Industry note: Brazil: a lead exporter and world power in agribusiness products

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Abstract: In the last 40 years, Brazil evolved from a minor producer of agricultural commodities to a top exporter and world leader in the production of several commodities. Brazil is now the world's third larger producer and exporter of food products. Soybean is at the centre of this evolution: the country is the largest producer and exporter. Corn is the second most important crop in Brazil, being the world's third largest producer and second exporter. Brazil is the second largest world producer of cotton, and the largest sugarcane producer, resulting in the production of sugar or ethanol. Brazil is also the leading producer and exporter of coffee and orange juice. Brazilian meat production is also an important segment, making the country the largest exporter of beef and chicken. Brazil agribusiness will keep on growing, facing the challenge of supplying food, fibres and renewable energy as international demanded by several other countries.

Keywords: Brazilian production; exports; soybean; sugar; corn; orange juice; coffee; meat; Brazil.

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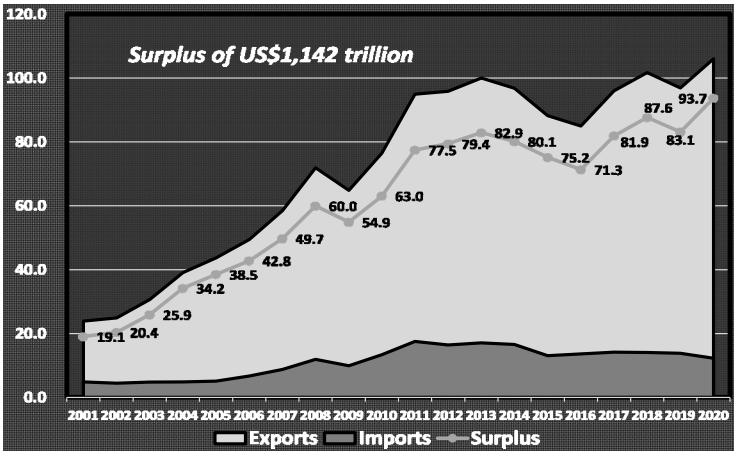
1 Introduction

Brazilian agribusiness is a case of technological success, especially for its productivity achievements in low latitude tropical climates and its resulting ability to compete as a worldwide leader in agribusiness exports. Brazil is today a top exporter and world leader in the production of commodities such as soybean, sugar, corn, orange juice, coffee and meat. While agribusiness has always been important in the context of Brazil's economy, it has never been more important than now, when it accounts for about 25% of GDP, 45% of exports, and generates about 30% of the country's formal jobs.

Figure 1 Trade balance of Brazilian agribusiness from 2000 to 2019

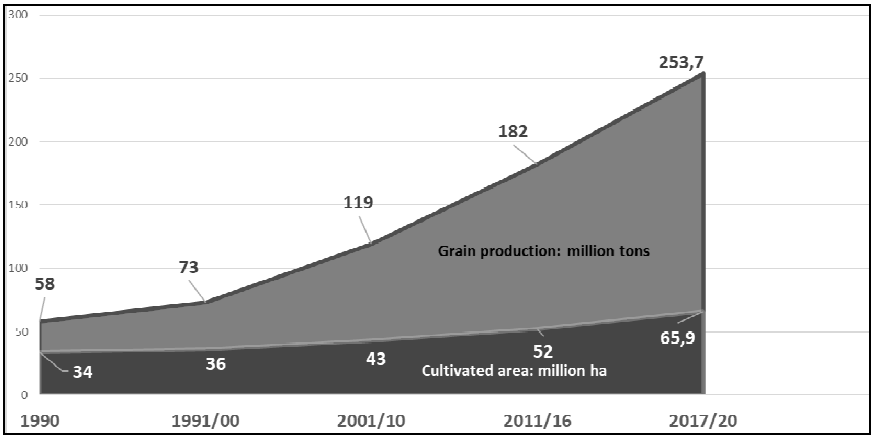


Source: Adapted from MAPA – Ministry of Agriculture, Livestock and Supply, and SECEX/MDIC – Foreign Trade Secretariat/Ministry of Industry/Foreign Trade and Services, Brazil

The growth and efficiency of Brazilian agribusiness over the last 40 years turned the sector into the flagship of the national economy, generating a surplus of US$1.142 trillion in the period from 2000 to 2019 (Figure 1). Brazilian agriculture has historically gone through several cycles, each emphasising a different commodity. These included rubber, Sugarcane, cocoa and coffee. During these cycles, production was greatly concentrated on a single crop. For example, at the start of the twentieth century, 70% of Brazilian exports were concentrated on one crop: coffee. Today, while soybean is now the main crop, it corresponds to only of 15% of exports. The corresponding share of coffee is a mere 3%, confirming that Brazilian exports are now far more diverse than in the past.

The transformation of Brazilian agriculture started in the 1970s, which is widely regarded as the take-off decade for Brazilian agribusiness. Since then, Brazil evolved from a minor producer of agricultural commodities to its current position as a world leader. Brazil is now the world's third larger producer and exporter of food products. Soybean is at the centre of this evolution. Technological innovations in soybean production spearheaded innovation in other crops and livestock in the 1990s, leading to widespread increases in the productivity of all crops and livestock.

Figure 2 Area and grain production in Brazil: 1990–2020



Source: IBGE (2020) and MAPA (2020)

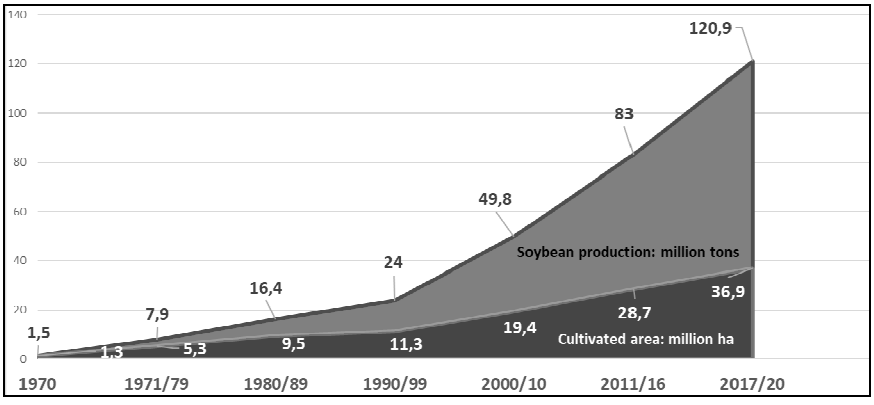
The output of Brazilian agribusiness has shown world-class improvements in the production of grains, meat and fibres. Grain production increased from 58 million metric tons (MMTs) in 1990 to 253.7 MMTs (Figure 2) in 2019/2020 (MAPA, 2020). Meat production grew eight-fold, from 3.3 MMTs in the mid-1970s to 27.5 MMTs in 2019 (CONAB, 2020a). Figure 2 is additional information about production and exports of key Brazilian agribusiness products.

2 Soybeans

First introduced in 1882, soybean production did not take off immediately. It remained at a low level for about 70 years. In the mid-twentieth century commercial production began in the subtropical region of Brazil (25° to 30° South), successfully using varieties developed in the Southern USA, where the subtropical climate exhibits similarities to the

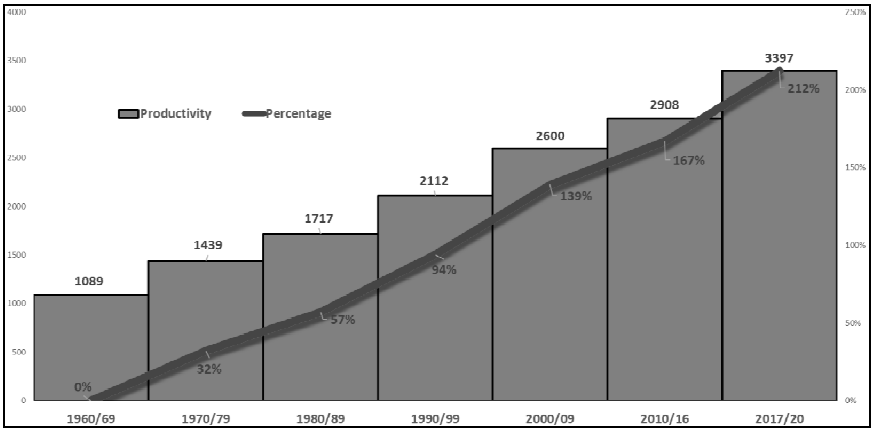
climate in Southern Brazil (Gazzoni and Dall'Agnol, 2018; Cattelan and Dall'Agnol, 2018). Early data on soybean production in Brazil indicates production at 25,000 MTs in 1949, a paltry amount compared to the 2020 output of 120.9 MMTs (Figure 3).

Figure 3 Cultivated area and production of soybean grain in Brazil: 1970–2020



Source: IBGE (2020) and MAPA (2020)

Figure 4 Average soybean productivity from 1960 to 2020



Source: CONAB (2019) and MAPA (2020)

The evolution of productivity is equally impressive (Figure 4), from a 1,089 kilograms per hectare (kg/ha) in the mid-1960s, to a record 3,397 kg/ha in the 2017/2018 crop; an increase of 211% (adapted from Gazzoni and Dall'Agnol, 2018).

In the 1980s, Brazil's soybean research culminated in the development of Tropical Soybean, which is the name given to soybean cultivation adapted to low latitudes. Thus, production grew in a low latitude region known as the 'Cerrado' (it has characteristics similar to the African Savannah), where conditions were unfavourable to the production of traditional varieties. The crop has adapted very well in that region, where the soils are acidic and infertile. However, the soil has good topography, is deep, easy to handle, well drained and receive significant amounts of rain in spring and summer, making it the

country's main production region, not just for soybean, but also for corn, cotton and meat.

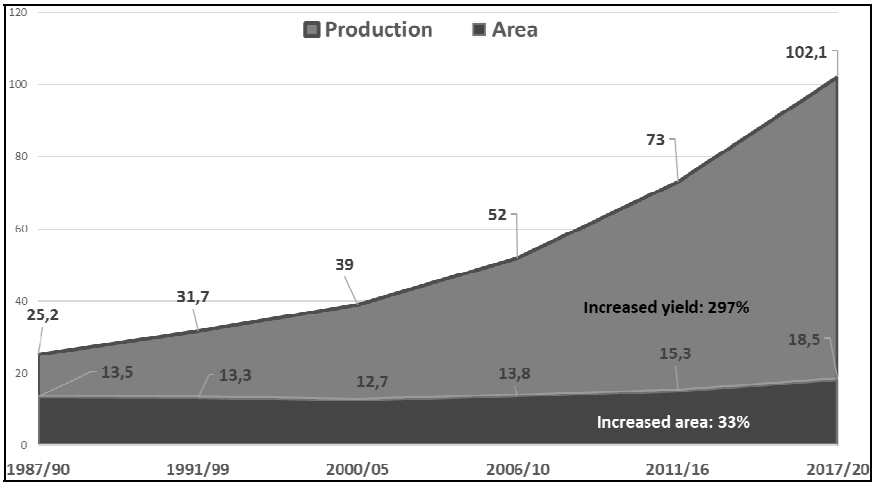
Progress has been remarkable. In 1970s, soybean production in the Cerrado was not significant: 1.4% of Brazilian production. It advanced to 15.3% in 1979, to 44.4% in the late 1980s and in 2019 led production with 65.0% (Gazzoni and Dall'Agnol, 2018; Cattelan and Dall'Agnol, 2018). The harvest of 120.9 MMTs for 2019/2020 (MAPA, 2020) indicates that Brazil has become the world's largest producer of soybean. For 2020/2021 a record harvest of around 133.3 MMTs is estimated (COGO, 2020). Brazil is also the world leader in exporting soybean: it is estimated a total of 86.5 MMTs exported in 2020 (COGO, 2020), most of it (70.0%) exported to the People's Republic of China.

Given that Brazil still has plenty of land to increase production, the future for Brazilian soybean is promising, without however advancing over forest areas of the Amazon and other lands still with native vegetation. Increased productivity and crop replacement should account for most of the future increase in yield.

3 Corn

After soybean, corn is the most important crop produced in Brazil, which ranks as the world's third largest producer with 102.1 MMTs (MAPA, 2020) and second largest exporter (Figure 5): exports totaled 45 MMTs in 2019 and is estimated in 38.0 MMTs in 2021 (COGO, 2020). Together with soybean, corn is a key ingredient of animal feed. The availability of quality feed contributes to Brazil's standing as the world's top exporter of beef and chicken and fourth of pork (USDA, 2019a; Flake and Silva, 2019; MAPA, 2020).

Figure 5 Area and grain production of corn in Brazil: 1987–2020

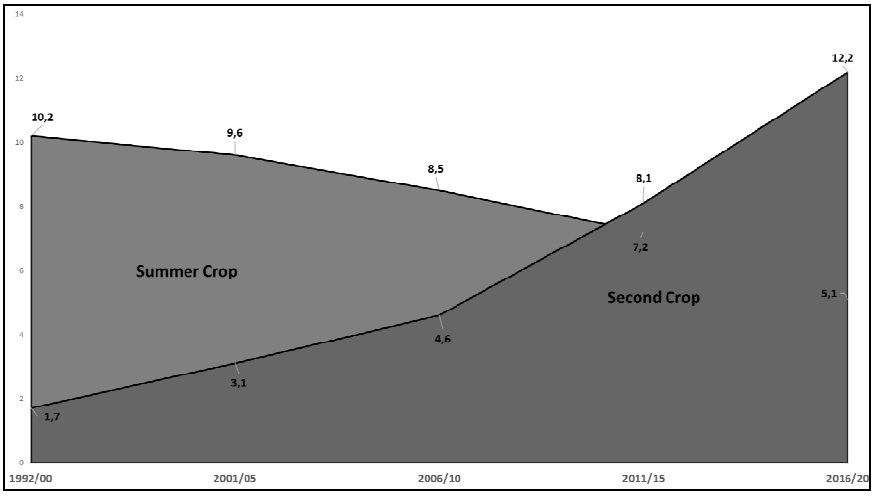


Source: CONAB (2019)

While corn has been widely cultivated in Brazil for centuries, its production has grown significantly in recent decades once the country developed a 'no-till' system, which allowed corn to be established as a second summer crop, right after the soybean harvest.

In 2020, corn cultivated area was 18.5 million hectares, of which 14.3 million were as second crop (Figure 6). The total production reached 102.1 MMTs, with a productivity level of 5,500 kg/ha (MAPA, 2020). By way of comparison, this is up from the 1991 level when the area covered was 13.5 Mha with less than 1.0 Mha a second crop; the total output was 24.1 MMTs with a productivity level of 1,700 kg/ha (CONAB, 2019).

Figure 6 Area cultivated with corn as a summer crop and as a second crop



Source: MAPA (2020)

4 Cotton

The production of Brazilian cotton provides an interesting example of how productivity enhancement may increase output even if the area of cultivation is reduced. The area dedicated to cotton production in 1970 was 4.0 Mha almost entirely harvested using labour and currently is down to 1.67 Mha and harvested mainly by machines (MAPA, 2020). Productivity of cotton fibre in the same period increased from 200 kg/ha in 1970 to 1,753 kg/ha in 2020 (MAPA, 2020), nearly a nine-fold increase. Brazil has the highest global productivity of cotton grown without irrigation. Currently the Brazilian production of grain cotton is 4.4 MMTs with 2.9 MMTs of fibre.

Although Brazil is the fourth largest world producer of cotton, it is the second largest exporter, exceeding 1.7 MMTs in 2019 (COGO, 2020). Main buyers are the Southeast Asian countries, such as Indonesia, Bangladesh, Vietnam and Pakistan. Turkey is also a large buyer, as well as China. Cotton cultivation in Brazil moved from Southeast to the Cerrado region, where its harvest is favoured by the dry weather prevailing during the fall harvest. Cotton, like corn, is preferentially grown after the soybean harvest as a second summer crop.

5 Sugarcane

Sugarcane (sugar/ethanol) is the 8th most valued product in the Brazilian export list and is the 4th most important among agricultural products: after soybean, meat and wood products; pulp, mainly. Although it remains important in the context of the Brazilian economy (exports exceeding US$10 billion in 2019), it was once more important in the period referred to as the Sugar Cycle (mid-16th to mid-18th century), during which sugar was the basis of the Brazilian economy and represented the first great agricultural and industrial wealth of the country.

Brazil is notably the world's largest sugarcane producer: 650 MMTs or 40% of the global crop. Its production is concentrated in the South-eastern region of the country and is mostly harvested by machines. Most sugarcane processing plants are flex, and can choose to produce sugar or ethanol, depending on convenience from an economic perspective. Historically, sugar production has been the mills' first choice, but this advantage is diminishing. In 2020, according to CONAB (2020b), 30 MMTs of sugar and 34 billion litres of ethanol were produced, making Brazil the 2nd largest producer of ethanol after the USA.

In addition to marketing pure ethanol (hydrated) as biofuel, Brazil also adds it to gasoline (hydrated). Currently the percentage is about 25%, but it was 27.0% and there are official indications that it could reach 30% by 2022. It is the highest blending rate among countries that add biofuel to gasoline. The price of hydrous ethanol at supply pumps is around 70% of the price of gasoline.

6 Orange juice

Orange cultivation is an important activity for Brazil, either by the volume of resources it generates for the country's trade balance or by the volume of jobs it offers in industry and the countryside. Brazil is the leading producer of oranges worldwide (18.3 MMTs) with about 35% of world production (51.8 MMTs), followed by China, the European Union, the USA and Mexico. According to the Brazilian Institute of Geography and Statistics (IBGE, 2020), the orange production area in Brazil totals 654,404 ha, with an average yield of 28.0 MT/ha.

As in production, it leads the way in fruit juice exports, accounting for 72.5% of world commodity trade with over 935 MTs, followed by Mexico, with just over 195 thousand tons of juice (USDA, 2019b). Three out of every five glasses of juice consumed worldwide comes from Brazilian orange groves. Brazil exports 90% of the orange juice it produces. The European Union, the USA, Japan and China are the main markets for Brazilian juice, especially the European community countries that consume approximately 70% of the orange juice that Brazil exports.

As in the USA, where about 60% of production is concentrated in a single state (Florida), something similar happens in Brazil: more than 70% of orange is produced in the state of São Paulo (IBGE, 2020).

7 Rice

With exception of countries in Asia, Brazil is the largest global producer and consumer of rice. Currently its planted area is 1.7 Mha with a total output of 11.2 MMTs and a yield of approximately 6,700 kg/ha (MAPA, 2020). The increase in productivity is remarkable with respect to 1981 numbers, when the planted area was larger (6.6 Mha), but with a lower output level of 8.6 MMTs. Productivity in 1981 was only 1,303 kg/ha; more than four times lower than the current yield.

Rice occupies the third largest crop area in Brazil, with production concentrated in the Southern region of the country, mainly in the state of Rio Grande do Sul. In this state, cultivation is almost entirely carried out in flood-irrigated fields, unlike other states where rice is preferably grown under rainfed conditions. More than 60% of the Brazilian cereal crop is produced in this state.

8 Coffee

Brazil has been remarkably the world's largest coffee producer for over 150 years, accounting for a third of world production and also boasting the position of largest global exporter. Although coffee's share of the country's total exports is a fraction of what it was last century, given the growth in exports of other agricultural commodities; soybean, for example, which today generates six times more export earnings than coffee.

The current coffee planted area is 1.9 Mha, producing 3.60 MMTs and average yield of 1,860 kg per hectare (MAPA, 2020). The Arabica species represents 70% of the Brazilian coffee production and its cultivation is concentrated in the South-central region of Brazil: states of Minas Gerais, São Paulo and Espirito Santo, in order.

Although coffee production is modernising, replacing labour with harvesting machines, it still represents a major source of jobs; more than 5.0 million today.

9 Meat

Brazilian meat production in 2020 will total 29.6 MMTs: 14.9 poultry, 10.5 beef and 4.2 pork. In 2019 is Brazil exported 4.1 MMTs of chicken meat, 2.2 MMTs of beef and 0.7 MMTs of pork, making the country the largest exporter of beef and chicken.

Brazilian livestock is presently 213.57 million head of cattle, 1.7 billion poultry and 41.4 million pigs (MAPA, 2020). The growth in meat production is largely explained by the increase in agricultural production, whereby the availability of feed spurred the growth of livestock numbers.

The production of more meat has received a strong boost recently as demand from the African swine fever has wiped out millions of animals in Asian countries, particularly China. Although the impact has been on pork, the lack of it has also affected demand for beef and poultry, encouraging Brazil to increase production to supply this additional global demand.

10 Conclusions

The significant growth of Brazilian agribusiness, both in production, productivity and exports, whether in agriculture, livestock or timber production is worthy of recognition, not only from the Brazilian community, but also from the international one.

The impression is that it was soybean that drove the development of other agricultural activities, especially in increasing productivity, mainly from the 1990s. Everything started from the 1970s, with the leading role of technology, a tool that started to be used more intensely from then on. Brazilian producers who did not adhere to this new agro dynamics were forced to leave the field for lack of competitiveness.

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