

## Antecedents

Like all the European colonizers of the New World who followed the Spanish, the Portuguese had to obtain a product that was exportable to Europe to sustain their American colonial enterprise. Without precious metals, the Portuguese only had access to Indian slave labor and had to develop new products acceptable to the European market. The solution was the establishment of a slave-based plantation economy producing cane sugar, a product which the Portuguese had already developed in their Atlantic islands in the fifteenth century. First using captured Indian slave labor, the plantations of Brazil by 1600 were already being manned by African slave labor brought by Portuguese slavers from West Africa. By the middle of the sixteenth century Brazil had become the world's largest producer of cane sugar, and the industry provided the funds necessary for the Portuguese to maintain their continental possession in the New World.

The settlement of Brazil occurred in distinct phases. In the first phase the economy and population were concentrated on the northeastern coast. It was here that the sugar plantation economy was first developed on a major scale, and this region continued to dominate the colonial economy and the world sugar market for more than a century. A second center of settlement quickly developed in the southeastern region around the port of Rio de Janeiro and its hinterland and at the coastal ports to the south and in the interior zone around what would become the current city of São Paulo. Here a frontier culture developed with whites, mestizos (*caboclos*) and Indians and this population carried out raiding and exploration expeditions in the western and southern frontiers of the country. It was these raiders, known as *bandeirantes*, who discovered both gold and

diamonds in this hinterland in the late seventeenth and early eighteenth century. Brazil then entered an intensive mining phase in areas now belonging to the states of Goiás, Mato Grosso and Minas Gerais. In the latter region the wealth of the alluvial gold deposits drew Africans and Portuguese in large numbers and there rapidly evolved a mosaic of major interior urban centers. The mining activity peaked in the mid-eighteenth century, which led to a long-term decline in what had now become the most populous region of the colony.

But the growth of sugar in the hinterland of Rio de Janeiro and in the highlands near São Paulo counterbalanced the decline of mining and also helped to shift the center of both population and economic activity to the southeastern region. The growth of the French and English Caribbean sugar plantation economies in the eighteenth century led to a decline in the relative importance of Brazilian sugar on the international market. Nevertheless Brazil was still a major exporter to southern Europe, and the sugar economy sustained the growth of the southeastern as well as northeastern regions until the early nineteenth century.

The arrival of coffee as a new slave plantation crop began in earnest in the late colonial and early imperial period. Moreover it was in the southeastern region that this slave plantation economy would be centered and it was to this region that several million African slaves arrived in the period up to 1850. The continued dynamism of Brazil, from sugar and gold cycles through the coffee boom, led to the massive introduction of African slaves over the three centuries of colonial settlement. It had already absorbed more African slaves, currently an estimated 3 million Africans, than any other single region in the Americas to 1850,<sup>1</sup> and with the end of slavery in 1888 it was able to attract an even greater number of free European immigrants. It was one of the few Latin American states able to compete with the North American countries in taking a share of the great European transatlantic migration of the late nineteenth and early twentieth century.

Despite the never-ending expansion into the western and southern frontiers, the population of Brazil was still highly concentrated near the coast even into the nineteenth century. Most of the interior space was lightly populated and consisted primarily of forest and grasslands. But much of this would change in the last quarter of the nineteenth century as the railroads and the coffee plantations moved westward to open the

<sup>1</sup> This is the latest estimate of Africans disembarked in Brazil generated from The Trans-Atlantic Slave Trade Database, accessed May 29, 2017, at [www.slavevoyages.org/voyage/search#](http://www.slavevoyages.org/voyage/search#).

interior to settlement. The expansion of coffee production in the second quarter of the nineteenth century provided Brazil with an international export whose demand systematically grew through increasing adoption of coffee drinking by a growing and ever more urban and richer population in the advanced countries of the world. Given Brazil's exceptional physical conditions for coffee cultivation, the country quickly assumed the position of world leader in the supply of this product, and was easily capable of increasing production adequately to respond to expanding world demand. For more than sixty years, coffee was produced with slave labor, but at end of the nineteenth century slaves were replaced by free wage labor based on the participation of European and Asian immigrants. The concentration of coffee production in the axis formed by the states of Rio de Janeiro, São Paulo and Minas Gerais gave this region an economic and political supremacy within the nation which was maintained until 1930.

Along with the substitution of slaves by free wage workers in 1888, the monarchy was replaced by a republic a year later. The emergence of the republic led to a fundamental reorganization of the locus of national power, which shifted from a centralized state to a more federal one, and their appeared new regional political actors who would consolidate their position throughout the period of the so-called Old Republic to 1930. São Paulo state emerged as the leading economic center of the country as coffee production moved west to the interior of the state of São Paulo, and this allowed São Paulo to become the leading state within the national economy.<sup>2</sup>

The initial expansion of coffee occurred in the Paraíba Valley, first in the part pertaining to Rio de Janeiro in the region of Vassouras. Coffee plantations then moved north and west into the region called the *zona da mata* in the southwestern part of the province of Minas Gerais and the areas around the counties (or *municípios*) of Areias and Bananal in the northeastern part of the province of São Paulo. Until the middle decades of the century the Paraíba Valley was the world's single largest producer of coffee. By 1850 Brazil accounted for half of world production, and coffee in turn accounted for half the value of national exports. As world demand increased, Brazilian coffee production expanded at an even faster pace,

<sup>2</sup> On the evolution of coffee see the two-volume survey by Francisco Vidal Luna and Herbert S. Klein, *Slavery and the Economy of São Paulo, 1750–1850* (Stanford, Calif.: Stanford University Press, 2003); and *The Economic and Demographic History of São Paulo 1850–1950* (Stanford, Calif.: Stanford University Press, 2018).

and in the last five years of the century Brazil accounted for 70% of world production. Land was abundant and cheap, and thus labor was the principal factor limiting the expansion of coffee. Initially the end of the slave trade in 1850 put at risk the expansion of coffee, but this was resolved by importing slaves from the non-coffee-producing regions. The result was that the coffee areas steadily increased their share of slaves after 1850.

Although planters as early as the 1850s began to experiment with using salaried European workers in the coffee fields, these initial attempts failed as free workers did not accept the conditions offered nor were they willing to work alongside slaves. Eventually government subsidization was needed to attract free laborers. In 1884, under pressure from the coffee growers, the government of the state of São Paulo assumed the entire cost of the travel of all immigrants from Europe to the farms of São Paulo.<sup>3</sup> It was this law which definitely established the basis for a massive introduction of European immigrants to São Paulo. The formal abolition of slavery in 1888 removed the last obstacle. There now occurred a major flow of immigration to the state of São Paulo. Between 1827 and 1884, only 37,000 foreign immigrants had arrived to São Paulo, but in the decade after 1884 half a million immigrants reached the state. Of the 2.3 million immigrants who came to São Paulo between 1887 and 1928, half were subsidized by the government. Other states also received immigrants in this same period, and in total some 4 million foreign-born immigrants arrived in Brazil between 1884 and 1940.<sup>4</sup> Thus despite the progressive dismantling and final abolition of slavery in the decade of the 1880s, there was no discontinuity in the production of coffee.

In this new free labor era, the west of São Paulo became the hegemonic producer of coffee within Brazil. The movement of coffee toward the west paulista plains was initiated in the 1870s following the introduction of railroads. The paulista western zone and other newly evolving areas of the state were developed on virgin lands with high soil productivity, and local planters were more open to experimenting with new labor regimes. In contrast, the lower-productivity coffee plantations of the Paraíba Valley went into decline and were no longer competitive without slave labor.

<sup>3</sup> Law 28 of 29 March 1884. [www.al.sp.gov.br/porta/site/Internet/](http://www.al.sp.gov.br/porta/site/Internet/)

<sup>4</sup> For São Paulo see *Anuário Estatístico do Brasil* (hereafter cited as *AEB*), 1939–1940, 1307, and for all Brazil *AEB*, 1950, 55.

Along with labor, the other obstacle to the expansion of coffee production was transport. From the middle of the nineteenth century the necessity of creating an efficient rail transportation system to ship coffee to the coast was recognized as a fundamental necessity. The traditional system of transporting the crop by mules created high costs and limited the potential expansion of the system. The solution came in 1853 when the government guaranteed interest on the funds invested in railroad construction.<sup>5</sup> The *Estrada de Ferro D. Pedro II*, which went from the port of Rio de Janeiro to Cachoeira in the state of São Paulo, was the first railroad to be successfully built. It served the coffee region of the Paraíba Valley, permitting the export of coffee to the port of Rio de Janeiro.

The newer São Paulo coffee zones continued to rely on mule transport to reach their natural export port of Santos, located some 60 km from the city of São Paulo. But in 1867 the São Paulo Railway was inaugurated which connected Santos to the city of Jundiaí, which was the traditional entrance to the western paulista region. Using local planter capital, a complex railroad network was created which spread through the interior of the province and reached into the unexplored backlands. The railroads permitted the exploitation of lands of exceptional quality, particularly apt for coffee cultivation. Thus by the second half of the century Brazilian coffee planters resolved the two crucial blockages that limited the expansion of coffee: the insufficiency of labor and the lack of a cheap transport system. These railroads also moved other types of goods between ports and between different regions, creating a more integrated regional market, both for domestic production as well as for imports and exports.

Given its extensive agricultural frontier and virgin lands, São Paulo could now meet the increasing world demand for coffee. Between 1852 and 1900 the rate of growth of world coffee consumption was 2.5% per annum. In this period world consumption went from 4.6 million sacks of coffee to 18.1 million sacks, of which 73% was produced by Brazil.<sup>6</sup> There were also important changes in the regional base of coffee production in this period. The state of São Paulo surpassed Rio de Janeiro as the dominant coffee region in the 1890s. This growth continued into the next

<sup>5</sup> Subsidies were essential since private financiers feared that their profits would prove insufficient. William R. Summerhill, *Order against Progress: Government, Foreign Investment, and Railroads in Brazil, 1854–1913* (Stanford, Calif., Stanford University Press, 2003), 40.

<sup>6</sup> Edmar L. Bacha and Robert Greenhill, *150 Anos de Café* (2nd edn. rev.; Rio de Janeiro: Marcellino Martins & E. Johnston Exportadores, 1993), tables 1.1 and 1.2.

century, and by the 1910s São Paulo alone accounted for 70% of total Brazilian production.

But the special characteristics of supply and demand for coffee created an unstable market with great fluctuations in price. World demand grew steadily due to the growth of population, urbanization and income in the consuming countries, but at the same time was seriously affected by periodic crises in the economies of Europe and the United States.<sup>7</sup> Although plantings were influenced by prices, other exogenous factors sometimes delayed this price influence for several years. Coffee trees, for example, only began to produce at four years of age and continued to produce for some twenty to thirty years, and sometimes even as much as fifty years. Finally, a factor of major importance was the exchange rate. Prices were quoted in English pounds but the relevant price for the producer was in national currency. Thus, beyond the internal costs in national money, fluctuations in the exchange rate influenced the decisions of producers as much as changing international prices. All of these factors led to delayed responses to changes in demand in the coffee market.<sup>8</sup>

Until the 1890s there was a stability between demand and supply. In 1892, however, the international price of coffee began a long secular decline. But given the strong devaluation of local currency these falling international prices did not lead to a decline in national production or new plantings, which created a structural excess of supply. This paradox of continued expansion and falling prices and profitability was the result of earlier coffee plantings gradually entering into production, thus leading to overproduction.<sup>9</sup>

Given the growing coffee overproduction crisis characterized by low coffee prices and the accumulation of stocks of coffee, there was increasing pressure on the government to intervene. By 1902 the state of São Paulo was forced to prohibit the planting of new trees for a five-year period. Even after this state intervention, there was another major harvest in 1906/1907.<sup>10</sup> By now Brazil alone in one year produced more than the

<sup>7</sup> On this theme see the seminal work of Antonio Delfim Netto, *O Problema do Café no Brasil* (São Paulo: IPE-USP, 1981), chap. I a IV. In various parts of this section devoted to interventions in the coffee market, we have used the work of Delfim Netto.

<sup>8</sup> *Ibid.*, chap. I a IV.   <sup>9</sup> *Ibid.*, chap. II.

<sup>10</sup> The stockpile of coffee bags was 11 million bags for a consumption of 16 million. And the initial estimate of the 1906/1907 harvest was 16 million, but production reached 20 million bags. There was no place to offer a crop of this magnitude. As previously noted, coffee trees began to produce only at 4 years of age and continued to produce for some 20 to 30 years, and sometimes even as much as 50 years. Thus, although the crisis was evident, the production did not depend on current decisions, but plantings made at

world consumed in that year. At a meeting of the Brazilian producers in 1906, the Taubaté Agreement was signed in which the government agreed to buy the excess coffee production at a minimum pre-established price. It was also decided to restrict the production of low-quality coffee, and stimulate internal consumption and promote the product abroad.<sup>11</sup>

But these programs were only partially successful and could not be maintained by the individual states. At the end of the 1906/1907 harvest the world stocks of coffee were 16.4 million tons, half of which pertained to the state of São Paulo. At this point the federal government decided to support the government of the state of São Paulo and took out international loans which it then passed on to the state government for its coffee control (valorization) program. This first valorization scheme was a success, prices recuperated on the international market and the state was able to gradually sell stockpiled coffee in the market. This first intervention in the coffee market was followed by two more successful programs, one in 1914 and another in the early 1920s.<sup>12</sup>

These three interventions were quite temporary, relating to short market crises and an annual overproduction. Part of the inventory was taken off the market. There were also temporary controls of planting and natural fluctuations in coffee production which led to a rebalance in the coffee market. The success of these intervention schemes promoted the idea of establishing a permanent defense of coffee. When stocks of the third recovery operation were sold, the federal government transferred operation of the defense of coffee to the state of São Paulo, which created the Institute for the Permanent Defense of Coffee which subsequently became the Coffee Institute of São Paulo.

The crisis of 1929 hit the coffee market at a moment of local overproduction, a natural result of the policies of long-term protection which had been adopted. Maintaining the policy of regulating total shipments of coffee to the ports, the exceptional harvests of the late 1920s created ever-increasing stocks in the warehouses, and also increased demand for credit both to purchase the stocks and to finance the time they remained warehoused. Given the system of convertibility then in place, the increase in credit would depend on the reserves of gold in the financial system. But as soon as signs of an international crisis appeared, there was an immediate

least five years earlier. Delfim Netto affirms that the regime of exploitation in São Paulo, based on the *colonato* regime, made the crisis more acute in São Paulo, in relation to other producing states. *Ibid.*, 44–45.

<sup>11</sup> *Ibid.*, chaps. II and III. <sup>12</sup> Luna and Klein, *Slavery and the Economy*, chap. I.

restriction of credit in the international market. As in all such crises, there was also a flight of capital to the more developed countries. This crisis of confidence thus stimulated the demand for foreign currency and simultaneously reduced the gold reserves and dramatically decreased the money supply. In this situation it was practically impossible to expand credit and to maintain convertibility of the national currency.

The government of Getúlio Vargas, installed after a 1930 revolution, faced the same crisis of coffee overproduction and was obliged to support the coffee sector in order to avoid a more profound crisis. It created a mechanism which pardoned part of the debts of the coffee growers, and then it restricted production. The extraordinarily large harvest of 1929 was repeated in the two following years, reaching maximum levels in 1933. To maintain prices at a profitable level for producers, the government began destroying the stocks of reserve that existed which could not be sold. In 1933 the debts of the coffee growers were reduced by half and the remaining debt financed over a ten-year period. It prohibited not only new plantings, but re-plantings of old trees, and created a program which divided all the coffee being sent to the ports in three parts: 30% would be exported, 30% placed in stocks and 40% would be destroyed. With periodic adaptations, this system would be maintained until 1944, resulting in the burning of 78.2 million sacks of coffee, the equivalent of three times annual world consumption. This program of control succeeded in gradually diminishing national production. World prices remained low until the end of the 1930s, only recuperating after the beginning of World War II. This control scheme also helped Brazil's competitors who continued to export at even very low prices, and Brazil by the end of the decade lost 10% of its world market share.<sup>13</sup>

In spite of the importance of coffee production to the national economy, other agricultural crops were produced throughout Brazil, some of which entered both the international and internal markets. In the export market, sugar was the leading crop after coffee. As late as the 1820s, sugar accounted for a third of the value of Brazilian exports, as compared to a fourth of the value obtained by cotton and just a fifth for coffee exports. But coffee soon dominated and progressively led mid and late nineteenth-century imperial exports, and throughout the period of the Old Republic it accounted for an average of some 65% of the value of exports (see Table 1.1).

<sup>13</sup> *Ibid.*, 142–157.



TABLE I. I: *Participation of principal crops in total exports, 1821-1939*

	Coffee	Sugar	Cocoa	Yerba mate	Tobacco	Cotton	Rubber	Leather & skins
1821-30	21%	34%	1%	0%	3%	25%	0%	16%
1831-40	49%	27%	1%	1%	2%	12%	0%	9%
1941-50	47%	30%	1%	1%	2%	9%	0%	10%
1851-60	54%	23%	1%	2%	3%	7%	2%	8%
1861-70	50%	14%	1%	1%	3%	20%	3%	7%
1871-80	59%	12%	1%	2%	4%	10%	6%	6%
1881-90	67%	11%	2%	1%	3%	5%	9%	4%
1891-1900	67%	6%	2%	1%	2%	3%	16%	3%
1901-10	54%	1%	3%	3%	3%	2%	30%	5%
1911-20	62%	3%	4%	4%	3%	2%	14%	7%
1921-30	79%	2%	4%	3%	2%	3%	3%	5%
1931-39	69%	1%	5%	2%	2%	15%	1%	5%

Source: IBGE, *Anuário* (1939-1940)

Although sugar lost its supremacy in the 1830s, it maintained its importance as the second most import export crop until the 1890s, only being temporarily displaced by cotton during the period of the US Civil War. Brazilian sugar had been produced in traditional mills until the 1870s. As other competitors introduced new milling technology with the so-called central mills, Brazilian influence in the world market declined, even though local production increased to meet the growing needs of the internal market. From the 1880s Brazil's sugar exports declined systematically, with only a temporary short recovery in the 1920s. But in general, Brazilian sugar was of little importance in the international market until after World War II.<sup>14</sup> The key factor here was the late development of a modern sugar milling industry in Brazil, compared to the earlier adoption of such technology by its competitors.<sup>15</sup> It was not until the first years

<sup>14</sup> Noel Deerr, *The History of Sugar* (London: Chapman and Hall Ltd., 1949).

<sup>15</sup> Eisenberg examined the technological backwardness of production in Pernambuco. Peter Eisenberg, *The Sugar Industry in Pernambuco: Modernization without Change, 1840-1910* (Berkeley: University of California Press, 1974), 42-43. On the evolution of the sugar-producing process see also Gileno de Carli, *O Açúcar na Formação Econômica do Brasil* (Rio de Janeiro: Anuário Açucareiro, 1937); Eisenberg, *The Sugar Industry in Pernambuco*; and Alice P. Canabrava, "A grande Lavoura," in Sérgio Buarque de

of the twentieth century that, with government support, the first *Usinas* (or sugar factories) were established. These were modern milling operations with their own vast fields of cane production, which only partially depended on the cane production of others.<sup>16</sup> Once transformation of the industry began, change was rapid. In 1917 there already existed 215 *usinas* and they now produced half of the national sugar output.<sup>17</sup> In that year Pernambuco accounted for 40% of national production, Rio de Janeiro for 20% and Alagoas for 10%. São Paulo, with just 8% of national output could only supply 40% of its own sugar needs and had to import the rest from other parts of Brazil.<sup>18</sup> As of 1939 there were 345 *usinas* and 18,000 *engenhos*, with the *usinas* now producing 70% of the sugar. The survival of the old mills despite the rapid growth of the modern mills shows how delayed was the transition to the new technology, especially compared with Cuba and other international producers who had all made a complete transition to the new system by this time. But the rise of the *usinas* did have an impact on national production as older zones declined in importance and new zones which were using the new mills rose in importance. By the end of the Old Republic, the Northeastern share of output had declined significantly and the Southeastern states had increased their importance.<sup>19</sup>

Cotton had two periods of major importance in the history of Brazilian exports. The first occurred at the beginning of the nineteenth century when European wars favored exports, and the second during the “cotton famine” of the US Civil War period when US cotton exports were drastically reduced, giving a new space for Brazilian production. But once this war was resolved, international sales were reduced and during the Old Republic period cotton was a relatively minor Brazilian export.<sup>20</sup> But cotton production continued to evolve in the twentieth century when Brazilian industrialization created a growing internal market for its

Holanda, ed., *História da Civilização Brasileira* (São Paulo: Difusão Europeia do Livro, 1971), II, no. 4, 85–140.

<sup>16</sup> Eisenberg, *The Sugar Industry in Pernambuco*, chap. 5.

<sup>17</sup> Carli, *O Açúcar na Formação Econômica do Brasil*, 32–33.

<sup>18</sup> Ministério da Agricultura, Indústria e Comércio, *Indústria Assucareira no Brasil* (Rio de Janeiro: Directoria Geral de Estatística, 1919), 44 and 68.

<sup>19</sup> *Anuário Estatístico do Brasil, 1939–40, 198–203*. This activity employed 134,000 persons, being 98,000 in agriculture, 25,000 in factories, 3,000 specialized work and 8,000 in the railroads.

<sup>20</sup> On this theme see Alice P. Canabrava, *O Algodão no Brasil, 1861–1875* (São Paulo: T. A. Queiróz Editor, 1984).

consumption, and it only became a significant export again in the twenty-first century.<sup>21</sup>

Natural rubber, especially in the period just before and during the Old Republic, became an important product. Native to the Amazonian region, rubber gained major importance in the world economy in the second half of the nineteenth century as methods were developed to process rubber and use it in industrial activities. But the major growth came with the use of rubber for tires in the new automobile industry at the end of the nineteenth century. With the expansion of auto production, the demand for rubber grew exponentially. The problem was that rubber trees grew naturally and so the production was artisanal. As it developed in Brazil, rubber collecting required a large quantity of workers given the dispersed nature of the rubber trees in the forest. These rubber collectors worked in terrible environmental and working conditions and their productivity was quite low. Moreover these workers had to be imported from other regions. It is estimated that the Amazon rubber zones received around 260,000 laborers from the Northeastern states. These workers arrived already in debt and were subject to a brutal labor system.<sup>22</sup> The government stimulated production in the Amazon, and for a short period Brazil held a monopoly on world production, including rubber shipped from other Amazonian regions such as Bolivia. But the development of new rubber tree varieties in the 1910s allowed Asian producers to develop major plantations of the rubber trees and compete successfully with Brazilian production.<sup>23</sup> By the late 1910s the East Asian producers were beginning to export and quickly surpassed Brazilian production. As prices fell on the international market, the higher-cost non-plantation-produced rubber of Brazil lost market share to its rubber plantation producing rivals in East Asia. In the 1920s Henry Ford, wishing to free himself from what was now the British colonial Asian

<sup>21</sup> Brazil in 2017 was ranked as the world's fifth largest producer of cotton and the fourth largest exporter of this crop. USDA, FSA, *Cotton: World Markets and Trade, June 2017*, table 1.

<sup>22</sup> Celso Furtado, *Formação Econômica do Brasil* (São Paulo: Cia Editora Nacional, 1968), chap. 23. In that chapter the author offers a magisterial analysis of what he called the Transumância Amazônica. On this theme also see Barbara Weinstein, *The Amazon Rubber Boom, 1850–1920* (Stanford, Calif.: Stanford University Press, 1983); Maria Lígia Prado and Maria Helena Rolim Capelato, "A borracha na economia brasileira na primeira república," in Boris Fausto, ed., *História Geral da Civilização Brasileira*, III, no. 1: 285–307; Zephyr Frank and Aldo Musacchio, Overview of the Rubber Market, 1870–1930, at <http://eh.net/encyclopedia/article/frank.international.rubber.market>.

<sup>23</sup> Although synthetic rubber was developed outside of Brazil, it was initially not an adequate substitute for the natural product.

monopoly of rubber production, tried to establish rubber plantations in the Amazon.<sup>24</sup> But the project was a failure despite the enormous amounts spent, since Brazilian rubber trees were destroyed by parasites as soon as they were planted close together. The result was that by the end of the twentieth century Brazil was an importer of natural rubber, although in recent years Brazil has finally succeeded in producing a modern rubber plantation regime outside the Amazon.

Another product of importance in this period was also native to Brazil and that was cacao, which was also an Amazonian product. Like rubber it was initially gathered naturally and with low productivity due to the forest environment in which it was produced. Brought from the Amazon to southern Bahia in the second half of the nineteenth century, it was then more systematically planted and harvested, allowing Brazil to become a major participant in the world market. This development of the cacao industry in southern Bahia produced both a major social transformation in the region as well as major conflicts over land between local landlords (the so-called coronels *coronéis*) and peasants as was depicted in the novels of Jorge Amado. During the period from 1890 to 1930 cacao production grew at an annual rate of over 6%. In turn, prices remained stable until 1929 when they began to fall, declining by 75% by 1939, thus creating a profound crisis in this sector.<sup>25</sup>

There were also other primary products which were significant in the local, regional and national markets. In both 1920 and 1930 corn was the second most important agricultural product in terms of value, only surpassed by coffee. Given its importance in human and animal consumption, it is no surprise that in the census of 1920 some 2.4 million hectares were planted in corn, which was greater than the 2.2 million hectares planted in coffee. Other products with significant internal markets included rice, beans, manioc and sugar (see Table 1.2). Moreover the cattle industry now accounted for 47% of agricultural output. Most of these major products destined for the internal market were produced on family farms based on family labor and sometimes a few hired hands, in contrast to the large production units with salaried workers in coffee and

<sup>24</sup> See Greg Grandin, *Fordlandia: The Rise and Fall of Henry Ford's Forgotten Jungle City* (New York: Metropolitan Books, 2009).

<sup>25</sup> To create instruments of market intervention in 1931 the Cacao Institute of Bahia was created. Later, in 1957, the Executive Commission for Rural Economic-Recovery of Cocoa Farming (CEPLAC) was established. The emergence of a plant plague in the 1980s devastated production in the south of Bahia and the country went from being an exporter to an importer of cacao.

TABLE 1.2: *Crops as percentage of total value of agricultural production, 1920 and 1930*

Crop	% in 1920	% in 1930
Coffee	26%	48%
Corn	25%	13%
Manioc	11%	6%
Sugarcane	9%	5%
Beans	6%	4%
Rice	4%	4%
Cotton (lint)	3%	3%
Tobacco	3%	3%
Oranges	2%	2%
Potatoes	2%	2%
Grapes	2%	1%
Bananas	1%	1%
Others	6%	8%
	100%	100%

Source: IBGE, *Recenseamento Geral*, 1920 & 1930

sugar. Moreover this production had less of a multiplying effect on the economy, in contrast to coffee.<sup>26</sup>

By 1920 Brazil was still a minor player in the world agricultural market except for coffee. It was the leader in coffee production, accounting for 75% of world output, and was second in the production of cacao – but accounted for only 16% of world production. It produced only 6% of world corn output, 7% of its tobacco and just 3% of the world's cotton. In all other products such as rice, potatoes and wheat it was a distinctly modest producer. This low output by world standards was due to the still poor application of even minimum technology to Brazilian agriculture in this period. In 1920, of the 224,000 rural establishments which were listed in the census, only 1,652 even possessed plows.<sup>27</sup> Machines and

<sup>26</sup> In a study which we made of the agricultural census of São Paulo state in 1905, we found a large part of the cereal production occurred on coffee fazendas, showing that these coffee estates were not mono-production units. See Francisco Vidal Luna, Herbert S. Klein and William Summerhill, "Paulista agriculture in 1905," *Agricultural History*, 90, no.1 (Winter 2016): 22–50.

<sup>27</sup> Instituto Brasileiro de Geografia e Estatística (IBGE), *Recenseamento Geral do Brasil*, 1920, v. 3, parte 3, vii and xiv, and the *Censo Agrícola de 1905*, available in digital format from the Núcleo de Estudos de População (NEPO) of the Universidade de Campinas.

agricultural equipment accounted for only 3% of the total value of these rural establishments in 1920. Even in São Paulo, the value of machines was only 4%, while lands represented 79% and other improvements another 18%.<sup>28</sup>

Whatever the weakness of the Brazilian agricultural sector in international terms, there is little question that the expansion of agriculture in the nineteenth century had a major impact on the internal economy and was crucial in modernizing ample sectors of the economy. The intensification of the agro-exporting sector required investments in machines and equipment beyond the farm gate, as well as the expansion and modernization of the transport system from railroads to ports. The last quarter of the nineteenth and beginning of the twentieth century saw the full elaboration of an extensive railroad system and the construction of deep water ports and modern docks with national and foreign capital.

But agriculture was not the only economic sector to expand in this period. There would also be the beginnings of an industrial economy in Brazil. Given the revolution in transport, there was a reduction in the costs of moving goods throughout the country, and the transition to a salaried rural workforce was another factor which promoted the growth of an internal market.<sup>29</sup> The expansion of wage labor increased dramatically with the abolition of slavery and the introduction of millions of immigrants, and it had multiple effects. It increased the size and diversified the consumer market, it encouraged an increase in monetary circulation, and finally created a modern labor market. It was this growth of a wage labor force which set the stage for the industrial transformation of Brazil which was started with the earnings generated by the coffee export sector. The agro-exporting sector, though not as modernized as other late nineteenth- and early twentieth-century agricultural societies, nevertheless generated the resources needed to invest in infrastructure, and extend and modernize the internal productive structure.<sup>30</sup> During the 1930s, despite the severity of the international crisis

<sup>28</sup> IBGE, *Recenseamento Geral do Brasil, 1920*, v. 3, parte 3, LX.

<sup>29</sup> As Celso Furtado argued in his classic work of economic history, the factor of major importance which occurred in the Brazilian economy in the last quarter of the nineteenth century was the increase in importance of the wage labor sector. Furtado, *Formação Econômica do Brasil*: chap. XXVI.

<sup>30</sup> There is an interesting insight developed by Nicol, who sought to analyze the relationship between the agricultural revolution and the process of industrialization in developed countries, believing that the path of industrialization is the technological revolution in agriculture. When he studies Brazil, he also identifies agriculture in the nineteenth century as the dynamic factor in industry. But although there was a large agricultural growth in

and the critical coffee situation which lasted through the decade, gross domestic product (GDP) declined moderately in the first two years of the crisis and maintained consistent growth in the following years. This reflected the fact that the agro-exporting economy was being replaced by the domestic market. Given the external restrictions on trade and credit, the government was able to maintain support for industrialization throughout the first Vargas period of government (1930–1945). In addition, the federal government made profound changes in the structure of the state, and created major agencies to promote specific agricultural products, from sugar and cacao to mate and salt. The financing of agriculture was supported by the creation of the *Carteira de Crédito Agrícola e Industrial* (CREAI) of the Banco do Brasil, which became the principal source of agricultural credit.

Until the beginning of World War II, the international crisis necessitated strict import control. As the economy recovered relatively quickly, domestic demand, once supplied by imports, could not be sustained because of balance of payments constraints. The government deliberately promoted a policy of import substitution, manipulating a complex tariff system to favor the import of essential commodities, raw materials and capital goods, and applying heavy taxes on finished products. These tariffs and the expensive and controlled access to foreign currency created sufficient protection for capitalists to invest in national production.<sup>31</sup>

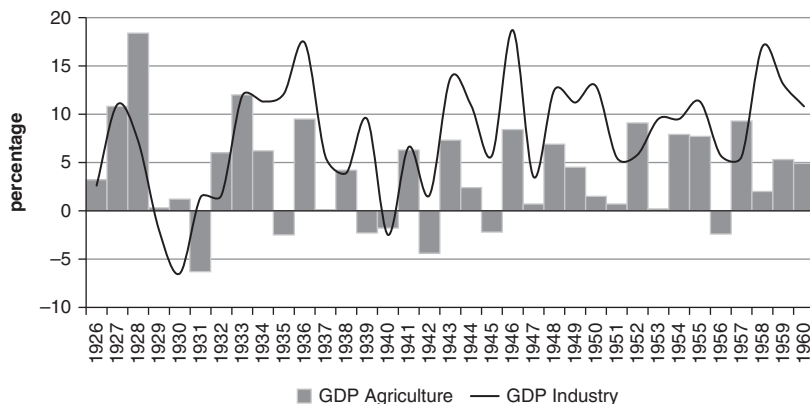
The Second World War made this situation more complex, as there was strong external demand for some specific Brazilian products, with an increase in prices and quantities exported that resulted in an increase in the capacity to import. But the world war also meant that there was a shortage of goods to import, which further stimulated domestic industrial production.<sup>32</sup> By acting to address specific infrastructure blockades and providing basic raw materials, the government greatly aided the industrial sector.<sup>33</sup> With the creation of manufacturing and infrastructure companies, the federal government implemented a new form of direct

that century, there was no agricultural revolution by European or Japanese standards. Technologically, Brazilian agriculture had not evolved very far. That conditioned the pattern of development of Brazilian industry. Robert N. V. C. Nicol, “A agricultura e a Industrialização no Brasil (1850/1930)” (PhD thesis, Universidade de São Paulo, FFLCH-USP, 1974).

<sup>31</sup> A. Fishlow, “Origens e consequências da substituição de importações no Brasil,” in F. R. Versiani and J. R. M. de Barros, eds., *Formação Econômica do Brasil: A Experiência Brasileira* (São Paulo: Saraiva, 1977): 7–41.

<sup>32</sup> Tavares “Auge e declínio do processo de substituição de importações no Brasil”: 60.

<sup>33</sup> Lourdes Sola, ed., *O Estado da transição: política e economia na Nova República* (São Paulo: Vértice, 1988), p. 275.



GRAPH 1.1: Change in GDP of industry and agriculture, 1926–1960

Source: Ipeadata

intervention in the productive sphere in areas where private enterprise was not interested in applying the necessary capital, either because of the risk, the low profitability or the amount of resources needed. All of these efforts by the government succeeded in stimulating the economy. Despite the slow recovery of the international economy, Brazilian GDP grew at 4% per year in the period from 1930 to 1945. While agriculture grew at 2.1% per year and services at 3.9%, industry grew at an impressive 6.2% per annum, increasing its position in the national economy from 20.3% in 1929 to 28.6% in 1945. The share of agriculture fell from 36.9% to 28.0% in the same period (See Graph 1.1).<sup>34</sup>

This extraordinary industrial growth can be seen in the changes that occurred between the industrial census of 1920 and 1950: the number of industrial establishments multiplied by seven, workers by four, and energy, measured by the force of the motors employed, by eight. Agriculture, as well as industry, expanded in this period of international crisis. This sector was responsible for supplying foodstuffs to the domestic market, for generating exportable surpluses, such as coffee, and producing raw materials necessary for the fast-growing and diversified industry, especially for the textile and food industries. Thus, an increasing share of agricultural production was directed to the market. Agriculture accounted for the generation of exportable surpluses and the supply of the domestic

<sup>34</sup> Raymond W. Goldsmith, *Brasil 1850–1984. Desenvolvimento Financeiro Sob um Século de Inflação* (São Paulo: Editora Harper & Row do Brasil Ltda, 1986), 148.



market for food and raw materials that replaced imports. For this reason, the government of Getúlio Vargas finally provided sustained and substantial credit for agriculture with the Banco do Brasil's CREAL,<sup>35</sup> and growth was the norm in agriculture the period between 1930 and 1950.<sup>36</sup>

This growth did not lead to any change in the traditional productive structure of agriculture, nor to the high concentration of land ownership or traditional rural labor contracts. Despite the extensive labor legislation promulgated by Vargas, there were no benefits for rural workers, who remained trapped in archaic labor relations in the countryside. Until the end of the 1940s, traditional “colonel” landowners were still predominant in some areas.<sup>37</sup>

Although agriculture still absorbed 60% of the national workforce by the end of 1950, after 1920 there was a gradual fall in this percentage in favor of industry and services. This liberation of the labor force from traditional agriculture was essential to consolidate the urban industrial sector, and although the rural population continued to grow, its rate of growth was smaller than that of the urban population. Between 1920 and 1940 the economically active population increased rapidly in the area of services (see Graph 1.2).<sup>38</sup> The increasing relative importance of industry significantly influenced the overall productivity of the economy, because industry had greater productivity than agriculture. In 1948, agriculture accounted for 28% of the national GDP, but its importance varied widely among states. In São Paulo, it accounted for approximately one-third of domestic income, but in most states it was approximately 50%.

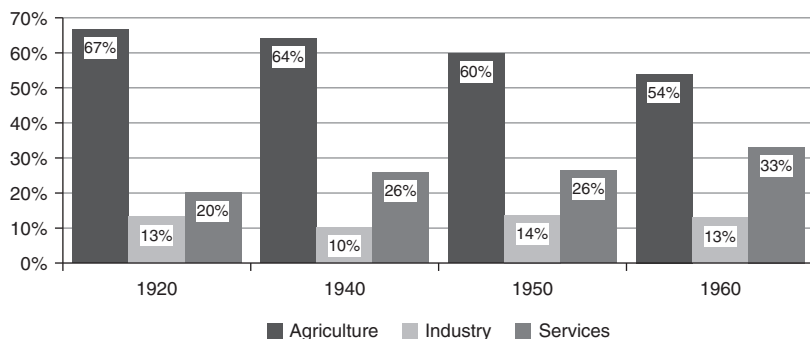
In 1945, agricultural and livestock products accounted for 90% of Brazilian exports, with coffee alone accounting for just over two-thirds

<sup>35</sup> Iliane Jesuina da Silva, “Estado e agricultura no primeiro governo Vargas (1930–1945)” (PhD thesis, Universidade Estadual de Campinas, 2010), chap. 4.

<sup>36</sup> Between 1920 and 1950, the percentage of the economically active population employed in manufacturing increased from 5% to 8%. Over the same period, the share in agriculture remained stable at 37%. Thomas Merrick and Douglas Graham, “População e desenvolvimento no Brasil: Uma perspectiva histórica,” in Paulo Nauhaus, ed., *Economia Brasileira: Uma Visão Histórica* (Rio de Janeiro: Editora Campus, 1980), 45–88. Thomas Merrick and Douglas H. Graham, *Population and Economic Development in Brazil, 1800 to the Present* (Baltimore: Johns Hopkins University Press, 1979).

<sup>37</sup> Given his reliance on the traditional rural elite, who supported his government and allowed him to advance in urban areas, Vargas had no interest in promoting social transformations in the countryside. Maria Isaura Pereira de Queiroz, *O mandonismo local na vida política brasileira* (São Paulo: Alfa-Omega, 1976), parts 1 and 2.

<sup>38</sup> In the services sector, the percentage was 134%; in industry 86% and in agriculture 61%. Merrick and Graham, “População e desenvolvimento no Brasil,” 45–88.



GRAPH 1.2: Population employed by sector, 1920–1960  
Source: Merrick & Graham

of the value of all exports. Approximately 22% of the value of exports consisted of raw cotton or cotton textiles.<sup>39</sup> Clearly, textiles were the most important exported manufactured goods in this period.<sup>40</sup> Cotton traditionally was concentrated in the Northeast Region and was primarily arboreal and still produced by traditional methods. However, in the 1940s, São Paulo became the largest producer using planted cotton and soon supplied two-thirds of production. Other traditional agricultural exports, such as sugar, rubber, cocoa, mate and tobacco, played only a modest role and accounted for only 8% of exports in 1945, the same level as in 1920 (see Table 1.3).

Although agriculture's relative share of GDP declined from 1930 to 1945, production expanded substantially. Rice and manioc, essential food consumption for the national population, grew at an impressive rate of 6% per year, and sugar and bean production at 2.4% per year. On the other hand, corn, a staple food for animals and humans, only maintained a stable production throughout the period, while coffee,

<sup>39</sup> AEB, 1946, 296–299.

<sup>40</sup> As we noted, historically, cotton was produced for the overseas market and, for this reason, when international demand grew, as during the Civil War period in the United States, there was an increase in Brazilian production to serve the international market. Since Brazilian cotton was of low quality and high cost, as soon as international markets returned to normal, domestic production and exports declined. This situation changed in the early twentieth century due to the establishment of a national textile industry, which created a new and growing market for cotton. Alice P. Canabrava, *O algodão no Brasil, 1861–1875* (São Paulo: T.A. Queiróz Editor, 1984); Alexandre Bragança Coelho “A cultura do Algodão e a questão da integração entre preços internos e externos” (MA thesis, Universidade de São Paulo, 2002).

TABLE 1.3: *Participation of the principal crops in agricultural exports, 1940–1960*

Year	Sugar	Cotton	Rubber	Cacao	Coffee	Mate	Tobacco
1940	1%	29%	3%	7%	56%	2%	2%
1941	0%	28%	3%	9%	57%	2%	1%
1942	2%	20%	5%	7%	62%	2%	2%
1943	0%	11%	5%	9%	72%	2%	2%
1944	2%	12%	7%	6%	70%	2%	3%
1945	1%	17%	5%	4%	68%	2%	4%
1946	1%	27%	2%	6%	59%	1%	4%
1947	2%	24%	2%	8%	60%	1%	3%
1948	5%	23%	0%	7%	62%	1%	2%
1949	1%	13%	0%	6%	77%	1%	2%
1950	0%	10%	0%	7%	80%	1%	2%
1953	2%	8%	0%	6%	82%	1%	1%
1954	1%	16%	0%	10%	69%	1%	1%
1955	4%	11%	0%	8%	73%	1%	2%
1956	0%	7%	0%	5%	83%	1%	2%
1957	4%	4%	0%	7%	80%	1%	2%
1958	6%	3%	0%	10%	75%	2%	2%
1959	5%	4%	0%	6%	79%	1%	2%
1960	6%	5%	0%	7%	76%	1%	2%

Source: Séries Históricas, IBGE

which had gone through a serious crisis in the 1930s and 1940s, seemed to be growing again, especially in the 1950s (see Table 1.4).

Of all the harvests (*safras*) in this period, seven products predominated – coffee, cotton, corn, rice, beans, manioc and sugar – which accounted for 85% of the value of agricultural production between 1938 and 1947. In terms of planted area, coffee, cotton, corn and rice occupied more than 90% of the area under cultivation in that period. Corn was the crop that occupied the largest area of land, about a third of the total area planted, followed by coffee and cotton. In the period from 1920 to 1950 cotton went through the greatest expansion of cultivated area and of output, with national production growing from 330 thousand to 1.1 million tons in the period from 1920 to 1950.

Even coffee-growing regions changed during this period. The production of Paraná increased significantly and was rapidly approaching the level of

TABLE 1.4: *Index of production of principal agricultural products, 1920–1960 (1931=100)*

	Crops typically exported				Crops typically for internal market			
	Cotton	Cacao	Coffee	Sugar	Beans	Manioc	Corn	Rice
1920	89	87	61	86	106		105	77
1925	126	78	68	77	81		94	66
1930	85	90	126	109	101		106	85
1931	100	100	100	100	100	100	100	100
1935	264	166	87	103	119	87	125	127
1940	416	167	77	137	112	141	103	122
1945	299	156	64	155	146	219	102	199
1950	311	199	82	201	182	241	127	298
1955	331	206	105	252	215	285	141	347
1960	429	213	320	350	252	338	183	445

Source: IBGE, Séries Históricas Retrospectivas

São Paulo production. There was still coffee produced in Minas Gerais, Espírito Santo and Rio de Janeiro. In 1950, São Paulo had 137 million newly planted coffee trees and a stock of 956 million trees in production. At the same time, Paraná had 118 million new coffee trees and a total of 160 million coffee trees in production. In the five-year period 1956–1960, coffee production in Paraná had already surpassed that of São Paulo. In the following five years, Paraná's production was 85% higher than that of the State of São Paulo.

Despite increased crop output there was only a modest increase in productivity in this period. Coffee changed little, and, there was a decline in cotton and cacao productivity in the late 1940s. Only rice, of the most important agricultural products, showed a clearly upward trend in yield per hectare (see Table 1.5).

This stability or even decline in productivity was due to the use of traditional agricultural techniques in most crops. Even plows were rarely used. In 1950 there was only one plow for 400 hectares of rural property, and the ratio was a plow for every 28 hectares in cultivated lands. Tractors were still little used, and as of 1940, only a quarter of the farms used some sort of agricultural machinery and these farms were highly concentrated in a few regions. The Northeast and Central-West regions used virtually no machinery, while in Rio Grande do Sul 81% of the farms had machines and 48% of the farms in São Paulo. Fertilizer use only became widely

TABLE 1.5: *Yield per hectare of the principal agricultural crops, 1931–1962 (tons/hectares)*

Year	Cotton	Rice	Cacao	Coffee	Sugar	Beans	Manioc	Corn	Wheat	Soybeans
1931	0.51	1.50	0.50	0.36	46.63	1.32	22.94	1.50		
1940	0.65	1.51	0.56	0.40	39.44	0.79	12.55	1.25		
1950	0.43	1.64	0.55	0.40	39.45	0.69	13.09	1.29		
1960	0.55	1.62	0.35	0.94	42.48	0.68	13.12	1.30	0.63	1.20
1961	0.57	1.70	0.33	1.02	36.35	0.68	13.07	1.31	0.53	1.13
1962	0.56	1.66	0.85	0.98	42.64	0.63	13.44	1.30	0.92	1.10

Source: IBGE, Séries Históricas Retrospectivas

distributed in Brazilian agriculture after 1960, and local production of tractors, which would increase greatly after the 1960s, was still incipient. But by the end of the decade, total tractor production reached 75,000 vehicles per annum.<sup>41</sup> As of 1940, only 5% of the arable land used fertilizer, regardless of the size of the property.

Growth between 1920 and 1960 was primarily due to an increase in the number of farms and in the cultivated area. Temporary or seasonal crops grew from 6.6 million hectares in 1920 to 12.9 in 1940 and 20.9 million hectares in 1960. Permanent crops, however, declined from 6 million hectares in 1940 to just 4.4 million hectares in 1950 but recovered to 7.8 million hectares in 1960 (there is no data in the 1920 census). In 1950, only 8% of the total areas in the listed properties were cultivated for both seasonal and permanent crops; this increased to 11% in 1960 (Table 2.3). The more intensively cultivated farms were concentrated in few states, such as São Paulo, Minas Gerais, Rio Grande do Sul and Rio de Janeiro, while other regions, such as the Cerrado,<sup>42</sup> for example, which today is a large grain-producing region, were still largely unoccupied or underutilized (see Table 1.6).

<sup>41</sup> Anfavea – Associação Nacional dos Fabricantes de Veículos Automotores, accessed May 17, 2017, at [www.anfavea.com.br/estatisticas.html](http://www.anfavea.com.br/estatisticas.html)

<sup>42</sup> With an area of 2,036,448 square kilometers, the Cerrado covers 22% of the Brazilian territory and includes the Federal District, Goiás, Tocantins, much of Maranhão, Mato Grosso do Sul and Minas Gerais, as well as smaller parts of than six other states. The Cerrado is the source of three important river systems in South America (Amazonia / Tocantins, San Francisco and La Plata), which results in high aquifer potential and great biodiversity.

TABLE 1.6: Farms by size and utilization, 1920–1960 (areas in hectares)

	1920	1940	1950	1960
Total farms	648,153	1,904,589	2,064,642	3,337,569
Total area in hectares	175,104,675	197,720,247	232,211,106	249,862,142
Crops				
Permanent		5,961,770	4,402,426	7,797,488
Seasonal	6,642,057	12,873,660	14,692,631	20,914,721
Pastures				
Natural		83,068,814	92,659,363	102,272,053
Planted		5,072,319	14,973,060	20,068,333
Woods and forests				
Natural	48,916,653	49,085,464	54,870,087	55,875,299
Planted			1,128,994	2,069,806
Productive lands not used		29,296,497	34,310,721	
Inappropriate		12,361,127	15,173,204	
Uncultivable				28,174,779
Equipment				
Tractors	1,706	3,380	8,372	61,345
Plows	141,196	447,556	714,259	977,101

Source: IBGE, Séries Históricas Retrospectivas e Censos Agrícolas

But land ownership changed little. The Gini inequality indexes of farmland ownership remained at the same level from 0.83 to 0.84 in the period from 1920 to the census of 1960. The most productive states in agriculture showed the lowest inequality indexes in the nation.

In the immediately post-war period, there were two major changes in Brazil's trade flows: the reduction in exports of raw materials and manufactured goods in general, particularly in the case of cotton; and the increase in imports of items that had suffered the greatest shortages during the war, such as machinery and equipment. Moreover, accumulated reserves, which could have been used to balance the external accounts, were not composed of convertible reserves, but rather of funds formed mainly by British pound rights, the usefulness of which was then very limited. The exchange rates were kept fixed, despite the strong inflation that occurred in that period. The control of inflation and the fear of a reduction in the international price of coffee were the main causes of exchange rate rigidity, which led to the strong appreciation of the national

currency in the second half of the 1940s. Coffee prices increased slowly in the early postwar years, and rose sharply in the period 1949–1950. The shortage of products during the war disappeared with the end of the war and the return of the traditional producers to the international market prejudiced Brazil's traditional exports. It also led to the return of traditional international suppliers of the Brazilian market, which in turn had a negative impact on local producers.

But coffee and continued government support for industry softened the negative impact of the immediate postwar period. In the early 1950s, coffee recovered its former importance and accounted for two-thirds of the value of Brazilian exports. Continued exchange control and import licenses were a great stimulus for the industrial sector. This mechanism of control of the exchange market constituted an effective protection to the local producers. As usual, the permanent external bottleneck made exchange control the main instrument of economic policy and was used to avoid the deterioration of the price of coffee in the international market and to aid in inflation control.<sup>43</sup>

In October 1953, during the second period of the Vargas government, a change occurred in this policy. The government started to buy the foreign exchange from the exporters, paying the official rate plus a bonus differentiated by product, which represented an important stimulus for exports in general, which had lost competitiveness due to the overvaluation of the local currency.<sup>44</sup> Imports, in turn, began to be divided into categories and participated in specific auctions, with limited supply of foreign currency for each category and setting a minimum premium on the official rate at each auction, which led to the bureaucratic process of granting licenses to be replaced by market rules. The difference between the values of the purchase and sale of foreign currency was appropriated by the government and, from then on, became a significant portion of the tax revenue. This change was of enormous importance for industrialization, because it consolidated a market reserve for the production of the goods that replaced the imported ones, as it increased the effective cost of imports. Industrialists began to have access to privileged

<sup>43</sup> Antonio Claudio Sochaczewski, *O desenvolvimento econômico e financeiro do Brasil, 1952–1968* (São Paulo: Trajetória Cultural, 1993), chap. 3.

<sup>44</sup> Although Instruction no. 70 of Sumoc benefited the exporters in general, who received a bonus beyond the official rate, there was opposition from the coffee growers, who received a smaller bonus. On this theme see Sérgio Besserman Vianna, “Duas Tentativas de Estabilização: 1951–1954,” in Marcelo de Paiva Abreu, ed., *A ordem do Progresso* (Rio de Janeiro: Editora Campus, 1992).

exchange rates and there was an implicit subsidy for imports of capital goods and inputs needed for the industrialization process.<sup>45</sup> This system, with some modifications, lasted until 1957.

Under the government of Juscelino Kubitschek (1956–1961) an ambitious investment plan was adopted. It gave absolute priority to building the more sophisticated industries needed to supplement traditional ones and provided for government funding to create these new sectors.<sup>46</sup>

This period of basic infrastructure construction with state financing was crucial for the Brazilian economy. Apart from investments in the construction of Brasília, electricity, transportation and heavy industry received almost all the government investments. But only 3% of the government's development plan was related to agriculture. Although not directly related to the so-called food sector, several actions directly or indirectly benefited agriculture, such as expanding electricity supply, refurbishing and building new railways, paving and expanding the road network, expanding ports and the merchant navy and promoting the chemical industry. Also the successful implantation of the automobile industry in Brazil included the production of trucks and tractors, and the construction of Brasília would have great influence in the later process of expansion of the agricultural frontier, particularly with the opening-up to the nearby Cerrado region.

Although agriculture was not, in fact, a government priority, little change occurred in the sector in this period. Nevertheless this sector did not represent an obstacle to the development of the industry, since it was able to meet the needs of basic food for an expanding population, increasing production by traditional means of incorporation of new areas and more workers. The demographic explosion that occurred in this period due to falling mortality rates allowed the rural sector to release labor to the urban area without putting pressure on the salaries in force in the countryside. On the other hand, the large supply of land suitable for agriculture also did not stimulate the

<sup>45</sup> Carlos Lessa, *Quinze Anos de Política Econômica* (São Paulo, Brasiliense/ Unicamp, 1975), 11.

<sup>46</sup> Maria da Conceição Tavares, "Auge e declínio do processo de substituição de importações no Brasil," in Maria da Conceição Tavares, *Da Substituição de Importações ao Capitalismo Financeiro* (Rio de Janeiro: Zahar, 1973): 27–115; and Lessa, *Quinze Anos de Política Econômica*, 14.



intensive use of capital in the form of plows, tractors, fertilizers and agricultural pesticides.

Agricultural production in the 1960s was extremely concentrated in only ten crops, which accounted for three-quarters of the value of production. In 1960, these ten crops occupied an area of 25 million hectares, with maize cultivation occupying the largest area (7.3 million hectares), followed by coffee, cotton and rice. By then plows and tractors were now more present on Brazilian farms (Table 2.4). During the 1950s, approximately 10.6 million hectares of new land went into production, and the number of agricultural workers increased by 4.5 million, considered modest compared to previous years. However, in that decade, machines began to appear in significant numbers on Brazilian farms and, as expected, most of these tractors and plows were concentrated in the South and Southeast regions. At that time, the Northeast had only one plow for each 310 hectares, while in the South the proportion was one plow for every 5 hectares, and in the Southeast, one for every 11 hectares. As for tractors, there was one for each 3,144 hectares in the Northeast, and one for each 292 hectares in the Southeast, with São Paulo leading among the states, with a proportion of one tractor per 177 hectares (see Table 1.7).

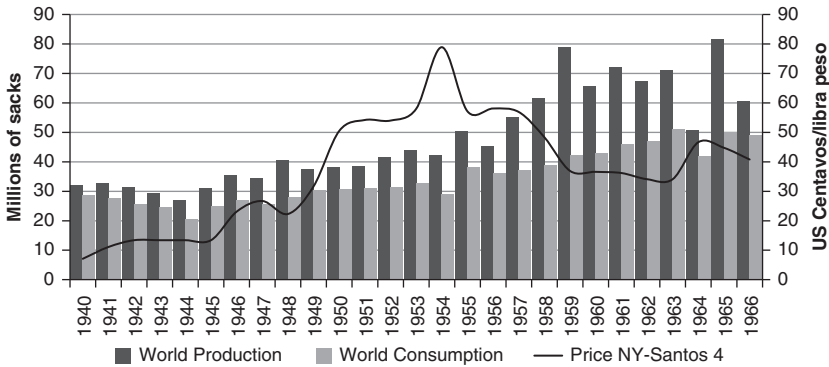
During this period coffee began to show new signs of overproduction. In 1959, Brazilian coffee production reached 44 million bags and total world production reached 79 million bags but world consumption was only 42 million bags. By 1963 the world had accumulated a stock of 81 million bags, of which 63 million belonged to Brazil, causing a sharp drop in prices in the international market and a decline in the value of coffee exports.

This time instead of burning stocks, international quotas became the prime instrument of control. In 1959 an agreement was signed between Latin American and African producers, defining quotas of coffee exports. In 1962, a new agreement was signed, with the participation of practically all producing countries and the United States. That year the International Coffee Organization (ICO) was established and in 1963 an international agreement led to eradication of coffee trees around the world. Between 1962 and 1967 almost half of the coffee trees in the world were eradicated. It was in this period of expansion and contraction that the coffee industry in Brazil suffered its greatest geographical movement. The state of Paraná went from 5% of national production in the 1940s to more than half of national production in the final years of the 1950s (Graph 1.3).

TABLE 1.7: Area cultivated, workers, tractors and plows used by region and selected states, 1950–1960

Region/state	Area of crops (ha)		Persons occupied		Tractors		Plows	
	1950	1960	1950	1960	1950	1960	1950	1960
North	234,512	458,490	326,502	536,619	61	266	381	306
Northeast	5,283,804	9,306,681	4,334,936	6,566,035	451	2,989	14,489	21,171
Southeast	8,447,903	10,297,939	3,999,860	4,465,344	5,155	35,215	318,863	394,696
Minas Gerais	2,937,126	3,673,466	1,868,657	2,076,829	763	5,024	79,968	93,040
São Paulo	4,257,633	4,973,300	1,531,664	1,683,038	3,819	28,101	224,947	286,580
South	4,530,566	8,279,870	1,949,923	3,174,233	2,566	22,720	383,435	604,050
Paraná	1,358,222	3,471,131	507,607	1,276,854	280	4,996	30,405	82,324
Rio Grande do Sul	2,502,691	3,795,840	1,071,404	1,277,390	2,245	16,675	312,001	440,467
Center-West	608,272	1,416,805	385,613	678,623	139	2,303	3,091	11,797
Total	19,095,057	29,759,785	10,996,834	15,521,701	8,372	63,493	714,259	1,031,930

Source: IBGE: Séries Históricas Retrospectivas



GRAPH 1.3: Coffee: World production, consumption and price, 1940–1960  
Source: Bacha and Greenhill, *150 anos de café*, pp. 288–340

The structure of Brazilian imports and exports also underwent significant transformations between 1947 and 1960. There was a relative decline of raw materials and relative increase of foodstuffs in exports. Wood (mainly pine) and metallic ores (mainly iron ore) increased and cotton declined. Sugar and cocoa increased and coffee increased. Imports, in turn, remained stable, with raw materials, food products and manufactures among the main items. However, it was not long before the latter category started to change, due to the growth of national industries. Thus, car imports, for example, which accounted for 9% of Brazilian imports in 1947, practically disappeared in 1960. In addition, in the case of food products, about 80% of these imports were wheat and cod. At that time, Brazil was already basically self-sufficient in the production of most agricultural products (see Table 1.8).

The agricultural census of 1960 shows that modest growth was occurring with still little change in basic structure. In that year there were 3.4 million farms and ranches with a total of almost 250 million hectares, an increase of 1.3 million properties and 17.7 million hectares from the 1950 census. The vast majority of land used consisted of natural pastures (41%) and natural forests (22%). Temporary or seasonal crops occupied 20.9 million hectares (8% of the area) and permanent crops 7.8 million hectares (3% of the area). Reforestation was still insignificant, and even smaller was the proportion of irrigated land, only 461 thousand hectares.

The 1960 census still showed the usual high concentration of land ownership. Although all regions had high concentration indices, large farms were more representative in the North and Central West, while in

TABLE 1.8: *Composition of foreign commerce, 1947–1960*

	1947	1960
<b>Exports</b>		
<i>Primary material</i>	39%	23%
Cotton	16%	4%
<i>Food</i>	53%	74%
Sugar	1%	5%
Cacao	5%	8%
Coffee	37%	56%
<i>Manufactures</i>	8%	3%
<b>Imports</b>		
Primary materials	22%	24%
Food	18%	14%
Manufactures	60%	63%

Source: Anuários Estatísticos do Brasil, 1948 and 1962

the Northeast the farms of 5 hectares or less represented over half the farms. Farms of up to 100 hectares represented over 90% of all farms in all regions (see Table 1.9).

Thus Brazilian agriculture differed little in basic indicators from the censuses of 1920, 1940 and 1950. There was a relative increase of establishments with less than 100 hectares, starting from 72% in 1920 and reaching 89% in 1960. There was also a proportional increase in the share of land related to this size of property, which increased from 9% in 1920 to around 20% in the three subsequent censuses. However, the largest settlements, with more than 1,000 hectares, which accounted for between 1% and 2% of rural establishments, still owned between 44% and 51% of the agricultural lands in the 1940 and the 1960 censuses. Farms with more than 10,000 hectares included only some 1,700 properties, but controlled a proportion of between 15% and 20% of the land surveyed. These properties undoubtedly represented latifundia, probably with extremely low productivity (see Table 1.10).

Despite the population exodus from the rural area which occurred in these years, the agrarian population continued to grow in absolute terms because of the high rate of population growth in this period. Although the percentage of the population employed in agriculture dropped sharply from 67% in 1920 to 54% in 1960, the population occupied in agriculture reached 15.6 million persons in the 1960 census, of whom 71% were men.

TABLE 1.9: *Farms by size by units and area, census 1960*

	Proportion			
	Farms	Area (ha)	% Farms	% Area
Less than 1 hectare	133,477	103,792	4.0%	0.0%
More than 1 hectare & less than 2	276,740	381,556	8.3%	0.2%
More than 2 hectares & less than 5	619,119	2,051,455	18.6%	0.8%
More than 5 hectares & less than 10	465,634	3,415,578	14.0%	1.4%
More than 10 hectares & less than 20	546,079	7,684,200	16.4%	3.1%
More than 20 hectares & less than 50	672,675	20,818,118	20.2%	8.4%
More than 50 hectares & less than 100	272,661	19,062,972	8.2%	7.7%
More than 100 hectares & less than 200	157,422	21,764,444	4.7%	8.8%
More than 200 hectares & less than 500	116,645	35,851,678	3.5%	14.5%
More than 500 hectares & less than 1,000	40,764	26,413,333	1.2%	10.7%
More than 1000 hectares & less than 2,000	18,392	25,172,435	0.6%	10.2%
More than 2,000 hectares & less than 5,000	10,138	30,187,634	0.3%	12.2%
More than 5,000 hectares & less than 10,000	2,353	16,060,835	0.1%	6.5%
More than 10,000 hectares & less than 100,000	1,569	33,226,159	0.0%	13.4%
More than 100,000 hectares	28	5,666,953	0.0%	2.3%
Total	3,333,696	247,861,142	100%	100.0%

Source: IBGE, *Censo Agrícola 1960 – VII Recenseamento Geral do Brasil*, vol. II, 1a. Parte, 17-31

Unpaid family members accounted for 9.8 million people, almost two-thirds of whom were men. A significant proportion of unpaid family members (2.2 million) were younger than fifteen years of age. Only

TABLE I.10: Size of farms by area, census 1920, 1940, 1950 and 1960

Area in hectares	Farms					Area (ha)				
	1920	1940	1950	1960	1960	1920	1940	1950	1960	1960
Total	648,153	1,904,589	2,064,642	3,337,769	3,337,769	175,104,575	197,720,247	232,111,106	249,862,142	249,862,142
<10		654,557	710,934	1,495,020	1,495,020		2,893,439	2,893,439	5,952,381	5,952,381
10-50		770,735	833,229	1,218,754	1,218,754		—	20,185,868	28,503,318	28,503,318
50-100		204,705	219,326	272,661	272,661		14,256,093	15,376,879	19,062,972	19,062,972
100-500		212,340	231,061	274,067	274,067		44,609,197	49,371,043	57,616,122	57,616,122
500-1,000		31,478	37,098	40,764	40,764		21,575,802	26,149,674	28,413,333	28,413,333
1,000-10,000		26,539	31,017	30,863	30,863		62,024,817	73,093,482	71,420,904	71,420,904
>10,000		1,273	1,611	1,597	1,597		33,504,832	45,008,788	38,893,112	38,893,112
Less than 100	463,879					15,708,314				
100-1,000	157,959					48,415,737				
1,000-10,000	24,647					65,487,928				
>10,000	1,668					45,492,696				

Source: IBGE, Censo Agricola 1960 – VIII Recenseamento Geral do Brasil, vol. II, ta. Parte 17-31

Notes: The data for 1920 are distributed differently; there is a difference between the total and the sum of the farms with no information.

812,000 farms had employees, totaling 4.4 million workers, of whom 1.4 million were permanent and 3.0 million temporary. The census shows the existence of 186,939 establishments with sharecroppers (*com parceiros*), which contained 916,039 people. The existence of these sharecroppers supports the belief that Brazilian agriculture still retained feudal features in this period.

Farm workers averaged 3 workers per unit. In establishments with employees, the average was 5.4 employees per unit and for establishments with sharecroppers there was an average of 4.9 partners. Some 68% of the establishments which employed workers had less than 5 employees and these units contained 36% of these employed workers; 30% had between 5 and 20 employees and they accounted for 48% of the employed workforce. Finally, only 2% of establishments occupied more than 20 people and these employed 16% of the employed workforce. Given the traditional agricultural methods then employed, with little use of equipment and tractors, it would not have been possible to exploit large productive units with such a small labor force per unit (see Table 1.11).

Regionally, coffee was concentrated in the Southeast and South; rice had a significant position in the Northeast and in the South, with Rio Grande do Sul being the major producer. The average unit of rice production in the South was 46 hectares, which was twice the size of the average production unit in the Northeast (19 hectares). Cocoa was concentrated in the Northeastern region, primarily in Bahia. There were 20,000 producers of cacao, using 1.4 million hectares for cocoa, with an average area of 70 hectares. Corn was concentrated in the South, with both 57% of establishments and cultivated area. In the case of livestock, although the Center-West represented only 9% of the registered establishments, these controlled 38% of the area nationally. The Southeast and the South also appeared with a large proportion of establishments and area, but in smaller units in terms of occupied area. In the Center-West, for example, there were 49 thousand establishments, with a total area of 44 million hectares, representing an average of 905 hectares per establishment. The Center-West was still essentially a region of large-scale livestock production.

Although agriculture did not present a significant evolution in technical terms in this period of rapid industrialization, reflected by the relative stagnation of productivity, the sector was able steadily to increase its production with a proportional increase of factors of production, above all land and labor. Thus the performance evaluation of agriculture cannot be measured solely by its relative growth against industry and the service

TABLE I. I I: *Workers, sharecroppers and number of people employed by farm, 1960*

	<b>Brazil total</b>
Total farms	3,337,769
Total persons	15,633,985
Total men	11,111,551
Total women	4,522,434
Non paid family members – Total	9,848,727
Non paid family Members – Men	6,444,198
Non paid family members – Women	3,404,529
Farms with employees	812,158
Employees – Total	4,412,674
Employees – Men	3,613,449
Employees – Women	799,225
Permanent employees – Total	1,429,350
Permanent employees – Men	1,162,702
Permanent employees – Women	266,648
Temporary employees – Total	2,983,324
Temporary employees – Men	2,450,747
Temporary employees – Women	532,577
Farms with sharecroppers	186,939
Sharecroppers – Total	916,039
Sharecroppers – Men	708,962
Sharecroppers – Women	207,077
Number of persons in previous censuses	
1920 census	6,312,323
1940 census	11,343,415
1950 census	10,996,834

*Source:* IBGE, Censo Agrícola 1960 – vol. II, 1a. Parte, 17–31

sector. Its performance must be considered in the general process of growth and development that occurred in Brazil. The large growth of industry, strongly stimulated by the state, and the service sector, grew naturally by rural exodus and rapid urbanization. This did not occur in agriculture, which logically lost relative share in terms of participation in GDP and in the economically active population. But this did not signify that agriculture did not successfully participate in terms of its expected



activities in this period.<sup>47</sup> There was growth but lower than what occurred in the service sector and industry, which explained the reduction in its relative participation.

Although the integration of industry and agriculture was particularly evident by the 1970s, in the whole process of Brazilian industrialization, agriculture played a fundamental role. There was such an abundant supply of labor that agriculture could produce the positive balance of payments and supply the economy with basic inputs, without changing the levels of rural worker remuneration. So abundant was that labor that it could also support the great rural exodus – an army of reserve labor sufficient to enable the process of urban growth, as well as the expansion of the labor in industry and services. The rural population actually increased, although the portion of the population employed in agriculture was significantly reduced. Because of expansion into the western frontiers the area explored was expanded and thus it was possible to systematically increase agricultural production.

It was in the period of military governments from 1964–1985 that agricultural policy finally became a priority of the government. The new government saw in agriculture an important source of inflationary pressure because of its shortcomings in the supply of the domestic market, and improving supply and reducing food costs was essential to contain wage pressures. In an underdeveloped country like Brazil, with low wages and a perverse distribution of income, food was a basic component of the cost of living and therefore had a strong impact on the formation of real wages.

This modernization of agriculture was to occur without any transformation in the agrarian structure, characterized as we have seen by a high concentration of land ownership.<sup>48</sup> Compared with most Latin American countries, Brazil never underwent a genuine process of land reform or engaged in free land distribution. In the countryside, land traditionally represented power and the reserve of value. In general, ownership and economic exploitation were not associated. Until the mid-twentieth century, unproductive latifundia and archaic labor relations prevailed in many regions of the country. In the 1950s and 1960s, the deficient structure of

<sup>47</sup> An interesting discussion on the interdependence of the agricultural with the other sectors of the economy can be obtained in Tamáz Szmrecsányi, “O desenvolvimento da produção agropecuária (1930–1970),” in Boris Fausto, ed., *História da Civilização Brasileira*, III. O Brasil Republicano, vol. 4, “Economia e Cultura (1930–1964)” (Rio de Janeiro: Beltrand Brasil, 1995): 107–207.

<sup>48</sup> Ruy Cirne Lima. *Pequena História Territorial do Brasil. Sesmarias e Terras Devolutas* (São Paulo: Secretaria do Estado da Cultura, 1990).

agriculture was identified as the main impediment to the country's development, by restricting the expansion of productive forces and allowing the survival of a backward and conservative power structure. Concentration of land, in addition to being politically conservative and socially damaging, it was argued, would impede the modernization of agriculture, and the proposed solution to the problem was agrarian reform.<sup>49</sup> However, the military governments put an end to the agrarian reform debate. Instead, with the goal of having plenty of cheap food, they began to encourage the modernization of agriculture and, thus, the transfer of the rural worker to urban industry, opening up agricultural production to international markets and using it to generate the foreign exchange necessary for growth. But despite all the proposed modernization, the government did not act against the concentration of land ownership and did not challenge the power of conservative rural elites.

Military support for agricultural modernization involved several areas. First, and fundamentally, there was the supply of abundant and subsidized credit. In 1965, the National Rural Credit System (SNCR) was created to provide substantial funds for agricultural producers and represented the main government instrument in promoting agriculture. In addition to the credit system, the guarantee of minimum prices and the formation of regulatory stocks were used to avoid large price variations for producers and consumers. Prior to planting, the government fixed minimum prices for the main products, especially those destined for the domestic market. It financed production and marketing through the Federal Government Acquisitions (AGF) and the Federal Government Loans (EGF). AGF was the instrument of direct purchase of products; the EGF represented loans to producers, who had the right to sell the product to the federal government, when market prices remained below minimum prices. Until the

<sup>49</sup> On the debates concerning the factors that influenced the evolution of Brazilian agriculture, see Affonso Celso Pastore, Guilherme L. Silva Dias and Manoel C. Castro, "Condicionantes da produtividade da pesquisa agrícola no Brasil," *Estudos Econômicos*, 6, no. 3 (1976): 147–81; Charles Mueller and George Martine, "Modernização agropecuária, emprego agrícola e êxodo rural no Brasil – a década de 1980," *Revista de Economia Política*, 17, no. 3 (Jul.–Sept. 1997), 85–104; Rodolfo Hoffmann, "Evolução da distribuição da posse de terra no Brasil no período 1960–80," *Reforma Agrária*, 12, no. 6 (Nov.–Dec. 1982):17–34; Carlos Nayro Coelho, "70 anos de política agrícola no Brasil, 1931–2001," *Revista de Política Agrícola*, 10, no.3 (Jul.–Sept. 2001): 3–58; Affonso Celso Pastore, *A Resposta da Produção Agrícola aos Preços no Brasil* (São Paulo: APEC, 1973); Alberto Passos Guimarães, *Quatro Séculos de Latifúndio* (Rio de Janeiro: Paz e Terra, 1977); Ruy Muller Paiva, "Reflexões sobre as tendências da produção, da produtividade e dos preços do setor agrícola no Brasil," in F. Sá, ed., *Agricultura Subdesenvolvida* (Petrópolis: Vozes, 1968).

1980s, much of the cotton, rice and soybean crops were financed by the EGF. In addition, the government created other special programs for regional development. Polocentro and Prodocer were the most important. The first, which began in 1975 and ended in 1982, aimed to stimulate the development and modernization of the Center-West in the Cerrado region, and was also based on the granting of subsidized credit. The second was the Japan–Brazil Cooperation Program for the Development of Cerrados (Prodocer), created through the Japanese Agency for International Cooperation (JICA), also to promote the agricultural development of the Cerrados. This program, besides foreseeing the participation of large companies, dedicated part of the land to family agriculture, through settlements. The program gave a great stimulus to the agricultural production of the savannahs of northwestern Minas Gerais, Bahia, parts of the Center-West and Maranhão.<sup>50</sup> Another important institution created by the government was the Brazilian Agricultural Research Corporation (Embrapa). Founded in 1973, it would play a fundamental role in the modernization of Brazilian agriculture.<sup>51</sup>

The rural credit system was based on public funds, via Banco do Brasil's "Conta Movimento" or on loans of the Central Bank of Brazil, and the "Exigibilities," which corresponded to a portion of commercial banks' demand deposits, compulsorily applied to credit operations for agriculture. The operation of the "Movement Account," which represented an automatic rediscounting of the Banco do Brasil, gave this bank a power of issue, and represented an effective increase in the money supply. The subsidy on credit came from the setting of interest rates in nominal terms, usually below inflation.

<sup>50</sup> Coelho, "70 anos de política agrícola no Brasil," *Revista de Política Agrícola*, X (Número Especial) (Jul./Aug./Sept. 2001): 29–31.

<sup>51</sup> "At the same time, it became clear that the opportunities for agricultural expansion in traditional areas were becoming limited. Increasing productivity in already opened areas, and incorporating the 'unproductive' Cerrado – the savannah-type biome in Brazil – was perceived as a means to guarantee the increase in agricultural production and to ensure food to the growing urban population at affordable prices. Thus, it was necessary to improve agricultural land and labor productivity significantly. The government's response to the challenge of creating a new era in agriculture resulted in the creation in 1973 of the Brazilian Agricultural Research Corporation, Embrapa, a 'research arm' of the Ministry of Agriculture, Livestock and Food Supply. This institution was given the mission of coordinating the Brazilian Agricultural Research System, composed of state agricultural research organizations, universities (agricultural colleges) and Embrapa itself." Geraldo B. Martha Jr., Elisio Contini and Eliseu Alves, "Embrapa: its origins and changes," in Werner Baer, ed. *The Regional Impact of National Policies. The Case of Brazil* (Cheltenham and Northampton, Mass.: Edward Elgar, 2012): 204–226.

During the 1970s, the volume of agricultural credit increased fourfold, having its best year in 1979. The abundance and negative cost of government credit to the producer financed the modernization of agriculture in terms of equipment and inputs. In the 1970s, an industrial complex was established in Brazil that supplied machinery, implements, fertilizers and pesticides; and the demand generated by agricultural modernization was an important factor in the rapid industrial development of that period. Between 1960 and 1980, the cultivated area almost doubled, from 25 million to 47 million hectares, and this was accompanied by increasing mechanization. In the same period, the number of hectares per tractor decreased from 410 to only 99, a proportion that remains stable to this day. Average fertilizer consumption per hectare increased from 8.3 kg in 1964 to 27.8 kg in 1970 and to 88 kg in 1980.<sup>52</sup>

Thus, the government provided three key pro-agricultural policies: subsidized credit, minimum prices, and purchase of regulatory stocks. The market for agricultural products was totally regulated. Domestic production was protected by customs tariffs and prior import authorizations, which made the market virtually immune to external competition. In this way, the government managed to guarantee both producer income and consumer price stability. It also helped the producer by controlling the price of inputs. Even products destined for foreign markets were heavily government-controlled. In addition to control over the exchange rate (essential variable for exportable items) and subsidized credit, regulations were established to guide exports, in many cases through the action of important public agencies such as the Sugar and Alcohol Institute (IAA) and the Brazilian Coffee Institute (IBC).<sup>53</sup>

In the case of sugar and alcohol, the government operated a complex system that controlled production per refinery (Usina), provided subsidies to compensate for regional differences in productivity and determined export quotas. Wheat was under another complex control system of the federal government, which was responsible for internal and external purchases of the product and regulated the supply to the mills of the country, also through a quota system. As the domestic producer was not competitive, the government controlled imports, bought wheat at prices

<sup>52</sup> There is an excellent series of statistics on agriculture on the sites of the Ministério da Agricultura: [www.agricultura.gov.br](http://www.agricultura.gov.br); IBGE. *Estatísticas do século XX*, available at [www.ibge.gov.br](http://www.ibge.gov.br); Banco Central, [www.bcb.gov.br/?RELRURAL](http://www.bcb.gov.br/?RELRURAL); and in Ipeadata, under Temas: produção, available at: <http://ipeadata.gov.br/epeaweb.dll/ipeadata?52305371>.

<sup>53</sup> The two institutes were closed at the beginning of the 1990s.

reflecting the high costs of domestic production, and sold the final product to the consumer with subsidies to avoid the impact that such an important item would have on consumer price indices.<sup>54</sup> These support policies stimulated the modernization of agriculture in terms of machines, implements, fertilizers and pesticides, but created distortions in resource allocation and discouraged productivity growth.

In addition to credit incentives and the minimum price policy, the federal government, under the leadership of Embrapa, implemented a major research program crucial to Brazilian agriculture's ability to modernize. With a focus on agribusiness, the goal was to provide solutions for the development of agriculture through the generation, adaptation and transfer of scientific and technological knowledge. Embrapa's sophisticated research work best explains agricultural productivity gains over the past twenty years. In retrospect, the performance of Brazilian agriculture from 1960 to 1980 can be considered reasonably favorable, since it represented the first leap into modernity, with an increase in cultivated area and productivity per hectare. Considering seven of the major grains, production rose from 18 million tons in 1960 to 52 million in 1980, made possible by an increase in the cultivated area from 17 million hectares to 38 million hectares and a relative increase in productivity, from 1,083 kilos per hectare to 1,363 kilos per hectare. Productivity was still very small but showing signs of growth, which would mark Brazilian agriculture in the next thirty years, particularly since the 1990s.

Soybeans stood out among the new grains that were part of agricultural modernization. Introduced in the late 1950s, they reached a production level of 15 million tons in 1980, a level of output only surpassed by corn. Among other items that began to be exported on a large scale in this period was orange juice. Sugarcane also had a strong expansion, especially after the implementation of the Proálcool program in 1975, which replaced

<sup>54</sup> On the transformations which then occurred see Guilherme Leite da Silva Dias and Cicely Moutinho Amaral, "Mudanças estruturais na agricultura brasileira, 1980–1998," in Renato Baumann, ed., *Década de Transição* (Rio de Janeiro: Campus/Cepal, 2000); Guilherme Delgado, "Expansão e modernização do setor agropecuário no pós-guerra: um estudo da reflexão agrária," *Estudos Avançados USP*, 15 no. 43 (Sept.–Dec. 2001): 157–172; Eliseu Alves, *Dilema da Política Agrícola Brasileira: Produtividade ou Expansão da Área Agricultável* (Brasília: Embrapa, 1983); Fernando B. Homem de Melo, "Agricultura de exportação e o problema da produção de alimentos" (São Paulo: FEA-USP, Texto para Discussão 30, 1979); and Fernando B. Homem de Melo, "Composição da produção no processo de expansão da fronteira agrícola brasileira," *Revista de Economia Política*, 5, no. 1 (Jan.–Mar. 1985): 86–111.

gasoline with ethanol. Even a traditional crop like wheat was transformed by strong government incentives. Generally complemented by imports, the Brazilian crop, thanks to government support, increased greatly in volume and productivity. In the mid-1980s, for the first time in modern times, domestic production finally managed to supply most of domestic consumption. However, other commodities did not perform as well. Corn and rice almost doubled in the period, but with little increase in productivity. Beans and manioc, essential items in the national diet, also did not experience any change in productivity and their harvests did not increase as well.

Traditionally, most of the Brazilian population had been rural. But an intense migratory movement toward the cities began in the middle of the twentieth century causing an average annual increase of 4.7% in the urban population between 1960 and 1980. During the same period, the rural population grew at the modest rate of less than 1% per year. By the early 1980s, two-thirds of Brazilians lived in urban areas, mostly concentrated in large cities. This exodus from rural workers to often marginal urban activities represented a serious social problem, although it was important for the productivity of the rural labor force.

Like all other sectors of the economy, agriculture was affected by the crisis of the 1980s, which began with the surge in oil prices in the previous decade and intensified with the Mexican debt crisis in 1982. This led to the deterioration of the accounts, inflation and a dramatic balance of payments crisis, which resulted in a moratorium on external debt and a sharp decline in economic activity. The need for internal and external adjustments led to the adoption of recessive policies reinforced by agreements with the IMF – which, in turn, led to adjustments lasting more than a decade. The supply of rural credit, based on large government subsidies and the use of funds derived from demand deposits, was greatly reduced. Inflation made demand deposits scarce, and these accounts were the basis of rural credit requirements, and the need to control public accounts restricted agricultural subsidies. In 1984, credit available to agriculture accounted for only 37% of the 1979 volume; in 1990, it fell to 23% of that figure. At the same rate, the share of credit in agricultural GDP fell. In the second half of the 1970s total credit represented around 70% of agricultural GDP; in the 1990s it remained slightly above 20%.<sup>55</sup>

<sup>55</sup> Banco Central do Brasil – Departamento de Regulação, Supervisão e Controle das Operações do Crédito Rural e do Proagro-DEROP. Registro Comum de Operações Rurais – RECOR.

In addition, from the mid-1980s, rural lending was adjusted for monetary correction: thus the cost of credit became positive and gradually rose as much as other market rates. Finally, the need to control inflation induced the government to permanently manipulate the price of products in the domestic market, especially food, which was sometimes costly for the producer. The policy of minimum prices, the purchase of agricultural products by the government, and the price control policy were reduced or eliminated due to the need to reduce public spending and to control inflation. Most of these measures had a negative impact on the producer and had little positive impact on inflation. Similarly, the succession of recessive policies and heterodox plans were generally ineffective in containing rising inflation, which created considerable uncertainty and negatively affected agriculture, which operates with long cycles of production.

When we compare the evolution of credit granted with the quantity produced, we see that there was a systematic fall in the value of credit granted while the quantity produced increased continuously. This generated an expressive drop in the average credit per ton (US\$ per ton). According to a study by the Brazilian Development Bank (BNDES), in the early 1980s, financing per ton surpassed all international prices of grains, creating an overabundance of financial resources, which were often misapplied. Already in the 1990s, credit per ton was scarce. As the average annual production in the period 1999–2001 was 70% higher than in the early 1980s, disbursement per ton fell by 80% over the same period.<sup>56</sup>

However, the adjustment of the 1980s, although dramatically affecting agriculture, like the other sectors of the economy, provided opportunities. The international oil crisis and its consequences for the external accounts which would culminate in the 1987 moratorium gave agriculture a new role, as the government promoted the replacement of oil with alcohol. In addition, in the face of external bottlenecks, the government began to stimulate agricultural exports. Differentiated policies were established for products destined for the foreign market (such as coffee, sugar, soybeans, orange juice, cocoa, cotton and tobacco) and those destined for the domestic market (such as rice, potatoes, beans, maize, cassava, onion). The latter were protected from foreign competition by tariffs and import quotas.

<sup>56</sup> Paulo Favaret Filho, “Evolução do Crédito Rural e Tributação sobre alimentos na década de 1990: implicações sobre as cadeias de aves, suínos e leite” (Rio de Janeiro, BNDES Setorial, no. 16), 34.

In the case of domestic products, the greatest concern was the impact of prices on explosive inflationary levels. In order to control prices, the government, as we have seen, regulated the supply in numerous ways. However, these costly controls on the domestic market soon became threatened by the growing public deficit. The maintenance of low prices to control the cost of living also served to stimulate consumption. However, the cost of the consumer subsidy policy and the income protection of the producer burdened the public accounts. With the deterioration of public funds, there was increasing pressure for abolishing these subsidies, pressure that came in particular from international institutions such as the World Bank and the International Monetary Fund (IMF). The importance of wheat in the basic diet and the potential political impact of adopting real prices postponed the decision to end subsidies. But in 1987 they were finally eliminated; and in 1990 the free market was established for all stages of wheat production and marketing. Although in the protectionist period the productivity of Brazilian wheat increased, with the end of the subsidies to the product, the local crops could not compete with the imports. In 1987, domestic production reached 6.2 million tons, meeting 90% of domestic demand. In 1995, wheat production had fallen to 1.4 million tons, accounting for only 17% of the market. In addition to the impact on production, by eliminating the producer incentive, the withdrawal of subsidies to consumption affected domestic consumption, which remained practically stable at around 6 million tons per year throughout the 1980s.<sup>57</sup>

With the oil crisis, the ambitious Proálcool was implemented to promote the domestic production of ethyl alcohol for use as an automotive fuel. Launched in 1975, the program expanded in 1979, following the second oil shock. Apart from adding alcohol to all gasoline sold in the country, the government gave incentives to manufacture cars that would run exclusively on hydrated alcohol. Fuel production targets had been set at 3 billion liters per year for the first phase and rose to 7.7 billion liters for the second, starting in 1979. In order to promote the program, numerous tax incentives were made available, along with government funding. Gasoline sold in Brazil already contained 20% alcohol, and

<sup>57</sup> Célio Alberto Cole, "A cadeia produtiva do trigo no Brasil: contribuição para geração de emprego e renda" (MA thesis, Porto Alegre: Iepe/UFRGS, 1998); J. F. Fernandes filho, "A política brasileira de fomento à produção de trigo, 1930–1990," *Anais do XXXIII Congresso Brasileiro de Economia Rural* (Brasília: Sober, 1995), 1: 443–74; Roque Silvestre Annes Tomasin and Ivo Ambrosi, "Aspectos econômicos da cultura do trigo," *Cadernos de Ciência e Tecnologia*, 15 no. 2 (May–Aug. 1998): 59–84.



this percentage rose to 22% in 1980. The first ethanol-fueled cars on the market were just adapted gasoline vehicles, but from the early 1980s onwards completely new and very efficient engines emerged that had been designed for the use of fuel alcohol. This enforced a policy that efficiently remunerated the alcohol producer and, at the same time, made that fuel competitive. Although the program was expensive for the government, Proálcool proved effective, since the market adopted almost exclusively alcohol-based vehicles: by 1984, 95% of cars manufactured in Brazil had an alcohol engine.

During that decade, the program was criticized for the costs and prioritization of sugarcane at the expense of other crops, especially those directed at domestic consumption. Cane for ethanol production was planted in the best soils of the country, with extremely efficient and mechanized cultivation. A national sugarcane processing technology was developed, which compared to the best in the world. However, with the subsequent decline in international oil prices, the program became too costly for the government, and alcohol could no longer compete with gasoline prices. In 1985, the Proálcool began to face a crisis, with the progressive decrease of the sales of alcohol motor cars, and by the mid-1990s such sales had almost ceased. The government, however, still required alcohol to be mixed with the common fuel. But continued oil shocks and an increase in government funding brought a new revitalized program into existence in the twenty-first century.<sup>58</sup>

As a result, the 1980s were turbulent for agriculture due to the country's long economic crisis. In the decade, the sector had average annual growth of 3%, which was above the average increase of GDP in that period. However, it was an erratic performance, alternating positive years with zero or negative growth phases and exhibiting better results in export products than in staples of domestic consumption. If we consider the instability and recessionary policies of the country plus the reduction in fiscal incentives for the sector and especially the loss of cheap and abundant subsidized credit, agricultural performance was better than could have been expected. The emergence of financing alternatives for the

<sup>58</sup> In Brazil, three types of gasoline were marketed: common, common additive and premium. By law, all three must contain alcohol in a proportion of 20% to 25%, depending on the availability of that fuel in the market. About such a program, see Fernando B. Homem de Melo and Eduardo Giannetti, *Proálcool, Energia e Transportes* (São Paulo: Fipe/Pioneira, 1981); Fernando B. Homem de Melo, *O Problema Alimentar no Brasil* (Rio de Janeiro: Paz e Terra, 1983); José Cláudio Bittencourt Lopes, "O Proálcool: uma avaliação" (MA thesis, Universidade Federal de Viçosa, 1992).

sector, involving other segments of agribusiness, was fundamental to explain that reasonable performance. Suppliers of inputs and equipment started to directly finance rural producers and there was greater financial and operational integration with the other end of the productive process, such as processing industries, wholesale and retail distribution channels (including supermarket chains) and trading companies. These new sources were used to finance the productive process in agriculture. The integration between producer, supplier and client, which began in the 1980s due to the sudden withdrawal of government credit, would become in the next decade the primary source of rural credit and still constitutes the financing system of Brazilian agribusiness.

Along with this important shift in credit sources, government-sponsored agricultural research was crucial in fostering the subsequent agricultural revolution. The activities of Embrapa and other research centers, such as the Agronomic Institute of Campinas, which accumulated an historical archive of the main products of Brazilian agriculture, and their regional characteristics, were among the main factors explaining the relative dynamism of agriculture, even during the crisis that devastated Brazil for more than fifteen years. Over the past two decades, there has been a steady increase in productivity across all crops and the progressive expansion of the agricultural frontier through the introduction of new seed varieties, which are compatible with local soil and climatic conditions. In the 1980s, the Cerrado began to be exploited, where several crops (especially soybeans) adapted very well to previously unproductive lands. The expansion of the agricultural frontier to the virgin soils of the Center-West region also had a positive impact, as it allowed the use of new and (now) extremely productive areas. But on the other hand, it imposed a burden on the state in terms of the need to invest in infrastructure if these new zones were to be exploited efficiently, which in turn denied these resources to traditional production zones. Given the progressive expansion of the agricultural frontier in the last twenty-five years, the itinerant character of Brazilian agriculture continues. Largely because of the public investments that accompany the opening of new agricultural regions, areas that were previously unprofitable are gaining value.

What we can consider the second phase of Brazilian agricultural modernization occurred in the 1980s, when the loss of government subsidies forced agriculture to become integrated into the market. In those years, the Brazilian farmer reached a level of modernization and efficiency that allowed him to survive and thrive in the market economy. To do so, the sector would need to make major adjustments. Thus on the eve of its

greatest expansion in the twenty first century, Brazil had passed through several stages of growth and crisis. Most of the period since 1900 had involved some aspect of government intervention to keep agriculture viable. But there was little modernization in the period to 1960. It was only with the governments of the military era that a systematic approach was taken to advance agriculture. Though the final organization of agribusiness as a free market enterprise would be far different from what these military governments anticipated, the massive support they gave agriculture would be fundamental to its transformation and ultimate success.