

Peyton Schumann
Fayetteville High School
Fayetteville, Arkansas, United States of America
Brazil, Sustainable Agriculture
Sustainable Agriculture in Brazil

According to sustainable agriculture, production of food needs to grow 70% before 2050 if it is to meet population estimates (The Nature Conservancy). For agriculture, this means a lot of growth in a little time, adapting to new ways of growing crops, all while protecting crucial biodiversity.

Brazil is currently facing this dilemma, they are the world's number one crop producer and their economy depends on agriculture. The demand for more of the crops produced in Brazil is growing and it is necessary to find new ways to increase food production without causing harm to the rainforest. Currently the deforestation of the rainforest is the number one way to find the land for the growth of cattle and soybean farms, which are the biggest food exports in Brazil. Brazil does depend on the money coming in from agriculture, this money does not have to be sacrificed for sustainable agriculture. In the long run sustainable agriculture will use less land and water which costs less money. Sustainable farming is a investment and will help the economy, environment and brazil in the long run.

The expansion of agriculture is necessary and can be improved in a way that doesn't hurt biodiversity. My step mother is from Brazil, and she informed me how she would go with her family to see the forests and animals. The rainforest is important to their culture and another reason it must be protected. Not only are the animals and forests a part of their culture, but different foods and techniques of farming are as well. That is why it is important to work with locals when protecting the biodiversity of their land. She spoke to me alot about the demand for food in brazil. Recently due to covid-19 their production has slowed down, This has created even more of a demand. The demand for food is put on many local farmers who buy, grow and sell locally.

The problem in simple terms is being able to provide for people while preserving biodiversity of the rainforest. Right now most farmers in Brazil are producing tons of food and feeding a lot of people. But there are better ways that they can grow their crops. What the farmers do affects the rainforests of Brazil and in turn the whole world. Biodiversity is important in Brazil because " As an ecosystem, the Amazon is one of the most biodiverse places on earth. Over 3 million species live in the rainforest, and over 2,500 tree species (or one-third of all tropical trees that exist on earth) help to create and sustain this vibrant ecosystem. (Greenpeace USA). The rainforest provides us with clean air as well as agricultural opportunities. The rainforests are extremely important and so is the growing need for food. Rainforest land has been cleared for agriculture, but feeding people shouldn't come with the chance of losing one of the most biodiverse places on earth. Agriculture in the rainforest isn't just crops and animals. Crops are needed to survive, and the same goes for biodiversity. For example, in early summer the amazon was on fire because some thought it was a quick way to clear trees. These ways are destroying agriculture while also trying to grow it. For example, cattle farming and soybean production in the amazon. Cattle farms need a lot of space and so do soybeans farms. In Brazil cows take up 162 million acres (Amnesty International). During the 20/21 crop year for soybeans more than 38 million acres were planted (Statista). So many soybeans are produced because they are widely consumed by humans, used in animal feed and involved in most of Brazil's means. Beef cattle are a big part of the food industry as well, so they must be produced in large amounts. The constant need for these industries to grow larger and produce more is putting a strain on the rainforest. To acquire the land for the growth of the beef cattle and soybean industry the locals are using rainforest land. It is common practice to clear and burn the forest to then be able to set up fields for soybeans and feedlots for the beef cattle.

One method of farming in the rainforest is slash and burn. Slash and burn method is when a plant's vegetation is cut and burned before the seeds are planted. This is beneficial to the crops because after the

burn a layer of ash forms over the soil, providing nutrients. This method is used in Brazil, but is harmful to the environment. Slash and burn causes many wildfires that become out of hand and affect large areas. It is estimated that 5.4 million acres were burned last year (mongabay). Along with that 10.4 million acres were deforested last year (Aljazeera). These have a very destructive relationship, Deforestation paves the way for controlled fires to become uncontrollable. MongaBay reads, " All of the 2021 fires are on land deforested in 2020, emphasizing the connection between deforestation and fire in the brazilian rainforest." In the year 2021 more than 1000 fires have burnt the amazon (Vox). This results in the destruction of ecosystems and forests. Some ecosystems benefit from fires but the rainforest is not one of them, Monga Bay writes, "fire in the rainforest kills most small trees, seedlings and can kill 50% of large trees." Fires don't only affect plants but they kill insects and some animals, which affects biodiversity. The animals are not adapted to live in those conditions because fires are natural in the rainforest. Another farming practice is called Swidden. Swidden is where a farmer will clear their plot of all the trees and vegetation. Then they will farm there for a few years, taking the nutrients out of the soil. Once the soil isn't as fertile they will leave that spot for many years. They leave and the soil gets nutrients overtime from organic matter and slowly starts regrowing. While their last plot is regrowth they do the same thing to a new plot, till it's soil is not fertile anymore. This continues till the first plot is ready to be farmed again. This isn't a sustainable practice because of how much land is destroyed during the process. Each plot is deforested, which then makes it more likely to catch on fire. The plots also don't have any biodiversity because once they start to develop again, they are farmed.

There are many reasons why the Amazon rainforest is important and a few of them are: potential medical findings and products needed to produce medicine, air quality, home to endangered animals, and cultural value. "Around 25% of all western modern medicine is derived from rainforest plants," states thought Co. 25% is small compared to what is yet to be discovered. The medicine produced from the amazon also produces money, Statista reports, "In the United States the total amount of money spent on medicines reached approximately 511 billion United States dollars". The demand for prescription drugs is increasing and so is the need for new medicines. This money goes back into brazil's economy, helping them. We haven't discovered a lot of the amazon rainforest, which makes up 54% of all rainforests (mongabay). So far we know there are over 40,000 plant species, 16,000 tree species, 3,000 fish, 1,300 birds, 1,000 amphibians, 430 mammals, and 400 reptiles (mongabay). These all contribute to the biodiversity and uniqueness of the amazon. All the plants in the Amazon also contribute to better air quality. The Amazon is often referred to as the earth's lungs, this is because the amazon contributes about 20% of the oxygen produced by photosynthesis on land (National Geographic). The admissions produced from deforestation of the rainforest also worsen the air quality. Air quality is important because it is very hard to fix and affects how we live and how long we live. Another reason the rainforest is important is because it is home to many endangered animals. Every animal plays an important part in the food web. If one is removed it will affect all the others and the ecosystem that they live in. These animals are going extinct for many reasons, hunting, loss of habitat, and too much competition. There is so much competition for food, land, and partners that the population of many animals facing these problems will decline rapidly. There is so much competition because their space is being taken away due to farming and other human activities. With less land there is less food and a lesser holding capacity. Some of the animals that are endangered and live in the amazon are, Jaugwires, toucans, river dolphins, tamarin, macaw, three toed sloth, woolly monkey, with 2633 total species of endangered animals living there. These animals keep a balance in the rainforest that benefits our lives in many ways. The Amazon is also important to the culture of brazil. Many small tribes live in the rainforest. Recently we have discovered a tribe that has never had contact with the outside world. This shows how big and unexplored the amazon rainforest is. The people who live in the rainforest and value it as a part of their culture is another reason it's so important to change our ways and protect the rainforest. Many of these people farm the amazon rainforest and their families have for a long time. With more sustainable practices we can protect the rainforest that provides us with many products and benefits. Crop rotation would be helpful instead of this method, because different crops need

different nutrients. Instead of taking everything you could give some nutrients and biodiversity back by keeping native plants.

I believe that sustainable agriculture can help solve the problem of biodiversity when it comes to farming in the rainforests. Farming is able to be done in smaller spaces, is better for the soil, and promotes biodiversity when you use sustainable agriculture. This means being able to provide for the growing population while also protecting biodiversity. For the idea of sustainable agriculture to work in the rainforests, the native farmers must know how to use it. That is why specifically going to the native farming towns along the rainforests and teaching them how to use sustainable agriculture is my solution. Teaching them how to choose cover crops and how to plant them, as well as crop rotation will make a long lasting impact. For example, most farmers in Brazil grow only one type of crop, and they space that crop out to maintain good soil. Little cover crops are used which causes a lot of evaporation and, in turn, the need for more water. The Rainforest Alliance, which is a non-profit group that works with farmers, and forest communities to adapt to the climate crisis, is familiar with sustainable agriculture practices and cover crops as well as preventing deforestation (Rainforest Alliance). The farmers will learn how to grow more plants while rotating crops, which will still maintain the integrity of the soil. Those things will help grow more crops for the growing population while planting new plants and reducing the need to farm more of the rainforest's land.

Many people educated in sustainable agriculture look for ways to spread the new and helpful ways of farming. They have realized that this is the future and could change the rate of deforestation. This would be a great opportunity for them to volunteer and help Brazil's agriculture as a whole. Brazil could produce more food for their growing population, less of their resources and destroy less of the rainforest. The Rainforest Alliance is a part of livelihoods, they raise a lot of money and partner with indigenous people to help the rainforest. Since they know people in the rainforest and how to raise money they would be a perfect partner. Also, they practice sustainable agriculture and have earned 57.6 million dollars by Maya Biosphere in 2019 (livelihood). Partnering with them opens many doors and will be much easier to teach the community about this concept. Since they are familiar with the rainforest and the native plants, we would be more familiar with the native plants used as cover crops. Some of the native plants used as cover crops are millet, sorghum, and mucuna. Since these plants are good for the rainforest, using them will bring back some biodiversity (No-Till Farmer). The importance of working with the native people is astronomical. It has been proven that when you go into a developing country and give them tools to help they will have short term success. People in developing countries live day to day and don't look far into their future. By teaching them farming methods you are adapting what they already know to benefit them more. Knowledge isn't something they can sell and make a quick profit, it is something that will help them reach long term goals. Knowledge is also shared and able to be passed down from generations before.

Though this is helping Brazil and their local farmers, it's also helping the world. The Rainforest produces medicine, clean air, and helps regulate our climate (National Geographic). Agriculturists, government groups, and sustainable agriculturalists are working to protect the Rainforest. It's important to realize that what happens to the rainforest affects everyone, so we should protect it. Sustainable agriculture is something that can be put into place now and help us in the future. But it is important that we act now because the effects of deforestation are hard to reverse and take a lot of time. As we increase agriculture products we must also be wise about sustainable agriculture and our ecosystem.

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