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A WAR WORTH FIGHTING: THE ONGOING BATTLE TO SAVE THE BRAZILIAN AMAZON

*Al Zachary Lazarus**

I. INTRODUCTION

BRAZIL, a country roughly the size of the continental United States, contains approximately 60 percent of the Amazon Basin, the largest rainforest area in the world,[1] and is home to a full one-third of all the tropical rainforest area in the world.[2] The Amazon region covers 58 percent of Brazil's entire territory.[3] The region has been referred to as a "cauldron of biodiversity," since it is estimated to contain between 800,000 and five million species – 15 to 30 percent of all the species in the world.[4]

Despite assurances by the Brazilian government to the contrary, a recent study by Smithsonian researchers concluded that deforestation in the Amazon has not seen a significant decline from the "catastrophic" rates of the 1970s and 1980s.[5] The study found that the average rate of deforestation from 1988 to 1998 was almost 7,000 square miles per year, compared to an average rate of more than 8,000 square miles per year from

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1. David Allen Reisman, *Debt-For-Nature Swaps in Brazil: Response to World Pressure to Protect the Amazon*, 8 J. NAT. RESOURCES & ENVTL. L. 397, 398 (1993). Al Zachary Lazarus is a 2004 J.D. Candidate at the Dedman School of Law, Southern Methodist University. Prior to attending law school, the author obtained a B.S. in Journalism from Texas A&M in 2000.
2. Cristina Schwansee Romano, *Brazilian Government Policies Towards the Amazon Rain Forest: From a Developmental Ideology to an Environmental Consciousness?*, 1998 COLO. J. INT'L ENVTL. L. & POL'Y 65, 67 (1998).
3. *Id.*
4. *Id.*
5. Brian McDonough, *Brazilian Government Disputes Bleak Amazon Deforestation Outlook*, NewsFactor Network, Jan. 29, 2002, *available at* http://sci.newsfactor.com/perl/story/16038.html. Although Brazilian authorities disputed the researchers' findings, the researchers could find virtually no evidence supporting the claims of much smaller amounts of deforestation in the Brazilian Amazon. "We used a rigorous statistical analysis to see if Amazonian deforestation had dropped in the 1990s, relative to the 1970s and 1980s," said William Laurance of the Smithsonian Tropical Research Institute. "This [decrease] should have happened if – as the Brazilian government maintains – deforestation really has been brought under control." *Id.*

1978 to 1988.[6] Most disturbingly, though, the study noted an upward trend throughout most of the 1990s, including a staggering 11,000 square miles in 1995 – an area larger than Maryland.[7]

This comment will detail the many causes of deforestation in the Brazilian Amazon, from the policies of the Brazilian government itself to the many industries that have been facilitated either directly by the government or by private economic incentives. The effects of deforestation on the people of Brazil and of the world in general will also be examined. Next, the many efforts undertaken to deal with the deforestation of the Brazilian Amazon, from international initiatives to those of Brazil itself, will be analyzed. Finally, this comment will discuss measures the United States and the rest of the world can take to significantly curtail deforestation.

A. Causes of Deforestation in the Brazilian Amazon

Before examining the various industries and policies affecting the Brazilian Amazon, it is necessary to understand the dreadful economic situation that has set the stage for rampant deforestation. Throughout the 1960s and the early 1970s, Brazil experienced rapid economic growth due in large part to an ability to efficiently and at least somewhat responsibly use the vast resources located in its territory.[8] Brazil's rapidly growing economy, however, made the country increasingly reliant on foreign sources of energy; by the world oil crisis of 1973 Brazil had become the largest oil importer in the world among the developing nations.[9] Faced with drastically scaling back its suddenly bountiful economy, Brazil instead opted to significantly increase foreign borrowing in the hope that any debt incurred at the time would be easily overcome as oil prices returned to normal and Brazil's economy resumed its upswing.[10] Brazil's strategy was seemingly successful through much of the remainder of the decade, but in 1979, when the world experienced yet another oil crisis, Brazil was confronted with a dire scenario: not only was it still hugely dependent on foreign energy, but now a near-worldwide recession had greatly diminished the market for Brazil's exports, and skyrocketing interest rates had rendered the country's debt all but unmanageable.[11] The stage was now set for an unprecedented assault on Brazil's primary asset: the Amazon rainforest.

Because of Brazil's determination to do whatever necessary to pay off its debt, many of the various industries discussed below have developed

6. *Id.*
7. *Id.*
8. *See* Reisman, *supra* note 1, at 402.
9. *Id.*
10. *See id.*
11. *Id.* at 402-03. By the end of 1982, Brazil's debt totaled more than $85.3 billion, prompting a five-year period in which foreign creditors restricted new lending. *Id.*

directly as a result of this financial near-sightedness.[12] Government-sanctioned policies thus could be considered the root cause of the rampant deforestation of the Brazilian Amazon, with virtually all policies being the product of quickly reached poorly reasoned decisions to find a quick fix for Brazil's increasingly dire economic condition.[13]

There are a handful of industries that have contributed directly to the deforestation of the Brazilian Amazon, but one main theme unites them all: The Brazilian government considers the rainforest to be a public good that can only be made a marketable good once it is cleared.[14] Little effort has been made to give the Brazilian Amazon, in its natural form, any kind of value; rather, the widely accepted notion seems to be that the only way the rainforest can be valuable is if it is cleared.[15] This notion has paved the way for the rampant deforestation of the Brazilian Amazon, most of which is undertaken by the industries (and, in some cases, government policies) discussed below.

1. Cattle Ranching

Clearing massive areas of the Brazilian Amazon for cattle ranching has wreaked large-scale damage not just on the rainforest but on the societies within it, as well – which, as discussed below, paves the way for a vicious cycle leading to more and more deforestation. It is estimated that between 1966 and 1983 cattle ranching accounted for two-thirds of all the deforestation in the Brazilian Amazon.[16] The clearing of large swaths of land to create pastures began not so much as a response to the needs of the Brazilian people but rather to the large demand for low-cost beef in post-World War II Europe and the United States.[17] The Western world's seemingly unrelenting demand for cheap beef encouraged many Latin American countries, such as Brazil, to clear huge areas of rainforest for pastures.[18] The support offered by Europe and the United States was not just moral; between 1971 and 1977, for example, over $3.5 billion in loans was provided to various Latin American countries to facilitate the massive land conversion.[19]

12. *See* Diana J. Eitman, *Maintaining Sovereignty and the Tropical Rainforests: The Promise of Debt-For-Nature Swaps*, 24-SPG ENVIRONS ENVTL. L. & POL'Y 29, 33-34 (2001).
13. *See id.*
14. *See* Emilio F. Moran, *The Law, Politics, and Economics of Amazonian Deforestation*, 1 IND. J. GLOBAL LEGAL STUD. 397, 398 (1994).
15. *See id.*
16. Matthew B. Royer, Note, *Halting Neotropical Deforestation: Do the Forest Principles Have What it Takes?*, 6 DUKE ENVTL. L. & POL'Y F. 105, 112 (1996).
17. Jacqueline Klosek, Note, *The Destruction of the Brazilian Amazon: An International Problem*, 6 CARDOZO J. INT'L & COMP. L. 119, 122-23 (1998).
18. *See id.*
19. *Id.* at 123. Various Latin American countries, including Brazil, received assistance mainly from the World Bank and the Inter-Latin American Development Bank, prompting them to convert millions of acres of tropical rainforest and cropland to pastures. *Id.*

Financial aid from much of the developed world made the Brazilian government encourage cattle ranching vigorously. The government developed a subsidy program that allowed ranchers to secure interest-free loans, and ranchers were also allowed to obtain the necessary land and equipment at dramatically reduced prices in return for a promise to use the land for cattle ranching.[20] The Brazilian government also did nothing to discourage the prevailing cultural attitude that considered a rancher lazy if he gave his land too much time to regenerate. Instead, ranchers were encouraged to clear more and more land and were even further encouraged by the generous economic incentives.[21]

The fact that the use of land for cattle ranching is decidedly inefficient only compounds the problem. Cattle ranching in the Brazilian Amazon usually occurs on lands of low productivity and often results in the abandonment of these lands after a relatively short time – sometimes as little as four years.[22] It is estimated that in order to make $1 million a year from raising cattle in the Brazilian Amazon, about thirty-eight square miles of forest have to be cleared; mining and timber uses, on the other hand, require clearing less than one square mile to make the equivalent return.[23] Some estimate that an undisturbed area of forest has the potential to produce ten times more food (including fruit, game, and fish) than would be produced were the same area converted into land for cattle.[24] Although studies have shown that these transformed lands – if not too damaged – do recover a fair amount of forest structure, in many cases the new growth is significantly less dense and diverse.[25]

Cattle ranching in Brazil has also had immeasurable effects in the country's social arena, and, consequently, has affected the social structure so crucial to maintaining the preservation of the Brazilian Amazon. Clashes between cattle ranchers and traditional rubber tappers, whose occupation requires them to do virtually no large-scale damage to the rainforest, have often degenerated into violence that has untold effects on the traditional social fabric of the region.[26] In one of the most highly publicized occurrences, Brazilian cattle rancher Darli Alves de Silva and his son, Darci murdered rubber tapper Chico Mendes in the late 1980s. The father and son were sentenced to nineteen years in prison.[27] The murder of one man in a region fraught with violence is itself relatively insignificant; but the incident is indicative of how one destructive industry can destabilize not only the actual rainforest, but also the societies within it. This indicates a disturbing cycle at work, as well. An industry contributes to the deforestation of a region and in the process destabilizes the

20. Eitman, *supra* note 12, at 33.
21. *See id.*
22. Royer, *supra* note 16.
23. Klosek, *supra* note 17, at 123-24.
24. Janelle E. Kellman, *The Brazilian Legal Tradition and Environmental Protection: Friend or Foe*, 25 HASTINGS INT'L & COMP. L. REV. 145, 149 (2002).
25. Royer, *supra* note 16.
26. *See* Klosek, *supra* note 17, at 123.
27. *Id.*

social structure within, leaving traditional people to often abandon previous lifestyles and paving the way for more deforestation since the traditional guardians of the forest are now either gone or hopelessly distracted.

Considering how devastating the cattle ranching industry as been to the conservation of the Brazilian Amazon, the economic payoff has been woefully lacking. Even though huge areas of rainforest have been converted into cattle pastures, the price of beef in Brazil has declined minimally; any economic benefit derived from this practice has been from continued sales of land, which each time is more deforested than before.[28] The one thing that could potentially curtail this problem – a 25 percent capital gains tax on land sales – is rarely collected, giving those engaging in the sales little incentive to stop.[29] Instead, the conversion of large areas of the Brazilian Amazon into cattle pasture will likely continue as long as the activity continues to appear to be viewed as offering an unusually high return in an economy with consistently high levels of inflation.[30]

2. *Pharmaceutical Companies*

The pharmaceutical industry, at least superficially, appears to be one of the parties with the most interest in reversing the devastating deforestation of the Brazilian Amazon. It is, after all, the biodiversity of the region in which the pharmaceutical industry arguably has the biggest stake. Biodiversity, which the United Nations has defined as "the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part,"[31] is a crucial factor for pharmaceutical companies because most of the medicines today are at least partly derived from plants and animals.[32] It is estimated that in the United States, 25 percent of prescription drugs derive from plant extracts, 13 percent from microorganisms, and 3 percent from animals.[33] In fact, these compounds were involved in developing the twenty most popular drugs in the United States, the combined sales of which were calculated as being slightly under $6 billion in 1988.[34]

Ironically, the pharmaceutical industry is often accused of taking part in the same large-scale destruction of the rainforest as other industries. Not surprisingly, once a company finds a desirable species, it may take

28. Moran, *supra* note 14, at 399.
29. *Id.*
30. *See id.* at 398.
31. United Nations Conference on Environment and Development, Convention on Biological Diversity June 15, 2002, *available at* http://www.un.org/documents/ecosoc/cn17/1995/ecn171995-7.htm.
32. Ryan K. McKain, Note, *A Critical Evaluation of the Development and Implementation of Forest Preservation Strategies*, 15 CONN. J. INT'L L. 235, 243 (2000).
33. Erin B. Newman, *Earth's Vanishing Medicine Cabinet: Rain Forest Destruction and Its Impact on the Pharmaceutical Industry*, 20 AM. J.L. & MED. 479, 480 (1994).
34. *Id.*

part in large-scale extraction of that species if it is convinced that it may have come upon the next highly successful medicine.[35] A much more common scenario, though (since these companies are often unable – or unwilling – to commit the funds necessary to take part directly in large-scale extraction), is the development of a potential medicine through the use – and often at the expense – of indigenous people.[36] This makes sense from the companies' standpoint because it is often these indigenous people who first discovered the healing power that a particular plant or insect possesses.[37]

The problem, however, is that once a pharmaceutical company acquires the rights to harvest a particular species, the indigenous people who helped the company in the first place often are left behind at the expense of their land.[38] Faced with a dramatic altering of their lifestyles, these people are frequently forced to move elsewhere, leaving the caretaking of the land - a hugely important factor in the prevention of deforestation – to someone else or no one at all. Either way the situation frequently spells doom for the particular area of rainforest affected.[39] This scenario is a prime example of how an industry can dramatically affect the Brazilian Amazon in an indirect, but just as damaging, fashion.

In a development promising to both the Brazilian Amazon and those who benefit from the discovery of new drugs, pharmaceutical companies had scaled back their often-damaging research in favor of more modern techniques by 1980.[40] Computer-modeling techniques allowed researchers to derive synthetic drugs in the laboratory instead of actually going into the rainforest and participating in large-scale extraction.[41] The reason for this was more a concern for the company's bottom line than for the environment: Only one plant or animal sample in 10,000 leads to a useful medication, and, more importantly, pure products of nature are non-patentable – allowing many companies to profit from the high-priced and time-consuming work of just one.[42]

By the early 1990s, however, pharmaceutical companies had begun to gravitate once again to traditional plant and animal research in the Brazilian Amazon.[43] This trend is partly because of the realization that many of the most powerful, and thus most effective, compounds are decidedly difficult to replicate in labs. More importantly, however, advances in prospecting techniques have allowed research in the rainforest to become less time consuming and more cost effective.[44] One bright spot among this return to the rainforest, though, is that the companies involved have

35. *See* McKain, *supra* note 32, at 244.
36. *See id.*
37. *See id.*
38. *See id.*
39. *See id.*
40. *See* Newman, *supra* note 33, at 482-83.
41. *Id.* at 482.
42. *See id.* at 483.
43. *Id.*
44. *See id.* at 483-84.

realized that maintaining the biodiversity of the Brazilian Amazon is increasingly crucial to them, since many drugs become less and less effective over time due to increased resistance.[45] It remains to be seen whether this newfound realization on the part of pharmaceutical companies will actually translate into a more conscientious attitude toward the preservation of the rainforest or whether the companies' high-minded talk of environmentalism is merely a response to the many critics who are well aware of the companies' renewed love affair with the Brazilian Amazon.

3. Development Schemes

A significant amount of the deforestation of the Brazilian Amazon has not necessarily occurred because of any natural resources possessed by the land but rather because of the most basic characteristic of the land itself – the fact that it is land (something, according to the Brazilian government, that should be developed). In 1966, Brazil instituted Operation Amazonia, a project designed to convert the Brazilian Amazon into commercially productive land.[46] By providing tax incentives to companies willing to develop this area, the Brazilian government facilitated the arrival of huge multinational corporations that immediately took to clearing large portions of rainforest to make room for their operations.[47] More than 6,000 miles of roads were built through previously untouched areas of the rainforest to further induce the movement into Brazil by these corporations.[48]

Commercial development schemes such as Operation Amazonia have had a hugely deleterious effect on the sustainability of the Brazilian Amazon. Between 1966 (the start of Operation Amazonia) and 1983, approximately 40,000 square miles of rainforest were cleared for commercial development.[49] Of all the rainforest destroyed during this period, the Brazilian government estimates that 38 percent of the deforestation is directly attributable to large-scale corporate development.[50]

Large-scale multinational corporations were not the only beneficiaries of Brazil's decision to exploit as much of its land as possible. With help from the World Bank, the Brazilian government started large-scale colonization projects designed to fill in some of the less densely populated areas of the country, such as the state of Rondonia in the northwest.[51] These programs were so attractive that by early 1984, 80,000 families had settled into the area, with each receiving generous parcels of land but

45. *See id.* at 484.
46. Klosek, *supra* note 17, at 126.
47. *Id.* at 126-27.
48. Roger W. Findley, *Legal and Economic Incentives for the Sustainable Use of Rainforests*, 32 TEX. INT'L L.J. 17 (1997).
49. Klosek, *supra* note 17, at 127.
50. *Id.* at 127-28.
51. Findley, *supra* note 48.

little or no guidance on how to properly use and sustain it.[52]

Unfortunately for both Brazil and the Brazilian Amazon, these developmental schemes have accomplished virtually none of their initial goals. With regard to Brazil's plans to have huge multinational corporations develop the land and, in the process, Brazil's economy, the project has been an utter failure.[53] The corporations who moved in created minimal employment opportunities and demonstrated no interest in putting their profits into anything but their own bank accounts.[54] Brazil has been left with little more to show for this than thousands upon thousands of square miles of useless ex-rainforest land and a still-huge national debt.

As for the colonization programs, Brazil failed in its stated goal of providing agricultural credits only for the use of land that would permit sustainable use.[55] Instead, the failure of the Brazilian government to provide these agricultural credits, combined with the unexpected arrival of hundreds of thousands of settlers, resulted in a huge amount of people settling on less fertile land, where they would simply exploit the land for all possible uses and then move on to other areas of the rainforest.[56] Indeed, it seems the only thing Brazil managed to "sustain" with this ambitious yet poorly conceived project was the continued deforestation of the Brazilian Amazon.

4. Energy Needs

As various industries and other commercial interests have become increasingly prevalent in the Brazilian Amazon, the need for energy has also proliferated. The construction of massive hydroelectric dams, while providing much-needed help in this area, has contributed significantly to the destruction of the rainforests.[57] The construction of a large dam can wreak havoc on the areas of rainforest around it, often flooding thousands of acres of land and displacing indigenous peoples.[58] Although the construction of a large dam in Tucurui was successful in that it provided a huge new source of energy in the area, it also created a reservoir covering over 1,000 square kilometers.[59] The sudden flooding of an area this large, despite efforts by developers to minimize the effects, caused significant damage to the area.[60]

Ironically, it is hydroelectric power's general reputation as an environmentally friendly source of energy that played a big role in the construc-

52. *See id.* at 18. The lack of guidance provided by the Brazilian government as to the proper means to achieve sustainable use was significant because virtually all of these colonization projects were undertaken to achieve sustainable use of these lands.
53. *See* Klosek, *supra* note 17, at 128.
54. *See id.*
55. *See* Findley, *supra* note 48, at 18.
56. *See id.*
57. Reisman, *supra* note 1, at 401.
58. *Id.*
59. *Id.*
60. *Id.*

tion of dams in the Brazilian Amazon.[61] Only recently have Brazilian officials realized that any pollution kept from the air probably does not balance out the large tracts of rainforest that are disrupted or destroyed by dams. As such, the trend in Brazil has gravitated recently toward the use of gas and nuclear power instead.[62]

This situation demonstrates a dilemma often encountered by Brazil: Should efforts to save the Brazilian Amazon take precedence over all other environmental considerations, or is it understandable (or maybe even necessary) to sometimes knowingly sacrifice part of the rainforest for the benefit of other parts of the environment? Complicating matters is the interrelatedness of the different parts of the environment; an area of rainforest might be saved from having a dam built nearby, but what if the resulting increase in air pollution ends up, either directly or indirectly, harming the rainforest even more?

5. *Timber*

It is somewhat ironic that the one industry in the Brazilian Amazon that clears areas of forest for the actual trees – not just to make way for something else – for the most part is not a big contributor to the overall problem of deforestation in the region. When large areas of the Brazilian Amazon were being cleared throughout the 1970s, for example, it is estimated that only 4 percent of the deforestation taking place was caused by the timber industry.[63] Nevertheless, areas are that are completely deforested can have significant negative impacts on the surrounding environment; runoff from lands that have been clear cut has been observed clogging surrounding rivers and deltas, doing untold damage to the marine populations in those places.[64]

The timber industry also may be damaging the Brazilian Amazon in ways that are not reflected in statistics. Clear-cut logging is not a preferred method by the industry in the region, but "selective" logging, as it as known, may end up completely removing one species of tree from a particular area of forest, which can have a devastating impact on the ecosystem of that area.[65] The difficulty of quantifying such damage makes "selective" logging especially concerning.

The main reason why the timber industry has traditionally had such a small effect on the Brazilian Amazon is that large-scale cutting and transporting is considered financially prohibitive.[66] Additionally, few of the many species of trees contained in the Brazilian Amazon are popular in

61. *Id.*
62. *See id.*
63. Klosek, *supra* note 17, at 125.
64. Phillip E. Wilson, Jr., Comment, *Barking up the Right Tree: Proposals for Enhancing the Effectiveness of the International Tropical Timber Agreement*, 10 TEMP. INT'L & COMP. L.J. 229, 243 (1996).
65. Eitman, *supra* note 12, at 31-32.
66. Klosek, *supra* note 17, at 125.

either Brazilian or international markets.[67] Because of these problems with cost and quality, most timbering to date has been on a relatively small scale and is not considered to have done significant damage to the Brazilian Amazon.[68]

The timber industry is becoming more of a problem area, however, as tradition takes a backseat to Brazil's bottom line. Like many of the industries contributing to deforestation of the Brazilian Amazon, the timber industry is increasingly influenced by foreign interests.[69] In the past several years, the Brazilian government has taken to selling large amounts of land to Asian logging companies; as of 1998, twenty-five such companies owned at least 20,000 square kilometers in the Brazilian Amazon.[70] Although the Brazilian Environment Institute (BEI) requires companies to submit a plan of sustainable exploitation before they proceed, staff and resource shortages at the BEI have prevented it from effectively evaluating each plan; meaning plans that should be rejected often are approved.[71] This inability to ensure each plan is proper, along with the above-mentioned lack of restrictions against foreign timber companies, has set the stage for the timber industry to become yet another major contributor to the deforestation of the Brazilian Amazon.

6. *Mining*

Mining has developed into a potentially troublesome industry with regard to the conservation of the Brazilian Amazon as much because of the Brazilian government's slow response to it as because of the actual effects it has on the environment.[72] This hesitance to deal with the mining industry is indicative of the fact that mining (usually for gold and tin) traditionally has been thought to have little harmful effect on the environment.[73] But as Brazil has become the world's leading extractor of gold,[74] poisonous mercury used in gold extraction has polluted both waters in the immediate vicinity of the area being mined and waters downstream of the mining site.[75] It remains to be seen whether serious efforts will be made to deal with an industry that has only recently begun to be viewed as yet another problem area in the fight against the deforestation of the Brazilian Amazon.

7. *The Underlying Cause: Brazil's Ideology of Developmentalism*

Regardless of what effects a specific industry or policy discussed above may be considered to have on the deforestation of the Brazilian Amazon,

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67. *Id.*
68. *Id.*
69. *Id.*
70. *Id.*
71. *See id.* at 126.
72. *See* Eitman, *supra* note 12, at 32.
73. Klosek, *supra* note 17, at 124.
74. Eitman, *supra* note 12, at 32.
75. Klosek, *supra* note 17, at 124.

the blame for this ongoing problem, at least indirectly, can be traced to one source: Brazil's ideology of developmentalism.[76] Critics have argued that this mindset has taken precedent over concerns about the environment, even though it is often the environment itself that has enabled Brazil to turn such an ideology into reality.[77] This irony, though, has not been lost on the Brazilian government and international community. Their attempts to deal with the problems leading to this situation and the effectiveness of such attempts will be examined next.

B. Attempts to Halt Deforestation

In this section, only the most general attempts on the part of Brazil and the international community to deal with deforestation in the Brazilian Amazon will be examined. Although there have been more specific attempts by both communities to address the problem, an analysis of the broader provisions is sufficient to set out the basic problems that have been inherent in both Brazilian and world responses to deforestation.

1. Brazilian Efforts

Rewritten in 1988, the Brazilian Constitution can at best be said to pay superficial attention to the crisis facing the Brazilian Amazon. But countering the Constitution's words declaring Brazil's forests to be a "national patrimony"[78] and allowing their use only under conditions that ensure environmental preservation is a sobering reality: The Brazilian government, like many governments – especially those in other Latin American countries – was ill-equipped to effectively implement the vaguely worded yet high-minded declarations in its constitution.[79]

The federal government in Brazil is limited by the constitution to formulating only general policies, which are then passed on to the various states and counties to be specified and implemented.[80] Although the new constitution of 1988 seemingly broke with tradition by obliging states and counties to take part in various forms of environmental monitoring, the reality is that few states or counties have implemented environmental policies that are specific enough to be workable.[81] Even when a specific policy has been implemented, such as an attempt in southern Brazil to control the use of environmentally damaging fertilizers, fertilizer companies fought the policy and went so far as to challenge its constitutionality.[82]

Another problem with most of the power to effect environmental policies being given to various states and counties is Brazil's taxation system.

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76. *See* Romano, *supra* note 2, at 70.
77. *See id.*
78. C.F. art. 4
79. *See* Kellman, *supra* note 24, at 152.
80. Moran, *supra* note 14, at 399.
81. *Id.*
82. *Id.*

Almost all of the state and municipal taxes collected are first funneled through the federal government before a small proportion is returned to the various localities, giving them little incentive to implement environmentally friendly tax policies.[83] This situation, along with the above-mentioned difficulty encountered with private entities when environmental legislation is actually implemented, demonstrates a basic problem with effectively dealing with the deforestation of the Brazilian Amazon: The entities charged with protecting the environment – the states and counties – often have little incentive to do so. Even when they actually do implement an environmentally friendly policy, it is likely to be either challenged or ignored by the private sector.

2. International Efforts

a. Stockholm Conference

The Stockholm Conference on Humanity and the Environment marked the beginning of the modern era of international environmental law.[84] Held in 1972, the conference was the first international attempt to reconcile the always-interrelated and often conflicting notions of development and the environment.[85] The Stockholm Conference introduced a widely recognized theme of international environmental law, one that hits at the very core of the problem with Brazil and the deforestation of its Amazon region: Although a country may have sovereign rights to the development of its own land, it also has obligations toward both the environment and other nations.[86]

b. Earth Summit

Increasing international awareness – as well as a realization that little had been done since Stockholm to transform many of the issues identified into actual policies – laid the groundwork for significantly more substantial anti-deforestation initiatives.[87] The most significant of these is the United Nations Conference on Environment and Development (UNCED).[88] The Earth Summit, as it is more commonly known, met in Rio de Janeiro in June 1992 and adopted five main documents: (1) the Convention on Biological Diversity; (2) the Rio Declaration on Environment and Development; (3) the Climate Convention; (4) the Statement of Forest Principles; and (5) Agenda 21, which contains a blueprint for action on all areas of activity relating to sustainable development.[89] Of these, the Forest Principles have provided the most detailed and far-reaching

83. *Id.*
84. Wilson, Jr., *supra* note 64, at 236.
85. *Id.* at 235.
86. *See id.* at 236.
87. *See* Andronico O. Adede, *The Treaty System from Stockholm (1972) to Rio De Janeiro (1992)*, 13 PACE ENVTL. L. REV. 33, 37-38 (1995).
88. *See* Klosek, *supra* note 17, at 144.
89. United Nations Conference on Environment and Development, June 3, 1992, *available at* http://www.un.org/documents/ga/conf151/aconf15126-1.htm.

guidance in terms of specific measures that should be employed in the effort to stop the deforestation of the Brazilian Amazon.[90]

(i) Forest Principles

Although not legally binding, the Forest Principles are significant in that they represent a comprehensive attempt by a diverse group of nations to establish rules applicable to all types of forests.[91] The Forest Principles are widely considered to represent the most far-reaching attempt up to that time to deal with deforestation, addressing everything from rather obvious environmental issues such as protection and restoration to issues such as the rights of indigenous people, the participation of local communities, and even finance and trade issues.[92] The wide-ranging spectrum of issues addressed made the Forest Principles significant in that, while not legally binding, it at least showed willingness on the international community's part to recognize the many problems either leading to deforestation or being caused by it. Either way, it was important for many of these less obvious problems and situations to be acknowledged by a respected international body.[93]

The Forest Principles, while intended to apply to all forests globally, contain certain principles particularly relevant and applicable to the problem of deforestation in the Brazilian Amazon. Some of these appear directed toward government schemes like Brazil's that helped set the stage for large-scale deforestation, proclaiming that policies (including fiscal, trade and industrial) that lead to forest degradation should be avoided.[94]

(ii) Other Earth Summit Initiatives

The four other documents adopted by the nations participating in the Earth Summit, while displaying an awareness of the various problems relating to deforestation, were often lacking in their overall ability to advance the general cause of preventing it. The Rio Declaration on Environment and Development, for example, only stated a number of basic principles regarding sustainable development, such as that states hold sovereign rights over their own resources, and that rates of development should not exceed the renewal capacity of the earth nor prejudice its future renewal capacity.[95] The Climate Convention was equally vague, recognizing the need to reduce carbon emissions without setting

90. *See* Klosek, *supra* note 17, at 145.
91. *See* Melanie Steiner, *The Journey from Rio to Johannesburg: Ten Years of Forest Negotiations, Ten Years of Successes and Failures*, 32 GOLDEN GATE U. L. REV. 629, 633 (2002).
92. *Id.*
93. *See id.*
94. *See Forest Principles*, United Nations Conference on Environment and Development, June 3, 1992, *available at* http://www.un.org.
95. Klosek, *supra* note 17, at 145; United Nations Conference on Environment and Development, Rio Declaration on Environment and Development, June 3, 1992, *available at* http://www.un.org.

out even the most basic framework for how to do so.[96]

One document that is especially promising (although, as mentioned above, so general as to make enforcement difficult) is Agenda 21, which addresses the need to financially and legally support indigenous people in their fight against both the social and environmental effects of deforestation.[97] Implementation of the provisions in the document is very difficult due to several factors: (1) the overall generality of the document; (2) the sometimes-large disparities in the population of different groups of indigenous peoples means that some groups are much more likely to be fairly represented than others; and (3) the ongoing conflict between the legally established right of indigenous groups to exist in the state and government organizations like the Indian Protection Agency, which purports to support the rights of indigenous people but is often accused of trying to facilitate the abandonment of the indigenous lifestyle.[98] Nevertheless, Agenda 21 remains a significant document if for no other reason than its recognition of the many indigenous people affected by deforestation, as opposed to just a general recognition of the problem of deforestation itself.

c. International Tropical Timber Agreement

Although the Earth Summit is widely viewed as successful in that it brought many environmental issues to the forefront, it was unwilling to step outside its ideological boundaries to recognize the interplay between the protection of the environment and the protection of trade. Recognizing the often-unrealistic expectations that were a product of this unwillingness to stray from idealistic values, the International Tropical Timber Organization passed the latest version of the International Tropical Timber Agreement (ITTA), effective February 1995.[99]

Although the ITTA, at its essence, is concerned with promoting the tropical timber industry, it is significant in that it does much more than just make casual references to sustaining the environment.[100] Initially, this is apparent from the preamble of the agreement, which incorporates the entire body of documents produced by the Earth Summit, as well as other international environmental agreement.[101]

The ITTA is a much more realistic document than other documents yet the ITTA does have its share of problems. The underlying problem preventing the ITTA from being more than minimally effective is that, while the agreement does call for timber production more favorable to the environment, it also repeatedly stresses state sovereignty.[102] This is

96. *See id.*
97. *See Agenda 21,* United Nations Conference on Environment and Development, June 3, 1992 , *available at* http://www.un.org.
98. *See* Moran, *supra* note 14, at 405.
99. *See* Wilson, Jr., *supra* note 64, at 229-31.
100. *See id.*
101. *Id.* at 237-238.
102. *See id.* at 243-44.

viewed as a problem because, while there is a generally recognized exception to state sovereignty when activities in a particular state are shown to have effects beyond that state's own borders, the deforestation of the Brazilian Amazon or other rainforests affects other states in ways that are often more difficult to quantify than other activities deemed hazardous to the environment.[103] Thus, the ITTA's emphasis on state sovereignty means that deforestation in a state, especially one as large as Brazil, is likely to be left to that particular state to deal with unless the effects of the deforestation are such that it is obvious to the global community that action should be taken.

There is yet one more significant obstacle to the effectiveness of the ITTA. As the first major trade agreement that specifically stresses the importance of environmentally favorable policies and that actually incorporates a conservation component, the ITTA is considered by some to be in significant conflict with much of the dominant trade agreements to date, including the General Agreement on Tariffs and Trade (GATT).[104] GATT is more typical of international trade agreements, stressing state sovereignty and free trade while deemphasizing the importance of conservation.[105] With its environmental emphasis, however, the ITTA is viewed as having the potential to serve as somewhat of a blueprint for future international trade agreements; or, at the very least, as having inserted the concerns about conservation and sustainable use into the international trade arena.[106] Either way, it seems safe to expect the ITTA's contribution to the fight against deforestation to come as much from future international trade agreements as it does through provisions of the ITTA itself.

d. World Summit on Sustainable Development

The World Summit on Sustainable Development (WSSD), more commonly known as the Johannesburg Summit, convened on August 26, 2002, marking the ten-year anniversary of Rio and thirty years since Stockholm.[107] The Johannesburg Summit is significant in that it was intended from its earliest planning stages to be the first-ever multistakeholder summit, allowing for representation from not just the expected government entities but also from industries and other entities with interests tied to the forests.[108] While it remains to be seen whether this multistakeholder approach will prove helpful, it appears at the very least that those in charge of the Johannesburg Summit emerged with a heightened sense of urgency. "Johannesburg clearly put sustainable development back on the agenda," said JoAnne DiSano, director of the UN's Division for Sustainable Development. "The Summit also sent a message to stop the chatter

103. *See id.* at 245.
104. *See id.* at 233.
105. *See id.*
106. *Id.*
107. Steiner, *supra* note 91, at 629.
108. *See id.* at 630.

and get on with implementation."[109]

C. Measures to Prevent Further Deforestation: Debt-for-Nature Swaps

The prevention of deforestation in the Brazilian Amazon should remain a priority of the United States and the rest of the world, especially when considering the overall impact deforestation can have on global stability. Considering the generally accepted notion that rampant poverty in developing states is a pressing concern to international stability, it is not a reach to believe that the continued degradation of the rainforest in states like Brazil could further destabilize the already-shaky global community.[110] But this consideration is just one of many; more common concerns such as the overall impact of deforestation on the environment and maintaining the biodiversity of the Brazilian Amazon continue to be pressing matters with which the world should concern itself. This section will discuss a promising approach to curtailing deforestation in the Brazilian Amazon, the debt-for-nature swap.

Because the root cause of deforestation of the Brazilian Amazon lies in the country's huge debt, it follows that developing ways to decrease this debt is crucial to effectively deal with the environmental crisis. One of the most direct and innovative approaches thus far is the debt-for-nature swap, which typically involves the purchase of Brazilian debt by a foreign non-profit organization (or a foreign government acting in conjunction with one) in return for the rights to a certain amount of land in the Brazilian Amazon.[111] There are five main steps involved in a debt-for-nature swap: (1) The organization seeks approval from the debtor nation (in this case, Brazil); (2) the organization acquires the debt instrument; (3) it transfers title to the debt; (4) the debt is converted into a local currency instrument; and (5) the organization implements environmental investment programs.[112]

In May 1992 Brazil approved its first debt-for-nature swap.[113] The purchase of $2.2 million of Brazilian debt was financed by the Nature Conservancy, which raised $850,000 for the purchase and then donated the debt to an organization called the Pro-Natureza Foundation (FUNATURA); FUNATURA in turn exchanged the debt for $2.2 million in long-term Brazilian "Environmental Government Bonds" paying 6 percent interest per year.[114] The bonds were used to create an endowment fund for the Grand Sertao Veredas National Park in Minas Gerais, Brazil, with the interest being used to fund conservation, management,

109. Press Release, United Nations, UN Taking First Steps toward Implementing Johannesburg Outcome (Sept. 23, 2002), *available at* http://www.un.org.
110. *See* Wilson, Jr., *supra* note 64, at 246.
111. Reisman, *supra* note 1, at 405.
112. *Id.* at 406.
113. *Id.* at 416.
114. *Id.*

and educational projects at the park.[115]

Brazil's first debt-for-nature swap was especially promising considering the other party involved in the swap, FUNATURA, seems committed to addressing Brazil's many environmental problems. In recent years, FUNATURA has teamed with the Brazilian Institute for Environment and Natural Resources (IBAMA), a federal agency charged with protecting Brazil's endangered resources, on several promising projects.[116] In addition to the project in Minas Gerais, the two organizations have established wildlife sanctuaries throughout Brazil.[117] Other ongoing projects include Sustainable Development in the Amazon Region; Non Wood Tropical Forest Products: Processing, Trade and Collection; and Alternative Industrial Operations for Sustainable Production.[118] The work of these groups is promising because, unlike many other attempts to curtail deforestation, these have a known means to achieve their goals: the debt-for-nature swap.

Debt-for-nature swaps continue to be an intriguing option for several reasons, almost all of them relating to the fact that these agreements virtually always involve a not-for-profit conservation organization on the other end. For one, this situation means that a state like Brazil does not have to worry about sovereignty concerns; the land involved is, after all, technically going to a non-governmental, not-for-profit organization (even though there is a good chance that the organization involved is working closely with another government).[119] Another reason why debt-for-nature swaps may become increasingly popular is the common perception by the debtor country that it is in a favorable bargaining position, considering the conservation organization on the other end of the swap ostensibly has only one goal: to obtain and subsequently protect endangered areas of land.[120] These reasons why debt-for-nature swaps may become an increasingly attractive option to states like Brazil highlight the underlying theme that makes these deals attractive: ideally they involve benign non-governmental entities, as opposed to neighboring or distant countries that may or may not enter the deal with motives as innocent as conservation organizations.

Countering the attractiveness of a symbiotic, well-intentioned relationship among parties involved in debt-for-nature swaps is the cold reality that these deals often end up proving much less favorable than the debtor country anticipates. In short, there is often a catch. When the United States became involved in debt-for-nature swaps, through the Enterprise for the Americas Initiative, it offered to allow debtor countries to pay the

115. *Id.* at 416-17.
116. Press Release, International Tropical Timber Organization, Institutional Profiles: Pro-Natureza Foundation, *available at* http://itto.or.jp/newsletter/v7/n2/24institutional.html (last visited Mar. 20, 2002).
117. *Id.*
118. *Id.*
119. *See* Eitman, *supra* note 12, at 44.
120. *See id.*

interest of their debts (the principal still must be paid to the United States) into special funds, which would support local environmental projects.[121] In return, though, the United States required the countries to meet several fairly significant economic conditions, leading to a fair amount of resentment toward U.S. policies and a renewed desire on the part of the debtor countries to fall back on their old ways of using (or more accurately, misusing) their own natural resources to pay down debt.[122] This reality of debt-for-nature swaps presents countries looking to enter such deals with a disturbing dilemma: they can opt for a big-name partner in the swap, one supported by a country with deep pockets but ulterior motives, or they can choose a more traditional, idealistic partner, one who will attach fewer strings but be restrained financially.

Of course, the previous discussion assumes that a country like Brazil would be interested in a debt-for-nature swap were the terms favorable. This has not always been the case, though.[123] A former foreign minister of Brazil, Abreu Sodre, was critical of these deals because they tend to aim at halting development.[124]

II. CONCLUSION

It is clear that if the world is serious about significantly curbing deforestation in the Brazilian Amazon, all parties must make a much greater effort. The Brazilian government's immediate priorities should be two-fold: (1) give local authorities more of an incentive to actually implement the various environmentally friendly policies that have been touted; and (2) place an increased focus on policies that emphasize a more direct approach to dealing with the environment, such as debt-for-nature swaps.

Although Brazil often supports land reform as a potential solution to deforestation problems in Brazil, the problems (discussed above, in section A(3)) with these programs can be formidable.[125] In addition to the problems discussed above regarding the actual implementation of these programs, there have been dire consequences for people partaking in them.[126] In April 1996, Brazilian police killed nineteen settlers and wounded forty more at the request of landowners on whose land the settlers were living.[127] Recorded by a television crew, the killings caused a

121. *Id.* at 45-46.
122. *See id.* at 46.
123. Roy A. Torres, *Debt-For-Nature Swaps in the Amazon Basin: An Expanding Solution to the Debt Crisis*, 3 TOURO J. TRANSNAT'L L. 59, 69-71 (1992).
124. *Id.* at 70-71. It is unclear whether criticism directed toward debt-for-nature swaps truly has been about development or about an unwillingness on the part of Latin American countries to have other countries interfering with their affairs. These possible ulterior motives are demonstrated by former Chilean president Eduardo Frei, who once said, "[w]hat we're faced with is a difficult decision between cleaning the environment and not halting our industrial progress. What bothers us is when industrialized countries try to impose their rules on us." *Id.*
125. Findley, *supra* note 48, at 23.
126. *Id.*
127. *Id.*

national outrage and prompted government authorities to vow to speed up the process of land reform.[128]

Situations like this show why land reform is such a tantalizing, yet problematic, solution to the problem of deforestation in the Brazilian Amazon: The government rightfully sets out to have large amounts of private, undeveloped land settled by landless people for sustainable use, but then must respond when the no-doubt wealthy owners complain. It is not surprising, then, that the settlers would rather just find a previously unsettled part of the Brazilian Amazon. Nevertheless, land reform does have a great deal of potential. If it was administered correctly, vast amounts of land could be given to those who need it without further deforestation occurring.

As for worldwide efforts, the Johannesburg Summit should be considered promising because of its multi-stakeholder approach to dealing with environmental problems. But the international community has touted novel approaches before; what remains to be seen is how effective this one will be. In the interim, an increased interest by countries like the United States – specifically, by non-governmental organizations in the United States – in debt-for-nature swaps would likely send a message that halting deforestation in the Brazilian Amazon remains of utmost importance to the international community. But for any kind of significant progress to be made, the United States would be wise to limit the amount of strings it attaches to these deals. It is likely that debt-for-nature swaps will never be accorded real legitimacy until they appear to be, at least for the most part, selfless acts reflecting true concern for the environment.

Deforestation in the Brazilian Amazon is a tremendously complicated problem. About the only thing regarding it that is undisputed is that it is a problem of concern to the entire world, not just Brazil. As the world's only remaining superpower, the United States should think very seriously about bringing this issue to the forefront. It is likely that only when this happens can the problem finally be effectively handled.

128. *Id.*