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Brazil, Factor 5: Climate Volatility

The Effects of Climate Instability on Brazil

Brazil is the largest country in South America. It is bordered by 10 countries, including Colombia, Argentina, Peru, and Bolivia. Its population has been growing rapidly and is now about 203,080,756, with the most densely populated areas including São Paulo and Minas Gerais (Belandi, 2022). Brazil is divided into various geographical regions. The country's landscape includes savannas, wetlands, and forests, including 60% of the Amazon Rainforest (Brazil and the Amazon, 2025). The country also consists of a variety of climates. Since the equator passes through northern Brazil, some regions of Brazil have an equatorial climate; rainfall varies, but ranges from 80 to 120 inches per year (Climate in Brazil, n.d.). Other regions of Brazil have tropical climates, with both a dry and rainy season. Southern regions have a subtropical climate, in which cold seasons are not uncommon between May and August. This climatic inconsistency, paired with global climate change and rising temperatures, can make it difficult for Brazilian agriculture to remain consistent and dependable when it comes to growing sufficient amounts of nourishing crops for the nation.

Daily life varies across the country due to geographical and developmental differences. However, family is a fundamental piece of Brazilian culture. "Familia" includes immediate family members, but also includes extended family, such as cousins, aunts, uncles, and in-laws. Typically, three generations live under the same roof at any given time (Scroope, 2018). Another common theme is the concept of "compadrio," which is the inclusion of close friends and neighbors into family units. Housing ranges from urban apartments in more densely populated areas to more traditional huts built from wood, bamboo, and thatching in rural areas (Brazilian Daily Life, 2019). Brazilian households are still largely patriarchal, with the husband viewed as the head of the household. Men are typically responsible for making money to support the family, whereas women are responsible for raising children, keeping house, and cooking. The Brazilian diet is largely composed of rice, beans, and manioc- a starchy root vegetable. It also includes a variety of seeds, breads, fruits, and meats. However, in recent years, studies have shown that the consumption of ultra-processed foods, such as prepackaged snacks, sweets, and pastries, has drastically increased in Brazil (da Silvia Oliveira & dos Santos Vieira, 2024).

Agriculture plays a crucial role in the Brazilian economy. Livestock and crop production account for 29% of Brazil's gross domestic product (GDP), as well as employing 15.1 million people (Valdes, 2022). Common crops include soybeans, cotton, coffee beans, and sugarcane. Poultry and hog production have also experienced significant growth in recent years (Valdes, 2022). Additionally, Brazil is a top global exporter of various agricultural goods, including beef, orange juice, cotton, and soybeans (The Global Power, 2010). The average size of a farm in Brazil is 69 hectares, or roughly 170 acres (Guimarães, 2020). However, farm sizes vary greatly depending on geographic location. Family-owned farms comprise the majority of Brazilian farms, and they are responsible for producing a wide range of goods, including beans, milk, and pork (Family Farming Knowledge, n.d.). Brazilian agriculture differs from that of the United States in several ways. The most prominent difference is the way farms are perceived. Farms in Brazil are viewed as assets, and farmers are more similar to businessmen, spending most of their time in offices and less of their time working in fields (Ofstehage, 2019). Families are still closely connected to their farms, but farmers themselves are less directly involved with the actual labor and production of goods.

As of 2021, 29.4% of people living in Brazil were considered to be living in poverty. Of those people, 8.4% were considered to be in extreme poverty (Belandi, 2022). This poverty can make it difficult for families to afford basic necessities such as food and housing. While starvation and malnourishment are declining, around 15 million people still suffer from malnutrition due to a lack of good, nurturing food options. Education is also somewhat lacking. It is required for children ages 6 through 14 to attend either private or public education, but beyond those years, schooling is not required (The Education System, n.d.). Since education is often completed so early, it can be challenging for young people to access the necessary information needed to secure better job opportunities and overcome poverty.

The shifting environmental conditions in Brazil are linked to agricultural production problems. Though Brazil has always had a warm climate, recent years have seen a significant increase in temperature, which could be devastating for agriculture as a whole (How the Climate Crisis, 2025). Increased temperatures can damage crops, not only reducing the amount produced, but also increasing the prices of the few crops able to be grown. These increased prices will make it more difficult for low-income households to provide food for their families. Along with increasing temperatures, rainfall has begun to shift and decrease in certain regions of Brazil. Significant reductions in annual rainfall could have a devastating impact on agricultural production. Furthermore, one study found that as temperatures continue to rise and rainfall decreases, agricultural productivity in Brazil could decrease up to 18% (Asscunçã & Chein, 2016). Crop rotation is a common practice on Brazilian farms; switching between crops allows for soil turnover, as well as stores carbon within the soil. However, as rainfall decreases, less water is available to irrigate so many crops, so farmers are becoming less able to produce several fields of crops per year. Farmers have also begun planting more drought-resistant fruit trees along their fields to help with water retention.

A common reason deforestation occurs in Brazil is to clear pastureland for raising livestock (The Editors, 2024). This deforestation results in increasing carbon and greenhouse gas emissions, which increase temperatures and reduce rainfall. To combat this, some Brazilian farmers are integrating their farmland into the pre-existing natural forests- a process known as agroforestry. By doing this, farmers preserve the natural environment and its ecosystems, as well as reduce up to one-third of the carbon emissions necessary to eradicate in order to prevent the worst predicted climate conditions. (The Editors, 2024). In 2010, a plan known as the “ABC Plan” was implemented by the Brazilian government. This plan focused on reducing carbon emissions through government regulations and the development of new, environmentally beneficial technologies (Sampiao et al., n.d.). While the plan was beneficial and accomplished a great deal, Brazil’s climate remains unstable and continues to pose threats to agricultural production.

The issue of climate instability and its effects on agricultural production could be improved through new educational programs and public awareness campaigns. Through collaboration with and education of local farmers on the effects of climate change and various strategies for combating its consequences, crop production could be increased, thus enhancing food security for the nation as a whole. Additionally, forming closer relationships between farmers and the general public can bring awareness to the problem at hand and can involve the public when it comes to fighting climate change. One program, established by the United Nations Food and Agriculture Organization, has already begun to do this by introducing students to agriculture at a young age. The project educates children about the process of growing fruits and vegetables by planting gardens in several thousand schools across the country (Chatterjee, 2016). By learning about how crops grow, students are becoming more directly involved in producing their own food. Additionally, the program is teaching them about the importance of healthy

eating and maintaining a healthier lifestyle. Another program created by the United Nations, the Intelligent and Sustainable Agroclimatic Module (MAIS), enables rural farmers to implement technologies and practices that combat climate change. The program helps Brazilian farmers plan for severe droughts, as well as maximize soil use by using practices to restore pastureland damaged by a lack of carbon. The program also helps farmers with their finances, so they are better able to invest in their farms and increase production as well as their profits. As a result, land use has increased by 30%, dairy production has increased by 63%, and some farmers have nearly doubled their incomes (MAIS Program, 2025).

Increasing public awareness related to agricultural production and the shifting climate could also help. While Brazil is a country deeply rooted in agriculture, making the general public aware of the effects of climate change could prevent the problem from worsening. A project implemented in 2008 has been working to accomplish that goal. Founded by the Brazilian government, the project, "Strengthening the Dialogue Between FAO, Governments and Civil Society", works to educate rural leaders and youth, as well as to educate the public on efficient agricultural practices (Program of Brazil-FAO, n.d.). Another method of achieving this solution is Brazil's National Policy for Agroecology and Organic Production (PNAPO). This policy was issued in 2012, and it works to conserve natural ecosystems through sustainable agriculture, as well as involves local farmers and youth in sustainable production methods. It also provides financial support for small, family-run farms and works to reduce gender inequalities in the agriculture field. The policy yielded significantly positive results. Between 2013 and 2015, it assisted nearly 400 small farms, increased school spending on organic food grown from local small farms by 30%, and increased public awareness, resulting in increased agricultural employment that benefitted almost 133,000 small farmers (Brazil's National Policy, n.d.). Through these programs and initiatives, rural communities can learn about sustainable agriculture in an unstable climate, which can increase production and thus increase food security for the country.

Since Brazil is such a prominent exporter of various agricultural goods, it is imperative that agricultural production remains consistent and food security continues to increase. High poverty rates, partnered with malnutrition and educational barriers, make it difficult for families to provide nutritious food for children. The considerable increase in temperatures, along with a decreasing trend of rainfall, presents challenges to those working in the agricultural production industry. Together, these difficulties pose a severe threat to national food security and, without intervention, could have devastating effects on the Brazilian population. Not only that, but countries relying on Brazilian commodities could experience difficulty resulting from the scarcity of these commodities. By working to increase education on environmentally sustainable and efficient methods of agricultural production, these problems can be reduced. Similarly, increasing public outreach and awareness can minimize further environmental instability as well as increase public knowledge on efficient production methods. While neither solution will completely eradicate the issue at hand, both can work to significantly improve the situation and, in turn, the lives of countless Brazilian citizens, along with their trade partners worldwide.

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