Agriculture-Induced Deforestation in the Amazon Rainforest

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III. Agriculture-Induced Deforestation in the Amazon Rain Forest

With the Lorax gone, who will speak for the trees? Although climate change and deforestation are topics commonly discussed in the media, their true magnitude is hard to see without getting up close and personal. Students at the Richard Stockton College of New Jersey had the opportunity to observe regions often exploited by the logging industry while travelling with The Brasil Experience this past January. Further research shows agriculture to play a significant role in deforestation as poverty, government corruption and a high demand create a booming market for timber, cattle, soy and coffee. Unmonitored, this can lead to an array of consequences including soil erosion, loss of biodiversity and carbon sink depletion. If Brazil hopes to preserve their environment, culture and economy, they must appoint an organization whose views reflect a public policy that incentivizes sustainable harvest while supporting and engaging social welfare at the community level to the fullest extent.

When dining in Brazil, it is difficult to find a meal that does not incorporate some sort of beef into the plate, be it steak, egg-cheeseburgers or some sort of mystery meat wrapped in a puff pastry. In addition to the high quantity of beef (notice I said quantity, not quality), the prices of a steak entrée are relatively inexpensive, with the average tenderloin meal with gravy, broccoli, rice and manioc flour selling for about twenty five Reals, equivalent to \$8 U.S. On the contrary, chicken meat is less common in Brazilian dishes and chickens are raised in small coops for personal consumption. In fact, the only instance during the Brasil Experience in which fried chicken was served (bones and all) was in Iguassu Falls when the lakeside restaurant ran out of fish to serve with the chips. These unique characteristics of Brazilian cuisine solicit further curiosity regarding the agricultural practices and politics that occur in the Amazonian region.

One can imagine that any region dense in beef consumption must be located in relative proximity to large herd of cattle. Illegal harvest of timber, an important good commonly exported from the region, turns empty rainforest floors into prime areas of real estate for farmers searching for cheap land to take advantage of the soy and cattle industries.

Deforestation issues in Brazil are an incessant topic on media networks as indicators of climate change become more evident and these regions are the first to be affected. Despite the attention to the issue, logging companies make little efforts to conceal illegal practices leading to destruction of 2.6 million hectares of forest in the Amazon alone annually (World Wildlife Fund, 2015, p. 1). An inefficient paradox occurs resulting from a large international demand, entrenchment in government and high poverty rates. This leads to exploitation of the vulnerable native people, species and resources in the region. In order to seek a solution to the issue of deforestation as a result of agriculture, each factor both contributing to and resulting from the issue must be addressed.

IV. Causes of Agriculture-Induced Deforestation

The cause of deforestation in the Amazon Rainforest can be traced back to three major factors that have synergistic effects on each other. The most influential flaw leading to destruction of the vulnerable Amazon Rainforest stems from inadequacies in government enforcement of environmental policy and a lack of regulation on private land ownership, uses and restrictions. According to The Economist (2009), "just 14% of privately owned land in the Amazon is backed by a secure title deed. The rest is covered by fake documents (usually lovingly antiqued) or simply by right of settlement" (p. 2). Land ownership in Amazonian states is enforced somewhat violently according to a philosophy described as *ocupar para não entregar*, translating in Portuguese to "occupy it or lose it" (The Economist, 2009, p. 1).

Sergio Margulis (2004) describes in his article "Causes of Deforestation in the Amazon" of the unspoken and accepted land ethic as a system in which grileiros (land-grabbers) invade and 'tame' unclaimed public land for as little as \$3 U.S. per hectare on average, extirpating the land of all timber resources and reselling to farmers at a price greater than or equal to their marginal costs of production. "This means that the first occupants can eventually extract a substantial profit from occupation, clearing, land preparation, planting of pasture, acquisition of title and sale of the properties" (p. 22).

Considering the transparent and frankly apathetic attitudes of the logging industry in South America, it is remarkable that these practices are allowed to continue unopposed. To acknowledge this inconsistency is not to say there are not national or even statewide policies in place aiming to foster more sustainable methods of logging and agriculture.

In fact, in recent years, Brazil has imposed laws "handing smaller plots of land to their apparent owners and reclaiming very large ones (in excess of 1,500 hectares or 3,700 acres)" for state ownership" (The Economist, 2009, p. 2). If enforced, this law would reclaim a large portion of Amazon land out of illegitimate hands; however, speculators have predicted that the new policies will be difficult to enforce given the high demand and profit margin associated with the soy, beef and timber industries. While "the sporadic weakness of the Brazilian [and more specifically, the Amazonian] state is partly to blame for this, any government would struggle to police the frontier between forest and farmland, which is far longer than America's border with Mexico" (The Economist, 2009, p. 2). Nonetheless, it is the responsibility of the Brazilian government to regulate management and conservation of natural resources within its national

borders and kindle prosperity for the ecosystem, the economy and the social well-being of the Amazonia state.

The underlying issue that stalls any progressive policy from succeeding in the Amazonia region of Brazil at this point in time can be attributed to inefficient allocation of funding and assistance by the Brazilian government. Students travelling with the Brasil Experience learned of the severity of government entrenchment when conversing with Davison, a local student native to Manaus, Brasil. Davison spoke casually of the corruption that exists within the Brazilian government and told grapevine tales of representatives buying out public votes in exchange for false promises.

This corruption, a seemingly accepted attribute of the Brazilian government, is magnified by economic inequality and high levels of poverty in the Amazon region. Agriculture is a profitable industry in Brazil, and many environmental concerns are often overlooked as local farmers and loggers seek an easy way to profit off land that becomes vital to their existence, both physically and economically.

In Pará, a logging town located outside of Manaus, "some 70% of the population depends on logging in some way (The Economist, 2009, p. 2)". Such high dependence on the timber industry leads to contention between locals as environmental and economic interests collide. There are some who say Brazil has become "too dependent on commodity exports and risks being afflicted by the Dutch disease, where revenues from natural resources make the currency stronger, imports cheaper, and manufactured products more expensive . . . sustainable growth will require internal reforms to boost productivity and economic freedom" (Roberts, 2012, p. 1). Adapting to more sustainable levels of production and consumption becomes difficult given such a high demand for products in the timber, cattle and soy markets.

The soybean trade alone contributes largely to Brazil's long term success in the agriculture industry. An article published by WorldInfo.org warns that "biodiesel made from soya oil is taking over huge areas of Brazil's farmland, savannah and forest, with harvests surging from 1.5 million tons in 1970 to 57 million in 2006". The work describes this rapid expansion to be driven by forces including "lower transportation cost as a result of improved local infrastructure, higher international demands for soybean prices, and rapid economic growth in China, which consumes great quantities of soybean products. (World Info, 2012, p. 1). Aside from use in biodiesel production, soybeans are also a main source of protein in the diets of many people and animals.

Furthermore, soy is also a staple ingredient found in most animal feeds, making it vital to the agriculture industry. The most frequent importers of inexpensive Amazonian harvest are Germany, The United Kingdom, France and the Netherlands. According to nutritional studies, the recommended serving of meat for an individual is roughly one-third of an average German's diet. This trend holds true for many developed countries as the resources and land used per capita follows a path in positive correlation with economic freedom.

V. Effects of Agriculture-Induced Deforestation

Over time, the unpaid externalities of deforestation including species extinction, soil erosion and loss of carbon sinks become increasingly costly to the vulnerable region. When an area is established for harvest and cultivation, roads are constructed and poachers survey the land removing exotic species, many of which are sold at high prices to developed countries. Brazil is famously known for the anaconda, sloth and scarlet macaw that are native to the Amazon Rainforest. As students on The Brasil Experience witnessed, these beautiful animals tend to become the first to be exploited in the market. Unfortunately, for every one animal that makes it to the store or the auction, countless others die along the way. Animal trafficking is not the only pressure that deforestation puts on biodiversity in the Amazon region. Exotic species are also threatened by pollution, climate change and habitat destruction, all externalities carrying their own burdens.

Once a plot of forest is stripped of its valuable resources, the leftover skeleton of land is sold into the agriculture industry. Basic geological and farmhand knowledge implies that land can only be recycled so many times until the soil becomes deficient of nutrients and has neither adequate nutritional value nor the ability to support biotic life. Studies have found that logging and intensive agriculture and deplete the soil of nutrients essential to forest health and erode approximately 20% of the total topsoil in a given area (Ericksen, 1999). This erosion carries its own burdens including issues with groundwater retention, sedimentation in the Amazon River and a dramatic increase in the loss of carbon sinks.

The Amazon Rainforest, in its vastness, plays a large role in the global carbon cycle and provides a valuable ecosystem service given the tendency of trees to sequester carbon in their roots. Unfortunately, these buildups of carbon (which often are attributed to the burning of fossil fuels) are released when old growth forests are converted into cow pastures and the like. This phenomenon severely diminishes the value that these trees have to ecosystem function under the assumption that a reduction in quantity of trees will result in an assumed decrease in carbon sequestration in the forest. The rate of release of carbon into the atmosphere becomes directly proportional to the number of trees removed from the forest and inversely proportional to the forest's overall ability to sequester carbon. One may argue that an optimal point exists at which the economic prosperity achieved from pursuit of human self-interest is equal to the environmental costs that this economic growth imposes upon the ecosystem. "Exactly where that limit lies will be the subject of further study, but the prospect of more forest clearance resulting in less food should alarm policymakers" (Watts, 2013, p. 1). While it is difficult to acknowledge this limit to consumption given the convenience of the current system, it is the responsibility of the federal government and neighboring countries to hold industry accountable for damages done to the Amazon Rainforest.

Although demanding countries have made little efforts to reduce consumption, interest has been expressed to limit, or at the very least, regulate the production side of the equation. Many developed countries have openly conveyed great levels of support for Amazon Rainforest preservation in the form of monetary donations to the Amazon Fund. Norway, for example, gave the Brazilian government a grant for one billion dollars to help stimulate a viable forest economy (The Economist, 2009, p. 2). Germany has also expressed desire to slow deforestation and other countries and private companies seem to be following suit. Given this support in combination with recently legislated federal environmental protections, it can be argued that the gap in policy emerges from a lack of enforcement and punishment.

VI. Possible Solutions

The underlying discrepancy limiting protections on the Amazon Rainforest relates to the neglect of enforcement in several avenues of environmental policy. In order utilize aid from foreign nations most feasibly, the Brazilian government must appoint a counsel responsible for tracking environmental impacts and holding farmers and larger companies accountable for externalities.

The first item on the agenda of this counsel should be to follow through with the government's initial actions and place a moratorium on all logging practices until proper land ownership is established. At this point, decisions can be made as to plot size, priority and pricing. While the appointed committee will need government approval on any major decisions, enactment of three fundamental changes in legislation would lead to great strides in the war against deforestation.

Foremost, the committee would be responsible for allocating all charities donated to the Amazon Fund. The main financial expenditures would be employee salary and the costs of safeguarding and rehabilitating crop land. These would be covered in the budget in the form of a donation or a tax imposed on industry. The committee would have the authority to use funds to hire surveyors, rangers and planners and create an outline of plots to be managed. Ideally, this blueprint would incorporate a section of managed croplands surrounded by a larger untouched section of forest and a single road for entry and exit. This plan would keep plots in close proximity, limiting habitat fragmentation and the likelihood of a fishbone effect occurring. Along with land surveyors, forest rangers would also be employed to evaluate each plot, relocate extant biodiversity and monitor the border for poachers. Environmental planners would be appointed to track deforestation patterns and set standards for plot size, management and price. These variables could be recalculated every five years based on average projections of growth and ecosystem vulnerability. Filling these vital positions is a key step to fostering a lasting policy change in Brazil.

Having an entity to hold accountable for sustainable resource management is essential to properly managing the natural resources in any ecosystem. If this entity is successful, it will create results that both reduce deforestation and stimulate the economy. To do so, it must manage the land in the most efficient and sustainable way. Brazil's Amazon Fund committee will fare best by creating a land management strategy that leases out a quantity of land no greater than the quantity actively being preserved.

In other words, the committee could offer a certain number of adjacent plots of land to loggers at a certain price under the agreement that the logger must also purchase additional plots outside the area to be designated as wilderness areas. Once the logger has removed the trees, farmers can rent the pastureland for 10% of their annual profits, but it may only be harvested for ten years until the farmer must rotate to a plot of equal size (number of rotations granted will vary based on availability of land in that year). After a plot is harvested for ten years, money from the Amazon Fund will be used to rehabilitate the crop field and revitalize the soil. Farmers can also receive incentives for sustainable farming practices such use of natural fertilizer and replanting of trees. By creating incentives and offering the land at reasonable prices, Brazil will also see improvements in local economies as the natives maintain employment and industry is forced to engage in conservation.

While simple, these policy provisions address three essential steps to reducing rates of deforestation in the Amazon Rainforest. To overcome the controversies leading to the current paradox, the Brazilian government must enlist a counsel responsible for delegating tasks, restricting destruction and stimulating the economy of the Amazonia state. The committee will prove successful in restricting destruction by rationing plots of land for lease, relocating exotic species and closely monitoring ecosystem health in ten year spans. In addition, the combination of increased tariffs on large companies with tax breaks on farmers will help to keep much of the economy in the hands of the local peoples, weakening industry power and alleviating the pressures of poverty while still fulfilling the international demand for many Brazilian exports.

VII. Conclusion

In order to reduce high rates of deforestation in the Amazon Rainforest, a more stringent public policy is needed that takes into account both the causes and effects of the environmental atrocity. Entrenchment in government, high rates of poverty and demand are all factors contributing to an increase in rainforest destruction, while the repercussions often result in soil erosion, species extinction and loss of carbon sinks. Brazil can seek a solution by appointing a committee whose views reflect a public policy that incentivizes sustainable harvest while supporting and engaging social welfare at the community level to the fullest extent. If these three actions can be taken, there may be hope for the Amazon after all.

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