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## **The Diminishment of Our Agrarian World**

Brazil is one of the richest nations in the world in the terms of GDP, but still 58 million people in Brazil suffer from hunger and lack of food security. One of the biggest problems is that the Brazilian government is completely behind large-scale agriculture. They gave \$840 million to 10 multinational agribusinesses in 2003/2004. An equal amount had to be split between the entire country's 4 million families in the agriculture sector (Alternative). These multinational agribusinesses have completely taken control of the agricultural market. By 1999, large-scale agriculture dominated 90% of the hybrid maize seed market (Oliveira). Unfortunately, however, the cost of producing crops using chemical methods is about 60-70% of the price of the crop and is much more expensive than traditional methods. Agricultural families are left with an income that puts them far below the international poverty line. Forty percent of poor people live in rural areas. These unequal agricultural policies that favor agribusinesses along with unequal land distribution are the root of Brazil's agricultural problems. Because of this money given to agribusinesses, they are also granted much of the arable land to these large-scale agricultural firms too. This left the poor with very little to work with. Lime and pesticides are not often used in subsistence agriculture and the acidity of much of the rural soils is a large problem with poor farms. Fertilizer use is also restricted and applied in low amounts in many areas. All of these problems with the soil amount to very dry nutrient poor soil after a couple of years, and the cultivation of native grasses must ensue. That parcel of land is abandoned and the abandonment leads to another area being deforested. The natural grasses are less demanding for soil nutrients. Not only are these fields going to waste, but with the slash and burning of the forests including part of the Amazon rain forest is ruining ecosystems, and habitats, as well as degrading that land. Little to no extensive work has been done to control plant diseases, promote soil fertility, and discourage deforestation. There is a growing need to balance production and preservation of the farming ecosystem. The world population is inevitably growing and so are the need to increase agriculture by intensifying the use of the present agricultural lands rather than making new ones and cutting down forests, and the need to improve production factors such as genetics, chemicals, and fertilizers. There are two large diseases called soybean canker and soybean cyst nematodes that are the biggest problem in Brazil (Ray). To add to all of this, poverty is a problem in Brazil. People struggle to supplement farm income with salaried labor and small scale enterprises such as handicrafts and other activities. At least 30 percent of rural people are participating in non-agricultural employment as their main occupation. With all of these problems mounting up to a very difficult lifestyle, it's a wonder that there still are subsistence rural farm families.

While the typical household in Brazil may consist of parents and children, it is not the familiar isolated nuclear family found commonly in America. Regardless of social class, Brazilians do not like to live far away from their kin. Brazilian culture puts a high premium on extended family ties. Adult sons and daughters often remain at home until they become married, and it is common for them to live near their parents after marriage. In the urban middle class, it is not uncommon for members of an extended family to live in separate apartments in the same building. Weekly, if not daily, members of the extended Brazilian family interact with each other. This includes cousins, aunts and uncles, married children and their spouses, grandparents, and in-laws. "Family" to Brazilians means a large extended kin group rather than an immediate family of spouse and children. Family consists of all maternal and paternal relatives, as well as in-laws. This is an essential part of their social life and in time of need ideally provided assistance to the members of the family. The support the family gives can also be obtained through ritual kinship in which parents select additional allies and protectors as godparents for their children (Brazil).

The diet of a poor Brazilian family is often rice, beans, and manioc (a root crop that is often eaten as manioc flour sprinkled over rice and beans or sautéed in a bit of oil with onions, eggs, olives, or other ingredients) (Brazil). The rice, beans, and manioc are the core of the Brazilian diet, and to this core, meat, poultry, or fish are added, but financial well-being determines how much. The middle and upper classes have the liberty of consuming them on a daily basis; however, the poor cannot afford such protein sources quite as often. These meals may often be accompanied by soft drinks made from a fruit that grows in the Amazon, beer, or bottled water.

The educational opportunities offered in Brazil are tied to social class, race, and geography. Brazilians are obsessed with class distinctions and are very quick to judge others they meet by the distance between them socially. They measure this by the person's general appearance and the "correctness" of his or her speech. The degree to which a Brazilian's vocabulary and grammar is considered "educated" is used as a measure of schooling and therefore social class. This in turn establishes patterns of respect and authority between two individuals from different social stratum. Education is also linked to race and geography. A white person in the Southeast has an average of 6.6 years of schooling, whereas a person of color living in the Northeast has an average of 3.5. Two-thirds of all of the public money spent on education in Brazil goes to universities (Brazil). Public universities are surprisingly viewed as superior to their private counterparts, and charge no tuition. However, they have very competitive entrance exams which generally favor students who have attended costly private schools with high academic standards. Most poor rural and urban families can afford little to no education and therefore do not go to the public or private universities.

Brazil has long had a public health system, but like many social programs that serve the poor, it is not getting the funds it needs. In the 1990s, per capita spending on health care was only about \$50 annually, which was too small for a system that over 60 percent of the Brazilian population depends on (Brazil). Most of the poor get whatever remedies they can from local pharmacists who are the only health care providers in some rural areas or they self-medicate.

Brazil is a region characterized by unusually large farms. They grow sugarcane, cotton, coffee, cocoa, soybeans, wheat, sugar, and oranges. In the last decades of the twentieth century however, the increasing automation and dominance of the best farmlands by large-scale agricultural enterprises has sped up the loss of small family-owned farms. However, there are still some five million family farms ranging in size from 12 to 250 acres that occupy about 143 million acres. But in contrast, large commercial agricultural enterprises cover almost three times that area (Brazil).

One of the biggest barriers to improving productivity in the farms is the fact that the soil has a low pH and a low nutrient level (Oliveira). These rural farmers do not have the resources or the ability to find a way to cultivate the soil in a manner that will benefit them. Only using an agricultural field for two or three years and then having it go to waste is very unproductive and wasteful.

The unfortunate conclusion is that in Brazil, hunger and food insecurity are not due to any shortage of food, but because people simply cannot afford to eat. Because of lack of money, tens of millions of Brazilians have inadequate access to food and therefore adequate nutrition. By the early 1980s, agricultural production increased so much that Brazil had become the fourth largest food exporter in the world, but Brazil was not adequately feeding its own people. The poor do not often have meat in their diet simply because they don't have the money that the rich do. The falling food supply leads to weak income which leads to unemployment which leads to low wages which leads to income concentration which leads to falling food consumption. Falling food consumption leads to falling farm prices which leads to weak farm policies which leads to income concentration which leads to farm crisis which in turn leads back to the falling food supply. All of this centers on hunger, which is the product. This loop bars the way for gaining access to food and adequate nutrition.

While disease and drought are important factors affecting crops, the worst problem in Brazil is the swift degradation of fields. Increasing crop yields and improving disease/drought resistance through research and breeding of improved plant varieties affects agricultural productivity by increasing it tenfold, rural farm family income increases because of the greater yield, food availability is increased because there is more land utilized and more crops produced, and lastly, the quality of food is increased because of the research and breeding of new plants.

Agriculture is the main base of the local economy in Brazil. The cultivation methods such as subsistence cultivation introduced by the immigrants constitute the current base of this economy. However, the land is associated with the low soil fertility and methods of non-sustainable agriculture which results in a constant destruction of natural resources. After clearing an area, common bean or corn plants are planted for two or three years, followed by cultivation of native grasses. Pastures are often routinely burned to allow the grass to re-grow. In a short time the nutrients of the soil are completely used up, the land is abandoned to deforest a new area, and the process is repeated. There has been very little done to control plant diseases, promote soil fertility, and deter farmers from clearing new areas.

Deforestation is a very large problem in Brazil today because of this agricultural difficulty of low soil fertility. When the farmers deforest a new area for farming, they use the slash and burn method, which destroys rainforests and habitats unnecessarily for land that will only be of use to these farmers for a couple of years.

The amount of arable land in Brazil belonging to agribusinesses is increasing so greatly that there is not nearly enough land left for the poor farmers, and when farmers are only using land for a few years and then needing new land, they end up producing very little while the big companies owning all the land produce a lot and ship it all away. When subsistence farm families can't even produce enough food for themselves, let alone for profit, their income decreases. These families then don't have the money to buy the food they need for adequate nutrition. The wealthy urban folk can afford the meats and other delights that rural families cannot.

Presently there are many people doing research to find ways to improve the quality and use of fields. However, it is a severe condition with 40 percent of the poor living in rural areas (Alternative). With the poverty rate increasing so swiftly and many subsistence farm families losing their farms because they don't have the money to keep it going, Brazil's gap between rich and poor is increasing to the point where we might not be able to fix it. Brazil is one of the highest producing countries in the world, so the rich corporations that are shipping their products out of the country or the rich families living in the urban settings who have jobs are just getting richer and richer. On the other hand, the poor rural and even the poor urban families are being put out of their jobs and losing money so rapidly that they soon will hit poverty.

The rural poor are the people most disadvantaged. Currently the only improvements are being made through large scale businesses who are taking the money from the small scale farmers. It is much more efficient to buy everything at one big supermarket now, comparable to Wal-Mart or Target in the United States, than to buy things such as fruits, vegetables, corn, beans, and meat all separately from rural farms, especially when a person lives in the cities. Now that all of these products are available on the wide scale of industrial businesses, small scale farms are being put out of business because they cannot make enough money. Not only are their products not selling as well, but they are not being produced at a very efficient rate. Disease and degradation of the land are the biggest problems. The two major diseases, soybean canker and soybean cyst nematodes, affect the condition of the plants and kill off many, making a lower yield for farmers. These diseases coupled with a very low soil pH and nutrient level makes for a very bad cultivation and sustainable way of life.

The trends for crop yields and disease, drought, and degradation of fields are staying about the same. This trend can be measured by the poverty rate, the social gap, and the infant mortality rates in Brazil. While the poverty rate is going down, poverty levels and human development indicators in poor rural areas in Brazil are similar to some of the poorest countries in Latin America. About 35 percent of Brazil as a whole lives in poverty, but in the rural areas, poverty hits 51 percent of the population (Rural). Brazil has the largest number of poor rural people in the Western Hemisphere. As previously stated, the rich are also getting richer and the poor getting poorer. This leads to a whole slew of problems because of main cause of extreme inequality of land tenure. On the other side of this spectrum however, infant mortality rates are going down, which means people are doing something right and brings hope for the condition of poverty in Brazil. Rural farm families are getting worse. Luckily, however, many of the 4 million farms in Brazil produce at the small-scale agricultural level and accounts for about 70 percent of Brazil's food production and a significant share of food exports (Rural). This means that small-scale agriculture could possibly have a strong potential as a means of overcoming poverty. To achieve this, though, the problems facing small-scale farmers such as the inequality of land tenure and domination of the agribusinesses must be addressed.

Improving crop yields and disease, drought, degradation, and deforestation resistance would increase the profit made by a rural small-scale farm family. With this profit, they could then afford the meats and other foods that they could not afford and it would improve their overall health and quality of their diets. It would also give them more produce to sell and even possible more free time for salaried labor or small-scale enterprises such as handicrafts and other activities for subsistence farm families. Improving the disease, drought, degradation, and deforestation would most definitely preserve the environment and it will preserve it sustainably because less forest will be cut down when the land is used year after year for harvesting corn and beans and other products. Economic development will occur in Brazil by shrinking the gap between the poor and the rich and fixing the inequality of land tenure. The rich will essentially stay rich, but the poor will climb up by gaining profit through improved crop yield. The poverty will be reduced in the same manner. As the well being of these poor rural family increases, the poverty is inversely proportional, meaning it decreases. This will definitely benefit smallholder farmers in Brazil by helping increase their quality of life. The better their crop is and the more of it there is the more profit that can be made off of it.

Major issues such as climate change, population growth, water scarcity, and urbanization could all negatively affect the ability to increase crop yields and improve the resistance of fields of produce to extremities and the wellbeing of rural families and their communities in the decades ahead. Any severe climate change, be it cold or warm, could hurt the ability to increase crop yields. Too cold would freeze the soil and the plants would not grow, and too hot would cause the plants to wither from lack of water and too much sun exposure. To confront or overcome such a challenge, a family would have to know biology and know ahead of time what the weather would be like for the upcoming season, and would have to plant a type of plant that could withstand that heat or that coldness, or they would have to find some way to blanket the crops from the frigid weather and still obtain the nutrients and sun needed for photosynthesis and for the heat they would have to have a certain kind of irrigation that would help with the scorching heat. Data from the University of Illinois suggests crop yields will suffer unless new approaches to adapt crop plants to climate change are adopted (Stephen). As for population growth, the effects are obvious. Much like what is happening around the world today, as the population grows, so do the problems. With that increased population, money is spread thinner. There are more people to feed and less food to feed them with. Population increase will put a pressing demand on the increase of crop yields, and farmers would have to learn how to resist all problems in order keep up with that demand. And this demand to increase crop yields would put pressure on a rural family. If they could not increase their crop yields at the pace that the population is increasing, they might be completely bought out by large agribusinesses. To overcome such an obstacle would be a great feat for such a small farm, but to do it would take a lot of research and breeding of improved plant varieties and a much greater crop yield than

what there is now. Water scarcity would be a problem and would negatively affect any kind of crop growth. Because Brazil is so near the equator, it is used to dry hot seasons, but with little to no water at all, research and breeding would have to be done to find a new plant that will be sustainable in such an environment. This could become expensive for rural families, and they may not be able to afford the seeds of this new plant. Urbanization is a major problem in Brazil currently. With the increase of these urban areas, comes the domination over industries and inequality of land tenure. There aren't many ways for rural families to combat this other than to get a leg up on their competition.

To effectively address the increasing need for better crop yields, the poor rural families need a cheaper and easier way to provide nutrients to the soil. It is important for the economy in Brazil to grow, and in order for Brazil to stay a major manufacturing and producing power, funds continually need to be pumped into large agribusinesses, but if the Brazilian government has concern for their people, they should also consider funding for research and breeding of improved plant varieties that are also affordable. Some form of public education and dissuasion of the deforestation that is going on. If the rural people are informed on what they are doing to the environment, and also given a way to remedy the situation such as being given the resources needed to increase the nutrient quality in their fields or at least the access to these improved plant varieties, it will help decrease the amount of forests being cut down dramatically. With all of the money that the agribusinesses are getting from the government, either the agribusinesses need to help out by funding research because it will in turn come back to help them, or the government of Brazil needs to increase funding for the agriculture sector. The World Bank and its International Development Association (IDA) are helping out currently, and that is one thing that is helping the poor the most. If they help even more, their support could pull many Brazilians out of poverty.

Despite recent improvements in income distribution by the help of many organizations such as the IDA, the issue of income inequality and social exclusion still remain at the root of rural poverty. Poor rural families live in disadvantaged conditions: water supply and sewage systems are normally quite poor, education and health facilities are not often available without difficulty, and rural people face severe constraints in accessing technology and resources needed for a sustainable life. While Brazil is one of the richest nations in the world, 58 million people still suffer from hunger and lack of food security. With the corrupt government so concerned with getting richer, the poor are left to fend for themselves while large agribusinesses flourish. This needs to be fixed. Through funding and research, the rural subsistence farm families will be able to increase their crop yield and therefore increasing their profit. Because of this food insecurity, poor people eat less and eat cheaper foods or stop spending on health and education. If the income of poor subsistence families improves, the poverty rate will not be so severe because the rural families' diets will improve and so will their life style. Disease is often a problem. However, the Mato Grosso Foundation, which is Brazil's largest private plant breeding research program, released a plant variety with a stacked gene that was tolerant of both soybean canker and soybean cyst nematodes in 2006 (Ray). This marks serious progress in the development of new plant varieties through research that could help change Brazil entirely. To increase poor rural families' income, liming of the soil is a good idea to improve the soil pH. Fertilizer and even small amounts of nitrogen boost the nutrient level in the soil and have been shown to increase the yield of farms in those such as in the Cunha region by 50 percent (Oliveira). Not only does this improve crop yield, however, it also reduces deforestation in local regions.

As the population grows, so does the need for food. It is the best for humans and for the world if farmers can be more productive with their land rather than have the deforestation problem. Production needs to be balanced with preservation. The world needs the food, but at what cost? To remedy the problem, donations and funds are going to be needed. The biggest problem is where do those funds come from? The government in Brazil needs to step up and realize this problem and decide to help, or the problem is just going to continue to get worse.

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