

**Voluntary Report** – Voluntary - Public Distribution

**Date:** July 01, 2024

**Report Number:** BR2024-0017

**Report Name:** Brazil's 'Tropical Wheat' - Paving the way to self-sufficiency

**Country:** Brazil

**Post:** Brasilia

**Report Category:** Grain and Feed, Climate Change/Global Warming/Food Security, Agriculture in the News, Biotechnology - Plants and Animals

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**Report Highlights:**

Brazil consumes over 12 million tons of wheat and wheat-based products per year, which is more than the country's national production of roughly 9.5 million tons. As a result, Brazil is among the top ten importers of wheat in the world. However, the Brazilian government is committed to making the country self-sufficient in wheat production within the next decade. This should be achieved by cultivating land in the Cerrado biome, a savanna-like region in Central Brazil. The government aims to expand wheat production in almost 4 million hectares of degraded land and use adapted wheat seed varieties that are resistant to dry weather and soil conditions prevalent in the region.

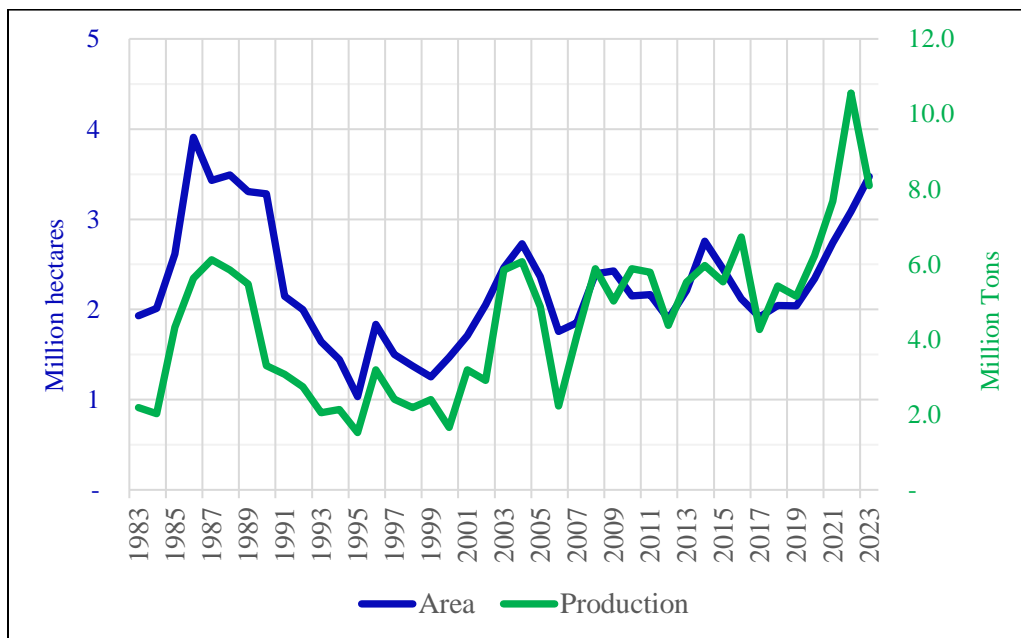
### Brazil: Big Consumer, Big Importer of Wheat

Brazil is one of the largest agricultural producers in the world, yet it is also the tenth-largest importer of wheat. According to USDA, the estimated production of wheat in Brazil is expected to reach 9.5 million tons in the 2024/2025 harvest, while the Brazilian National Supply Company (CONAB) states it to be around 9 million tons. However, the consumption of wheat and wheat-based products in Brazil is expected to reach around 12 million tons, which means that production is not sufficient to meet internal demand. As a result, Brazil relies heavily on imports, particularly from Argentina, which has been responsible for more than 80 percent of Brazil’s imports and benefits from the Mercosur tax-free arrangement.

In the early 2000s, Brazil's wheat production was only able to meet just over 30 percent of the national demand. However, by the 2022/23 harvest, this self-sufficiency rate had increased to 80 percent, a significant improvement. Despite this progress, the country still faces a significant gap between production and consumption. Farmers and researchers have made considerable strides in increasing crop production, yield, and planted area. However, there are still significant challenges to overcome to achieve the Brazilian Government’s ambitious plan of wheat self-sufficiency within the next decade.

Over the past 40 years, the wheat planted area in Brazil grew by nearly 80 percent, from 1.9 million hectares in 1983 to an estimated 3.4 million hectares in 2023, according to historical data from CONAB. During the same period, wheat production increased by 270 percent, from 2.1 million tons to an estimated 8 million tons this season.

**Figure 1**  
*Evolution of Wheat Production and Area in Brazil*

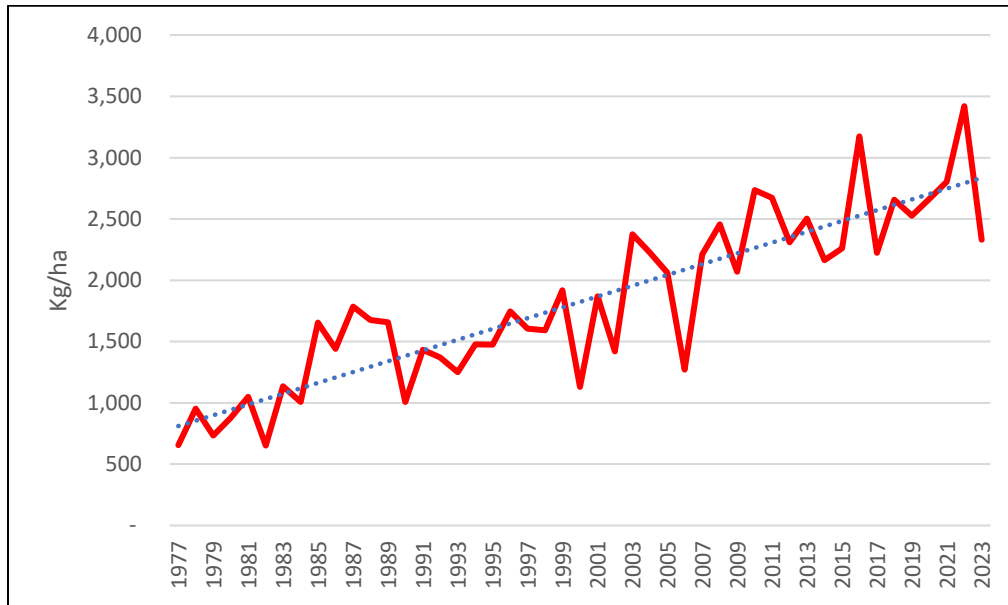


**Data source:** National Supply Agency (CONAB); Graph Post Brasilia

Yield also presented significant increases during this period, reaching a record 3.42 MT/ha (metric tons per hectare) in 2022, against 1.13 MT/ha registered in 1983. The huge growth in production, despite a nearly stagnant planted area, is a result of investments in technology and intensification of existing agricultural production systems, with wheat in crop rotation in existing areas, such as corn and soybeans, and better use of areas that were initially idle during the winter.

## Figure 2

*Evolution of Wheat Yield in Brazil*



**Data source:** National Supply Agency (CONAB); Graph Post Brasilia

This significant increase in production and yield is credited not only to the increment in the planted area but primarily as a direct result of research and development, which Brazil has achieved in the past with the evolution of soybean and corn farms. Highlights include the creation of new wheat cultivars better adapted to national climatic conditions, the development of more efficient methods of pest and disease control, and the improvement of the plantation rotation system to improve soil quality.

Until the 1970s, wheat production was low in Brazil due to a lack of investment in appropriate agricultural technologies and low-yielding varieties. However, from the following decade onwards, intense research was conducted on wheat, and with the advancement of soybeans to the center-west of Brazil, wheat was also introduced as a second crop. The wheat genetic improvement program for the Cerrado biome was intensified by the Brazilian Agricultural Research Corporation (EMBRAPA) in the 1980s, and the first cultivars were offered a few years later.

## Tropical Wheat: The Solution for Self-sufficiency?

Wheat production in Brazil is primarily focused in the southern states, including Rio Grande do Sul and Paraná, where the climate is predominantly temperate and subtropical. These two states contribute to approximately 80 percent of the country's annual wheat production.

### Figure 3

*Main Wheat Producing States, 2023*



*Data Source: National Supply Company (CONAB); Graph Post Brasilia*

The tropicalization of wheat in the Cerrado region began in the 1920s in an effort to expand wheat production and increase productivity outside the southern region. This initiative gained momentum in the 1980s, following the establishment of EMBRAPA, where researchers worked on developing cultivars and technology production systems for cereal cultivation in the Center-West, Northeast, and Southeast regions, as a project referred to as 'Tropical Wheat.'

The Cerrado biome is the second-largest in Brazil and covers around 22 percent of the country's total area, spanning 12 states and the Federal District. The region's rainfall patterns and air masses are heavily influenced by atmospheric systems that affect South America, such as the South Atlantic Convergence Zone (SACZ), Amazonian depressions, and the Chaco in Paraguay. The Cerrado region is characterized by two well-defined seasons: a rainy period lasting from September/October to March/April and a dry season from April/May to September/October.

**Figure 4**  
*Brazilian Biomes and States*



*Data source: Graph Post Brasília*

In March 2022, the Brazilian Ministry of Agriculture and Livestock (MAPA) approved a document called the Term of Decentralized Execution (TED) for Tropical Wheat. This document highlights investments in research and technology transfer totaling around 2.9 million reais across various grain sectors in the states of São Paulo, Goiás, Minas Gerais, Mato Grosso, Mato Grosso do Sul, Bahia, and the Federal District.

EMBRAPA estimates that it is possible to increase the Cerrado region's planted area from 252 thousand hectares in 2021 to 353 thousand hectares of degraded pastures by 2025 in the Cerrado region alone, not considering the Atlantic Forest area. As a result, an additional 300 thousand tons of wheat could be produced, which the Brazilian government estimates will result in savings of up to 400 million reais for the country in avoided imports. Currently, tropical wheat is cultivated in the Cerrado and Atlantic Forest biomes on more than 400 thousand hectares.

Wheat production in the central region has increased with the adoption of technologies that ensure profitable yields and include the growth of tropical wheat. The crop is cultivated in the states of Goiás, Mato Grosso do Sul, Bahia, Mato Grosso, São Paulo, Minas Gerais, and the Federal District and is traditionally planted in a rainfed system (also referred to as 'safrinha' wheat), starting in March, or an irrigated system, under a central pivot, with sowing beginning in the first half of April. The 'tropical wheat' needs only ten days of continuous rain during the flowering period, making it a preferred planting option for producers. This type of harvest currently represents around 80 percent of the planted wheat in the region. Nevertheless, irrigated production is expected to grow, as yields tend to be

considerably higher. Currently, irrigated wheat is an alternative in crop rotation with beans, carrots, onions, garlic, and potatoes.

In the past harvest, with optimal rain patterns, the average productivity in the Cerrado was 35 bags per hectare, with some producers reaching up to 50 bags per hectare. Meanwhile, yields in the irrigated system can reach up to 100 bags per hectare, albeit at higher production costs.

EMBRAPA has invested in adapting the grain to tropical climates through investments involving genetic improvement of plant varieties that have higher grain productivity for Cerrado's weather, soil, water level, and nutrients. Wheat planting in the Cerrado has advanced mainly among producers who wish to diversify crops or even to take advantage of areas that would otherwise remain fallow or be cultivated with cover crops. The tropical wheat is planted in succession to soybeans and in rotation with corn and sorghum, diversifying the production system and reducing risks. This provides numerous agronomic benefits, such as breaking the cycle of pests and diseases in the area, mainly soil fungi, weeds, and nematodes, aside from also providing a rotation of active ingredients of agricultural pesticides.

### **New Varieties: The Path to Success**

Wheat's growth cycle lasts between 100 and 170 days, typically depending on the cultivar type, weather, and soil conditions. The Cerrado region in Brazil has well-defined seasons, with six months of rain followed by six months of drought. This makes it ideal for tropical wheat cultivation, as better-outlined weather patterns help combat diseases and pests and assist in the choice of planting system, be it rainfed or irrigated.

In the early 1990s, the Brazilian government stopped intervening in wheat purchases, and the sector came under pressure to improve the quality of the grain. As a result, the Brazilian wheat production system underwent significant changes to ensure compliance with international market parameters. The development of cultivars, which until then was dominated by soft wheat, was quickly replaced by bread wheat, which has higher quality. This allowed the utilization of industrialized products with specific characteristics in human nutrition, such as bread, biscuits, thickeners, and other foods for human consumption. Additionally, wheat cultivars of higher quality for animal feed were developed, which contain higher levels of protein, fiber, and amino acids. EMBRAPA has also been developing wheat cultivars specifically resistant to drought and heat, which are ideal for planting in the Cerrado region. While there have been many varieties adopted in the region to date, four of them have been the main ones: BRS 264, BRS 394, BRS 404, and BRS 254.

#### **- Variety *BRS 264***

The most used wheat variety developed by EMBRAPA is known as BRS 264. It is estimated that 80 percent of all the irrigated wheat currently planted in the region is of this variety, as it is well accepted by mills, which allows for good liquidity in sales, mainly for baking. The BRS 264 is considered a high-quality type of wheat cultivar for its high productivity and high stability (resistance of the dough to mechanical treatment and fermentation during the bread-making process). Baking quality is measured in

relation to dough stability and gluten strength. Stability in wheat processing measures how long the dough maintains its consistency and is measured in minutes. Weak gluten flour has a lower water absorption and shorter stability time than strong gluten flour, so the longer the stability, the better quality the wheat. Brazilian Mills require a minimum of 14 minutes of stability. Gluten strength is an indicator commonly used by professional bakers to measure the flour's toughness and elasticity by a 'W index.' Flour with higher W index strength requires a longer rising time and is more suitable for bread. Mills require gluten strength (W) between 200 and 250.

BRS 264 can reach 32 minutes of dough stability, high gluten strength, and high flour yield (66.5 percent on average) compared to other wheat in the region (between 58 and 60 percent). The flour milling yield is the percent of flour obtained from the milling of the kernels. This makes it the preferred option for planting in the Cerrado region.

In addition, BRS 264 is highly productive. According to data from the National Supply Company (CONAB) for 2024, the average yield in the Cerrado region is 6 tons per hectare (compared to 3 tons per hectare in Brazil). Cultivar BRS 264 reached 9.6 tons per hectare in commercial farming in 2021, when a farmer obtained the world record for daily yield in the city of Cristalina, Goiás. Meanwhile, despite concentrating the highest production in the country, the Southeast region (Paraná, Rio Grande do Sul, and Santa Catarina) presents an average yield of 2.9 tons per hectare. Contacts consulted by Post have indicated that given its high quality, millers have favored the commercialization of this variety in Brazil.

- ***Variety BRS 394***

Another cultivar used in the Cerrado, BRS 394, was launched in 2015 and is suitable for irrigated and rainfed systems. It also has a high yield and rapid development cycle of approximately 110 days. It has moderate resistance to lodging and is considered a bread wheat with dough stability over 25 minutes. On average, it yields 62.5 percent flour and has an average gluten strength (W), which makes it a popular choice for blending with other flours. As a result, it is widely accepted in the industry.

- ***Variety BRS 404***

BRS 404 is a wheat variety that is highly tolerant to dry weather in the Cerrado region and can also be grown with an irrigated system. This cultivar has a hard-grain texture that is preferred in the milling industry for bread making due to its high gluten strength, protein content, and stability. The cultivar has a fast development cycle and presents an average yield.

- ***Variety BRS 254***

Among the listed wheat varieties, the oldest is BRS 254, which was launched in 2005. It has high yield rates and an average development cycle of 120 to 125 days. However, this variety is more prone to lodging and requires careful management, particularly in terms of irrigation and nitrogen fertilization. This improved wheat variety has garnered industrial interest due to its high wheat strength, which benefits bakeries in producing frozen bread. BR 254 also demonstrates high stability and an average flour milling yield of 62.2 percent.

## Can Old Challenges Hinder the Ten-Year Self-Sufficiency Plan?

Farmers in Central Brazil have indeed expressed interest in planting tropical wheat as a second-season crop after corn or soybeans. This is due to the various advantages it offers, such as generating income in the off-season, suppressing weeds, fungi, and soil nematodes, improving soil water retention and fertility, and contributing to the sustainability of the agricultural system. However, the soil in the Cerrado biome is usually poor in phosphorus and potassium, making it necessary to correct the soil properly and adopt a balanced fertilization according to the crop's needs to produce economically viable grains in the region.

In addition, the wheat crop in the Cerrado region faces severe incidences of wheat blast, a disease caused by the fungus *Pyricularia grisea*. The disease can occur in several parts of the wheat, in all stages of development, especially when the relative humidity is high (> 90 percent) and the temperature is around 82°F (28°C).

Wheat blast is a complex disease to control and can lead to a significant loss of production. The use of genetic resistance is still limited to a few wheat cultivars with a moderate level of resistance, such as cultivars BR 18-Terena and BRS 229. For this reason, one of the primary goals of the Term of Decentralized Execution (TED) approved by the government is to promote strategies to combat wheat blast.

Another challenge faced by Brazilian farmers and producers is the well-known logistical hurdle and production costs (see [Grain and Feed Update | BR2023-0028](#)). Given that producers in the region are traditionally familiar with planting other crops, such as soybean, cotton, and corn, purchasing equipment and machinery needed to switch to wheat can be too expensive for many farmers. In addition, high fuel prices and dependence on imported fertilizers can also significantly increase production costs, which might not offset the gains in productivity. As a result, many farmers prefer to continue investing in more reliable and more risk-averse crops.

Another significant setback is the lack of large mills that can process wheat in the Cerrado region. The state of Minas Gerais alone has a milling capacity of 800 thousand tons but is estimated to only use 200 thousand tons. Mills are traditionally located in the northern and northeast regions of Brazil due to the location of ports and in the southern and southeast regions, where most of the production is located.

Wheat consumption patterns also vary across the country. The Southeast region accounts for 42 percent of wheat consumption, while the South accounts for 9 percent, the Center-West for 5.5 percent, the Northeast for 22 percent, and the Northern region for 10 percent. Most of the wheat is grown in the South of Brazil, and many states that border zero tariff Mercosur countries import wheat from their neighbors instead of buying it locally. In return, producers in the South traditionally process their wheat in mills located near ports, making it easier to negotiate exports at more profitable prices.

The path of transforming Brazil from one of the major importers to self-sufficient in up to a decade, as intended by the Brazilian government, is overlaid with well-known challenges by farmers in the country. However, there have been substantial investments to produce cultivars and equipment better suited to the conditions imposed by the Cerrado biome. Considering the history paved by Brazil with corn and



soybean, when the country shifted from a net importer in the 1980s to a primary exporter in current days, Brazilian tropical wheat is likely to gain momentum, as the other grains before it.

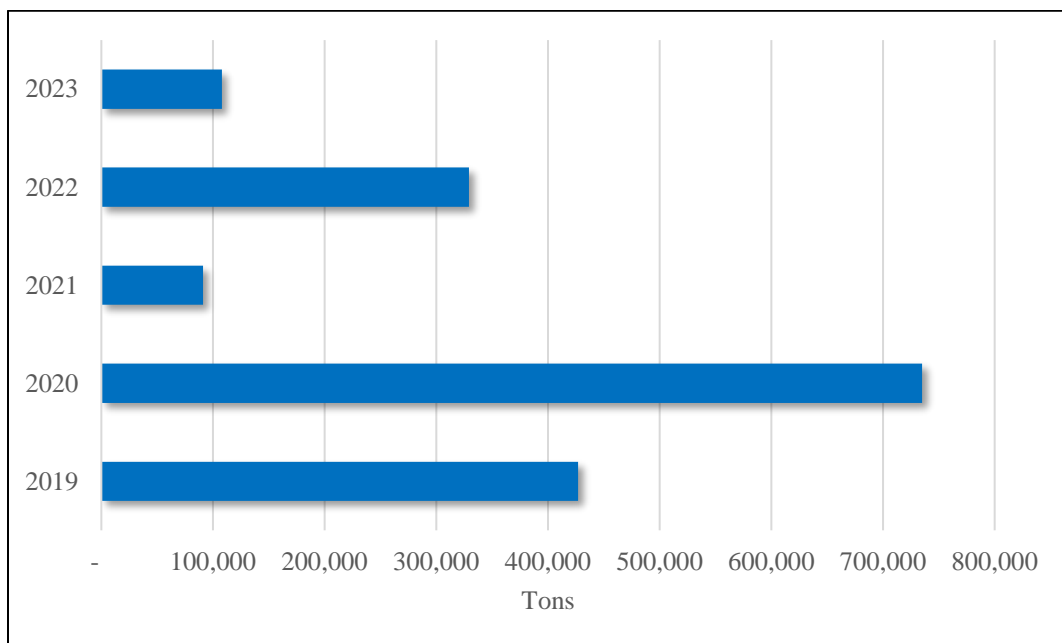
### U.S. Wheat Exports to Brazil: Will Tropical Wheat Get in the Way?

In March 2019, the governments of Brazil and the United States announced an agreement that allows Brazilian mills to import American wheat without any tariffs. This means that the U.S. can export up to 750 thousand tons of cereal per year to Brazil without incurring the 10 percent tariff that is usually applied to wheat purchases from outside the Mercosur bloc.

U.S. wheat is traditionally sold to mills in the north and northeast of Brazil, and it competes with the product from Paraná. With the cost of national land freight, considering Brazil's extension, American wheat ends up being a more viable alternative for many millers. Still, the proximity and high availability of wheat from neighboring Mercosur countries, which export to Brazil at zero tariffs, have influenced the amounts sent to Brazil.

#### Figure 5

*Brazil: Wheat Imports from the United States*



*Data source: Trade Data Monitor (TDM); Graph Post Brasilia*

The TRQ extension for non-Mercosur countries in Brazil has allowed U.S. wheat to increase its market share in the country. However, Brazilians still prefer to import cheaper wheat from neighboring countries. As a result, U.S. wheat exports to Brazil have been continuously declining. Brazil aims to self-sufficiency in wheat in the next ten years, which would have consequences in the long run. Nevertheless, any possible changes to the TRQ or other trade measures would undoubtedly have a more severe impact until then.

**Attachments:**

No Attachments.