

ANALYSIS OF THE BRAZILIAN COMPETITIVENESS OF ROASTED AND UNROASTED COFFEE EXPORTS BETWEEN 1989 AND 2018

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ABSTRACT

Coffee is the second most consumed drink globally, second only to water consumption thanks to its flavor, aroma, and benefits to human health. The highlight of the high productivity of the coffee tree in Brazilian soils occurs due to the types of soils, average daily temperatures, rainfall, and type of management, among other aspects that are considered important for its productivity. Given this scenario, Brazil stands out as the world's largest producer and exporter of the product, cultivating both the Arabica species and the Conilon species, where roasted and unroasted coffees participate positively in the growth of the GDP (Gross Domestic Product) and generate direct jobs and indirect. In this sense, this study aimed to analyze the Brazilian competitiveness of roasted and unroasted coffee exports between 1989 and 2018 through the Revealed Comparative Advantage Index (IVCR), the Growth Rate, and the Competitiveness Matrix. Due to the country's high production of the crop and the high consumption of the drink worldwide, coffee plays a fundamental role in the country's economic and social terms, generating jobs and raising taxes, being one of the most relevant products in Brazilian agribusiness. However, coffee farming faces challenges about price volatility and environmental changes, so it is necessary to adapt the sector to seek innovative solutions that guarantee the appreciation of this sector and its permanence in the world market.

KEYWORDS: coffee export, economy, productivity.

ANÁLISE DA COMPETITIVIDADE BRASILEIRA DE EXPORTAÇÕES DE CAFÉ TORRADO E NÃO TORRADO ENTRE OS ANOS DE 1989 E 2018

RESUMO

O café é a segunda bebida mais consumida no mundo, perdendo apenas para o consumo de água, graças ao seu sabor, aroma e benefícios à saúde humana. O destaque da alta produtividade do cafeeiro nos solos brasileiros ocorre devido aos tipos de solos, temperaturas médias diárias, pluviosidade, tipo de manejo, entre outros aspectos considerados importantes para sua produtividade. Diante desse cenário, o Brasil se destaca como o maior produtor e exportador mundial do produto, cultivando tanto a espécie arábica quanto a espécie Conilon, onde os cafés torrados e não torrados participam positivamente do crescimento do PIB (Produto Interno Bruto) e geram empregos diretos e indiretos. Nesse sentido, este estudo teve como objetivo analisar a competitividade brasileira das exportações de café torrado e não torrado entre 1989 e 2018 por meio do Índice de Vantagem Comparativa Revelada (IVCR), da Taxa de Crescimento e da Matriz de Competitividade. Devido à alta produção da safra no país e ao alto consumo da bebida em todo o mundo, o café tem papel fundamental na economia e na sociedade do país, gerando empregos e elevando impostos, sendo um dos produtos de maior relevância no agronegócio brasileiro. Porém, a cafeicultura enfrenta desafios quanto à volatilidade de preços e mudanças ambientais, por isso é necessário adequar o setor para buscar soluções inovadoras que garantam a valorização deste setor e sua permanência no mercado mundial.

PALAVRAS-CHAVE: exportação de café, economia, produtividade.

INTRODUCTION

Coffee is one of the most expressive products in the Brazilian economy, as it is prominent in the country's exports. In addition, it contributes to the GDP (Gross Domestic Product) for the primary sector and other sectors of the economy (TANAHASHI; CALDARELLI, 2021).

The monastery monks tried the fruits by infusion and found they could pray for hours at night. From then on, coffee spread to several countries until, in 1727, it arrived in Brazil through the state of Pará, brought by Sergeant Major Francisco Mello Palheta in response to the request of the governor of the time (OLIVEIRA *et al.*, 2012).

From the 19th century, coffee began to have relevance in national and international trade, due to the increase in domestic and foreign consumption, especially in Europe and the United States (DIAS; SILVA, 2015).

Faced with constant changes in trade relations due to the emergence of globalization, factors such as transactions between markets and the competitiveness of different economies are relevant to the development of nations in order to improve the application of production factors, build income and provide macroeconomic balance (PINTO *et al.*, 2020).

According to the Council of Coffee Exporters in Brazil (2021), Brazilian coffee stands out for being the world's largest producer and exporter of the product and being in the second position in the ranking of the largest consumer country of the beverage.

In Brazil, agribusiness, generally contributes positively to economic growth; coffee, in particular, supports the increase in GDP (Gross Domestic Product) and

generates income through millions of direct and indirect jobs (SANTANA *et al.*, 2019).

Accumulated exports for the 2020/2021 season reached around 45.6 million bags, representing an increase of 13.3% compared to the previous 2019/2020 season and 10.1% over the 41.4 million bags of 2018 /2019 period of best performance (CECAFÉ, 2021).

In monetary terms, in 2020, Brazilian agribusiness exports reached US \$100.81 billion, the second highest value in the historical series, behind only 2018, when it was US \$101.17 billion. Compared to 2019, there was a 4.1% growth in sector exports. As a result, agribusiness accounted for almost half of Brazil's total exports, a record share of 48.0% (FERREIRA; SANTOS 2019).

Coffee is commercialized for both the Arabica and Conilon species in raw grains, soluble, roasted, and ground (MENDES; LUCHINE, 2020). The two varieties (Arabica and Conilon) are relevant in the market, but there are some differences, such as the shape of the grain, the flavor, the aroma, and, mainly, the added value (PEREIRA *et al.*, 2019). Arabica coffee stands out in price due to its use in finer coffees, also known as specialty or gourmet, and Conilon coffee directed in greater volume to the segment of blends (blends) and soluble coffee (BSCA, 2020).

In the 2020 harvest, the volume of coffee production in Brazil was approximately 61.7 million bags of 60 kg, including Arabica and Conilon species, which corresponds to a 25% increase about the previous harvest, in which the Arabica coffee held about 47.4 million bags and Conilon coffee, with an estimated production of 14.3 million bags of 60 kg (CONAB, 2020).

At a global level, for the 2020/2021 harvest, a production of 171.9 million 60 kg bags was obtained, representing an increase of 1.9% about the coffee year 2019/2020. Arabica coffee production should increase by 5.2% and reach the mark of 101.8 million bags, while robusta coffee should show a reduction of 2.6% and end the coffee year with approximately 70 million bags (ICO, 2021).

Brazil stands out as the largest exporter of green beans, a product that has not gone through industrialization and added value known as a "commodity," which has uniform characteristics and quality, produces on a large scale and acts as a raw material for several countries (TANAHASHI; CALDARELLI, 2021). Subsequently, the green bean undergoes a process of differentiation or industrialization, known as branding, and ends up in the trade of coffees with high added value (GURGEL; RELVAS, 2018).

In this sense, with the objective of analyzing the performance of exports of certain products in relation to the international market, Schirigatti *et al.* (2018) applied the analysis method, Revealed Comparative Advantage Index (IVCR), of Brazilian and Argentine mate, during the period from 1997 to 2011, and subsequently identified the position of mate through the competitiveness matrix.

Costa *et al.* (2015) analyzed the competitiveness of the main products in the paper and cellulose segment exported by Brazilian companies through the competitiveness matrix and based on the Revealed Comparative Advantage Index (IVCR), which allows for detecting the relevance of a product in the list of exports of a country in relation to the international level.

For coffee culture, Lacerda *et al.* (2019) applied the Revealed Comparative Advantage Index (IVCR) and the Symmetrical Revealed Comparative Advantage Index (IVCRS) for the competitiveness analysis of the two largest national producers, using export data from 2010-2015 for the three main phases of coffee (green, roasted and soluble beans). The result was the supremacy of the state of Minas

Gerais, but they identified that, due to the lack of processing of the product, there were losses of gains for the national economy.

In this sense, this study has the research objective of analyzing the Brazilian competitiveness of roasted and unroasted coffee exports, in the period between 1989 and 2018, through the Revealed Comparative Advantage Index (IVCR), the Growth Rate, and the Competitiveness Matrix.

DEVELOPMENT

The Origin of coffee

The emergence of coffee is still unknown to historians and academics, but there are reports that the coffee plant originated on the African continent, around 575 AD, in the Ethiopian region.

The stimulating effect was observed by a shepherd when his goats consumed the red fruits of the bushes in the fields, becoming more willing and bouncy (ABIC, 2021). However, it was the Arabs who started and expanded the commercialization of coffee to other regions of the world, such as Persia and Egypt, in addition to popularizing the fruit in some European countries, such as France and the Netherlands (MARTINS, 2008).

In Brazil, the first coffee seedlings were planted in the city of Belém do Pará around 1727 and later spread to other regions of the country, which culminated in the state of Rio de Janeiro as the holder of coffee economic supremacy around 1860, followed by São Paulo and Minas Gerais, placing Brazil as one of the largest coffee producers in the world, given the adaptability of the fruit to favorable conditions for its cultivation (OLIVEIRA *et al.*, 2012).

The coffee plant belongs to the Rubiaceae botanical family, which comprises more than 100 species, most of which are tropical trees and shrubs, with at least 25 more important coffee species. The main species cultivated and marketed are *Coffea Arabica*, also known as Arabica Coffee, and *Coffea Canephora*, known as Conilon or Robusta Coffee. Both varieties have market importance and economic interest (MOLDVAER, 2015).

Coffee Classification

Arabica Coffee

Arabica coffee is the most produced species in Brazil, representing around 77% of coffee production, predominantly cultivated in the states of Minas Gerais, São Paulo, Paraná, Bahia, Rio de Janeiro, and part of Espírito Santo (LANDAU *et al.*, 2020; CONAB, 2021).

The favorable characteristics for the cultivation of Arabica coffee are based on average altitudes between 1,000 and 2,100 m, with average daily temperatures ranging between 18 and 22 °C, typical of equatorial regions with annual precipitation between 1,500 and 2,500 mm (LANDAU *et al.*, 2020).

The Arabica species, which has a superior drink to Conilon coffee, has a more intense aroma and flavor and is required by the specialty coffee market (LIBERATTI; DA SILVA, 2019). According to Agnoletti *et al.* (2019), the Arabica coffee drink is sweet, slightly acidic, and has a pleasant bitter aftertaste; on the other hand, Conilon coffee is rough and more bitter. In addition to quality, it presents differences in prices and acceptability.

Conilon coffee (robusta)

Conilon coffee represents about 23% of the country's total coffee production, and its crops are concentrated mainly in Espírito Santo, Rondônia, Bahia, and part of Minas Gerais (CONAB, 2021).

Robusta coffee needs a hot and humid climate with lower altitudes, between 100 and 1,000 m, with average temperatures between 22 and 26 °C and a minimum annual rainfall of 2,000 mm (PEREIRA *et al.*, 2019).

Robusta coffee drink has bitterness and woody flavor, with low acidity, having a higher caffeine content when compared to C. Arabica it has a greater demand in the soluble coffee industries for the preparation of blends (AGNOLETTI *et al.*, 2019). In addition to composing the blends of roasted and ground coffee, it is attributed to export and the domestic market (MICHELMAN; CARLSEN, 2018). Its drink has a bitter and woody flavor, being more full-bodied and with low acidity (ALMEIDA-COUTO *et al.*, 2020).

Agnoletti *et al.* (2019) point out that this variety has lower quality and prices than Arabica coffee; on the other hand, it has better productivity, lower production costs, and a higher concentration of caffeine.

Coffee commercialization

Coffee growing in Brazil has acquired a fundamental role in economic and social terms in the country, as evidenced by the representativeness of the volume of production and export of the product, as well as the increase in domestic consumption and the capacity to generate employment and income (PELOSO *et al.*, 2017).

Worldwide, coffee production in the 2018/2019 harvest reached around 174.5 million bags of 60 kg, a record production of the last ten years. Of this volume, Arabica coffee corresponded to approximately 104 million bags, that is represented 60% of production, with the other 40% being Robusta coffee, with just over 70.5 million bags produced (BRASIL, 2019).

For Fassio and Silva (2015), the activities of the agribusiness sector provide economic and social development for the country by generating jobs, raising taxes, and contributing significantly to the formation of foreign exchange revenue.

Within this context, Brazil ranks first in coffee production, whose harvest reached a total of 61.6 million bags produced, and corresponded to 35.3% of world production. In second place is Vietnam, with 29 million bags produced, with a volume that represents around 16.6%, and, in third place, Colombia, with just over 14.3 million bags harvested, the equivalent to 8.2% of the world's harvest (BRASIL, 2019).

It is worth mentioning that Vietnam and Colombia are the main competitors of Brazilian coffee beans, but these countries are creating strategies such as geographical indication to value the quality associated with the origins of coffee plantations, investing in the production of special and certified coffees, establishing partnerships between private sectors and producers (CONCEIÇÃO *et al.*, 2019).

The state of Minas Gerais is the largest coffee producer in the country; in the 2018/2019 harvest, the state produced approximately 57.9 million bags out of a total of 111.0 million bags in Brazil, corresponding to 52.2% of the total produced (BRASIL, 2019).

According to the Brazilian Coffee Exporters Council (2020), coffee exports in Brazil reached a record 44.5 million 60 kg bags in 2020, considering the sum of Green Coffee (Robusta and Arabica), roasted, soluble, and ground. The result of

shipments represented an increase of 9.4% compared to 2019, as can be seen in Table 1.

TABLE 1. Production and export volume of coffee in 60 kg bags.

Period	Green Coffee			Industrialized Coffee			Exports
	Robusta	Arabica	Total	Roasted	Soluble	Total	
2016	580,313	29,786,018	30,366,331	29,885	3,784,750	3,814,635	34,180,966
2017	296,069	27,123,656	27,419,725	26,321	3,482,908	3,509,229	30,928,954
2018	2,480,140	29,412,021	31,892,161	19,226	3,727,461	3,746,687	35,638,848
2019	3,959,653	32,713,205	36,672,858	26,033	4,001,109	4,027,142	40,700,000
2020	4,923,519	35,474,494	40,398,013	23,367	4,096,554	4,119,921	44,517,934
Variation	24.3%	8.4%	10.2%	-10.2%	2.4%	2.3%	9.4%

Source: (CECAFE, 2020).

According to data from the Brazilian Coffee Exporters Council (CECAFÉ, 2021), the main buyers of Brazilian coffee in 2020 are the United States, in first place with 8.1 million bags exported, equivalent to 18.2 % of exports. In second place is Germany with 7.6 million (17.1%) and, in third, Belgium, with 3.7 million (8.4%). The top three correspond to 43.7% of coffee exports from Brazil, as can be seen in Table 2.

TABLE 2. Destination of Brazilian coffee exports.

Destiny	Arabica	Conilon	Soluble	Roasted	Total	%
USA	6,522,886	861,506	750,970	4,673	8,140,035	18.2%
Germany	7,359,081	235,298	44,582	0	7,638,961	17.1%
Belgium	2,867,309	891,245	1,936	0	3,760,490	8.4%
Italy	2,990,270	27,295	2,386	22	3,019,973	6.8%
Japan	2,162,323	1,183	242,366	2,143	2,408,015	5.4%
Türkiye	1,379,768	6,373	59,068	0	1,445,209	3.2%
Others	12,343,386	2,904,284	3,027,035	17,737	18,295,442	40.9%
Total	35,625,023	4,927,184	4,131,343	24,575	44,708,125	100.0%

Source: (CECAFÉ, 2021).

It is noted that importing countries have characteristics of a developed economy, focusing on re-exporting coffee, which adds greater value to the product (THOME; FERREIRA, 2015). For Barbareso *et al.* (2017), re-export makes countries become commercial intermediaries, whether due to tariff or logistical aspects, which adds value to the product and obtains greater profitability. He emphasizes that Germany is the world's largest exporter of industrialized coffee, without coffee cultivation.

Coffee demand

Coffee has become a prominent product in agribusiness and exports, as its flavor and aroma are very well accepted by people's palates (BLISKA *et al.*, 2009).

The estimate for the coffee year 2020/2021 for world coffee consumption was 166.62 million bags of 60 kg, of which 115.96 million bags, corresponding to 70%, should be consumed by importing countries and 50.66 million by producing countries themselves, which represents 30% of total consumption (ICO, 2021).

Coffee has gained popularity on all continents. In view of this, it becomes the second largest beverage consumed in the world, second only to water. World coffee

consumption is estimated at four hundred billion cups per year, around 7.5 million tons (SPENCE; CARVALHO, 2020).

World coffee consumption increased by an average of 1.2% per year from 2016 to 2020, with Europe being the largest consumer, with around 54.3 million 60 kg bags in 2020, followed by Asia and Oceania, responsible for the consumption of 36.5 million bags, North America, with the equivalent of 30.9 million bags, South America, with 27.1 million bags, Africa consuming close to 12.4 million bags and by Mexico and Central America, with 5.3 million bags (ICO, 2021).

With this growing increase in coffee consumption, it is noted that the countries that import Brazilian coffee are looking for specialty coffees that offer differentiated prices and greater added value in the foreign market (BSCA, 2020). In this perspective, even with the growth of exports of unprocessed coffee, Brazil can expand into the specialty coffee market, developing value-added strategies for the exported product (FRANCK *et al.*, 2016).

Coffee re-export

Brazil stands out as the largest producer and exporter of green coffees (Arabica and Conilon) in the world however it limits itself as a mere exporter of raw materials. Some countries that do not even cultivate coffee re-export the product with high added value (XIMENES; VIDAL, 2017).

According to the National Supply Company (2020), in 2016, 2017, and 2018, the average import of coffee was 77.4% in the world context. Importing countries have two purposes, consumption or re-export, which may be in the form of green coffee, roasted coffee, soluble coffee, and any other by-products, after transformation, industrialization, and adding value to the product.

TABLE 3. World situation of the international coffee market.

Countries	Discrimination	2013	2014	2015	2016	2017	2018
USA	Importation	27,016	27,565	27,708	28,838	29,488	28,918
	Reexportation	3,248	3,361	2,958	3,175	2,929	2,902
	Consumption	23,417	23,767	24,438	25,243	26,183	26,514
Japan	Importation	8,381	7,657	8,063	8,026	7,647	7,540
	Reexportation	92	111	117	111	113	124
	Consumption	7,435	7,494	7,695	7,872	7,742	7,834
Russia	Importation	4,410	4,747	4,710	5,233	5,468	5,288
	Reexportation	762	726	864	794	956	1,054
	Consumption	3,648	4,021	3,846	4,439	4,512	4,234
Switzerland	Importation	2,667	2,643	2,748	2,816	2,904	3,086
	Reexportation	1,547	1,616	1,641	1,748	1,861	1,946
	Consumption	1,123	1,028	1,096	1,066	894	1,170
European Union	Importation	72,237	76,212	76,897	81,455	79,211	83,869
	Reexportation	30,605	33,415	34,899	36,840	37,598	39,140
	Consumption	41,585	42,798	41,998	44,615	41,613	44,730
Total World Imports (A)		114,711	118,824	120,126	126,368	124,718	128,701
Total World re-exports (B)		36,254	39,229	40,479	42,668	43,457	45,166
Var % B/A		31.6%	33.0%	33.7%	33.8%	34.8%	35.1%
% Consumption		67.3%	66.6%	65.8%	65.9%	64.9%	65.6%

Source: (CONAB, 2020).

Overall, for the coffee year 2019/2020, the re-export volume increased by around 0.4% to 46.93 million bags (ICO, 2020).

In relation to the European Union, Germany can be highlighted as being the largest importer of green coffee (raw in beans), which benefits from trade agreements due to the high volume imported. Subsequently, it practices the strategy of re-exporting processed coffee with high added value in the market (FRANCK *et al.*, 2016).

According to Ximenes and Vidal (2017), Brazil lost profitability when it comes to roasted coffee and believes that the main causes that limit it are the lack of specialization in commercial activities and the industrialization of the raw material.

Coffee in Brazil

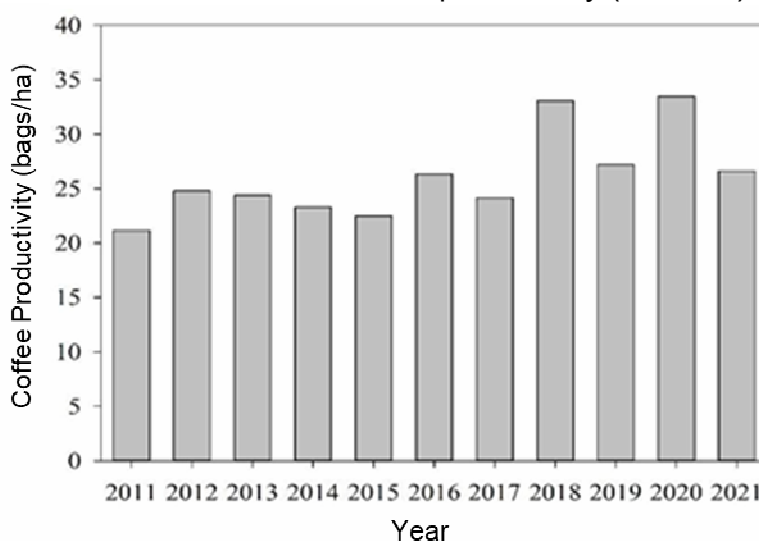
Coffee is one of the most relevant products in Brazilian agribusiness, especially in terms of its share of GDP (Gross Domestic Product), as it is the world's largest coffee-producing and exporting country (THOMÉ; FERREIRA, 2015).

The first coffee seedlings arrived in Belém in 1727. At the time, the governor of Maranhão entrusted the mission to Sergeant-Mor Francisco de Mello Palheta to get the seeds or seedlings of the precious plant, as coffee was on the rise in the market and with a high added value. Palheta approached the wife of the governor of the capital of French Guiana and gained her trust. Upon returning to Brazil, the wife secretly offered a seedling that was brought in the Brazilian's luggage (OLIVEIRA *et al.*, 2012).

In Brazil, the plant has developed satisfactorily because, due to the climate and the favorable soils, it obtained high importance in the international market and became one of the main export products from the empire to the present day (FRANCO JUNIOR *et al.*, 2019). Around 1840, coffee was Brazil's main export product. This feat was due to the high demand for its main consumer markets, at the time, Europe and the United States (ALMEIDA *et al.*, 2018).

Historically, coffee had a significant participation, mainly in the country's industrialization, development, and modernization (THOMÉ; FERREIRA, 2015). According to data from the National Supply Company (2021), the productivity of raw grain in Brazil is rising, as illustrated in Figure 1.

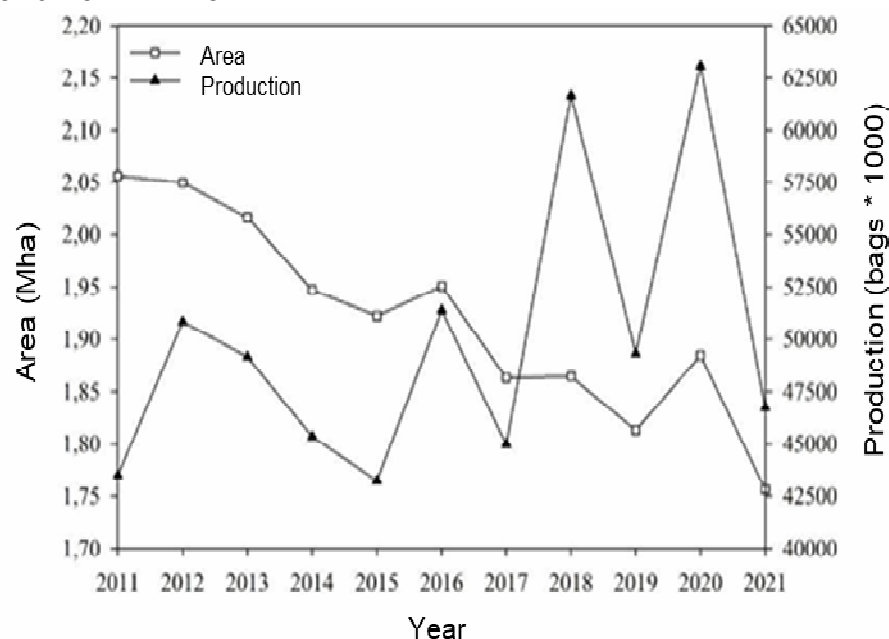
FIGURE 1. Brazilian coffee productivity (Sack/ha).



Source: CONAB (2021), adapted.

Productivity is justified due to favorable climate issues, technological investments, and eradicating unproductive areas (CONAB, 2021). Below, the area and production from 2011 to 2021 can be analyzed, as shown in Figure 2.

FIGURE 2. Planted area and coffee production between 2011 and 2021 in Brazil.

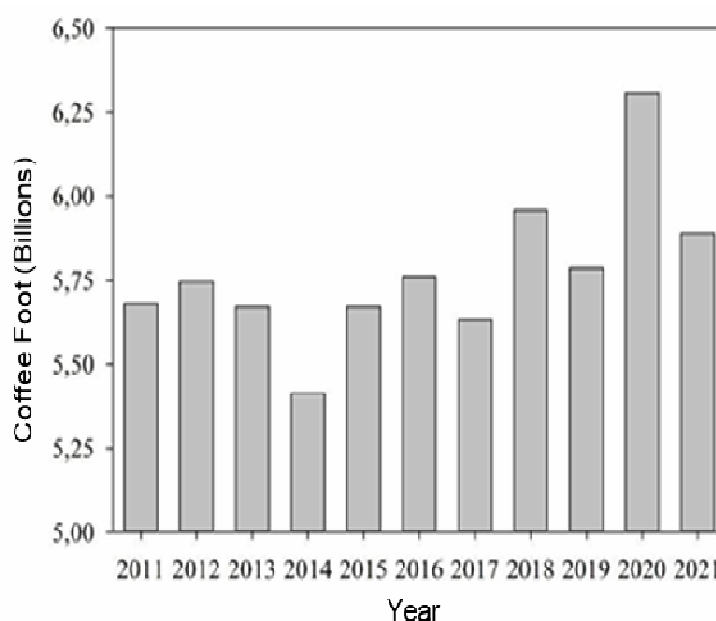


Source: CONAB (2021), adapted.

Even with the reduction of the production area, the number of plants has been increasing. In recent years, there has been a slight increase of 4.7% in coffee plant production, that is the density of plants per hectare has increased, thus being one of the justifications for the increase in productivity in Brazil.

In addition to the increase in productivity, coffee production has grown, even with reduced areas (Figure 3). The reason for this reduction is due to the promotion of other crops such as corn, soybeans, sugarcane, and livestock as a form of other income and greater profitability (FRANCK *et al.*, 2016).

FIGURE 3. Total number of coffee plants planted in Brazil between 2011 and 2021.

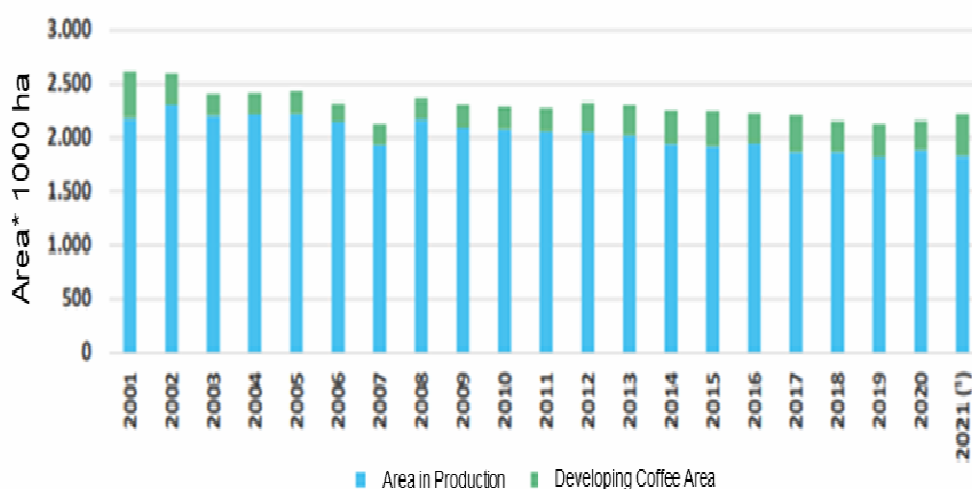


Source: CONAB (2021), adapted.

According to Pereira *et al.* (2011), coffee plant density, which is the reduction in spacing between rows and between plants in the planting row, provides gains in productivity and significant economic impacts, mainly in management. However, it should be noted that radical density can cause future problems due to competition for space between plants.

The area cultivated for coffee in the country in 2021 totals 2,216.9 thousand hectares, an increase of 2.6%, when compared to the area of the previous year, which represents 1,824.7 thousand hectares for crops in production (reduction of 3.2% compared to the previous year) and 392.2 thousand hectares, for crops in formation, an increase of 41.4% compared to the previous harvest, as seen in Figure 4 (CONAB, 2021).

FIGURE 4. Total area of coffee (Arabica and Conilon) in Brazil in production and formation.



Source: CONAB (2021)

The Companhia Nacional de Abastecimento (CONAB, 2021) emphasizes that, in cycles of negative bienniality, several producers practice more intense cultural practices, as well as pruning, skeletonizing, or harvesting in areas that will come into production in the following harvest. It is also noteworthy that, even with the reduction in areas, productivity gains have been increasing, mainly due to technological changes in coffee production.

Characteristic features of coffee

The coffee tree belongs to the Rubiaceae family and subfamily Ixoroideae of the genus *Coffea*, which are subdivided into *Coffea* L. and *Psilanthus* Hook f., which includes more than 100 species (DAVIS *et al.*, 2011).

The genus *Coffea* L., in turn, comprises three species most used in coffee production: *Arábica* C., *Canephora* C., and *Liberica* C. They are characterized as perennial, dicotyledons, with a bushy appearance, woody stems, persistent leaves, and hermaphrodite flowers (MACHADO *et al.*, 2020). The commercialization of coffee is mainly based on two species, *Coffea Arabica* (Arabica coffee) and *Coffea Canephora* (Robusta or Conilon coffee), varieties with the most significant economic advantage, with estimated world production of 80% to 20%, respectively (CONAB, 2019).

The productivity of coffee beans is strongly affected by climate variability, with the main meteorological elements being precipitation, solar radiation, and air temperature (MARTINS *et al.*, 2015). The rainfall distribution in the region is a factor that provides the coffee tree with conditions to develop in its preparatory and constructive phases during the phenological cycle and, thus, provide excellent fruits (CARDUCCI; OLIVEIRA, 2021). Coffee production has been affected by climatic conditions, primarily by long periods of drought caused by global warming. This factor interrupts the growth and productivity of the coffee tree (PELOSO *et al.*, 2017).

Carducci and Oliveira (2021) point out that the soil is another aspect that influences the production of crops due to its relief, texture, depth, and, mainly, its ability to retain water and nutrients for the plant. They add that the number of plants per hectare is one of the predominant factors in productivity.

Thus, properly planning the spacing between rows and between seedlings in planting influences the production, as well as the economic aspect, as it changes the type of crop management (PEREIRA *et al.*, 2011).

For Souza *et al.* (2019), applying a single spacing to enhance coffee production and reduce costs is not a viable strategy, as it is necessary to carry out specific studies of the edaphoclimatic characteristics of each region.

Excessive closing of spaces between plants can cause loss of their productive potential during the floral period, during which the coffee tree canopy must retain about 50% of solar radiation (PEREIRA *et al.*, 2011).

The use of irrigation, with adequate control in the supply of water to the plant, considering the edaphoclimatic conditions of the region and the characteristics of the plants, is a technique widely used to improve the productivity of coffee crops (CARDUCCI; OLIVEIRA, 2021).

Bienniality of coffee

The bienniality of coffee is explained through the vegetative and reproductive functions in the same branch, which directly affects productivity through the number of nodes or buds formed in the previous vegetative season, alternating between high and low harvests (MAGALHÃES, 2021). In this way, the metabolic reserves of the plant are directed towards fruit production, that is, it generates a high production in the year and, in the following year, there is a reduction in the vegetative growth of the branch, a low production (MENDONÇA *et al.*, 2011).

The biennial cycle is natural to the coffee crop, with a more intense effect on the Arabica species (SILVA; REIS, 2013). However, this phenomenon also occurs in the Conilon species with less expressiveness due to pruning practices and the alternation of productive plagiotropic branches (MENDONÇA *et al.*, 2011).

Due to this simultaneous occurrence of vegetative and reproductive functions in the coffee branch, the plant is unable to produce sufficient reserves for fruiting and branch growth in the same year, that is, alternately, the coffee tree provides fruits in one year and grows in another (SILVA; REIS, 2013).

Diseases and pests can cause alternation in production between harvests, as they cause defoliation, lack of branch growth, and leaf energy, which impairs the productivity of the following year (MENDONÇA *et al.*, 2011).

The damage caused to the coffee tree by manual or mechanized harvesting directly interferes with the biennial. Manual harvesting, when it causes physical damage to the plant, such as branch breakage and defoliation when stripping coffee fruits, can reduce photosynthesis or physiologically modify the plant's metabolism. In mechanized harvesting, it is necessary to adjust the coffee harvester correctly and, in

planting, correctly align the coffee plants and pay attention to land with irregular topographies (CARDUCCI; OLIVEIRA, 2021).

Other factors that affect the coffee biennial are the use of improved cultivars, nutritional management, and water stress during the phenological process of the plant, which delays or limits the differentiation of buds in flower buds (PEREIRA *et al.*, 2011).

Competitiveness

Since the beginning of the 20th century, coffee exports in Brazil are representative of the national economy, as, in addition to boosting the economy in the primary sector, it encourages the industries and services sectors. Roasted and unroasted coffees positively affect GDP growth (Gross Domestic Product) and generate direct and indirect jobs (SARA *et al.*, 2019).

Due to the importance of coffee for the Brazilian economy, a detailed study on the competitiveness within this sector is warranted (SARA *et al.*, 2019).

The concept of the word competitiveness can be defined in several ways, however, for this situation, it can be defined as the ability to face competition, succeed, and be explored at different levels. It is a definition of the capacity that a company, a sector, or a nation manages to remain competitive in the market, portraying its ability to protect itself and to improve itself about competitors (THOMÉ; FERREIRA, 2015).

In the perception of Schultz *et al.* (2011), the result achieved by the company is another way of measuring competitiveness in the segments in which they operate. They point out that, within the competition in the market, some norms or rules must be followed. Therefore, it is essential to analyze the strategies adopted and identify competitive advantages that stand out.

Competitiveness is directly linked to market concentration, given that it will have a relevant role as a performance generator depending on the concentration level of companies or the segment in a given market structure (IWASAKI *et al.*, 2008).

Market concentration combines significant market shares of a particular sector or segment, which can be divided into bullish or bearish. High market concentration is considered when few have a significant part of the market share, that is, the degree of the company's participation in the market. On the other hand, low concentration is represented by the significant number of competitors with the same market share, as there is no control over a particular group (OLADI; GILBERT, 2012).

Brazil, in turn, stands out in the international market due to the high production of raw coffee beans, particularly Arabica coffee, and its lower cost, which determine a country's comparative advantages (MENDES; LUCHINE, 2020).

The development of technology for agribusiness is another factor of success in competitiveness compared to other coffee-producing countries, such as the insertion of the dense planting system, the modernization and mechanization of crops, the drip system, and drones (SARA *et al.*, 2019).

Frank *et al.* (2016) highlight the favorable climate for coffee cultivation in Brazil, which, together with the availability of fertile land and techniques for using the same area to diversify production, form essential factors of competitive advantage.

Costa *et al.* (2015) point out that internal factors such as investment policies, production and financial management, marketing, human resources, and strategic planning influence competitiveness. Also, external factors, such as regulatory, institutional, and social policies, that is the macroeconomy.

The competitive advantage arises when the company creates value for the product, and the customer is willing to pay. This is crucial for competitiveness gains (SARA *et al.*, 2019).

Market concentration measures, to analyze the level of competitiveness, depart from the precept based on the international market shares of each country (IWASAKI *et al.*, 2008).

Thus, the importance of monitoring the level of competitiveness through its results is evident to weave strategies and actions to remain in the world market, serving the customer with maximum efficiency (COSTA *et al.*, 2015).

FINAL CONSIDERATIONS

From an economic point of view, coffee growing is one of the leading agricultural activities in the country. It generates jobs and income for thousands of people, from small rural producers to workers in the processing and export industries. Accordingly, coffee exports contribute significantly to the Brazilian trade balance, providing foreign exchange and boosting the national economy.

Coffee growing in Brazil accounts for about 35% of world coffee production, emphasizing the 2018/2019 harvest that produced about 174.5 million bags of coffee, the record production in the last decade worldwide. Given this fact, the country is the leading producer of the grain and an exporter, followed by Vietnam and Colombia, Brazil's main competitors in terms of the quality of the drink.

In short, the Revealed Comparative Advantage Index (IVCR), the Growth Rate, and the Competitiveness Matrix are broader economic concepts, however, they are applied to analyze the competitiveness of the roasted coffee market, and these tools can and are very valuable for providing insights into the relative position of countries or companies in the sector, as well as market performance and key factors affecting competitiveness.

Coffee growing also plays an important social role, in which many regions of Brazil depend on coffee cultivation as their primary source of livelihood, especially in the country's interior. Culture provides opportunities for work and development for rural communities, helping to reduce poverty and improve the quality of life for these people.

In environmental terms, coffee growing can play a positive role when sustainable production practices are adopted. Brazil has stood out in implementing more sustainable farming systems, such as precision agriculture and agroecology, which reduce the use of pesticides and promote the conservation of natural resources. In addition, coffee can be produced organically, preserving biodiversity and protecting local ecosystems.

However, it is essential to highlight that coffee growing also faces challenges, such as the volatility of international coffee prices, the pressure for monocultures, and the impact of climate change. Therefore, the sector must continue to adapt and seek innovative solutions to face these challenges and ensure long-term sustainability.

In conclusion, coffee growing plays a strategic role in Brazil, contributing to the economy, society, and the environment. It is an activity that generates jobs, drives regional development, and promotes the conservation of natural resources when practiced sustainably. Therefore, investing in strengthening and valuing this sector, recognizing its importance for the country, and creating strategies and actions to remain in the world market, serving with maximum efficiency is essential.

REFERENCES

- ABIC - Associação Brasileira da Indústria de Café. **Origem do Café**, 2021. Disponível em: <https://www.abic.com.br/o-cafe/historia/>. Acesso em: 06 abr. 2023.
- AGNOLETTI, B. Z.; OLIVEIRA, E. C. S.; PINHEIRO, P. F.; SARAIVA, S. H. Discriminação de café arábica e Conilon utilizando propriedades físico-químicas aliadas à quimiometria. **Revista Virtual de Química**, v. 11, n. 3, p. 785-805, 2019. DOI: <http://dx.doi.org/10.21577/1984-6835.20190057>.
- ALMEIDA-COUTO, J. M. F.; RESSUTTE, J. B.; BELLUCO, C. Z.; NASCIMENTO, M. G.; ZAGO, I. C. C. Discriminação da cor e categorização do padrão de torra de cafés torrados e moídos comerciais. **Brazilian Journal of Development**, v. 6, n. 2, p. 7863-7869, 2020. DOI: <http://dx.doi.org/10.34117/bjdv6n2-188>.
- BARBARESO, J. O.; CASTRO JÚNIOR, L. G.; CHAIN, C. P.; ANDRADE, F. T.; TOLEDO NETO, L. L. Drawback as a solution to improving the competitiveness of the soluble coffee industry: A feasibility study. **Custos e Agronegócio**, v. 13, n. Special edition, p. 363–388, 2017. URL: <http://www.custoseagronegocioonline.com.br/especialv13/17%20OK%20drawback.pdf>.
- ALMEIDA, D. C. B.; ALMEIDA, F. L.; SILVA, M. I. S. P.; TUNAS, N. C.; PENAS, H. W. A. A herança colonial brasileira: Quanto às relações sociais e de produção no ciclo do café (1727-2017). **Caribeña de Ciencias Sociales**, n. julho, 2018. URL: <https://ideas.repec.org/a/erv/rccsrc/y2018i2018-0782.html>.
- BLISKA, F. M. D. M.; VEGRO, C. L. R.; AFONSO JÚNIOR, P. C.; MOURÃO, E. A. B.; CARDOSO, C. H. S. Custos de produção de café nas principais regiões produtoras do Brasil. **Informações Econômicas**, São Paulo, v. 39, n. 9, p. 1-16, 2009.
- BSCA – Brazil specialty coffee association. A BSCA [online], 2020. Disponível em: <http://bsca.com.br/>. Acesso em: 15 abr. 2023.
- BRASIL- Ministério da Agricultura, Pecuária e Abastecimento. **Sumário Executivo Café**. 2019. Disponível em: <https://www.gov.br/agricultura/pt-br/agroestatisticas/sumario-executivo-de-comercializacao-e-abastecimento/sumario-executivo-cafe.pdf/view>. Acesso em: 08 abr. 2023.
- CARDUCCI, C. E.; OLIVEIRA, G. C. de (Org.). **Manejo do solo na cafeicultura: produtividade e sustentabilidade**. Lavras: Editora UFLA, 2021, 135p.
- CECAFE - Conselho dos Exportadores de Café do Brasil. **Relatório mensal dezembro 2020**, 2020. Disponível em: <https://www.cecafe.com.br/publicacoes/relatorio-de-exportacoes/>. Acesso em: 06 abr. 2023.
- CECAFE - Conselho dos Exportadores de Café do Brasil. **Exportações Brasileiras de Café - País Destino x Tipo de Café**, 2021. Disponível em: <https://www.cecafe.com.br/dados-estatisticos/exportacoes-brasileiras/>. Acesso em: 06 abr. 2023.

CECAFE - Conselho dos Exportadores de Café do Brasil. **Café: Brasil exporta volume recorde de 45,6 milhões de sacas na safra 2020/21** CecaFé, 2021. Disponível em: <https://www.cecfe.com.br/publicacoes/noticias/cafe-brasil-exporta-volume-recorde-de-456-milhoes-de-sacas-na-safra-2020-21-20210712/>. Acesso em: 06 abr. 2023.

CONAB - Companhia Nacional de Abastecimento. **Acompanhamento da Safra Brasileira de Café**, 2019. Disponível em: <https://www.embrapa.br/busca-de-noticias/-/noticia/56084554/producao-dos-cafes-do-brasil-atinge-6162-milhoes-de-sacas-de-60kg-em-2020-volume-25-maior-que-2019>. Acesso em: 06 abr. 2023.

CONAB - Companhia Nacional de Abastecimento. **Análise Mensal** - Café, 2020. Disponível em: <https://www.conab.gov.br/info-agro/analises-do-mercado-agropecuário-e-extrativista/analises-do-mercado/historico-mensal-de-cafe>. Acesso em: 06 abr. 2023.

CONAB - Companhia Nacional de Abastecimento. **Acompanhamento da Safra Brasileira de Café, 2021**. Disponível em: <https://www.conab.gov.br/info-agro/safras/cafe>. Acesso em: 06 abr. 2023.

CONCEIÇÃO, J. C. P. R.; ELLERY JUNIOR, R. G.; CONCEIÇÃO, P. H. Z. Cadeia agroindustrial do café no Brasil: **Agregação de valor e exportação**. 2019. URL: <https://repositorio.ipea.gov.br/handle/11058/9786>.

COSTA, T. R.; SILVA, J. C. G. L. da; VALERIUS, J.; ALMEIDA, A. N. Dinâmica competitiva das exportações brasileiras de papel e celulose: uma aplicação da matriz de competitividade. **Revista Ciência da Madeira** (Brazilian Journal of Wood Science), v. 6, n. 3, p. 191-201, 2015. DOI: 10.12953/2177-6830/rcm.v6n3p191-201

DAVIS, A. P.; TOSH, J.; RUCH, N.; FAY, M. F. Growing Coffee: *Psilanthus* (Rubiaceae) Subsumed on the Basis of Molecular and Morphological Data; Implications for the Size, Morphology, Distribution and Evolutionary History of *Coffea*. **Botanical Journal of the Linnean Society**, v. 167, n. 4, p. 357–377, 2011. DOI: <https://doi.org/10.1111/j.1095-8339.2011.01177.x>

DIAS, L. O.; SILVA, M. S. Determinantes da demanda internacional por café brasileiro. **Revista de Política Agrícola**, v. 24, n. 1, p. 86-98, 2015. URL: <https://seer.sede.embrapa.br/index.php/RPA/issue/view/110>.

FASSIO, L. H.; SILVA, A. E. S. Importância econômica e social do café Conilon. In: FERRÃO, R. G. (Ed.). **Café Conilon**. Vitória: Incaper, 2015. URL: <http://biblioteca.incaper.es.gov.br/digital/handle/item/694>.

FERREIRA, L. T.; SANTOS, J. Safra mundial do ano-cafeeiro 2018-2019 atinge 174,5 milhões de sacas. **Estudos socioeconômicos e ambientais**. Embrapa, 2019. Disponível em: <https://www.embrapa.br/busca-de-noticias/-/noticia/46165397/safra-mundial-do-ano-cafeeiro-2018-2019-atinge-1745-milhoes-de-sacas>. Acesso em: 06 abr. 2023.

FRANCK, A. G. S.; SILVA, M. L.; SILVA, R. A.; CORONEL, D. A. Análise da competitividade do mercado exportador brasileiro de café. **Desafio Online**, v. 4, n. 3, p. 1–21, 2016. URL: <https://desafioonline.ufms.br/index.php/deson/article/view/2669>.

FRANCO JUNIOR, K. S.; BRIGANTE, G. P.; SILVA, T. M.; SOARES, W. L. Qualidade do café arábica por diferentes granulometrias. **Revista Ciência Agrícola**, v. 17, n. 1, p. 31-35, 2019. DOI: <https://doi.org/10.28998/rca.v17i1.6495>.

GURGEL, M.; RELVAS, E. **Café com design: a arte de beber café**. São Paulo: Senac, 2018.

ICO - International Coffee Organization. **Relatório sobre o mercado do Café**. 2020. Disponível em: <https://www.ico.org/pt/Market-Report-19-20-p.asp>. Acesso em: 08 abr. 2023.

ICO. International Coffee Organization. **A história do café**. 2021. Disponível em: http://www.ico.org/pt/coffee_storyp.asp. Acesso em: 06 abr. 2023.

IWASAKI, N.; SELDON, B. J.; TREMBLAY, V. J. Brewing Wars of Attrition for Profit (and Concentration). **Review of Industrial Organization**, v. 33, n. 1, p. 263-279, 2008. URL: <https://www.jstor.org/stable/41799400>.

LACERDA, T. N.; VITAL, T. W.; COSTA, J. M. Vantagem comparativa do café para os dois maiores produtores nacionais: Minas Gerais e Espírito Santo. **Extensão Rural**, DEAER–CCR–UFSM, Santa Maria, v. 26, n. 1, p. 106-119, 2019. DOI: <https://doi.org/10.5902/2318179634389>.

LANDAU, E. C.; SILVA, G. A. da; MOURA, L.; HIRSCH, A.; GUIMARÃES, D. P. **Dinâmica da produção agropecuária e da paisagem natural no Brasil nas últimas décadas: sistemas agrícolas, paisagem natural e análise integrada do espaço rural**. Embrapa, v. 4, cap. 57, p. 2125-2171, 2020. URL: <http://www.alice.cnptia.embrapa.br/alice/handle/doc/1122551>.

LIBERATTI, A. I.; SILVA, P. F. Café Brasileiros: Patrimônios, histórias e sabores. **Revista Empreenda**. UniToledo Gestão, Tecnologia e Gastronomia, v. 3, n. 1, p. 231-244, 2019. URL: <http://www.ojs.toledo.br/index.php/gestaoetecnologia/article/view/3447/520>.

MACHADO, A. H. R.; PUJA, J.; MENEZES, K. C.; MACHADO, W. A Cultura do Café (CoffeaArabica) em Sistema Agroflorestal. **Brazilian Journal of Animal and Environmental Research**, v. 3, n. 3, p. 1357-1369, 2020. DOI: <https://doi.org/10.34188/bjaerv3n3-053>

MAGALHÃES, W. B. **Sistema radicular e suas interações com o desenvolvimento e nutrição do cafeeiro**. 2021.175f. Dissertação (*Magister Scientiae* em Fitotecnia) - Universidade Federal de Viçosa, Viçosa, 2021. URL: <http://www.sbicafe.ufv.br/handle/123456789/12843>

MARTINS, A. L. **História do café**. São Paulo : Editora Contexto, 2008. 316p.

MARTINS, E.; APARECIDO, L. E. O de; SANTOS, L. P. S; MENDONÇA, J. M. A; SOUZA, P. S de. Influência das condições climáticas na produtividade e qualidade do cafeeiro produzido na região do sul de Minas Gerais. **Coffee Science**, Lavras, v. 10, n. 4, p. 499-506, 2015. URL: <http://www.sbicafe.ufv.br/handle/123456789/8153>
MENDES, K.; LUCHINE, A. Non-tariff barriers removal in the Brazilian coffee 111 industry. **Journal of International Trade Law and Policy**, United Kingdom, v. 19, ed. 3, p. 139-157, 2020. DOI: <https://doi.org/10.1108/JITLP-04-2020-0027>.

MENDONÇA, R.; RODRIGUES, W.; MARTINS, L.; TOMAZ, M. A. Abordagem sobre a bienalidade de produção em plantas de café. **Enciclopédia Biosfera**, v. 7, n. 13, p.1-9, 2011. URL: <https://conhecer.org.br/ojs/index.php/biosfera/article/view/4087>

MICHELMAN, J.; CARLSEN, Z. The New Rules of Coffee – A Morden Guide for Everyone. **Ten Speed Press**, v.63, n.1, p. 159, 2018.

MOLDVAER, A. **O livro do café**. [tradução Laura Schichvarger]. São Paulo: Publifolha, 2015.

OLADI, R.; GILBERT, J. Buyer and Seller Concentration in Global Commodity Markets. **Review of Development Economics**, v. 16, n. 2, p. 359–367, 2012. DOI: <https://doi.org/10.1111/j.1467-9361.2012.00667.x>.

OLIVEIRA, I. P.; OLIVEIRA, L. C.; MOURA, C. S. F. T. Cultura de café: histórico, classificação botânica e fases de crescimento. **Revista Eletrônica Faculdade Montes Belos**, v. 5, n. 4, p. 18-32, 2012.

SANTANA, O. T. O.; LIMA, N. C.; TAVARES, M. A relação entre o comportamento do indicador de liquidez corrente das empresas de capital aberto do agronegócio pela variação de índices econômicos no Brasil. **Revista Contemporânea de Contabilidade**, v. 16, n. 41, p. 63-92, 2019. DOI: <http://dx.doi.org/10.5007/2175-8069.2019v16n41>

PELOSO, A. F.; TATAGIBA, S. D.; REIS, E. F. dos.; PEZZOPANE, J. E. M.; AMARAL, J. F. do. Limitações fotossintéticas em folhas de cafeeiro arábica promovidas pelo déficit hídrico. **Coffee Science**, Lavras, v. 12, n. 3, p. 389-399, 2017. URL: <http://hdl.handle.net/123456789/9130>

PEREIRA, S. P.; BARTHOLO, G. F.; BALIZA, D. P.; SOGREIRA, F. M.; GUIMARÃES, R. J. Crescimento, produtividade e bienalidade do cafeeiro em função do espaçamento de cultivo. **Pesquisa Agropecuária Brasileira**, v. 46, n. 2, p. 152–160, 2011. DOI: <https://doi.org/10.1590/S0100-204X2011000200006>.

PEREIRA, L. L.; MORELI, A. P.; BRIOSCHI JÚNIOR, D.; SOUSA, L. H. B. P.; MARCATE, J. P. P.; *et al.* Construção de perfil sensorial para o café Conilon fermentado. **IFES Ciência**, v. 5, n. 2, p. 242–252, 2019. DOI: [10.36524/ricv5i2.461](https://doi.org/10.36524/ricv5i2.461).

PINTO, V. H. L.; COSTA, M. E.; FERREIRA, G. do C. Avaliação da concentração das exportações mundiais de café entre 2008 e 2018. **Revista de Desenvolvimento e Políticas Públicas**, v. 4, n. 1, p. 40–54, 2020. DOI: <https://doi.org/10.31061/redepp.v4n1.40-54>.

SARA, C. E. D. A. B.; FERNANDES, A. M.; LIMA, A. P. A.; COSTA, L. T. D.; CUNHA, C. N. Competitividade da cafeicultura brasileira. **Revista de Política Agrícola**, v. 27, n. 3, p. 9–16, 2019. URL: <https://seer.sede.embrapa.br/index.php/RPA/article/view/1440/pdf>

SCHIRIGATTI, E. L.; SILVA, J. C. G. L. D.; ALMEIDA, A. N. D.; SANTOS, A. J. D.; RUCKER, N. D. A. Vantagem comparativa e matriz de competitividade do mate brasileiro e argentino, no período de 1997-2011. **Ciência Florestal**, v. 28, n. 4, p. 1807–1822, 2018. DOI: <https://doi.org/10.5902/1980509835360>.

SCHULTZ, G.; WAQUIL, P. D. **Análise da competitividade das cadeias produtivas agroindustriais**. Porto Alegre: Editora da UFRGS, 2011. URL: <https://lume.ufrgs.br/handle/10183/214156>

SILVA, B. A. D. O.; REIS, E. A. A bienalidade da cafeicultura e o resultado econômico da estocagem. **Custos e @gronegócio online**, v. 9, n. 3, p. 1-25, 2013. URL: <http://www.custoseagronegocioonline.com.br/numero3v9/Bienalidade.pdf>

SOUZA, M. F.; DE MUNER, L. H.; FORNAZIER, M.; ALIXANDRE, F.; KROHLING, C. Tendências para a sustentabilidade da cafeicultura de arábica em regiões de montanha. **Incaper em Revista**, Vitória, v. 10, n. 1, p. 105-124, 2019. URL: <http://biblioteca.incaper.es.gov.br/digital/handle/123456789/3963>.

SPENCE, C.; CARVALHO, F. M. The coffee drinking experience: Product extrinsic (atmospheric) influences on taste and choice. **Food Quality and Preference**, v. 80, n.1, p.103- 802, 2020. DOI: <https://doi.org/10.1016/j.foodqual.2019.103802>.

TANAHASHI, A. A. N.; CALDARELLI, C. E. Determinantes da oferta de exportação brasileira de café. **Revista de Política Agrícola**, v. 30, n. 1, p. 98, 2021. URL: <https://seer.sede.embrapa.br/index.php/RPA/article/view/1570/pdf>

THOMÉ, K. M.; FERREIRA, L. S. Competitividade e estrutura de mercado internacional de café: análise de 2003 a 2012. **Coffee Science**, Lavras, v. 10, n. 2, p. 184-194, 2015. URL: <http://www.sbicafe.ufv.br/handle/123456789/8125>.

XIMENES, L. J. F; VIDAL, M. F. Produtor de café no Brasil: mais agro e menos negócio. **Caderno Setorial ETENE**, v. 2, n. 12, p. 1-15, 2017. URL: <s1dsp01.dmz.bnb:8443/s482-dspace/handle/123456789/326>.