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Brazil, Sustainable Agriculture

### **Brazil: Emphasizing Sustainable Agriculture Practices**

Recently, the impacts of unsustainable agriculture in Brazil have been felt worldwide with the Amazon Forest Fires, which made headlines in 2019. However, the effects of unsustainable agricultural practices have been plaguing Brazil long before the infamous forest fires. The forest fires are simply a result of decades of slash and burn agriculture, monoculture, and other dangerous practices implemented by Brazilian agro-industrialists. These practices have not only impacted the environment but also have had negative impacts on food security issues throughout the region. These issues must be addressed immediately before further damage to the ecosystem ensues. To achieve a prosperous future for Brazil and the world, sustainable agricultural practices must be implemented.

Brazil is the fifth most populous country in the world and accounts for over one-third of Latin America's population. With this large population comes a vibrant diverse culture and a growing global economy (Momsen). The landscape throughout the country is very unique and encompasses a wide variety of different geographical features such as savannas, wetlands, and low mountain ranges. Brazil is divided into twenty-six states and one federal district. Like the US, Brazil has three branches of government: an executive, a judicial, and a legislative branch. Also like the US, Brazil is a federal constitutional democratic republic. The executive branch of government is headed by controversial right-wing president Jair Bolsonaro. Families in Brazil come in all shapes and sizes. In urban areas like Rio, the typical family consists of a husband, wife, and two children. In rural areas, it is common for families to have five to six children. According to The Culture Trip, a typical Brazilian eats three meals a day with coffee, beans, and rice being important dietary staples (Brown).

Agriculture is a principal base of Brazil's economy and culture. Brazil is currently the world's largest exporter of coffee, sugarcane, soybeans, beef, and crop-based ethanol. Nearly eight percent of the country's land is cultivated for agricultural purposes. Large-scale industrial businesses have been promoted over family farms under the administrations of Michael Temer and Jair Bolsonaro. Large-scale industrialized agriculture has been hailed as the solution to Brazil's food security issues, contributing 23.5% to the country's GDP in 2017. Proponents of industrialized agriculture in Brazil believe that it is necessary to keep up with the growing population, but a deeper analysis of agricultural statistics raises questions about whether the interests of industrial agribusiness are aligned with the best interests of the Brazilian people and easing national food insecurity.

Currently, over 66 million people in Brazil are food insecure. Access to food, not production, is the primary problem. Millions of people simply have too little income to buy adequate food. This is exacerbated by geographical variance in food production. Around 90 percent of Brazil's total food production is concentrated in the south, south-east, and the southern part of the central-western region. However, the UN's Food and Agriculture Organization estimates that 60 percent of food-insecure people live in northern and northeastern Brazil (FAO 2010). Further, the prominence of large transnational corporations dominating the agriculture and food industry has increased obesity in Brazil. In the mid-1970s, less than 3 percent of men and 8 percent of women in Brazil were obese. Today, almost 18 percent of adults are obese, and more than half are overweight, according to the Ministry of Health, and the rates of chronic, diet-related diseases like diabetes and some cancers have grown. This weight gain is most prominent in low-income populations in Brazil who have turned to cheap processed foods to satiate their hunger. Many of the food insecurity issues in Brazil are caused by large-scale industrial agriculture practices.

As large-scale industrial agriculture takes over Brazil's landscape it is crucial to analyze their practices through the lens of sustainability. Sustainable agriculture means meeting society's present food and textile needs, without compromising the ability of current or future generations to meet their needs. One of the most dangerous agricultural practices perpetuated by large-scale industries in Brazil is monoculture. Monoculture is the practice of planting a single crop in a farming system at the same time. This has dire consequences on existing biodiversity and soil quality. Monoculture diverts the natural resources of the area continuing unsustainable agriculture practices, while also upsetting the current ecosystem by displacing naturally occurring species. One of the main crops that are subject to monoculture in Brazil is soybeans. Today Brazil has 24-25 million hectares devoted to the growth of this crop (Global Forest Atlas). More than 17,000 square kilometers of the native vegetation in Brazil's Cerrado region has been cleared for soy plantations in the last decade (Asher). The Cerrado biome, which encompasses a combination of forests, savannas, and grassland, originally covered 2 million square kilometers in central and northeast Brazil and was home to roughly 5 percent of the world's biodiversity. In recent years, the region has been of interest to large agriculture industries, resulting in over half of its original vegetation being lost. Along with the threats to existing biodiversity, Monoculture also creates over-cultivated strains of plants that are less resistant to unforeseen diseases and environmental changes. When something unexpected happens in the environment, these crops die out, leaving those who are dependent on those crops hungry.

Deforestation is an additional consequence of unsustainable practices of large-scale farming. To create more land for large-scale farming, agriculture industries have turned to convert natural rainforests in Brazil into farmland. One of the main areas that have been affected by deforestation is the Amazon Rainforest, with over 15% of the total area being lost in the past 50 years for agriculture conversion (Worldwildlife). The many impacts of deforestation in Brazil can be felt worldwide. According to agronomist Antonio Donato, "South America is drying up as a result of the combined effects of deforestation and climate change" (Zanon). The health of the Amazon Rainforest is crucial to the individuals residing in the region as it works as a cooling system. On a single day, a tree with its 20-meter canopy pumps around 1,100 liters of water into the atmosphere. This humidity is transported from the Amazon Basin to Brazil's center-west, southeast and south regions as well as to neighboring countries. With fewer trees in the forest, there is less humidity in the air, leading to drought. This drought harms both large-scale and family farms, causing food insecurity throughout the region.

One way to combat the many issues presented by large-scale agriculture is to increase the prominence of small-scale family farms. Family farms are increasingly efficient, sustainable, and will promote food security throughout the region. Currently, in Brazil, large-scale agriculture industrialists occupy over 75% of the country's agricultural land, producing 62 percent of the nation's total agricultural output. Family farms, on the other hand, use under 25 percent of the nation's total agricultural land but produce over 70 percent of food consumed in the country (Gross). These statistics show that family farms are efficient and well-equipped to tackle the food security needs of Brazil. Much of what is produced by agro-industrialists in Brazil is exported to foreign countries, while the majority of family farm produce stays in the country. Unlike industrialized farms, family farms do not rely on deforestation and monoculture to sustain themselves economically. Family farming in Brazil mostly consists of the integration of many different crops planted side-by-side, adapting to the needs of each specific community (Huber). Emphasizing family farms would increase sustainability, while also increasing food security. Unlike large-scale agriculture, family farms do not have the pressure to produce massive amounts of produce for exportation. Traditional communities understand how the land works and know to farm in a way that complements the existing ecosystem. It is a common process in the large-scale agribusiness industry to use slash and burn farming, a process where the existing vegetation is cut down and burned to clear the land for cultivation. Once the land becomes infertile, these industrialists move on to another plot of land and repeat the process. Practices like these are responsible for the destruction of much of Brazil's biodiversity.

Small-scale family farms typically do not use these practices because healthy land benefits them personally. This is not the case for large-scale agriculturists who have the resources to simply relocate when the land and environment are ruined. Small-scale family farmers have to live with the consequences of unsustainable farming, which is why they use sustainable practices that advocate for the health of the ecosystem and the people surrounding it. Small-scale family farms have demonstrated their ability to sustain Brazil's food security needs while doing so in a sustainable way that complements the existing ecosystem.

Along with increasing family farms in Brazil, Syntropic Agriculture should replace unsustainable monoculture agriculture practices. Syntropic Agriculture is essentially the opposite of monoculture, which destroys existing biodiversity and degrades the quality of the land over time. Syntropic Agriculture revolves around the principle of cultivating in a way that favors the development of plants rather than "creating genotypes that support the bad conditions we impose on them" (Gotsch). The practice of Syntropic Agriculture was created by Swiss agronomist Ernst Gotsch who has adopted his practices heavily on his farm in Brazil. He first came to Brazil in 1976 and was fascinated by the contrast between the impressive biodiversity and the large pieces of degraded farmland. Gotsch cultivated this degraded land and restored it successfully, now selling cocoa beans to Italy's most expensive chocolate producer Amedei (Ruff). Today, he harvests an average of 2,000 lb of cocoa beans per hectare, more than three times the average across Brazil of 660 lb per hectare. Because he refuses to spend money on fertilizers and pesticides, unlike the large-scale industrialists, Gotsch enjoys higher profits (Kopp). Gotsch's success with the technique makes Syntropic Agriculture an appealing solution to restoring and cultivating Brazil's desolate land.

Syntropic Agriculture uses practices from nearly every discipline: science, engineering, and even philosophy to create agricultural practices that are effective, sustainable, and realistic. These practices allow farmers to replicate and accelerate natural processes of ecological succession and stratification, giving each plant the ideal conditions for its development. The practice is process-focused rather than production-focused. It is a self-sufficient system where different plants interact with one another, creating complex ecosystems and fertile soils. Syntropic Agriculture is most effective in tropical ecosystems, making Brazil an ideal environment for these practices. By embracing the natural ecosystem, practitioners of Syntropic Agriculture can produce high-yields of many different types of crops, creating an environment that emulates nature. Syntropic Agriculture would repair and prevent further damage to Brazil's ecosystem and diversity while producing sustainably sourced produce to feed the country.

Global governments can incentivize Syntropic Agriculture and family farms in Brazil by creating programs similar to the REDD+ program. The REDD+ program was a successful international program created to help tropical countries reduce deforestation all while being compensated by wealthier nations for any economic loss associated with implementing these programs. Through this program, Brazil dramatically decreased deforestation by expanding protected indigenous reserves, strictly enforcing logging laws, and maintaining a firm forest code. Between 2005 and 2010, Brazil nearly met its goal, almost a decade ahead of schedule. Data from 2009–2010 showed that Brazil's area of deforestation, which averaged 19,508 square kilometers per year between 1996–2005, had dropped 67 percent, to just 6,451, decreasing Brazil's overall contribution to global warming pollution by nearly 1 billion tons (Sox). This data shows that Brazil is very much capable of taking necessary action to protect its forests as long as they have a provocation to do so. Brazil could create programs similar to the REDD+ program to incentivize the existing agro-industrialists to move away from monoculture and slash and burn practices and incorporate syntropic agricultural practices.

According to the USDA's Agroforestry Strategic Framework, the primary way to promote agroforestry is to create agroforestry-related products and services, which can then be marketed to agro-industrialists (United States Department of Agriculture). For these large corporations for whom unsustainable

agriculture practices are both familiar and convenient, creating products and services for agroforestry will make implementing agroforestry much easier. Doing this could also incorporate family farms into the process as they can help create these products and services for the agro-industrialists, boosting the local economy by creating sustainable jobs. It is also crucial to communicate the successful results of syntropic agriculture well, especially to agro-industrial it's so they can see this as a lucrative opportunity. It also needs to be proven that this can be done on a large and profitable scale; the success of Ernst Goetsch's farm could act as a great example.

Brazil is a beautiful country with rich culture and a breathtaking natural ecosystem. However, much of this is threatened by the large-scale agriculture industry, which undermines the needs of the ecosystem and people for profits and production. The interests of these industries are inconsiderate of the needs of the Brazilian people and environment. To reverse existing damage and create a better future for the ecosystem and the Brazilian people, emphasis should be placed on creating more small-scale family farms and implementing Syntropical Agriculture practices.

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