

AGRICULTURE IN BRAZIL

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ABSTRACT

Brazil is the largest nation in terms of arable land. It has abundant land and water resources. It is among the few nations with potential to increase agricultural productivity. Access to export markets is crucial for Brazilian agriculture. Brazil is the third biggest exporter of agro-food products after the European Union and the United States. It is now regarded as a top-5 producer of 34 commodities and is the largest net exporter in the world. It is a leading comprehensive exporter of soybean, sugar, coffee, oranges, poultry, beef, cotton, corn, orange juice, and ethanol. The nation is essentially self-sufficient in basic foodstuffs. This paper introduces the reader to the practice of agriculture in Brazil.

Key Words: agriculture, farming, Brazil, Brazilian agriculture, traditional agriculture

INTRODUCTION

Brazil is the largest country in Latin America in area and population. It is one of the ten biggest economies of the world. It is subdivided into more than 5,000 municipalities. The federal government does not provide for separate regional administrations, although it promotes economic growth in the poorer regions. Brazil has the largest army, air force, and navy in South America, accounting for more than 300,000 soldiers. Although the Brazilian president is commander in chief, the nation does not have a long-standing tradition of civil control over the military.

Agriculture is an integral part of the world's economy, mainly for developing countries such as Brazil. It is the primary source of employment, income, and food. Brazil is a major agricultural and industrial power with the strongest economy in Latin America and the seventh strongest in the world. The agriculture of Brazil is illustrated in Figure 1 [1]. It is one of the principal bases of its economy. Brazil has developed a large-scale commercial agricultural system. It is recognized worldwide for its role in domestic economic growth and expanding exports. Brazil has a total land area of 851 million ha, with 264 million ha (30%) classified as agriculture. Currently, 61% of Brazil's total land is preserved. There are three general categories of farming in Brazil: subsistence farming, intermediate family farmers, and consolidated farms. Family farms are establishments that employ mostly family members. Due to financial constraints, small farmers generally have difficulties securing the capital necessary to stay in rural areas and maintain production.

Agricultural production accounts for almost 6% of the GDP. Soybean covers the largest cropped area in Brazil, followed by corn, sugar cane, rice, and beans. Brazil's leadership in soybean and maize production depends on predictable rainfall in the Amazon-Cerrado agricultural frontier. Figure 2 shows land for agriculture in Brazil [2]. Brazil's vast territory encompasses two separate and distinct regions engaged in field crop and livestock production: South and Center-West. The two regions are distinguished by differences in climate, cropping patterns, and other farm characteristics, particularly farm size. Brazil is the world's fourth-largest fertilizer importer, behind China, India, and the United States. More than 70 percent of fertilizer in Brazil goes to three crops: soybeans, corn, and sugarcane [3].

Brazil has chosen a development strategy that continues to rely heavily on the agricultural sector for economic growth. Since the mid-2000s, Brazil has accelerated its transformation from an exporter

of mainly tropical agricultural products such as coffee, sugar, citrus, and cacao to a major global supplier of commodities, including soybeans, grains, cotton, ethanol, and meats. Soybeans and corn compete for acreage with sugarcane, cotton, cattle, and timber in Brazil's frontier region. Figure 3 shows Brazilian soybean cultivation [4]. Brazil is the world's leading producer of coffee. About one-third of the world's oranges are grown in Brazil. Brazil has one of the world's largest livestock populations. Sugar cane is a big crop in Brazil. Brazil is the largest world producer of sugarcane. Brazil has around 253 million head of cattle, and its cattle industry is largely grass fed. Figure 4 shows cattle farming in Brazil [5]. About one-fourth of Brazil's total catch is freshwater fish, of which a major portion comes from the Amazon River system. Brazil is a major gold and diamond producer. Brazil produces the majority of its petroleum and natural gas, mainly from offshore fields. Since the mid-20th century Brazil has been a major world supplier of automobiles, producing nearly two million vehicles per year. Brazil has been a major producer of textiles, clothing, and footwear since the early 19th century [6]. Rio Grande do Sul is the largest producer of rice in the country. Brazil is the world's second largest tobacco producer, and the largest exporter since 1993. It is the world's second largest cassava producer.

BRIEF HISTORY OF BRAZILIAN AGRICULTURE

The Indians both influenced and were influenced by the Europeans who arrived in the fifteenth century. The strategic importance of the agricultural sector to Brazilian economic growth has been clear since the first colonial ventures in the early 16th century. Although Brazil became an independent nation in 1822, breaking free from Portuguese control, they continued to grow the same crops as during the colonial period for several decades, primarily sugar, tobacco, coffee and rubber. Brazilian farmers relied heavily on slave labor to clear land and work on plantations. Brazil was the last country in the Western hemisphere to end slavery, in 1888. Brazil began to set up its own agricultural education system in the late 19th century, but the effort received a boost in the post-World War II period [7]. Early in the post-WWII period, the Brazilian government implemented an import-substitution strategy to promote domestic economic growth while limiting foreign debt and the use of foreign exchange. In 1934, Brazil began adding hydrated ethanol to their gasoline. Today most of their cars are flex-fuel, meaning the consumer can freely choose between gasoline and ethanol. In 1960, four main agricultural products were exported, growing by the early 1990s to nineteen. The rapid industrialization process that took place in Brazil between the 1960s and 1980s led to an important transformation in the nation, including the agricultural sector. However, the expected productivity growth of the overall economy and structural transformation did not happen. The Brazilian Enterprise for Agricultural Research was established during the military rule (1964-85) in 1973 with the objective of diversifying production. Since 1965, they have had a Forest Code, which sets the percentage of land area that each farmer must conserve. Beginning with the 1994 creation of Plano Real for monetary stabilization, Brazilian agriculture went through a radical transformation: the State cut subsidies and the market began to finance agriculture. This forced Brazilian producers to adapt to global practices. By the end of the 1990s, commodities were still important for Brazilian exports, but the two main products of the 1990s, soybean and iron ore, represented 10% of total exports. Several measures implemented during 2020 confirmed Brazil's commitment to rural credit as its main agricultural policy tool.

GOVERNMENT INTERVENTION

Brazil has a history of government intervention in the agricultural sector. Support to farmers accounts for about three-quarters of all support to agriculture, with the remaining quarter delivered as general services to the sector. The support included market price support, input subsidies, land zoning, promotion of biofuels, marketing interventions, and disaster payments. Financing for agriculture comes from three sources: Government agricultural credit disbursed through the National System of Rural Credit, agricultural processors, and commercial banks or other government agencies. From the 1950s, Brazil adopted an import-substitution industrialization strategy, which involved wide-ranging

controls over supply and prices in the agro-food sector. The National Agency for Food Supplies regulated distribution of basic foodstuffs and set prices. This continued until the late 1980s, when the government began to reform Brazil's economy. A government initiative in the 1970s began to replace costly, imported gasoline as a motor fuel with ethanol. Since the mid-2000s, policy emphasized support to smallholders, and minimum prices for staples produced in the poorest regions. Since 2008, all support based on input use (mainly to credit and insurance) is conditional on environmental criteria and farming practices [8].

MODERN AGRICULTURE

Many poor families barely subsist on small, overworked patches of land. The traditional national dish of Brazil is the *feijoada completa*, a mixture of up to 20 different dried, salted, or smoked meats simmered in a stew of black beans (*feijoadas*) and often served with rice, vegetables, and other foods. Figure 5 shows traditional farming in Brazil [9]. Thirty years ago, soybeans only grew in south Brazil. Despite its massive size and an economic history based on primary goods, Brazil was a net food importer until the 1980s. Mechanized farming is still somewhat rare in Brazil. For example, banana farming requires very intensive manual labor. Although hand harvesting employs many people, machine harvesting is more efficient and environmentally friendly. Figure 6 shows a typical mechanized farming in Brazil [10].

Brazil has the opportunity to lead tropical countries in combining modernized agriculture with highly diverse and functional ecosystems. Brazilian technological advances and scientific efforts have benefited the agricultural sector. The country is well known for the science-based development of successful tropical agriculture, which occurs between latitudes 23N and 23S.

Agricultural credit at preferential interest rates represents a significant share of agricultural support in Brazil. This is the major policy instrument supporting both commercial, medium, and small-scale family farms. It is designed in co-operation between the Central Bank, the Treasury, and the Ministry of Agriculture. Rural credit lines with more preferential conditions are provided for commercial farmers and small producers. All rural credit is conditional on compliance with environmental criteria.

BENEFITS

Agriculture has been an island of success in terms of productivity growth in the last decades compared to other sectors of the Brazilian economy. It may not bring higher yields, but it is more sustainable and makes better use of land. Agricultural credit at preferential interest rates represents a significant share of agricultural support in Brazil. It is important to maintain Brazil's significant research capacity, notably through the Brazilian Agricultural Research Corporation (EMBRAPA).

The development of Brazilian agriculture was predominantly based on productivity gains. Agricultural policies need to be designed to support research efforts that stimulate growth in productivity. The three major determinants of agricultural productive capacity are human capital, technology generation and dissemination, and adequacy of natural resources and weather conditions [11].

CHALLENGES

Challenges still persist, despite large production increases. The success of Brazilian agriculture has not been attained without a heavy price. It has been associated with widespread destruction of Brazilian Amazon rainforest, environmental degradation, and land distribution inequality. Other challenges of Brazilian agriculture include [12,13]:

- *Poor Infrastructure:* Development of storage facilities, ports, roads, and railways has not kept pace with Brazil's growth in agricultural production and exports. Brazil's railroad and port systems are slow and ineffective, resulting in delays. With less than 14% of their roads paved, efficiency is lost when the product leaves the farm.

- *Corruption:* Brazil has had a long history of a corrupt government. Until recently, buying votes, money-laundering, falsified public documents, and misuse of public funds had been almost a norm. President Dilma Rousseff has worked tirelessly to remove the corruption from her government, but these old habits are dying hard.
- *Social Inequality:* It will require stronger efforts to decrease inequalities in income and land distribution in the rural sector. Brazil's ability to integrate socio-economic development with environmental preservation will have major consequences not only for Brazil, but also for other tropical countries and the rest of the world.
- *Food Insecurity:* Ensuring food security has always been a priority issue for governments, international organizations, and society in general. A third of Brazil's population is food insecure. Despite increased food production since the industrialization, a large proportion of Brazilians have difficulty meeting their nutrition needs. Ensuring food security for the world's population over the coming decades will face the challenges of a larger world population, greater urbanization, limited natural resources, higher levels of income, and stronger links between the agricultural and biofuel markets. As a leading producer and exporter of agricultural products, Brazil is one of the few countries well placed to lead global food security efforts.
- *Climate Change:* The vulnerabilities of food production systems to the adverse impacts of climate change have been recognized. Although agricultural expansion and intensification have increased over time, dry-hot weather during drought events has slowed their rate of growth. The deforestation of natural forests, notably in the legal Amazon, has posed a gigantic issue for the country in recent years. Much of the country has experienced reduced rainfall over recent years.
- *Environmental Degradation:* The growth of Brazilian agriculture has been accompanied by massive deforestation in its three major forests: the Atlantic Forest, the Cerrado, and the Amazon Forest.
- *Sustainable Development:* Although agriculture plays a key role in the Brazilian economy, it is also one of the largest sources of (greenhouse gas) emissions. Therefore, the opportunities to implement more-sustainable practices are countless. Brazil is at a critical juncture in terms of sustainable development. In order to achieve sustainable development, Brazil must reconcile its increasingly productive, modern tropical agricultural system with environmental preservation, social equity, and poverty alleviation. Brazil has other specific credit lines and programs to promote sustainable agricultural practices.
- *Fires:* These are one of the problems still present in Brazilian agriculture. One practice of indigenous Brazilians was to clear land for cultivation by burning it. This provided arable land and ashes for use as fertilizer and soil cover.

CONCLUSION

Agriculture is an important sector of the Brazilian economy and is crucial to economic growth and foreign exchange earnings. The country has a recognized global leadership when it comes to the "4Fs" (food, feed, fuel, and fiber), i.e., the country is a global player in the production of food, renewable energy, and fibers [14]. Brazilian agriculture is well diversified. The nation is largely self-sufficient in food. Brazil currently ranks as the third largest world agricultural exporter in the world. Agriculture productivity growth in recent decades in Brazil has been mainly driven by investments in agriculture innovation, facilitation of sector financing, and trade liberalization. Increases in agricultural

production and exports positioned Brazil to become a major player in the global market. Brazil is globally important for both food security and environmental sustainability. It is one of the three largest producers and exporters of sugar, coffee, orange juice, soybean, beef, tobacco, ethanol, and broiler chicken in the world. Brazilian farming faces many challenge and opportunities with other tropical developing countries. Its success story has generated intense interest from other developing countries, mainly in Africa, Latin America, and the Caribbean. Brazil has become a role model to these nations. More information about agriculture in Brazil can be found in the books in [15-25].

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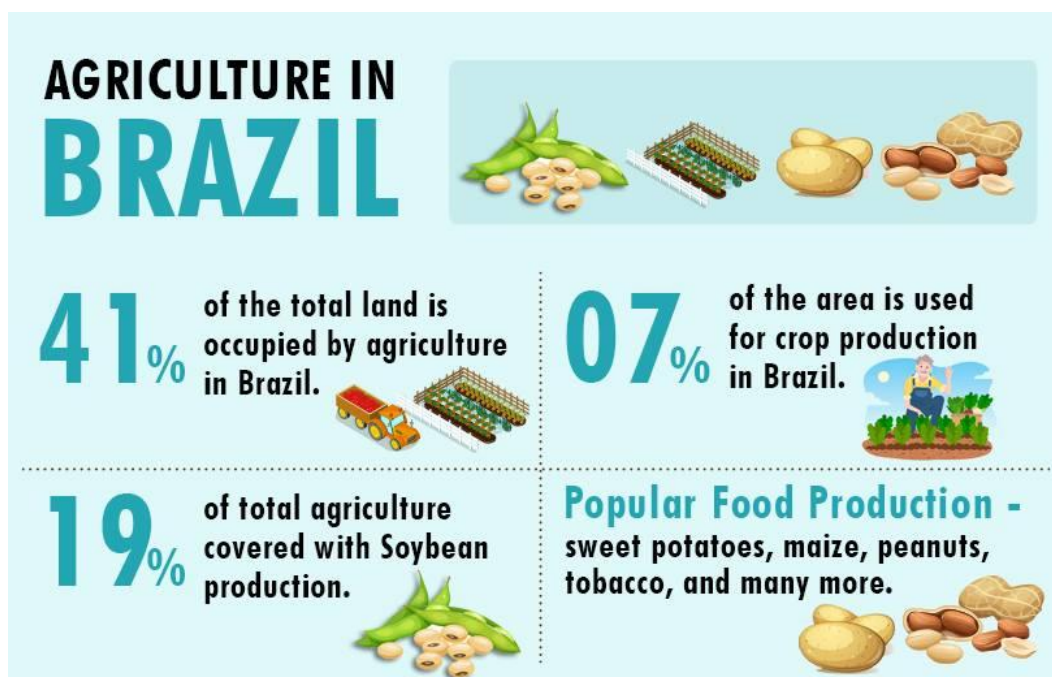


Figure 1 The agriculture of Brazil [1].

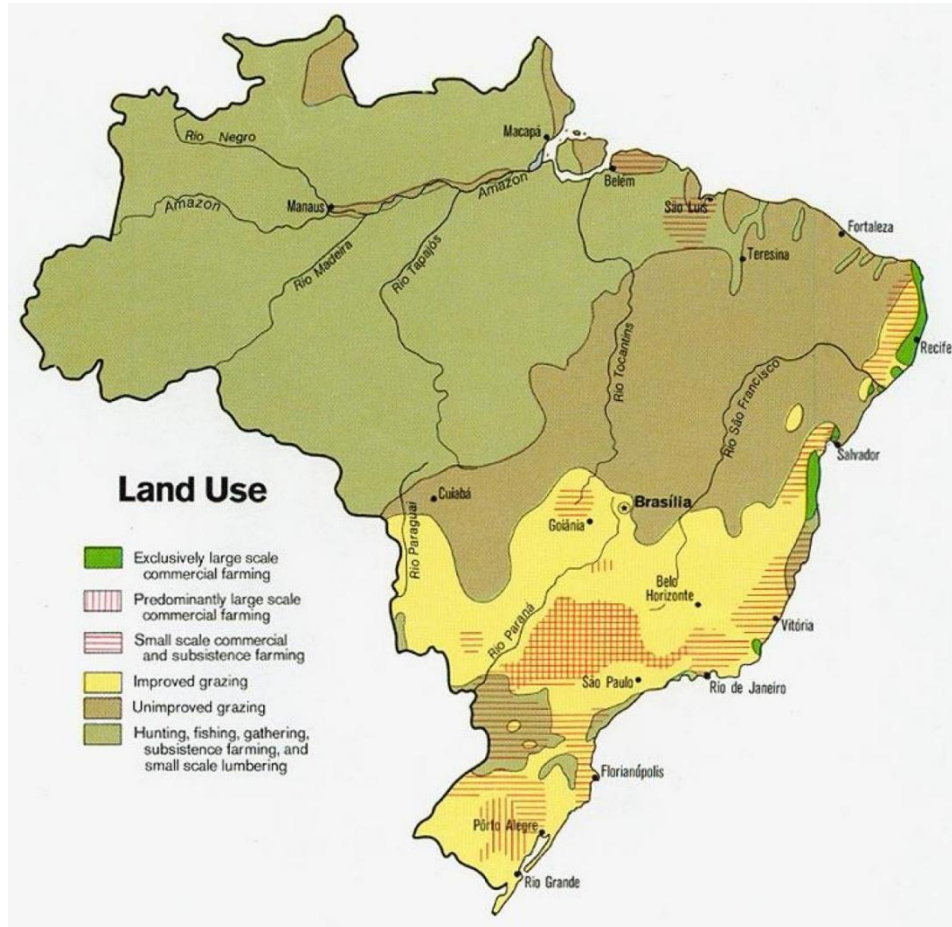


Figure 2 Land use for agriculture in Brazil [2].



Figure 3 Brazilian soybean cultivation [5].



Figure 4 Cattle farming in Brazil [5].

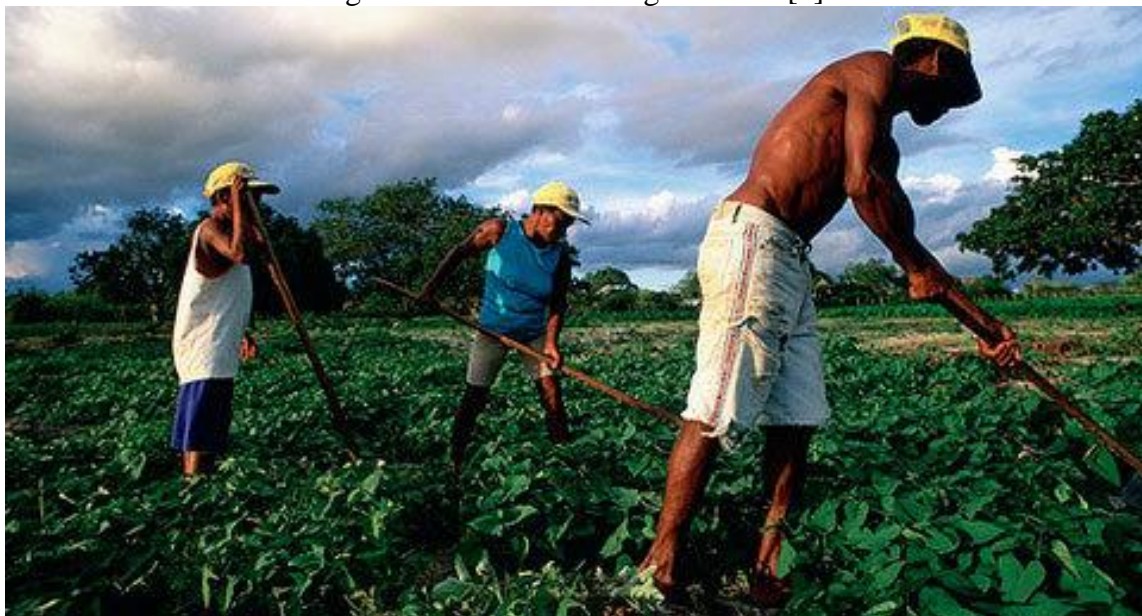


Figure 5 Traditional farming in Brazil [9].



Figure 6 A typical mechanized farming in Brazil [10].