surplus production and/or fruit with no commercial standard for fresh consumption. While there is domestic and international demand, this agribusiness has been rather tentative in the volume produced and when it comes to developing innovations in formulations.



# MANGO



This page presents the main indicators related to the cultivation and commercialization of Mango in Brazil and in the world.

## KPIs 2019

No. of Establishments  
**14,8 mil**

Direct Jobs  
**126,9 mil**

GPV US\$  
**415,5 mi**

Qty. Produced (tons)  
**1,4 mi**

Harvest Area (ha)  
**67,3 mil**

Prod. Avg (tons/ha)  
**21,0**

Exports in US\$  
**221,8 mi**

Exports (tons)  
**215,8 mil** 15,4%

## World (FAO - 2018)

Production - millions of tons (5+)



1° India	-39,3%	21,82
2° China	-9,0%	4,99
3° Thailand	-6,8%	3,79
4° Indonesia	-5,6%	3,08
7° Brazil	-3,4%	1,9

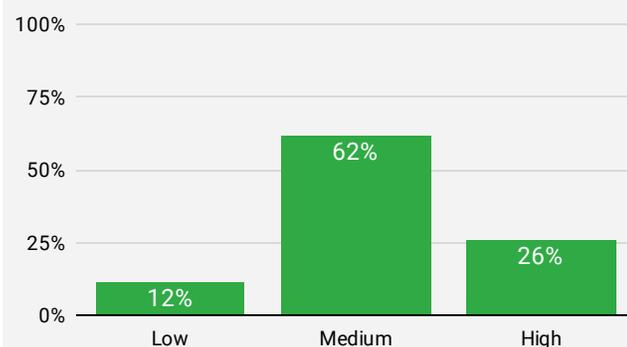
Export Bilions US\$

1° Mexico	-17,3%	0,44
2° Netherlands	-15,9%	0,41
3° Thailand	-12,3%	0,32
4° Peru	-10,0%	0,26
5° Brazil	-6,9%	0,18

Import Bilions US\$

1° USA	-19,0%	0,48
2° Netherlands	-13,6%	0,34
3° Germany	-8,9%	0,23
4° UK	-7,0%	0,18
112° Brazil	-0,0%	0

## Technological Profile of the Producer - BR



## Top producing FUs (tons)



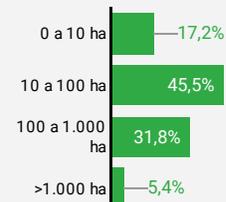
## Major Production Centers

- 1- Petrolina (PE)
- 2- Juazeiro (BA)
- 3- Jaboticabal (SP)
- 4- Itaparica (PE)
- 5- Livramento do Brumado (BA)
- 6- Vale do Açu (RN)

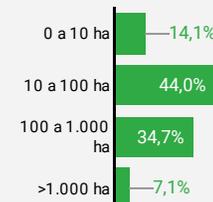
## Facilities (un.)



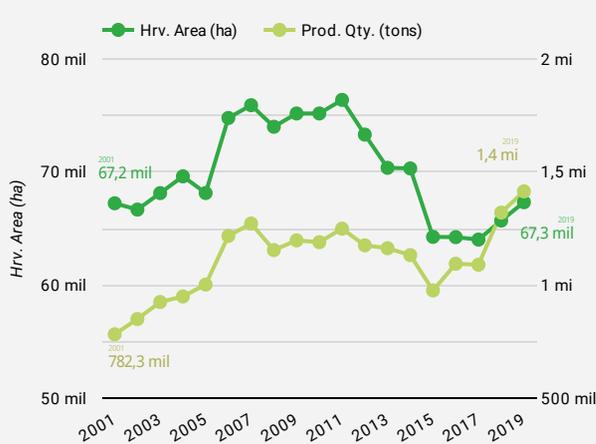
## Harvest Area (ha)



## Production (th. tons)



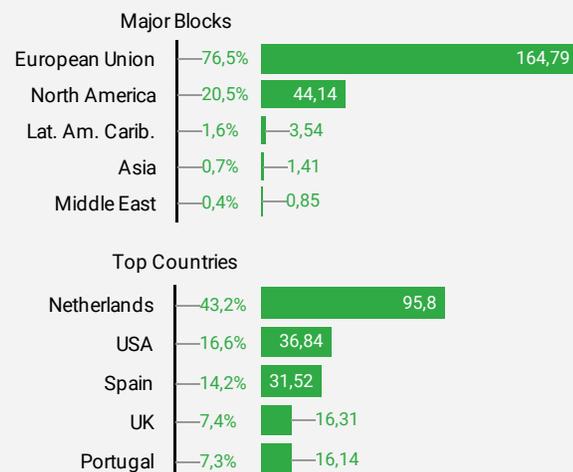
## Performance of production Brazil - 2001-2019



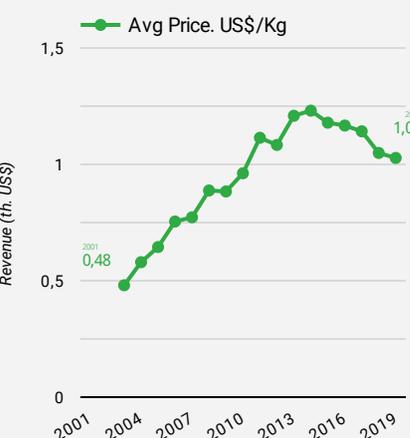
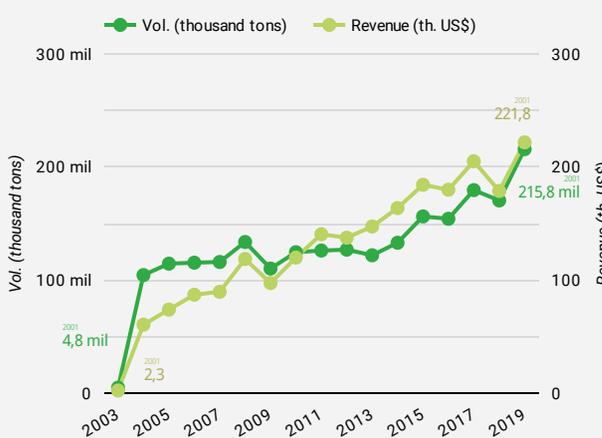
Change 2001-2019

Harvest. Area (ha): +0,1% Qty. Produced (tons): +79,0% Average Productivity (ton/ha): +81,0% GPV US\$: +361,7%

## Exports Brazil in 2019 - Millions US\$



## Exports Brazil - 2001-2019



Change 2001-2019

Volume (thousand tons): +4395,8% Revenue (thousand US\$): +9543,5% Avg Price (US\$/kg): +114,6%

## Data Summary

Productivity nearly doubled between 2001 and 2019. Continued growth in exports.

Other highlights:

- [2019] Brazil is the 7th largest producer and 5th in Mango exports.
- [2019] 15.4% of the mangos produced are exported as fresh fruit.
- [2001-19] 81.0% increase in average productivity, from 11.6 to 21.0 ton per ha.
- [2017] Most of the production (44.0%) on properties between 10 to 100 ha
- [2018] A majority (62%) of producers have a low technological level of production.
- [2001-19] Increase of 114.6% on average, from 0.48 to 1.03 US\$/kg.
- [2019] European Union is the main destination for exports of fresh mangos, with 76.5% of total revenue.



## 1. Current Outlook and Agricultural Production

**1.1.** Mango farming has historically been carried out extensively in Brazil. It is common to see crops in sparse areas in the backyards and valley floors of small rural properties, forming sub-spontaneous forests, and traditionally grown in diverse locations.

**1.2.** Mango cultivation initially began to expand in the State of São Paulo. New varieties were then spread to the rest of the country, like into the irrigated agriculture hubs in the Northeast, where more technical plantations were incorporated, primarily in the Sub-medium of Vale do São Francisco (Bahia, Pernambuco) and other irrigated areas such as the Jaguaribe Valleys, Açú-Mossoró, Parnaíba and Plateau de Neópolis (Ceará, Rio Grande do Norte, Piauí, and Sergipe, respectively), created a positive distinction in the product and increased the competitiveness in the domestic and international markets. **It is in this northeastern semi-arid region where the enterprises were and continue to be located, with commercial plantations that produced the varieties most sought after by the stringent domestic market and the sophisticated international market.** In all these areas, mango farming is known as the "export type" has entered a phase of rapid expansion based on varieties such as Tommy Atkins, Haden, Palmer, Keitt, Van Dyke, Kent, and others.

**1.3.** The estimated mango planted area in Brazil today is at 67,000 hectares, producing approximately 1.4 million tons of fruit and with average productivity of 21.0 tons per hectare. Mango production in Brazil generates 126.900 direct jobs and can be found on 14,000 properties spread across the country.

**1.4.** Production technology varies depending on the region. However, professional producers who are responsible for supplying large urban centers in Brazil, as well as exports, possess outstanding technology for agricultural production and fruit packaging.

## 2. Major Production Centers

**2.1.** The cultivation of irrigated mangos in Brazilian semi-arid conditions encompasses 69% of the planted area and 76% of the volume produced in Brazil. It is also responsible for more than 90% of national mango exports.

**2.2.** Fruit farming in the semi-arid region of the Northeast is not only notable for the expansion of the cultivated area and production volume, but primarily for the high yields attained and the quality of mango produced. In keeping with the consumption trends of the global market for fresh fruit supply, the region currently leans towards mango production in accordance with the food safety and sustainable production standards recommended by national and international legislation.

**2.3.** There are two major production areas in the Northeast: the Meso-region of South-Central Bahia where the Municipality of Livramento do Brumado is located, and the Submédio do Vale do São Francisco, where the municipalities of Petrolina in Pernambuco, and Juazeiro in Bahia, are located. The latter is regarded as the most prominent hub for the production of irrigated fruit in Brazil, where mangos are the most relevant crop in terms of cultivated area. A significant portion of the production here is intended for the foreign market and to the more discerning segments in terms of quality, flavor, and low fiber in the domestic market. Benefited by the potential of natural resources and by public and private investments in irrigation projects, this macro-region has gone through a massive mango planting and production expansion since 1995.

**2.4.** Another mango producing region is in the countryside of São Paulo, covering the West (Presidente Prudente), Northwest (São José do Rio Preto), and Northeast (Ribeirão Preto) regions.

**2.5.** The northern Minas Gerais region has the potential to become a major producing region within the irrigated perimeters of the Jaíba Project because the semi-arid climate is good for keeping away pests and diseases and advantageous for the development of plants and floral induction for year-round production when irrigated regularly. The logistics for exports in this region are, however, not as conducive as they are in Petrolina and Juazeiro because transport to the nearest port would be increased by approximately 500 km.

## 3. Logística

**3.1. Roadway transport is the predominant method for the distribution and sales of mangoes for the domestic market.** Trucks are used to transport the fruit from the farm to the packing houses, and from there to the distribution centers in major consumption centers.

**3.2.** Cold chain methods are not generally used, even for long-distance transportation, reducing the availability of fruit under the "ready-to-eat" category.

**3.3.** An estimated 10% of mango exports are transported by air to markets that are more discriminating over quality and that require "ready to eat" products, as well as to faraway destinations such as the Middle East and Asian markets such as Japan and South Korea. **The remaining 90% of the exported volume is transported by sea** in reefer containers that lack controlled or modified atmospheres. The predominant transport mode between production farms and egress points (ports and airports) is via roadways. Containers (capacity 20 pallets) must be loaded quickly and in a location that is specially built for this purpose. The optimal temperature is between 10°C and 13°C.

**3.4.** Packaging is usually in plastic boxes for the domestic market, which can vary from 14 to 20 kg. For the international market, cardboard boxes are used which can vary from 4.5 to 6.0 kg each.

## 4. Commerce

**4.1. The main source of production flow for the Brazilian mango is the domestic market.** Even with the significant increase currently observed, our exports of mangos have not yet reached 10% of the total volume produced in the country.

**4.2. Mangos are sold in the domestic market almost exclusively in their natural "fresh" state, although it can also be found in whole juice and frozen pulp.** The pulp can be used to manufacture sweets, jellies, juices and nectars, and can also be added to ice creams, juice mixtures, liquors, and other products. The primary objective of mango producers in the domestic market is to ensure that there is a regular supply. This is why technologies have been used that facilitate a production calendar that is better distributed throughout the year.

**4.3. The two leading technologies used by producers to make the calendar more flexible are floral induction and the diversification of planted varieties between the early, mid, and late season.** Floral induction is used for fruit sales in the domestic market's off-season when fruit prices are higher. In the domestic market, mangos hit their highest prices in the first half because of the lack of a harvest in most production hubs in the country. For producers in Juazeiro, BA, the largest fruit commercialization center in the Northeast, mango prices reach their highest price in May and are at their lowest in November.

**4.4.** Mangoes are popular fruits in the domestic market that can be found in major supermarket chains, stores specializing in fresh products, street fairs, and other sales outlets.



**4.5.** One of the most prominent Brazilian mango production hubs for the international market is the Submédio do Vale do São Francisco. Foreign trade statistics from the Ministry of Economy (CACEX) reveal that, for over a decade, the **Submédio do Vale do São Francisco has accounted for more than 85% of Brazilian mango exports.**

**4.6.** Exports are primarily sent to the European Union, followed by North America. **In Europe, the largest importer is the Netherlands with 43.2%.** However, much of the mango is re-exported to countries in the European Union and others, such as Russia and countries in the Middle East.

**4.7.** Exports to the United States, South Africa, and Asian countries (Japan and South Korea) need to have hydro-thermal treatment as part of the prevention process for the spread of fruit flies that, because they are not found in these territories, are considered quarantine pests.

## 5. Sustainability

**5.1.** The entire mango production chain adheres to Brazilian laws related to issues of sustainability and food safety that apply to Brazil.

**5.2.** All export-oriented properties and packing houses are certified by international companies in matters related to environmental and social issues, and follow strict standards regarding chemical waste and other elements of food safety.

## 6. Vision of future

**6.1.** This activity has yielded returns for investors over the last few years, and this trend needs to be maintained in light of the current global landscape concerning public health issues due to the Covid-19 pandemic. Exchange rate issues are also quite pertinent to future developments related to exports. The current exchange rate is quite attractive!

**6.2.** Accordingly, **mango crops are expected to grow over the next few years** as Brazil also makes progress on opening new markets and investments to promote this fruit in existing markets. The semi-arid region of the Brazilian Northeast and the Rio São Francisco valley, from the North of Minas at its mouth is preferred by investors because there are not as many climate-related risks and, due to the dry climate with availability for irrigation, they also help with quality and flavor.

**6.3.** **Investments are still somewhat modest for the agro-industrialization of this fruit,** despite favorable outlooks for whole mango juice and other preparations and manifestations of the fruit, such as freezing. Bear in mind that the mango is not the most convenient fruit to consume because it requires peeling. As such, any initiatives and innovations geared towards making its consumption more practical have the advantage of making it easier for it to be accepted by consumers.

**6.4.** Brazil has a flair for producing quality mangoes compared to other major producing countries like India, Pakistan, Bangladesh, countries in Southeast Asia and Central America. If Peruvian mangos feature a very beautiful color, the flavor of Brazilian mangos tops the opinions of consumers and importers.





## 7. SWOT Analysis

### S Strengths

- Wide range of varieties and year-round production schedule.
- Production technology for irrigated mangos.
- Nationwide adoption of mangos.
- Brazil's ability to increase the production volume substantially and sustainably.

### W Weaknesses

- Production chain lacks effective governance and organization, primarily for volumes targeted for the domestic market.
- Low productivity in orchards outside the irrigated areas.

### O Opportunities

- Increase in exports to existing markets through effective promotional programs.
- Increased exports to new markets such as the Middle East and Asia.
- Innovations in the area of agro-industrialization with more convenient formulations for consumption.
- Inputs and technology for organic production.
- Technologies and equipment designed for precision agriculture and packing houses.
- E-commerce for fresh-cut, frozen, or ready-to\_eat mangos.

### T Threats

- Climate change affecting the availability of water for irrigation.
- New entrants in the international market, like African and Asian countries.
- Amazon deforestation creating legal barriers for Brazilian products abroad.
- Global recession decreasing consumption in the foreign and domestic markets.

**7.1. There is a huge opportunity for potential investors in the mango production chain of accessing new international markets in both existing and new destinations.** The Brazilian fruit is imbued with indisputable quality and flavor and can become much more routine in people's daily diet, much in the same way as it is in some European Union countries such as England, Belgium, Germany, France, and others. This growth in the international market will provide security for current and future producers and maintain the profitability of this production chain.

**7.2.** New and more modern equipment will be needed for packing houses, new inputs that have a lower impact on the environment, new logistical opportunities with new shipping lines and precision agriculture will become increasingly important for the competitiveness of this sector.

**7.3. There are numerous opportunities for innovation in the visualization of the product, mainly in industrialized or semi-processed aspects. This is expected to boost its practicality for consumption in the non-domestic realm by not requiring any pre-preparation of the fruit,** like peeling, slicing, refrigerating, etc. Frozen fruits are common in markets such as the USA and even in Europe, while whole juices, with no added sugars and preservatives, have taken over the soft drink and beverage market where healthy living has become more popular. Great opportunities to market these innovations via e-commerce.

**7.4.** There is high demand and opportunities for fresh mango and organic fruit products. There is a lack of technology and products for production under this process, opening up many opportunities for the links in the "before the farm" production chain.

**7.5.** In addition, companies and consultants that are specialized in marketing and sales will be needed over the next 5 years, as there is a clear trend towards a higher concentration of commerce in major retail chains due to the difficulties created by the pandemic for small businesses. These challenges will force the productive sector to organize and professionalize at levels that are above the current ones to reach fair trade standards.



# MELON



This page presents the main indicators related to the cultivation and commercialization of melon in Brazil and in the world.

## KPIs 2019

No. of Establishments  
**25,1 mil**

Direct Jobs  
**46,7 mil**

GPV US\$  
**146,7 mi**

Qty. Produced (tons)  
**587,7 mil**

Harvest Area (ha)  
**22,1 mil**

Prod. Avg (tons/ha)  
**26,6**

Exports in US\$  
**160,3 mi**

Exports (tons) % Prod.  
**251,6 mil** 42,8%

## World (FAO - 2018)

Production - millions of tons (5+)



1° China	-46,7%	12,79
2° Turkey	-6,4%	1,75
3° Iran	-6,3%	1,73
4° India	-4,5%	1,23
12° Brazil	-2,1%	0,58

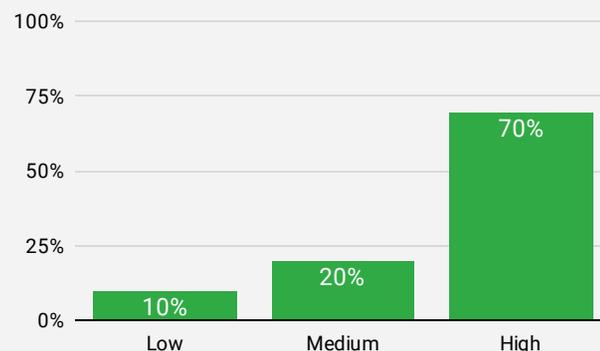
Export Bilions US\$

1° Spain	-21,1%	0,36
2° Guatemala	-12,3%	0,22
3° Netherlands	-11,3%	0,19
5° Brazil	-8%	0,14
4° USA	-8%	0,14

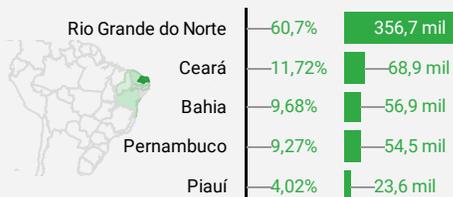
Import Bilions US\$

1° USA	-20,5%	0,4
2° Netherlands	-10,6%	0,21
3° France	-10%	0,2
4° UK	-8,9%	0,17
- Brazil	-0%	0

## Technological Profile of the Producer - BR



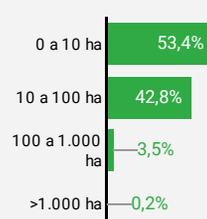
## Top producing FUs (tons)



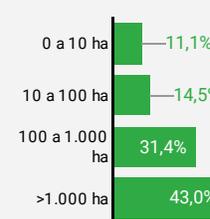
## Major Production Centers

- 1- Mossoró (RN)
- 2- Litoral de Aracati (CE)
- 3- Chapada do Apodi (RN)
- 4- Sertão do Moxotó (PE)
- 5- Juazeiro (BA)
- 6- Ribeira do Pombal (BA)

## Facilities (un.)



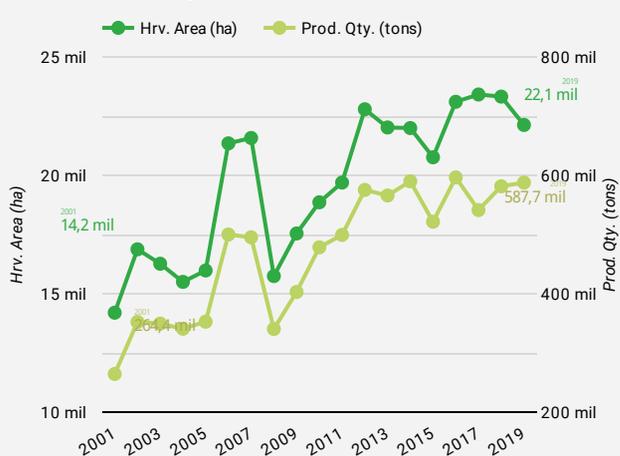
## Harvest Area (ha)



## Production (th. tons)

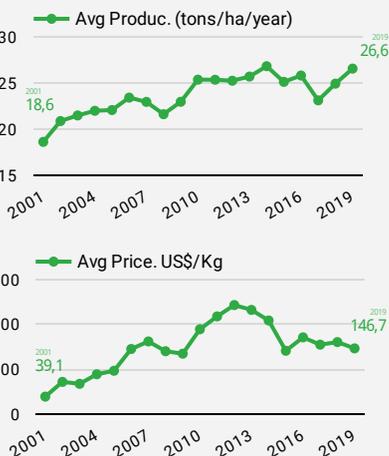


## Performance of production Brazil - 2001-2019



Change 2001-2019

Harvest. Area (ha): +55,6% Qty. Produced (tons): +122,3% Average Productivity (ton/ha): +43,0% GPV US\$: +107,2%



## Exports Brazil in 2019 - Millions US\$

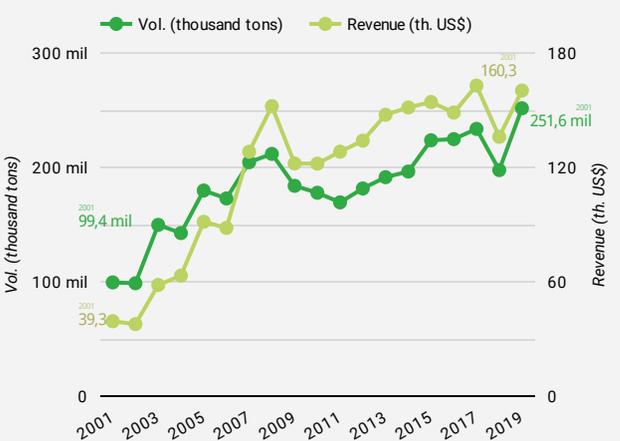
### Major Blocks

European Union	-96,1%	153,12
North America	-1,7%	2,63
Middle East	-1,6%	2,62
Lat. Am. Carib.	-0,5%	0,76
Asia	+0,0%	0,07

### Top Countries

Spain	-55,5%	10,84
Netherlands	-21,1%	4,11
Argentina	-9,1%	1,78
France	-5,8%	1,14
Canada	-2,6%	0,51

## Exports Brazil - 2001-2019



Change 2001-2019

Volume (thousand tons): +153,1% Revenue (thousand US\$): +307,9% Avg Price (US\$/kg): +60,0%



## Data Summary

Key indicators on the rise: continuous increase in productivity, harvested area, volume and exports.

### Other highlights:

- [2019] Brazil is the 12th largest worldwide producer and 5th in melon exports.
- [2019] 42.8% of the melons produced are exported as fresh fruit.
- [2001-19] 43.0% increase in average productivity, from 18.6 to 26.6 ton per ha.
- [2017] Most of the production (46.7%) is on properties over 1,000 ha.
- [2018] A majority (70%) of producers have a low technological level of production.
- [2001-19] Increase of 60.0% on average, from 0.40 to 0.64 US\$/kg.
- [2019] European Union is the main destination for exports of fresh melons with 96.1% of total revenue.



## 1. Current Outlook and Agricultural Production

**1.1.** The melon is a widely loved fruit with increasing popularity in Brazil and worldwide, and it is consumed on a large scale in countries in Europe, Asia, and the Americas. The melon is rich in vitamins A, B, B2, B5, and C, mineral salts such as potassium, sodium and phosphorus, has a relatively low energy value and can be consumed fresh or as juice. The ripe fruit has medicinal properties and is regarded as being calming, refreshing, a diuretic, and laxative.

**1.2.** Brazil grows an area of approximately 22,100 hectares of melon that produces around 587,700 tons of fruit. The average Productivity is 26.6ton/ha/year.

**1.3.** There are nearly 14,800 melon producing properties in Brazil and the sector generates 35,000 direct jobs. The activity is crucial for regional development in the fruit production hubs, especially because it encourages professional development as it requires a specialized workforce.

**1.4.** The most important period for production is from the end of the rainfall season in the Northeast of Brazil, which is the second half of the year. Rainfall is disastrous for the quality of the melon and producers seek to dilute the agricultural risk by planting in semi-arid regions and outside the rainy season.

**1.5. The combination of trade in the domestic and foreign markets has made melon farming profitable in the most relevant fruit production centers. Unlike other fruit species, melons are mainly grown in medium and large rural properties,** as the scale of production is essential for competitiveness in this segment. Another interesting aspect of melons is that it offers better flexibility when it comes to the planted area and control over the production volume because it has a relatively short production cycle of 60 days.

**1.6.** There are several melon varieties grown in Brazil, including canary melon, which is the most common, Cantaloupe, Piel de Sapo, Galia, Orange, and others. Boasting a wide range of varieties, textures and flavors, the fruits attract consumers thanks to their high concentration of sugars (Brix). Given that production usually occurs in drier regions, irrigation is essential and, when combined with the high intensity of sunshine, creates a plant physiology that plays a role in the distinctive flavor.

## 2. Major Production Centers

**2.1.** The melon grows best in regions with average temperatures between 25 and 32 degrees Celsius, which is why the Northeastern region of the country is preferred. This temperature variation holds for a good part of the year there, and the soil in this region has a light texture and features characteristics that make it suitable for the crop. When coupled with irrigation, the semi-arid tropical climate facilitates high productivity and quality fruits.

**2.2.** The Mossoró region in the northern part of Rio Grande do Norte and bordering Ceará produces 80% of the domestic melon in an area of approximately 14,000 hectares. The top melon producers in the country are located in this region and include technically advanced farmers who dominate the domestic and international markets. Some of these companies top global rankings as the largest melon producers in the world. This region is also preferred because it is the only Brazilian region that is free from the Cucurbitaceae fly (*Anastrepha grandis*), thereby sustaining itself thanks to the work conducted collectively by the COEX (Phytosanitary Executive Committee of the region of Assu, Mossoró, and Areia), UNIVALE (Vale do Jaguaribe Agribusiness Union), SAPE (Department of Agriculture, Livestock and Fisheries) and MAPA (Ministry of Agriculture, Livestock and Supply). This characteristic is rather important for accessing the international market

because the *Anastrepha* fly is classified as a quarantine pest for many places around the world.

**2.3.** While the ideal climatic conditions are found in the Northeast (very little rain and a lot of sun), melons can also be produced anywhere in the country. The Vale do São Francisco region, on the border between Bahia and Pernambuco, also plants an area of 2,000 hectares of fruit per year. The State of Piauí has also served as an alternative for planting, particularly after the water crisis that began in 2013. But production in these regions outside the CE and RN border is intended more for the domestic market than for exports.

## 3. Logistics

**3.1. Brazilian melon production destined to the domestic market uses roadway transport to distribution the fruit within the national territory.** Although the distances are continental, trucks are still the most common means of transport to serve the domestic market. Cabotage shipping is rarely used, and the railway network does not cover this sector. Trucks that transport one item and return with another are used. Most are refrigerated and carry industrialized products from the Southeast to the Northeast, the leading fruit-producing region.

**3.2. Melon is the top fruit in volume for Brazilian exports and is second in sales.** In 2019, 252,000 tons of fruit were exported, mostly via maritime shipping (reefers). Only promotional samples use air transport as a logistical alternative.

**3.3.** Destinations include the major supply centers and supermarket chains in the domestic market and importers and/or supermarket chains in the international business environment.

**3.4. One of the top logistical challenges for the sector is being able to reach Asian markets with the fruit quality intact.** China had recently opened in early 2019, using reefer containers without any controlled or modified atmosphere. It is estimated that there will be a 38-day transit time between Brazilian ports and ports in southern China, which is precariously close to the limit of the fruit's standards of quality.

**3.5.** Melon is sold in cardboard boxes in the international market with a weight that varies from 9.5-12 kg and in bulk and cardboard boxes in the domestic market, depending on the quality of fruit (premium fruits in boxes and cheaper fruits in bulk).

## 4. Commerce

**4.1. Out of all the leading fruits sold in Brazil, the melon sector is one of the most organized from an operational and commercial point of view.** The producers are organized and strive to have an integrated model to sell their fruits, especially in exports.

**4.2.** The marketing model for the domestic market is aligned to the pattern of sales to large distribution centers, such as CEASAs and/or direct sales to major supermarket chains.

**4.3.** The model is not very different in the international market because the distribution centers are replaced by major importers in the destination countries. There are also some direct negotiations with more traditional supermarket chains in the target markets.

**4.4.** There is a very high level of innovation in terms of products and services in the sector. Some examples include a diversity of varieties, successful product positioning, and outstanding quality in certain companies. This above-average success in innovations is also true for fruits sold in the domestic market.



## 5. Sustainability

**5.1.** The melon production chain is fully committed to the principles of sustainability established in Brazilian legislation and there are no relevant issues related to this in the business. All production includes traceability for both the domestic and international markets.

**5.2.** Because the melon is grown in the Brazilian Northeast within the Caatinga biome, the fruit does not face pressures concerning the illegal deforestation of Brazilian tropical forests. All exporting companies have international certifications in best agricultural and social issue practices.

## 6. Future Outlook

**6.1.** The planted area for the melon has remained stable in recent years, indicating that the sector has not exhibited any leaps in the development of new production areas. As organized as the sector is, producers are aware that increasing production without a guarantee of crop flow is not good business. **Nevertheless, opening the Chinese market for Brazilian melons could mean a change in the sector's strategy for the future.** The per capita consumption of melon and watermelon in China is the same as that of all fruits in Brazil, 57 kg per inhabitant/year. Even exporting only in the off-season of Chinese melon production - during the winter months in China (November - March) - this market could have a significant influence on the segment, increasing the volume of exports and creating a demand for stepped-up fruit production.

**6.2.** While challenges exist in melon logistics for China, there is no doubt that having yet another open and high-consumption market can stimulate investments in fruit production. It should be noted that markets consuming a large number of melons, such as Taiwan and neighboring countries in China, may feel encouraged to follow the same path as the Asian giant and ask Brazil to initiate negotiations.

**6.3.** There are also negotiations from the productive sector with the Brazilian Ministry of Agriculture to expand the free area of *Anastrepha grandis* in the Northeast, a situation that would create more planted areas targeted towards the foreign market. The availability of water for irrigation is an additional factor that needs to be examined. However, with the transposition of the São Francisco River completed, new possibilities are emerging on the horizon.

**6.5.** Sound production technology, associated with the calendar and the Brazilian melon's reputation for high quality, are key prerequisites in justifying efforts to increase opportunities with new production areas and the technical standards required for exports.

**6.6.** Despite the adverse effects on the economy caused by the Covid-19 pandemic, there is potential in the domestic market in the mid and long term to increase the consumption of melon based on the same beneficial qualities of the fruit that international consumers enjoy. This trend can be supported by the successful sales of products positioned as "premium" in the domestic market, with a final price to consumers that is nearly twice that of normal pricing and increased sales performance.





## 7. SWOT Analysis

### S Strengths

- Organization of production companies.
- Production technology.
- Diversity in the product line.
- Production schedule.
- Flavor of the fruit.

### W Weaknesses

- Distance of the production centers from consumer hubs in the domestic market.
- Limitation of major quarantine pest-free zones.

### O Opportunities

- International markets opening for melons and consolidation of the Chinese market for fruit, increasing exports.
- Demand for organic melon with opportunities for biological inputs and organic production.
- Technology and equipment for precision agriculture.
- New post-harvest technologies and logistics for long distances.

### T Threats

- New players in the international market.
- Climate change affecting productivity and increasing costs.

**7.1.** Brazil is and will remain one of the melon centers of the world. **The conditions for production are extremely positive in the producing regions and the fruit enjoys worldwide demand for consumption.**

**7.2.** **The recent opening of the Asian market to the Brazilian melon – represented by China with a per capita consumption of 57 kg/inhabitants per year – could signify a successful turn of events for this sector, with annual growth of over 10%.**

**7.3.** This upward trend for the industry has already been noticed by investment funds throughout the world, and several negotiations are underway for strategic partnerships, acquisitions and mergers between melon producing companies in Brazil and international investors. This new business initiative will be a boon to the production chain, as it will improve the business maturity of the sector, including gains in business management for both the domestic and international markets.

**7.4.** **There are opportunities to improve the logistical technology for transporting melons over long distances via the sea,** as well as in the inputs segment through the development of technology and products for producing organic fruit (there is a scarcity of organic melons grown in Brazil).

**7.5.** The sector's technification is a guaranteed demand for technology and equipment in the field of precision agriculture, be it either in the area of fertility or the phytosanitary control of pests and diseases, or even irrigation.

**7.6.** Opportunities still exist for growth in melon consumption in the countries of the Arab world, and the path to success in this market involves initiatives to aggressively promote the fruit in those regions. With an arid and hot climate, the melon is a tasty and refreshing fruit that could be part of the common diet of the inhabitants in that area of the globe. Opportunities are there for both fresh (in natura) consumption and also in juices and other forms that are combined with other fruits and/or foods.



# GRAPE



This page presents the main indicators related to the cultivation and commercialization of grapes in Brazil and in the world.

## KPIs 2019

No. of Establishments  
**9,0 mil**

Direct Jobs  
**261,3 mil**

GPV US\$  
**850,9 mi**

Qty. Produced (tons)  
**1,5 mi**

Harvest Area (ha)  
**74,6 mil**

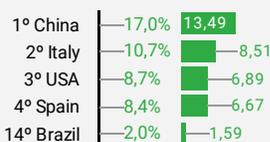
Prod. Avg (tons/ha)  
**19,9**

Exports in US\$  
**93,5 mi**

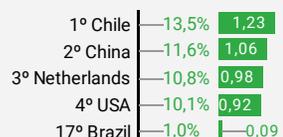
Exports (tons)  
**45,1 mil** % Prod.  
0,02%

## World (FAO - 2018)

Production - millions of tons (5+)



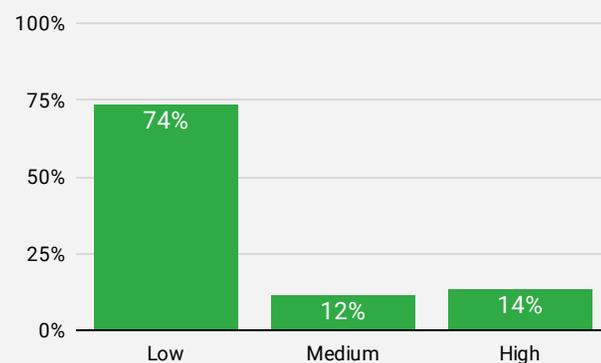
Export Bilions US\$



Import Bilions US\$



## Technological Profile of the Producer - BR



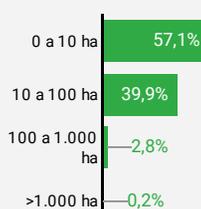
## Top producing FUs (tons)



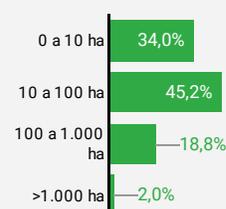
## Major Production Centers

- 1- Caxias do Sul (RS)
- 2- Petrolina (PE)
- 3- Juazeiro (BA)
- 4- Piedade (SP)
- 5- Guaporé (RS)
- 6- Joaçaba (SC)

## Facilities (un.)



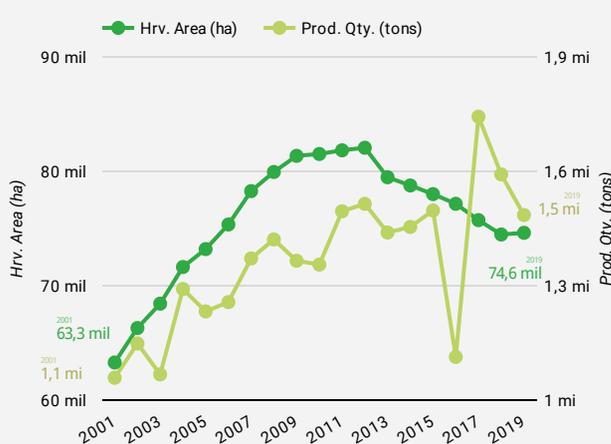
## Harvest Area (ha)



## Production (th. tons)

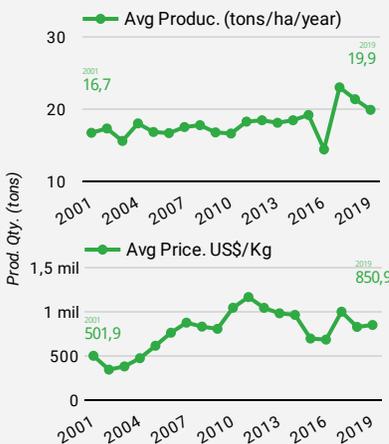


## Performance of production Brazil - 2001-2019



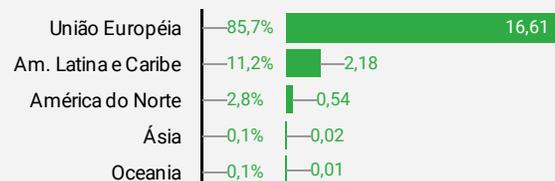
Change 2001-2019

Harvest. Area (ha): +17,9% Qty. Produced (tons): +36,4% Average Productivity (ton/ha): +19,2% GPV US\$: +69,5%

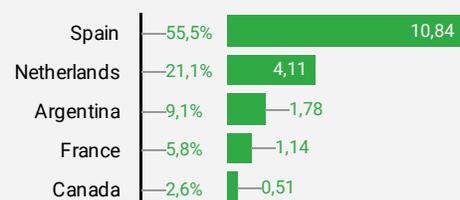


## Exports Brazil in 2019 - Millions US\$

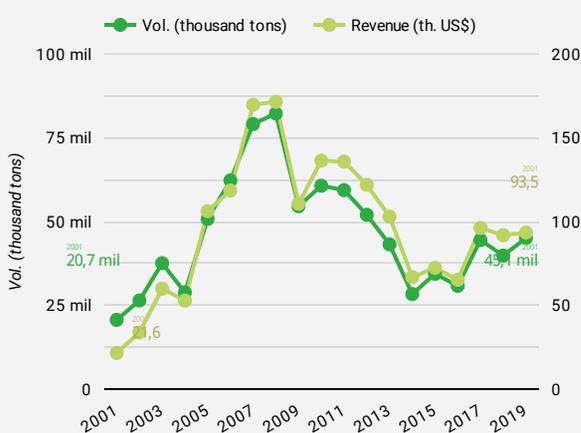
Major Blocks



Top Countries



## Exports Brazil - 2001-2019



Change 2001-2019

Volume (thousand tons): +117,9% Revenue (thousand US\$): +332,9% Avg Price (US\$/kg): +99,0%

## Data Summary

Fluctuation in exports, with a small surplus from 2001-2019.

Other highlights:

- [2019] Brazil is the 14th largest worldwide producer and 17th in grape exports.
- [2019] 0.02% of the grapes produced are exported as fresh fruit.
- [2001-19] 19.2% increase in average productivity, from 16.7 to 19.9 ton per ha.
- [2017] Most of the production (41.5%) on properties between 10 to 100 ha
- [2018] A majority (74%) of producers have a low technological level of production.
- [2001-19] Increase of 99.0% on average, from 1.04 to 2.07 US\$/kg.
- [2019] European Union is the main destination for exports of fresh grapes, with 78.9% of total revenue.



## 1. Current Outlook and Agricultural Production

**1.1. Grape production in Brazil can be divided into production for the wine and juice agro-industry and production for table grapes and fresh consumption.** Nearly half of the volume of grapes produced in the country is meant for fresh consumption, while the other half is farmed for agro-industrial processing.

**1.2.** Over the last decade, research agencies focused on genetic improvements have developed a range of new varieties of table grapes and new production technologies that have profoundly modified the profile of this agribusiness activity in Brazil.

**1.3.** Viticulture has become increasingly relevant from an economic point of view, considering that the production of table grapes is a highly profitable activity and has become a major contributor to national fruit production, including exports.

**1.4. The productive chain for table grapes in Brazil is varied depending on the climatic conditions of the production regions and the range of varieties, which includes hybrid American seed or seedless grapes and older and traditional cultivars containing seeds.** Brazilian consumers prefer the Niagara "Rosada" grape, grown in the mid-southern region of the country. The grape remained stable between 2007 and 2016, the year that seedless grapes arrived to a great reception despite the higher final price. In addition to the Niagara, there are other traditional varieties of grapes produced in Brazil, like the Italy group grape, grown in the mid-southern region of the country in a semi-arid tropical climate. The most popular varieties in the domestic market, from the group of fine seedless grapes, include Thompson, Crimson, and Victoria.

**1.5.** Starting in 2016, the domestic consumer's desire for seeded grapes has been decreasing, and seedless varieties, whose production had entirely been destined for export, began to occupy an increasingly important position in the Brazilian market. This trend has grown as the number of varieties increases, the production technology progresses, and yields greater productivity and the cost adapts to the characteristics of the purchasing power of the Brazilian population.

**1.6.** As such, over the last decade, several genotypes developed by international companies have been introduced in the region and tested, along with the BRS cultivars developed by Embrapa. The lower cost of royalties paid for the use of national varieties, associated with greater bud fertility, simplified cluster management, the potential for two crops per year and tolerance to mildew and rain have spurred on the expansion of farming the BRS Núbia (with seeds), BRS Isis, and BRS Victoria (both seedless), which already has an estimated 1,500 ha planted area in the semi-arid region.

## 2. Major Production Centers

**2.1.** Southern Brazil is the primary production region (with agro-industrial varieties) and continues to lead in planted areas, followed by the Northeast, Southeast, Midwest, and Northern regions.

**2.2. The production of table grapes in Brazil takes place from the 30° S to 5° S. parallel, from Rio Grande do Sul to Ceará, covering a wide diversity of climates.** However, table grapes are predominantly produced in the states of Bahia, Pernambuco, São Paulo, and Minas Gerais.

**2.3.** Production in the Submédio São Francisco Valley region, an area with a semi-arid tropical climate, comprising the States of Pernambuco and Bahia (Petrolina/ Juazeiro region) is responsible for the production of table varieties for export and the domestic market, where there is a prevalence of large agricultural companies and high-quality seedless varieties.

**2.4.** In the southern states of Brazil (Rio Grande do Sul, Santa Catarina, and Paraná), while there are some islands of table grape production, farming is predominantly intended for the agroindustry of wine and whole grape juice and grape products.

## 3. Logistics

**3.1. Logistics in the chain of table grape production, like other fruits produced in Brazil, are basically handled via roadway (ground transport) for the domestic market and via the road-maritime combination for international destinations.** Occasionally, air transport is also used for exports, mainly for premium products and for destinations that are more discerning when it comes to quality.

**3.2.** Coastal shipping (cabotage) is not used, even though there are great distances separating the producing regions of the Northeast in relation to consumption centers in the Southeast. One alternative for maintaining the quality of perishable fruits such as these is having refrigerated trucks that transport meat from the Southeast to the Northeast pick up the fruits on their return route.

**3.3.** Packaging for the domestic market is done in plastic and wooden boxes of around 5 kg and 0.5 kg plastic containers for the finest and highest value varieties. For exports, 10 0.5 kg plastic bowls in boxes, totaling 5 kg, dominate.

## 4. Commerce

**4.1.** Distribution and sales in the domestic market, and responsible for the consumption of 90% of all table grapes produced, is done through large supply centers such as CEASAs, as well as through the supermarket chain, the latter option has risen substantially over the last few years and is the trend for the sector.

**4.2. There has been a noticeable shift in consumption habits in terms of the final consumer, which has increasingly boosted the preference for fine seedless grape varieties every year.** Data from CEAGESP, the principal product distribution center located in São Paulo, suggests that the share of seedless grape varieties has grown from 7% to 30% of the total table grapes sold since the last decade.

**4.3.** For exports, the most accentuated growth has been seen since 2000 and in the development of the production region in Northeast Brazil, where 95% of all table grapes exported today by Brazil originate. This is due to the excellent climatic conditions in that region that contributes to the quality of the product. The semi-arid climate coupled with irrigation allows for two harvests throughout the year, increasing the production schedule and improving control over production risks like rainfall and pest attack. The flavor and appearance of the fruit are much better thanks to this combination of climate and irrigation.

**4.4. Despite year-round production, the most profitable export period for producers is the second half of the year,** particularly during September, October, and November – the off-season for many other competing countries – and the period for best prices in the international market. Over the years, this commercial window has been decreasing due to the efforts of competitors to develop varieties and technologies to extend production in the off-season.

**4.5.** The variation seen in the exported volume is mostly due to instability in the volumes produced and the consequent availability of the product for exports. The sector works intensively on R&D in an effort to develop more stable varieties of fine grapes with respect to production, offering an increased guarantee of availability for growing volumes to supply the markets.



## 5. Future Outlook

**5.1.** The future outlook for the sector is positive, as many countries in the world are beginning to appreciate and value the Brazilian product and its exceptional quality, while understanding Brazil can be a reliable supplier for the periods between harvests in those countries. Simultaneously, faster development and adoption of new technologies to support the sector is seen in the production of table grapes.

**5.2. There is a whole market to be further explored in the Middle East, Asia, the US, including many European countries.** The São Francisco Valley region has the potential to produce and supply to this growth in the international market due to the abundance of water, constantly evolving production technology and the introduction of new high-quality varieties by Embrapa or by several private international genetic improvement companies operating in the region.

**5.3.** Asia, China, and South Korea are at an advanced stage of opening their market its significance from a consumption point of view. Many other countries in the region have also shown interest in the Brazilian table grape and, from a logistical point of view, the grape supports long-distance maritime transport better than other fruit species. This demand for the Brazilian product is promising and producers will be able to supply these new markets.

**5.4.** The outlook for the future in the domestic market needs to account for predictions progress of the Brazilian economy and in the improvement of the population's socio-economic levels to increase the consumption of more sophisticated fruits, such as table grapes. The product has a high value in the market, and higher consumption is directly linked to the general public with a better income. Nevertheless, there can be seen a predilection for quality over volume by even the less economically fortunate. In other words, a better quality product ends up being preferred over another one of lesser quality, with the consumer buying slightly less to make up for the price. This type of behavior has discouraged any growth in planting older varieties and those at lower prices. The future of table grapes undoubtedly lies in fine seedless varieties.





## 6. SWOT Analysis

### S Strengths

- Organization of producers in the Valley production center.
- Genetics and production technology.
- Diversity in the product line; production schedule.
- Quality and taste of the fruit.

### W Weaknesses

- Distance of the production centers from consumer hubs in the domestic market.
- Concentration of sales in the international market only during the windows of the season.

### O Opportunities

- Opening new international markets like China and South Korea during their off-season for harvesting grapes.
- Greater penetration in the Arab markets, Russia, and other alternatives.
- Brexit and growth in the UK.
- Consolidation in the domestic market for fine table grapes; production technology, raw materials, and production of organic fruit.
- Technology and equipment for precision agriculture.
- New and innovative formulas for grape products such as whole juice, etc.

### T Threats

- Reduction of international windows in the period due to actions by competitors.
- Climate change, affecting the quality and quantity of grapes produced.
- International campaigns like "buy locally" because of the global economic crisis.

**6.1.** The table grape sector offers a series of opportunities for business growth in both the international and domestic markets. **This industry is well structured, with organized production in the most prominent exporting region - Petrolina/ Juazeiro in the São Francisco valley - with a wide variety of fine seedless grapes that are highly competitive in the market and with outstanding production technology.** Many countries throughout the world would appreciate having Brazilian grapes as an option, especially in the off-season, due to the product's excellent reputation for quality and flavor.

**6.2.** **The likely scenario of the post-Brexit British market implies great opportunities for Brazil's grapes, thanks to the difficulties in reaching a free trade agreement with the USA and the consequent customs and tariff implications.** There are already processes underway in Asia to establish phytosanitary requirements for importing Brazilian grapes into countries such as China and South Korea. They are significant markets for consumption and can play a major role in increasing exports. In Russia, although there is an even more demanding market for grapes with lower aggregate value (such as the Red Globe and Italy varieties), the demand for fine seedless grapes has increased, and Brazil could become a major supplier due to the EU trade embargo imposed to that country. The Arab market is just now finding out about fine table grapes from Brazil, and there has been excellent commercial acceptance. The properties of the fruit are well suited for long-distance sea transport and this product will not be a problem for establishing these new territories as habitual consumers of Brazilian table grapes. Lower value table grapes are still widely consumed in the domestic market. They are generally bought during the harvest period at the end of the second half of the year, but the demand for finer seedless grapes has risen, leading the product to be seen more often on supermarket shelves in the major commercial venues in the country, prompting consumers to make the product more common in their diet. The overall scenario is undoubtedly positive for this fruit, with expected volume growth and profitability for producers. **The critical point in making this environment favorable to business is the sector's investment in promoting products primarily in the international market.**

**6.3.** The production of organic fruit would prove to be another great opportunity – not just for producers, but also for companies specialized in technologies and inputs for this type of production. Supply currently does not satisfy the demand for organic grapes worldwide, and sales would be guaranteed at profitable prices. For both conventional and organic production systems, improving the management of production variables, increasing productivity, and reducing costs and risks would represent a huge opportunity for products and services in precision agriculture.

**6.4.** Agro-industrialized products that are derived from grapes, including sugar and preservative-free whole juice, are fully aligned with the new dietary preferences in Brazil and the rest of the world. This sector can be better explored with the introduction of innovative formulations for direct consumption or ingredient for other foods (ice cream, pies, etc.).



# PEAR



## 1. Brazilian Production

**1.1. The production of pears in Brasil is not so relevant** when compared to the other species of tropical fruits. The planted area has decreased along the past years mainly due to the low profitability of that business caused mainly by poor yields in the field, old varieties and unstable climate conditions for that crop. Orchards of pear trees have been replaced by apple trees throughout the main production areas in the Southern region of the country.

**1.2. However, pear is listed as one of the highest volume of imported fresh fruit in Brazil.** The product has high demand by customers and the most important suppliers are countries from the Northern Hemisphere like Portugal, Spain and United States and also from the Southern Hemisphere like Argentina and Chile.

**1.3.** Pear is one of the most favorite imported fruit in Brazil due to its flavour, very easy and convenient to eat and recommended to a wide age range of consumers.

**1.4.** During the entire year of 2020, Brazil exported around 90 metric tones of pears and imported around 138.4 thousand metric tones. The balance between exported versus imported was around 105 million US dollar. It means that importing pears to Brazil would be a very promising business.

## 2. Trade and consumption of pears in Brazil

**2.1.** The pear is positioned among the temperate climate fruits of greatest interest in the world, and it is also the **most imported fruit in Brazil.**

**2.2. The consumption of the domestic market is about 210 thousand tons / year, of which, approximately 90% are imported from Argentina, Chile and Portugal (FAO, 2017).** This import occurs due to the low Brazilian production, which is around 22,108 tons in an area of approximately 1,3 05 hectares, positioning the country at the 46th place in the world ranking of pear producers.

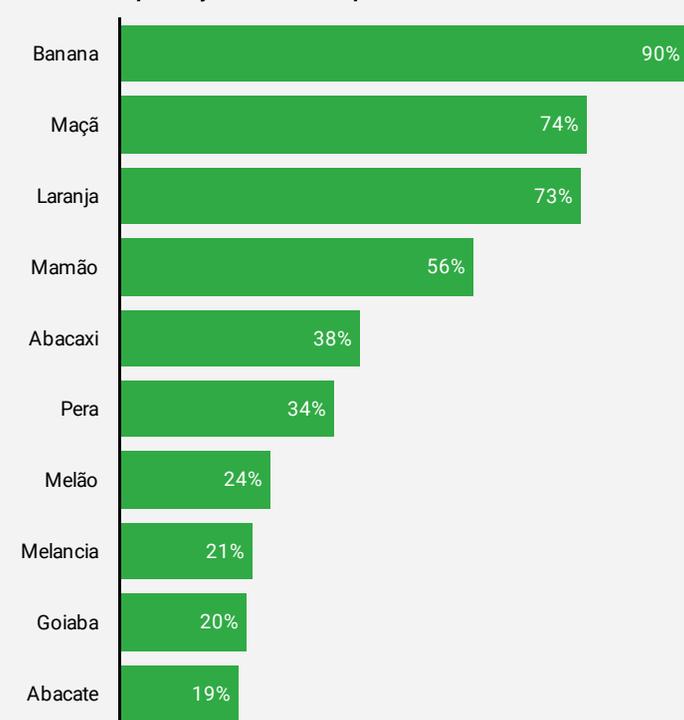
**2.3.** Pear is a fruit that is highly appreciated by Brazilian consumers . In a survey carried out by the Confederation of Agriculture and Livestock of Brazil - CNA, **the pear appeared in 6th place among the main fruits that are part of the diet of Brazilians.**

**2.4.** According to several studies developed by the Brazilian Agricultural Research Corporation - EMBRAPA, the Brazilian consumer accepts well the three types of pears found on the market, respectively named as European pears, Asian pears and hybrid pears.

**2.5.** Taking into account the use and acceptance of pear by Brazilian consumers, **it would be possible to increase the consumption of that fruit in Brazil to around 300,000 tons/year.** One important strategy to have it done, would be supplying fruit to the market all year round considering that the market, nowadays, has shown a shortage of supply from August to December.

**2.6.** A relevant factor that has affected the pears import operations in Brazil regarding mainly to new suppliers is the **compliance with the existing phytosanitary legislation in relation to the Cydia pomonella pest.** As Brazil is free of that pest, potential new suppliers must be attending all the requirements to avoid the risk of introducing the insect in the country.

Fruit Consumption by the Brazilian Population



Data source: CNA, 2014

Import Pear 2010-2020



Data source: AGROSTAT/MAPA



# LOSSES AND WASTE

## Losses and wastes of Fruits and Vegetables in Brazil

### 1. Visão Geral

**1.1. The root of waste in the fruit and vegetable (FLV) supply chain is its perishable nature that causes items not considered fresh to be discarded and discarded.** But the losses are tangled up at every stage: production, post-harvest, storage, transport, processing and distribution. Thus, in addition to ensuring that fruits and vegetables retain the same characteristics from the field to the home, the FLV supply chain is challenged to minimize and combat losses and waste that are responsible for economic, social and environmental impacts.

**1.2.** How to reduce losses on fresh products? The first step is to identify and map the causes of losses and waste. Then, look for ways to stop them, based on good practices already established. And finally, look for new solutions, if necessary. Initially, supermarkets were more concerned with addressing the issue of losses from FLVs. However, over the years and due to international agreements signed by Brazil, losses and waste have taken on a transversal and global dimension, involving other agents in the chain directly or indirectly linked to these issues, according to the ABRAS – Brazilian Supermarkets Association and its Traceability and Food Monitoring Program (RAMA).

**1.3. First of all, it is necessary to differentiate the two concepts (losses and waste) and identify in which stages of the chain they occur.** “Loss is everything that is produced and lost along the chain and is more concentrated in production, post-harvest, storage, transport, processing and distribution. Waste, on the other hand, is everything that has nutritional value, but is lost or discarded, usually because of unknown, and involves more retail, services (restaurants, cafeterias, etc.) and consumers. In this way, there is the warning that combating losses and waste goes beyond preventing financial losses, it also prevents social, environmental and nutritional losses. Ultimately, it is a way to ensure that people with food difficulties do not stop eating because of operational failures in the supply chain or even because they ignore what can or cannot serve as food. At this point, it is about food safety and food safety.

**1.4.** And what would the difference be? Safe food is one that is free from biological, physical and chemical contaminants and, therefore, is suitable for consumption. The term food security, on the other hand, refers to the adoption of public policies to expand, why not universalize, the population's access to food, in adequate quantity and quality. According to data from Embrapa- Brazilian R&D Agency for agriculture and livestock, for every ten kilos of food that goes to waste, another ten are needed to meet market demand, which means that waste doubles the use of resources needed for agricultural production, including Water. Furthermore, they have a direct environmental impact: the production of methane gas, for example, which, although less famous, is much more potent than carbon dioxide in terms of its contribution to the greenhouse effect. Data from the Food and Agriculture Organization of the United Nations (FAO) reveal that the world discards approximately one third of the food produced globally, that is, 1.3 billion tons per year.

**1.5. In the case of Latin American countries, it is estimated that 28% of the food that reaches the end of the chain is wasted.** In higher-income countries, the big villain of waste is the consumer. In those with lower incomes, losses at the beginning of the food chain are more common due to the low technological support in crop management, lack of structure for production storage and inadequate infrastructure for crop flow/ transport.

**1.6.** According to Embrapa, Brazil, losses tend to be higher since the management of the crop, passing through post-harvest, reaching the retail and consumer. In the first stage, the problems stem from inappropriate harvesting, attack by pests, diseases and natural disasters. Postharvest losses, on the other hand, can be classified as physiological (ripening), mechanical

injury (storage in inadequate boxes) or phyto-pathological (attack by microorganisms). They result, among other factors, from lack of knowledge of handling techniques, inadequate storage, lack of refrigeration, failures in display on shelves, excessive handling of products by consumers and use of inadequate packaging. Handling after harvesting, when done improperly, is considered one of the most sensitive points for causing physical damage and physiological and pathological deterioration. Furthermore, exposure to the sun and the use of dirty boxes contribute to a faster deterioration, as well as damage to the product's surface that opens up a path of contamination by microorganisms.

**1.7.** In general, these conditions accelerate the degradation of important components of the sensory quality and accelerate the metabolism the fresh produce that spoils faster. Therefore, many FLVs arrive at newsstands injured, shriveled and even contaminated, increasing the chances of waste. However, it is important to note that aesthetically ugly FLVs are not necessarily unfit for consumption.

**1.8.** According to the studies presented in the doctoral thesis defended at the University of São Carlos by university professor Camila Colombo de Moraes, **the rate of losses in fruit and vegetables reaches 12% to 15% in Brazilian supermarkets, more than double indicated by existing surveys.** An average value of 30% is considered to be a total loss in the fruit and vegetable supply chain, which is close to the average considered for Latin American countries.

### 2. Information Sharing

**2.1.** One of the most critical points identified by specialists is the sharing of information with suppliers, especially regarding sell out. As a result, it is very difficult to forecast demand and, thus, have better production planning. **Suppliers, in general, end up relying only on what they sold of each product to the supermarket, without knowing what, in fact, is being purchased by the final customer**

**2.2.** Within supermarkets, one of the situations identified is data divergence. In the same network, it is common for an area to attribute a certain cause to another or even to point out other formats operated by the company, such as those that pull some bad indicators up. In one of the network are studied, for example, obtained If a given that 60% of grocers who were not good for sale were going to donation and 40% for composting. Already in another department of the same company, the information was that the composting project was not yet working.

**2.3. The lack of a single loss calculation methodology makes comparisons between companies difficult.** There are networks that claim to have zero loss because they adopt as a criterion not to account for what is returned to the supplier, although there was a situation within the store that made the sale of that product unfeasible. In addition, there are companies that measure in volume and others, in percentage.

### 3. Consumer education

**3.1.** It is up to the retailer to promote the education of its customers regarding behaviors such as

- Do not squeeze the vegetables at the time of purchase. It is necessary to explain to them that this causes losses, as it hurts the products. This problem was even alleviated with the pandemic. Due to the fear of becoming contaminated, many people stopped touching food.
- There are products that are ugly but can be consumed.
- Clarify that piles of products accelerate losses in general.

## Losses and wastes of Fruits and Vegetables in Brazil

### 4. Collaboration with Suppliers

**4.1. The retail often requires the supplier standards very hard delivery. Vegetables outside the specifications established in the technical sheet are often rejected, even if they are suitable for consumption.**

Retailers only make an exception when they need the product. Even so, they reduce the purchase price that had been established, harming the producer, who sometimes accepts the conditions so as not to have total loss. Important points that situations like this do not happen more expensive products, such as meat

**4.2. It should be emphasized from the rejection of a large number of products ends up increasing the price at final consumers because it reduces the supply.** To avoid this, the return could be better coordinated within the chain, according to experts

**4.3.** Still on the issue of the relationship, the experts point out the need for retail help this producer, who has less economic conditions than others in their training. The technical training offered to supermarket employees could be extended to these suppliers.

**4.4.** Technology is another support that supermarkets could give to producers, facilitating access to equipment such as refrigerators for storing fruits and vegetables.

### 5. Customer Culture and Legislation

**5.1. Consumer habits and existing laws make it difficult to sustainably combat supermarket losses.** In the first case, it is observed that a large part presses the fruit in the selection process. In addition, Brazilians prefer more aesthetically beautiful products. It is different from what happens in other countries, where the consumer accepts ugly fruits or vegetables as long as they are good for consumption and ends up pulling retail initiatives, such as the creation of specialized stores in this type of food.

**5.2.** The tactic of piling up in the shelves, which aims to give the consumer a feeling of abundance, also ends up accelerating losses in the FLV section. It is common for customers to have a feeling that empty stalls represent a lack of retail interest in service.

**5.3.** Legislation is another barrier to reducing retail losses. The expiration date, for example, is quite strict in Brazil. In the US, there are stores that only sell expired products. Here, if one day passes the date, you run the risk of being arrested. But there is no effective mobilization of the sector to press for change. In Europe and other countries, this happens because, at this point too, it is the consumer who drives changes in order to avoid waste.

### 6. Waste at home

**6.1.** Experts said that often the problem is "pushed to the consumer's home." Waste in the home can be great, especially of more perishable products. And this is usually caused by the purchase above the consumer's need. Another relevant information is that approximately 90% of the food that is not sold goes to landfill.

Source: <https://rama.abras.com.br/especial-flv-cortar-o-mal-pela-raiz/>



# Final CONSIDERATIONS

## Data Summary

### Avocado

There has been a sharp upward trend in production and exports since 2014.

Other highlights:

- [2019] Brazil is the 6th largest producer and the 19th in avocado exports.
- [2019] 4.2% of the avocados produced are exported as fresh fruit.
- [2001-19] 22.3% increase in average productivity, from 13.0 to 15.9 ton per ha.
- [2017] Most of the production (47.1%) on properties between 100 to 1,000 ha
- [2018] A majority (40%) of producers with low technological level of production.
- [2001-19] Increase of 235.1% on average, from 0.57 to 1.91 US\$/kg.
- [2019] Latin America and the Caribbean are the main destination for banana exports with 62.4% of total revenue.

### Banana

A decrease in harvested area coupled with increased productivity. Fresh fruit exports have fallen between 2009-2019. Low level of technification in production.

Other highlights:

- [2019] Brazil is the 4th largest producer and 41st in Banana exports.
- [2019] 1.2% of the bananas produced are exported as fresh fruit.
- [2001-19] 22.3% increase in average productivity, from 12.1 to 14.8 ton per ha.
- [2017] Most of the production (51.1%) is in properties boasting between 10 to 100 ha.
- [2018] A majority (59%) of producers with low technological level of production.
- [2001-19] Increase of 106.6% on average, from 0.15 to 0.31 US\$/kg.
- [2019] Latin America and the Caribbean are the main destination for banana exports with 62.4% of total revenue.

### Orange

A decrease in harvested area coupled with increased productivity. Sharp drop in fresh fruit exports after 2017.

Other highlights:

- [2019] Brazil is the leading global producer and 24th in fresh orange exports.
- [2019] Only 0.02% of the oranges produced are exported as fresh fruit.
- [2001-19] 40.8% increase in average productivity, from 20.6 to 29.0 ton per ha.
- [2017] Most of the production (85.7%) is on properties over 100 ha.
- [2018] A majority (63%) of producers have a low technological level of production.
- [2001-19] Increase of 165.0% on average, from 0.20 to 0.53 US\$/kg.
- [2019] European Union is the main destination for exports of fresh oranges, with 49.6% of total revenue.

### Lime

Since 2001, continuous increase in exports. Production is concentrated in Sao Paulo and exports are mainly to the European Union.

Other highlights:

- [2019] Brazil is 5th largest global producer and 10th in fresh lemon and lime exports.
- [2019] 6.9% of the limes produced are exported as fresh fruit.
- [2001-19] 37.4% increase in average productivity, from 19.5 to 26.8 ton per ha.
- [2017] Most of the production (45.1%) on properties between 10 to 100 ha
- [2018] A majority (81%) of producers have a low technological level of production.
- [2001-19] Increase of 67.3% on average, from 0.52 to 0.87 US\$/kg.
- [2019] European Union is the primary destination for exports of fresh lemons and limes, with 95.9% of total revenue.

### Apple

High growth in productivity, which maintained the volume produced even while the harvested area diminished between 2013 and 2019.

Other highlights:

- [2019] Brazil is 13th largest global producer and 20th in fresh lemon and lime exports.
- [2019] 4.7% of the apples produced are exported as fresh fruit.
- [2001-19] 63.2% increase in average productivity, from 23.1 to 37.7 ton per ha.
- [2017] Most of the production (60.4%) is on properties over 100 ha.
- [2018] A majority (60%) of producers have a low technological level of production.
- [2001-19] Increase of 47.1% on average, from 0.51 to 0.75 US\$/kg.
- [2019] Asia is the main destination for exports of fresh apples, with 48.8% of total revenue.

### Papaya

Instability in productivity and production volume. Exports on the rise from 2012 onwards.

Other highlights:

- [2019] Brazil is the 2nd leading global producer and 2nd in fresh papaya exports.
- [2019] 3.7% of the papayas produced are exported as fresh fruit.
- [2001-19] Maintenance of productivity, with a positive and negative variation.
- [2017] Most of the production (50.0%) on properties between 100 to 1,000 ha
- [2018] A majority (60%) of producers have a low technological level of production.
- [2001-19] Increase of 32.1% on average, from 0.81 to 1.07 US\$/kg.
- [2019] European Union is the main destination for exports of fresh papayas, with 90.8% of total revenue.

### Mango

Productivity nearly doubled between 2001 and 2019. Continued growth in exports.

Other highlights:

- [2019] Brazil is the 7th largest producer and 5th in Mango exports.
- [2019] 15.4% of the mangos produced are exported as fresh fruit.
- [2001-19] 81.0% increase in average productivity, from 11.6 to 21.0 ton per ha.
- [2017] Most of the production (44.0%) on properties between 10 to 100 ha
- [2018] A majority (62%) of producers have a low technological level of production.
- [2001-19] Increase of 114.6% on average, from 0.48 to 1.03 US\$/kg.
- [2019] European Union is the main destination for exports of fresh mangos, with 76.5% of total revenue.

### Melon

Key indicators on the rise: continuous increase in productivity, harvested area, volume and exports.

Other highlights:

- [2019] Brazil is the 12th largest worldwide producer and 5th in melon exports.
- [2019] 42.8% of the melons produced are exported as fresh fruit.
- [2001-19] 43.0% increase in average productivity, from 18.6 to 26.6 ton per ha.
- [2017] Most of the production (46.7%) is on properties over 1,000 ha.
- [2018] A majority (70%) of producers have a low technological level of production.
- [2001-19] Increase of 60.0% on average, from 0.40 to 0.64 US\$/kg.
- [2019] European Union is the main destination for exports of fresh melons with 96.1% of total revenue.

### Grape

Fluctuation in exports, with a small surplus from 2001-2019.

Other highlights:

- [2019] Brazil is the 14th largest worldwide producer and 17th in grape exports.
- [2019] 0.02% of the grapes produced are exported as fresh fruit.
- [2001-19] 19.2% increase in average productivity, from 16.7 to 19.9 ton per ha.
- [2017] Most of the production (41.5%) on properties between 10 to 100 ha
- [2018] A majority (74%) of producers have a low technological level of production.
- [2001-19] Increase of 99.0% on average, from 1.04 to 2.07 US\$/kg.
- [2019] European Union is the main destination for exports of fresh grapes, with 78.9% of total revenue.

## Summary of Opportunities

	BEFORE the farm	WITHIN the farm	AFTER the farm
 <b>Avocado</b> Rapidly expanding market	Bio-Inputs; Precision Agriculture; Equipment for processing.	Partnerships for production (targeting domestic market and exports). Organic fruit production.	Agro-industrial applications of avocado (olive oil), including the cosmetics industry; Packaging, and technology for e-commerce.
 <b>Banana</b> Potential market expansion	Bio-inputs; Genetics and new varieties that are more resistant to diseases (Fusarium 4); Precision Agriculture.	Strategic partnerships for projects involving new banana production in the Northeast with a focus on the international conventional and organic Silver (Prata) banana market.	Post-harvest technology; Agro-industrial formulations for conventional and organic bananas; Partnerships in the international distribution and sales of the Silver (Prata) banana.
 <b>Orange</b> Market at a stable level	Bio-inputs; Genetics and new varieties that are more resistant to diseases (canker, greening, and black spot); Precision Agriculture.	Bio-inputs; Genetics and new varieties that are more resistant to diseases (canker, greening, and black spot); Precision Agriculture.	Post-harvest technology to maintain fruit quality; New and innovative agro-industrial formulations for orange products.
 <b>Lime</b> Potential market expansion	Bio-inputs; Genetics and new varieties that are more resistant to diseases (canker, greening); Precision Agriculture.	Strategic partnerships for innovative lime production projects geared towards new international markets in the process of opening up, like the USA (conventional and organic).	New and innovative agro-industrial formulations for lime products; International marketing partnership targeted towards increasing the consumption of lime in cooking.
 <b>Apple</b> Market at a stable level	Bio-inputs; Genetics and new varieties that are less dependent on cold spells; Precision Agriculture; Technology and equipment for protected cultivation.	Production of apple and organic derivatives.	New and innovative products derived from the agro-industrialization of apples.
 <b>Papaya</b> Market at a flat level	Bio-inputs (fertilizers and pesticides); Genetics and new varieties that are more resistant to viruses; Precision farming hardware and software; Equipment for packing houses and irrigation.	Strategic partnerships for new papaya farming projects focusing on the domestic and international markets, in semi-arid regions but with available water.	Advice and technical support to improve the governance and organization of the sector, with professional and business development offered to producers; Devising strategic partnerships for the development of the international market in order to increase the consumption of papaya (professional promotion and sales).
 <b>Mango</b> Moderately expanding market	Bio-inputs; Genetics and new varieties that are more anthracnose resistant; Precision Agriculture; Equipment for packing houses and irrigation (expansion of area).	Strategic partnerships for new mango farming projects focusing on the domestic and international markets, in semi-arid regions but with available water (conventional and organic fruit).	Development of new semi-processed or processed products (whole mango juice, frozen fruit, etc.) in order to improve the practicality of consumption; Partnerships for distribution and marketing in unconsolidated international markets.
 <b>Melon</b> Moderately expanding market	Bio-inputs; Genetics and new varieties that are more resistant to diseases and with new flavors and textures (Asia); Precision Agriculture; Equipment for packing houses and irrigation (growth of volume for Asia).	Strategic partnerships, mergers, and acquisitions for large agricultural melon production projects in the semi-arid Brazilian region, geared towards producing extra volumes for conventional and organic fruit for Asia.	Development of new technologies for fruit conservation and long-distance maritime transport; Strategic partnerships for commerce in the Middle East, China, and other new Asian markets.
 <b>Uva</b> Moderately expanding market	Bio-inputs; Genetics and new varieties that are more resistant to viruses; Precision farming; Equipment for packing houses and irrigation.	Strategic partnerships, mergers, and acquisitions for large agricultural table grape production projects in the semi-arid Brazilian region, geared towards producing extra volumes for conventional and organic fruit for Asia.	Strategic partnerships for the promotion and marketing of table grapes in the Middle East and Asia.

## Final Words

Brazilian fruit production offers a wide variety of opportunities for investors as analyzed and illustrated in this report.

Bear in mind that agribusiness is a sector of the economy that many countries today regard as strategic for economic blocs due to its relationship with food security, the quality, and safety of the food produced, sustainability, and others.

It is also a fact that agribusiness involves specific risks that are distinct from other segments. However, the sector has developed effective tools for managing these risks throughout its long history in Brazil. The diversity that poses so many challenges to Brazilian fruit culture is the same that offers varied and innovative solutions to problems.

Once there is a decision to invest in agribusiness, it is difficult to ignore the outstanding opportunity that Brazil offers. The country's fruit farming is a prominent sector for investments because it is aligned with the trends and consumption habits of the modern world:

- Healthy eating and well-being;
- Health and protected immunity;
- Food safety and traceability;
- Organic and/or ecological production;
- Environmental and social sustainability.

**The future of major agricultural projects resides in Brazil** because the country has the potential to double its food production while maintaining sustainability and preventing deforestation and forest degradation.

**Investors are recommended to conduct detailed and expert studies for each opportunity identified**, building business models with validation in the market of pilot projects while applying other management tools to predict results.

ABRAFRUTAS is available to anyone interested in following up on the strategic and operational process for further steps in investment decisions.



**Avocado**

Rapidly expanding market!  
The world wants avocados. This is the most promising production chain today, providing great opportunities for investors.



**Banana**

Silver (Prata) Banana is poised to be a true innovation in this market and, with proper marketing, will play a pivotal role in adding value to a product that is now a commodity!



**Orange**

Brazil has the potential to become a major supplier of table oranges, similar to what it has done with concentrated juice frozen across the globe.



**Lime**

New markets opening for limes, as the U.S. will have a major impact on exported volumes and business profitability!



**Apple**

Stabilizing production through new varieties that are less fussy in cold weather will ensure volumes for export to non-producing countries that appreciate the taste and texture of Brazilian fruit.



**Papaya**

Aggressive marketing promotions, based on the flavor and functionality of papayas, will boost consumption in existing markets such as the USA and new markets in the Middle East and Asia, thereby increasing exports.



**Mango**

Growing demand and a diversity of varieties will lead to growth in the domestic and foreign markets for this fruit, thereby providing a return for the investor.



**Melon**

Consolidation of the Chinese market and opening of new markets in the Middle East and Asia will create excellent investment opportunities in this production chain.



**Grape**

Increasing demand during the off-season in the Northern Hemisphere and diversity of varieties make the Brazilian table grape great for competitiveness and yield an outstanding return on investments made.

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[www.conab.gov.br](http://www.conab.gov.br)

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Pesquisa Agrícola Municipal - <https://sidra.ibge.gov.br/pesquisa/pam/tabelas>

#### Ministério da Agricultura, Pecuária e Abastecimento - Governo Federal do Brasil

Agrostat - <http://indicadores.agricultura.gov.br/agrostat/index.htm>

#### National Mango Board

[www.mango.org](http://www.mango.org)

## Attachment CEASA

### 1. CEASA

**1.1.** Ceasas (Supply Centers) are state-owned or mixed-capital companies (public and private), implemented in the 1970s, aimed at improving the marketing and distribution of horticultural products. **The chain's wholesale warehouses are currently distributed in 67 units, including urban wholesale markets, rural and several retail markets of varying sizes, in large and medium-sized urban centers.**

**1.2.** Within the scope of Ceasas there is the Brazilian Program for the Modernization of the Hortigranjeiro Market (Prohort), implemented as a strategic arrangement to adapt the Brazilian Wholesale Centrals to a new context in the National Food Supply Policy (Ministry of Agriculture, Livestock and Supply - Map, and Companhia Nacional de Abastecimento - Conab. Prohort's data systems, implemented in close partnerships with the Supply Centers, are the only sources of compiled information on the horticultural sector at the national level. It aggregates statistical data from Ceasas throughout the country in a single, publicly accessible platform.

### 2. General numbers:

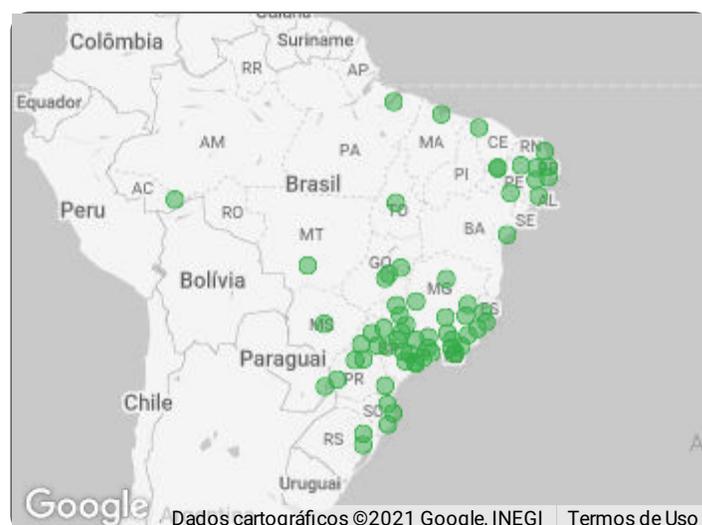
- São Paulo is the Federation Unit with the largest number of CEASAs, totaling 14. Then MG and RJ, with 12 and 5, respectively.
- Currently in CEASAs there are 12,000 established companies that generate 200,000 direct jobs in the wholesale activity, in addition to 500,000 jobs in the field for the cultivation, handling and treatment of food;
- In 2020, 14.9 million tons of horticultural crops were sold in CEASAs, representing approximately US\$ 7.6 billion;
- Considering as a parameter an average tax burden of 25% on the operation of the amounts indicated, the approximate tax collection estimate is R\$ 8.06 billion/year;
- The six main units concentrated 64.9% of the total sold in 2020, totaling 4.91 billion.

### Evolution of Commercialization in CEASAs - 2007/2020

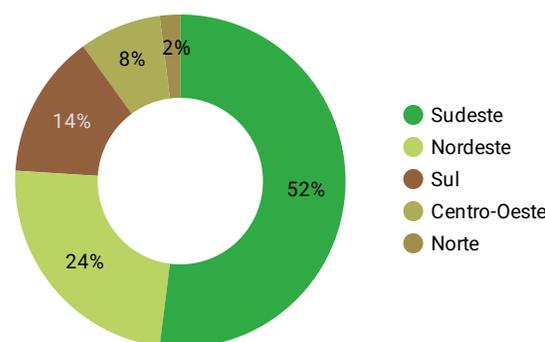
Ano ▾	Quantidade (kg)	Valor R\$	Valor US\$
2020	14,93 bi	39,02 bi	7,57 bi
2019	16,17 bi	38,44 bi	9,74 bi
2018	17,65 bi	35,79 bi	9,80 bi
2017	17,09 bi	34,16 bi	10,70 bi
2016	14,60 bi	33,82 bi	9,69 bi
2015	15,08 bi	29,51 bi	8,86 bi
2014	16,30 bi	29,18 bi	12,40 bi
2013	16,17 bi	28,60 bi	13,26 bi
2012	15,84 bi	24,84 bi	12,71 bi
2011	15,52 bi	20,91 bi	12,48 bi
2010	14,86 bi	17,61 bi	10,00 bi
2009	13,57 bi	15,30 bi	7,66 bi
2008	12,93 bi	13,20 bi	7,19 bi
2007	11,82 bi	11,69 bi	6,00 bi

Source: CONAB, 2020.

### Geographical distribution of CEASAs



### Financial Transactions US\$ (2020)



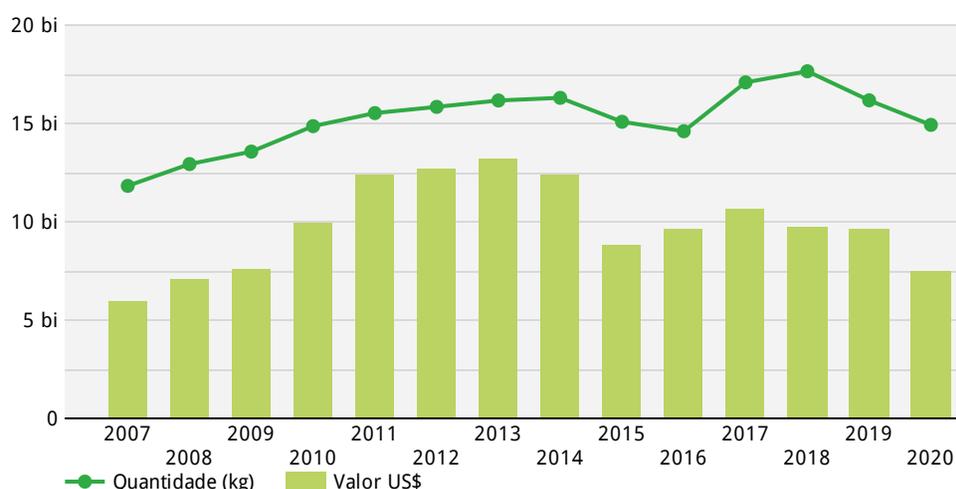
Source: CONAB, 2020.

### Main CEASAs (2020)

Unidade	Valor US\$	% ▾
São Paulo-SP	1,54 bi	20,4%
Rio de Janeiro-RJ	940,94 mi	12,4%
Belo Horizonte-MG	661,38 mi	8,7%
Juazeiro-BA	560,53 mi	7,4%
Goiânia-GO	464,11 mi	6,1%
Curitiba-PR	392,01 mi	5,2%
Recife-PE	349,49 mi	4,6%
<b>Total geral</b>	<b>4,91 bi</b>	<b>64,9%</b>

Source: CONAB, 2020.

### Evolution of Commercialization in CEASAs - 2007/2020



Source: CONAB, 2020.