

7-1-1990

# The Deforestation of the Brazilian Amazon: Law, Politics, and International Cooperation

Henry W. McGee Jr.

Kurt Zimmerman

Follow this and additional works at: <http://repository.law.miami.edu/umialr>



Part of the [Environmental Law Commons](#), and the [Foreign Law Commons](#)

---

## Recommended Citation

Henry W. McGee Jr. and Kurt Zimmerman, *The Deforestation of the Brazilian Amazon: Law, Politics, and International Cooperation*, 21 U. Miami Inter-Am. L. Rev. 513 (1990)

Available at: <http://repository.law.miami.edu/umialr/vol21/iss3/2>

This Article is brought to you for free and open access by Institutional Repository. It has been accepted for inclusion in University of Miami Inter-American Law Review by an authorized administrator of Institutional Repository. For more information, please contact [library@law.miami.edu](mailto:library@law.miami.edu).

## ARTICLES

### THE DEFORESTATION OF THE BRAZILIAN AMAZON: LAW, POLITICS, AND INTERNATIONAL COOPERATION

HENRY W. MCGEE, JR.\*

KURT ZIMMERMAN\*\*

I. INTRODUCTION .....	514
II. GEOGRAPHY .....	515
A. <i>Flora and Fauna</i> .....	516
B. <i>Homo Sapiens</i> .....	517
III. EFFECTS OF DEFORESTATION .....	518
A. <i>Overview</i> .....	518
B. <i>Global Warming</i> .....	519
IV. THE SCOPE OF DESTRUCTION .....	521
V. THE BRAZILIAN PERSPECTIVE .....	522
A. <i>Development Plans</i> .....	524
B. <i>Environmentalists</i> .....	528
VI. BRAZILIAN LAW .....	530
A. <i>The Brazilian Constitution and Environmental Protection</i> .....	530
B. <i>Statutory Law</i> .....	533

---

\* Professor of Law, University of California, Los Angeles. B.S., 1954, Northwestern University; J.D., 1957, DePaul University; LL.M., 1970, Columbia University.

\*\* A.B., 1985, M.A., 1987, Stanford University; J.D., 1990, University of California, Los Angeles.

C. <i>The Environmental Bureaucracy</i> .....	534
VII. INTERNATIONAL ENVIRONMENTAL LAW .....	535
A. <i>Case Law</i> .....	536
B. <i>United Nations Activities</i> .....	536
C. <i>Regional Conventional International Law</i> .....	539
VIII. GLOBAL EFFORTS .....	540
A. <i>UNEP</i> .....	540
B. <i>TFAP</i> .....	541
C. <i>ITTO</i> .....	542
IX. THE ROLE OF DEVELOPMENT ASSISTANCE .....	544
X. DEBT-FOR-NATURE SWAP .....	547
XI. CONCLUSION .....	549
XII. ADDENDUM .....	550

*The process of systematic destruction of native forest is a crime against the country. Our children will live in deserts unless measures that protect the environment from destruction become effective immediately.*

Roberto Burle Marx, Brazil's leading landscape architect, 1975<sup>1</sup>

## I. INTRODUCTION

The Brazilian Amazon rain forest is the world's most remarkable example of biological diversity supporting millions of different species. The forest provides not only food but valuable chemical products used in the manufacture of pharmaceutical and other industrial products. However, only a tiny fraction of plant and animal species have been studied for their potentially beneficial application. Many scientists also believe the world's largest jungle serves as a regional and perhaps even "global thermostat."<sup>2</sup> It is therefore essential that vigorous efforts be directed toward its preservation. Unfortunately, vast areas of the forest are experiencing

1. S. Davis, *VICTIMS OF THE MIRACLE* 21 (1977).

2. A global thermostat serves to reset the earth's temperature.

either deforestation or the clearing of trees for non-forest uses. The following sections will briefly describe the region and explore Brazilian attitudes towards rain forest conservation. A number of possible solutions to the dilemma of forest destruction, with particular reference to domestic and international law, will likewise be introduced.

## II. GEOGRAPHY

The "traditional Amazon" is generally said to comprise about forty-two percent of Brazil's national territory or 3.5 million square kilometers and includes the states of Acre, Rondonia, Amazonas, and Para and the territories of Roraima and Amapa.<sup>3</sup> This region is five times the size of Texas. The "Legal Amazon" includes the "traditional Amazon," as well as the states of Mato Grosso, Goiás north of the 13th parallel, and Maranhão west of the 44th meridian. Government investment incentives apply in this larger region of 4.9 million square kilometers.<sup>4</sup> This region contains 2,860,000 square kilometers of tropical moist forest or at least one-third of the world's "biome."<sup>5</sup> In addition to its vast stands of timber, this forest is rich in other natural resources. As much as two-thirds of the world's fresh water is located in the Amazon basin. Also, deposits of manganese, aluminum, copper, tin, nickel, iron, gold, and natural gas have been found.<sup>6</sup> Annually, the region produces 1.5 billion dollars worth of minerals and 100 billion cubic meters of gas.<sup>7</sup>

---

3. R. SKILLINGS, ECONOMIC DEVELOPMENT PROSPECTS OF THE AMAZON REGION OF BRAZIL 1-2 (The Johns Hopkins University School of Advanced International Studies Occasional Paper Series No. 9, 1979).

4. *Id.*

5. N. MYERS, CONVERSION OF MOIST TROPICAL FORESTS 5, 118 (1980). The term rain forest and tropical moist forest are essentially synonymous. There is no universally accepted definition of rain forest. However, they are frequently described as closed ecosystems of broad-leaved evergreen trees growing in regions of limited climatic seasonality (*i.e.*, the tropics) and supporting communities of biotic diversity. *Id.* at 11-22.

6. Grainger, *The State of the World's Tropical Forests*, 10 *THE ECOLOGIST* 6, 34, 47 (1980). Gold production is extremely dangerous because the poisonous and mutagenic mercury is used in its extraction. *Hope Reaches the Amazon*, *THE ECONOMIST*, July 15, 1989, at 47.

7. The figures for minerals and gas are found in *Minerio na Superfície*, *VEJA*, July 5, 1989, at 96 [hereinafter *VEJA*].

### A. *Flora and Fauna*

The area is also an unparalleled example of biological diversity. Each hectare of forest can contain up to 230 different species of trees.<sup>8</sup> Indeed, the Amazon is probably home to about half of the world's species. Scientists estimate that 80,000 plant species (including 600 kinds of palm alone) and possibly 30 million animal species, most of them insects, live in the forest.<sup>9</sup> This diversity or "speciation" might be due to long-term environmental stability and to the variety of ecological niches.<sup>10</sup> Recent geological evidence, however, suggests that the region has been subjected to mild climatic disturbances like electrical storms and floods. These changes have felled dominant species and given the more numerous, weaker species a chance to survive.<sup>11</sup>

Presently, tropical forests like the Amazon are important sources of natural products used in industry including gums, oils, latexes (especially natural rubber), resins, and a variety of natural fibers.<sup>12</sup> The forest also produces foodstuffs like tapioca (from the manioc root), cocoa, pineapple, brazil nut, cashew nut, and passion fruit.<sup>13</sup> With proper cultivation and creative marketing, the forest's more exotic fruits, like the delicious "cocona" or peach tomato (with thirty times the vitamin C concentration of the orange), may one day supplement the North American or European diets.<sup>14</sup>

Amazonia is likewise a vast natural pharmacopoeia. The region's plants and animals produce certain chemicals with potent medicinal properties. There are old discoveries like quinine, curare, and ipecuanha (more commonly known by its trade name ipecac)<sup>15</sup> and new discoveries like the powerful hypertension drug "Capoten" derived from the venom of the deadly Brazilian pit viper.<sup>16</sup> Despite the many uses of tropical plants, less than one per-

---

8. THE WORLD RESOURCES INSTITUTE AND THE INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT, *WORLD RESOURCES 1986*, 71 (1986) [hereinafter *WORLD 1986*].

9. Colinvaux, *The Past and Future Amazon*, *Sci. Am.*, May 1989, at 102.

10. Begley, *The World's Largest Lab*, *NEWSWEEK*, Feb. 20, 1989, at 47-48. For a discussion of the niches, see THE WORLD WILDLIFE FUND, *ITTO: TROPICAL FOREST CONSERVATION AND THE INTERNATIONAL TROPICAL TIMBER ORGANIZATION*, at 21-24 (June 1988)[hereinafter *WWF*].

11. Colinvaux, *supra* note 9, at 102-08.

12. *WORLD 1986*, *supra* note 8, at 70-71.

13. Grainger, *supra* note 6, at 39.

14. Begley, *supra* note 10, at 47-48.

15. *WORLD 1986*, *supra* note 8, at 72.

16. Capoten is described in Linden, *The Death of Birth*, *TIME*, Jan. 2, 1989, at 34.

cent of them have been studied for their possibly useful properties. The continuing destruction of the forests will therefore deprive future generations of the opportunity to improve the quality of their life by expanding the world's "genetic base."<sup>17</sup>

### B. *Homo Sapiens*

In addition to millions of species of plants and lower animals, the forest also supports indigenous human cultures. In 1900, there were at least one million indigenous peoples. Six decades later, this number dropped to 200,000.<sup>18</sup> In 1980, it is estimated that only 100,000 Indians remained in Brazil.<sup>19</sup> The Yanomami are the largest South American Indian group with a population of about 16,400 in 1979.<sup>20</sup> They live in about 300 widely dispersed villages in Northern Brazil along the Venezuelan border. Their diet includes fish and small game; they also cultivate bananas, plantains, manioc, and other tubers.<sup>21</sup> There is no evidence that these food producing activities degrade the environment; in fact, they may rejuvenate the forest. This "symbiosis" has likewise been emulated by rubber-tappers and *caboclos* (a people of mixed Indian and European blood), who, although latecomers to the forest, have learned from the Indians the benefits of a self-sustaining lifestyle.<sup>22</sup>

The Kayapo Indians are found far to the south of the Yanomami along the Xingu, a tributary of the Amazon. The Kayapo, like the Yanomami, are semi-sedentary sustaining themselves by hunting, gathering, and small-scale farming. Further, like the Yanomami, the Kayapo lifestyle is in harmony with the natural processes of the rain forest. Indeed, one scientist has observed that the Kayapo actually practice reforestation. The Indians create

---

17. INTERNATIONAL TASK FORCE CONVENED BY THE WORLD RESOURCES INSTITUTE, THE WORLD BANK, AND THE UNITED NATIONS DEVELOPMENT PROGRAMME, *Tropical Forests: A Call To Action* pt. I, at 12 (Oct. 1985) [hereinafter *Tropical Forests*].

18. DAVIS, *supra* note 1, at 5.

19. Grainger, *supra* note 6, at 32. Given a dearth of precise statistical data, estimates of the pre-Colombian Amazonian population are problematic. One study estimates that there were 6,800,000 Indians living in greater Amazonia before the Iberian arrival. W. Denevan, *The Aboriginal Population of Amazonia*, in *THE NATIVE POPULATION OF THE AMERICAS* IN 1492, 229 (W. Denevan ed. 1976). But cf. J. STEWARD & J. FARON, *NATIVE PEOPLES OF SOUTH AMERICA* 53 (1959) (2,188,970 Indians in the tropical forests of interior South America).

20. A. RAMOS & K. TAYLOR, *THE YANOAMA IN BRAZIL 1979 AND YANOMAMI INDIAN PARK PROPOSAL JUSTIFICATION* 101 (1979). The Yanomami are a sub-group of the Yanoama. *Id.*

21. Taylor, *Deforestation and Indians in Brazilian Amazonia*, in *BIODIVERSITY* 138 (E.O. Wilson ed. 1986).

22. *Id.* at 139.

*apetes* or forest patches on land considered to be infertile or *campo cerrado*.<sup>23</sup>

### III. EFFECTS OF DEFORESTATION

#### A. Overview

Unfortunately, this fabulously wealthy ecosystem is extraordinarily fragile. When large areas are deforested, regeneration to the original state may take from 300 to 1,000 years.<sup>24</sup> Most Amazonian soils are of extremely low fertility. Nutrient matter is contained in the vegetation itself and is quickly recycled when dead branches or leaves fall off the trees. If the layer of vegetation is destroyed, the thin topsoil erodes and the ground becomes hard and incapable of supporting life.<sup>25</sup> Human attempts to restore degraded Amazon land have proven expensive and remarkably difficult.<sup>26</sup> Of course, the sylvan culture of the indigenous peoples is also destroyed. Those Indians who do not die from starvation or disease are forced to migrate to cities where they "swell the ranks of the under and unemployed."<sup>27</sup>

In addition to causing the extinction of valuable plants, animals, and Indian culture, deforestation in Brazil also produces deleterious changes in regional and international meteorological patterns. Many climatologists now agree that the destruction of the rain forest could exacerbate drought conditions in large parts of Brazil. Indeed, even if half of the Amazon were to be safeguarded in national parks or other conservation units, it is likely that most of the region's moisture would be lost through a "hydrological feedback mechanism." The remaining forest would be subject to steady desiccation.<sup>28</sup> Species that had adapted over millennia to the moist environment would soon perish. In addition, deforestation also encourages erosion, sedimentation, and devastating flooding.<sup>29</sup> This flooding is responsible for deadly water-borne dis-

---

23. *Id.* at 140.

24. Bunyard, *World Climate and Tropical Forest Destruction*, 15 *THE ECOLOGIST* 125, 129 (1985).

25. Amazonian soils are discussed in SKILLINGS, *supra* note 3, at 2.

26. Uhl, *Restoration of Degraded Lands in the Amazon Basin*, in *BIODIVERSITY* 328-32 (E.O. Wilson ed. 1986) (describing the myriad problems inherent in reforestation projects).

27. Taylor, *supra* note 21, at 143.

28. Salati & Vose, *Amazon Basin: A System in Equilibrium*, 225 *SCIENCE* 129-38 (1984).

29. *WORLD* 1986, *supra* note 8, at 71.

eases.<sup>30</sup> Other scientists contend that deforestation introduces more ozone into the atmosphere, produces acid rain and contributes to global warming or the greenhouse effect.<sup>31</sup> It is the last consequence of deforestation that is perhaps the most alarming.

### B. Global Warming

Since the Industrial Revolution, the emission of gases, especially carbon dioxide, has altered the world's atmosphere. Certain of these gases absorb infrared radiation reflected from the earth.<sup>32</sup> When the concentrations of these heat-absorbing gases increase so does the world's average temperature. The biggest offender is carbon dioxide or CO<sub>2</sub>. This gas is commonly introduced into the atmosphere when fossil fuels such as coal, oil, and natural gas are burned. Forests, such as the Amazon are also "vast storehouses" of carbon,<sup>33</sup> and when trees are burned, they release carbon into the atmosphere which exacerbates the greenhouse effect.<sup>34</sup>

In a 1971 study, scientist Harold Sioli calculated that each hectare in the Amazon basin contained 600 tons of organic matter and 300 tons of carbon.<sup>35</sup> Sioli also cautioned, that the release of

---

30. Deforestation is frequently a public health disaster. In recently deforested areas of Rodonia, for example, the incidence of malaria is 100%. Rich, *The Multilateral Development Banks, Environmental Policy, and the United States* 12 *Ecology L.Q.* 681, 695 (1985) [hereinafter *Multilateral Development*]. Other "Indian tribes are menaced with physical extermination from measles and influenza epidemics, and infant mortality rates of 50 and 25 percent have been reported in two recently contacted tribes." Rich, *The Politics of Tropical Deforestation in Latin America: The Role of the Public International Financial Institutions* (available from Environmental Defense Fund, Washington, D.C.).

31. Bunyard, *supra* note 24, at 125-34. Ozone introduced into the lower atmosphere and troposphere behaves as a greenhouse gas absorbing energy. Ozone in the much higher stratosphere serves as a global "sunscreen" blocking out ultraviolet radiation. Interview with William W. Kellog, Senior Scientist (Retired) of the National Center for Atmospheric Research, Boulder, Colorado, in Sante Fe, New Mexico (July 12, 1989).

32. Wirth, *Climate Chaos*, 74 *FOREIGN POL'Y*, Spring 1989, at 4. Methane is likewise increasing in the atmosphere and may rival CO<sub>2</sub> as the principal greenhouse gas early in the next century. "Sources of methane are not as clear as those of carbon dioxide, but release of natural gas, plus bacterial production in rice paddies and the stomachs of ruminants and termites are all contributing factors." W. Kellog, *Economic and Political Implications of Climate Change 2*, presented at the Conference on Technology-Based Confidence Building: Energy and Environment, at St. John's College, Sante Fe, N.M., July 9-14, 1989 (available from the Center for National Security Studies, Los Alamos National Laboratory).

33. Wirth, *supra* note 32, at 4.

34. *Id.* at 5.

35. Sioli, *REALIDADE*, Oct. 1971, at 146-49. Indeed, a Brazilian satellite analysis, *infra* note 43 and accompanying text, reports that in 1987, at least 580 million tons of emissions from Amazonian fires were released into the atmosphere. Setzer, *Relatorio de Atividades do Projeto IBDF-INPE "SEQUE"-Ano 1987*, at 43-45 (May 1988) (available from Instituto de



the carbon would have drastic effects on the earth's atmosphere.<sup>36</sup> Carbon dioxide released worldwide from the burning of rain forests adds about twenty percent to amounts released from fossil fuel combustion.<sup>37</sup>

The greenhouse effect could produce climatic dislocations of the first order if allowed to proceed unchecked. By the middle of the next century, it is predicted that average global temperatures may rise by three to seven degrees. This warming trend may adversely affect regions of agricultural productivity. More importantly, the increase in temperature will produce a thermal expansion of the oceans and begin to melt the polar ice caps. A corresponding rise in sea-level could inundate a number of coastal cities and seriously affect fifty percent of the world's population that inhabit coastal regions.<sup>38</sup> A recent study concludes that the world is already experiencing the grip of the pernicious warming trend.<sup>39</sup>

Some scientists suggest that large forests, such as the Amazon, if unmolested, can actually reverse the process of global warming. According to the Sioli study, the Amazon annually produces fifty percent of the oxygen added to the atmosphere and consumes about ten percent of its gaseous carbon through photosynthesis.<sup>40</sup> However, other scientists believe that the forest is not "the lungs of the world" and does not produce a significant net gain in oxygen. After evolving for thirty million years, the forests may be in a state of "dynamic equilibrium" and may not contribute much, if any, oxygen to the atmosphere. Instead, these scientists believe about ninety percent of the "vital gas" may come from fitoplankton growing on the ocean surface. Consequently, the destruction of the forest might not affect the supply of oxygen to the atmosphere.<sup>41</sup>

---

Pesquisas Espaciais, Sao Jose dos Campos, Brazil and World Resources Institute, Washington, D.C.).

36. Sioli, *supra* note 53, at 146-49.

37. NATIONAL ACADEMY OF ENGINEERS, INSTITUTE OF MEDICINE, *GLOBAL ENVIRONMENTAL CHANGE: RECOMMENDATIONS FOR PRESIDENT-ELECT GEORGE BUSH* 8 (1988). According to VEJA, the United States is responsible for 22.8 percent of all the carbon introduced into the atmosphere, and the Soviet Union is responsible for 18.8 percent. VEJA, *supra* note 7, at 68.

38. Wirth, *supra* note 32, at 7-9.

39. Houghton & Woodwell, *Global Climatic Change*, SCI. AM., Apr. 1989, at 36-37.

40. Sioli, *supra* note 35.

41. Grainger, *supra* note 6, at 49. The information concerning the fitoplankton is found in *Selva No Laboratorio*, VEJA, July 5, 1989, at 70.

## IV. THE SCOPE OF DESTRUCTION

Although estimates vary widely, deforestation in the Brazilian Amazon has occurred on a horrific scale. The Brazilian Institute for Forest Development (IBDF) estimated that from 1966 to 1975, 11,469,751 hectares were destroyed in the Amazon.<sup>42</sup> In 1978, with the help of LANDSAT satellite imaging, the IBDF estimated that by 1978 only 77,171 square kilometers of forest had disappeared.<sup>43</sup> A report by the World Resources Institute (WRI) in 1987 concluded that average annual deforestation in the 1980s was 2,323,000 hectares per annum.<sup>44</sup> However, the WRI statistics are somewhat misleading since they also include the removal of trees outside the Amazon. Moreover, by the WRI's own admission, the statistics are probably highly inaccurate. Deforestation figures for Brazil and other tropical countries are obtained from the United Nations Food and Agricultural Organization (FAO). The FAO, in turn, generates the statistics through a combination of scientific and non-scientific means. As one WRI expert noted, "A lot of guesswork goes on and sometimes [the FAO has] to rely on the estimates of the individual countries . . . ."<sup>45</sup> For example, in 1978, the Philippines claimed that forests covered fifty-seven percent of the islands. However, satellite photos revealed that forests covered only thirty-eight percent.<sup>46</sup>

Not surprisingly, the most recent evidence suggests that these figures vastly underestimate the actual damage. In March 1989, Marshal Tucker of NASA's Goddard Space Flight Center published a ten year analysis of satellite images of Rodonia, a state in the remote west of Brazil. Tucker found that more than six million acres of forest, an area the size of Vermont, had been razed in the four years since paved roads reached Rodonia.<sup>47</sup> He concluded, that at the present pace, "the exponential rate of increase in deforestation during 1975 to 1985 will lead, if maintained, to the disappearance of approximately fifty percent of the state's tropical for-

---

42. *Uma Devastação do tamanho do Amapá*, O ESTADO DE SÃO PAULO, Nov. 11, 1975, at 60.

43. Bunyard, *supra* note 24, at 125-26.

44. THE WORLD RESOURCES INSTITUTE AND THE INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT, WORLD RESOURCES 1988, 286 (1988) [hereinafter WORLD 1988].

45. Telephone interview with Richard Woodward at the World Resources Institute (Mar. 15, 1989). To their credit, the WRI is planning to revise these figures based on the information gleaned from satellite images. *Id.*

46. Grainger, *supra* note 6, at 6.

47. Waters, *Fall of the Rain Forest*, DISCOVER, Jan. 1989, at 40.

est by the early 1990s, and its complete disappearance by the year 2000."<sup>48</sup>

Tucker's figures were augmented by Alberto Setzer of the Brazilian Institute of Space Research. With the aid of the NOAA-9 meteorological satellite, Setzer found that a staggering eight million hectares of forest were burned in the Brazilian Amazon in 1987 alone.<sup>49</sup> At the state level, the percentages of areas burned in relation to the total area of the state varied from 18.7 percent in Rondonia to 0.1 percent in Amazonas. On some days, as many as 400,000 hectares were observed burning. The smoke from these holocausts frequently closed airports and disrupted ground and air transportation.<sup>50</sup> From this data, the Brazilian Institute for Environment and Renewable National Resources calculated that 5.1 percent of the forest was destroyed. Critics charge, however, that this figure was doctored for the benefit of the Brazilian government. The actual deforestation may be closer to 12 percent of the forested region.<sup>51</sup> This data, if accurate, also indicates a gross underestimate in worldwide rain forest destruction which was previously reported at 11.3 million hectares annually.<sup>52</sup>

## V. THE BRAZILIAN PERSPECTIVE

Many Brazilians either disagree with or ignore the findings of scientists concerning the deleterious effects of deforestation. For Brazilian politicians, military officers, and businessmen, the Amazon is not an eternal cornucopia of food, medicine, Indian culture, and natural beauty, nor does it have some effect on the world's climate. Rather, many believe the region is a vast bonanza that must be exploited for short-term benefits. Specifically, they argue

---

48. Malingreau & Tucker, *Large-Scale Deforestation in the Southeastern Amazon Basin of Brazil*, 17 *AMBIO* 49, 54 (1988).

49. Setzer, *supra* note 35, at 43.

50. *Id.* at 43-44.

51. Long, *Forest Ranger in Space: Satellite Monitors Burning of Amazon Jungle*, L.A. Times, July 31, 1989, § 2, at 3, col. 1.

52. Postel, *Halting Land Degradation*, Focus, Spring 1989, at 8. The World Resources Institute erroneously estimated that the annual average rate of deforestation in all of Latin America during the 1980s was only six million hectares per year. WORLD 1988, *supra* note 45, at 286. Most sources have very little idea how many hectares, acres, or square kilometers of rain forest vanish annually. For example, consider the imprecise figure offered by the Institute for Environment and Development estimating the deforestation of "under 10 to over 20 million hectares annually." R. CLARKE & L. TIMBERLAKE, STOCKHOLM PLUS TEN 28 (1982).

that the destruction of the forest serves important purposes.<sup>53</sup> First, clearing the region of trees provides land for small, self-sustaining farms, larger cattle ranches, and other forms of agribusiness. Second, the highly nationalistic Brazilian officer corps and numerous politicians contend that it is vital to national security to redistribute Brazil's historically coastal and landless poor population to the sparsely populated Amazon and link these "colonists" to the rest of the country with highways. Prior attempts to populate the jungle frontier, however, met with little success.<sup>54</sup> Presently, the population of the vast region is estimated at only nine million.<sup>55</sup>

Related to this notion of national security is the insecurity of Brazilian leaders who are fearful of an "international conspiracy" to take over the Amazon. For example, a grand hydroelectric scheme in the late 1960s was shelved following protests that the area would be "internationalized."<sup>56</sup> The plan called for the construction of an enormous dam across the Amazon river west of Santarem and a series of smaller dams across tributaries. Although Brazilian engineer E.P. Lopes originally developed the proposal, a group of Americans working for the Hudson Institute advanced the plan. The scheme was supposed to create cheap electrical power. However, some critics charged that its "economic justification was obscure."<sup>57</sup>

Former President Jose Sarney has likewise expressed concern that the Amazon will become a "Green Persian Gulf"<sup>58</sup> and proclaimed, "We will not accept tutelage."<sup>59</sup> This fear probably stems from earlier attempts by North Americans and Europeans to exploit the region for their benefit. Most Brazilians are aware of Henry Ford's ill-fated attempts to produce rubber and Daniel K. Ludwig's disastrous tree farm in the forest.<sup>60</sup>

---

53. For a useful summary of Brazilian attitudes and development in the region, see D. MAHAR, *FRONTIER DEVELOPMENT POLICY IN BRAZIL: A STUDY OF AMAZONIA* 1-30 (1979).

54. The army is currently building posts in frontier areas of the jungle with the idea of creating new settlements. *Brazil Agrees to Accept Aid to Save Rain Forests*, N.Y. Times, Feb. 5, 1989, § 1, at 3, col. 2.

55. Long, *BR-364: Road To Riches-or Ruin in Brazil*, L.A. Times, June 5, 1989, § 1, at 22, col. 1.

56. MAHAR, *supra* note 53, at 18. See also SKILLINGS, *supra* note 3, at 8.

57. MAHAR, *supra* note 53, at 18.

58. *Brazil's Debt Can Save the Amazon*, N.Y. Times, Feb. 3, 1989, at A30, col. 1.

59. For the comment on tutelage, see Sherrill, *A Dubious Plan for the Amazon*, TIME, Apr. 17, 1989, at 67.

60. For a history of international involvement in the region, see A.C. FERREIRA REIS, A

### A. *Development Plans*

As a result of perceived domestic imperatives, the Amazon has long been the subject of grand development dreams and environmentally disruptive policies. Private efforts to develop the region during Brazil's rubber boom in the late nineteenth century gave way to concerted public activity in the twentieth century.<sup>61</sup> During the first half of the twentieth century, the government concentrated on bolstering the sagging rubber trade with programs like the Rubber Support Plan which ran from 1912 to 1913 and the so-called Batalha da Borracha (Rubber Battle) Plan running from 1942 to 1947.<sup>62</sup>

In 1946, a new Brazilian constitution provided for long-term Amazonian development to be financed by a three percent share of total federal tax revenues collected over a period of twenty consecutive years.<sup>63</sup> An elaborate plan was eventually developed which called for the creation of a supervisory agency, SPVEA, to carry out objectives such as the promotion of agriculture, industry, mining, transportation, communications, energy, and social welfare. However, funding problems ensured that most of these objectives,

---

AMAZONIA E A COBICA INTERNACIONAL (5th ed., 1982). Two twentieth-century cases of foreign penetration are well known. In 1926, the Brazilian government granted the American automaker Henry Ford a 10,000 square kilometer concession near the Tapajos river for a vast rubber plantation. Workers on the "Fordlandia" estate planted 800,000 trees in the hopes that the project would be as successful as British and French rubber ventures in Indochina and Southeast Asia. Unfortunately, the trees contracted *dothidella ulei* or South American leaf disease and most perished. Undaunted, Ford established a new plantation 100 kilometers downstream called "Belterra." Two million trees were planted, and they quickly contracted the same blight. Agronomists in 1936 discovered that the trees could be saved with an expensive double grafting process. DAVIS, *supra* note 1, at 153-54. The plantation was finally sold to the Brazilian government for a paltry \$250,000 after an estimated loss to Ford of \$20,000,000. A. NEVINS, *FORD DECLINE AND REBIRTH 1933-1962*, 323 (1963). There is the more recent example of Daniel Keith Ludwig's ill-fated tree farming venture in Amapa. The eccentric billionaire purchased between 3.5 and 4 million acres of Amazon land lying on both sides of the Jari River for the cultivation of the Nigerian pulpwood *Gmelina arborea*. Ludwig insisted on substantial tax and customs exemptions for his project from the military dictator Castelo Branco, and many accounts claim he paid less than \$1 per acre for the property. The project proved to be an unmitigated disaster. By 1981, Ludwig invested \$1 billion in Jari without showing a profit. Moreover, his imperious management style and mistreatment of his workers infuriated Brazilian politicians and the public alike. The billionaire finally unloaded the "green elephant" on the Brazilian government and private investors in return for certain dividends if a profit was ever shown. J. SHIELDS, *THE INVISIBLE BILLIONAIRE DANIEL LUDWIG* 284-333 (1986).

61. For information on the "boom," see Melby, *Rubber River: An Account of the Rise and Collapse of the Amazon Boom*, 23 *HISPANIC AM. HIST. REV.* 452-69 (1942).

62. MAHAR, *supra* note 53, at 2-10.

63. CONSTITUIÇÃO FEDERAL [C.F.] art. 199 (Braz.).

especialy social welfare projects, were not realized. In fact, it seems that most of the federal money flowed to the moribund rubber industry.<sup>64</sup>

Following the *golpe* or coup of 1964, the military government initiated "Operation Amazonia."<sup>65</sup> A new national development agency for the Amazon, the Superintendency for Development of the Amazon (SUDAM), was also established to promote public and private activity in the region.<sup>66</sup> The keystone of Operation Amazonia was Law 5173 (October 27, 1966). Article 4 of this document stressed the creation of "development poles" (i.e., centers for import-substitution industrialization) and encouraged emigration to the sparsely populated region.<sup>67</sup> To achieve these aims, SUDAM supervised FIDAM, a credit account for private investors in the region. FIDAM was funded by a full one percent of federal revenues. Industries deemed of interest to the region were also eligible for generous tax reductions and in some cases exemption from import/export duties.<sup>68</sup>

From 1970 to 1975, the theme of national integration dominated development in the region. The Programa de Integração Nacional (PIN) was established by law in 1970.<sup>69</sup> PIN's centerpiece was the construction of the 15,000 kilometer Trans-Amazon highway to connect Amazonia with the Northeast and a north-south road linking the area with the South and Southeast. Government plans to resettle 70,000 families mostly from the Northeast along the highway were never realized. By 1980, only 8,000 families moved to the land near the highway and only forty percent of those were from the Northeast.<sup>70</sup>

The route chosen and the layout of the settlements was accomplished with little regard for fertility or topography. Indeed,

---

64. MAHAR, *supra* note 53, at 2-10. The constitution was drafted following the collapse of the populist dictatorship of Getulio Vargas and promulgated on September 18, 1946. It was designed to circumscribe the powers of the president by strengthening the other branches of the government and giving the military the responsibility to "defend the country and guarantee the constitutional powers and law and order." E. BRADFORD BURNS, A HISTORY OF BRAZIL 442 (1980).

65. Giamo, *Deforestation in Brazil: Domestic Political Imperative-Global Ecological Disaster*, 18 Env'tl. L. Rep. (Env'tl. L. Inst.) 537 (1988).

66. Mahar, *supra* note 53, at 12.

67. *Id.*

68. *Id.* at 10-11.

69. D. MAHAR, GOVERNMENT POLICIES AND DEFORESTATION IN BRAZIL'S AMAZON REGION 23 (1988)[hereinafter GOVERNMENT POLICIES].

70. MAHAR, *supra* note 53, at 25-26.

only about three percent of the soils along the highway were fertile.<sup>71</sup> The removal of the trees and the arrival of the rains likewise created a nursery for the pernicious *anopheles* mosquito (the principle carrier of malaria). In the early 1970s, an estimated twenty percent of the colonists were infected with the disease.<sup>72</sup>

The relative isolation of the settlements engendered other difficulties. The colonists had to pay steep prices for fertilizers and pesticides shipped hundreds or even thousands of miles. Transportation costs also boosted the price of their surplus crops and put them at a competitive disadvantage with producers who were closer to the major markets on the coast.<sup>73</sup>

From 1975 to 1979, the POLAMAZONIA project, administered by SUDAM, and the superintendency for the Development of the Center West Region (SUDECO) sought to create a "more favorable investment climate," by encouraging cattle-ranching and other agribusiness. The project also concentrated on developing the infrastructure for the extraction of iron ore from the Serra dos Carajas mines in Para.<sup>74</sup> In 1967, geologists from United States Steel Corporation discovered an enormous deposit of iron (160,000 hectares) in the region.<sup>75</sup> The company quickly received a concession from the government and also formed joint ventures, apparently to circumvent Brazilian laws limiting investments by foreigners.<sup>76</sup> Later prospecting in the region has uncovered copper, bauxite, manganese, and some gold.<sup>77</sup>

Finally, the 1980s have been dominated by the Northwest Development Program or POLONOROESTE. This plan is concerned with the construction of a 1500-kilometer highway from Cuiaba through the state of Rondonia to Porto Velho. As with the Trans-Amazon, the government encouraged colonization along the road in an area of the forest three-quarters the size of France.<sup>78</sup> From 1980 to 1987, the population in Rondonia grew fourteen percent annually

---

71. *Id.* at 27.

72. *Id.*

73. *Id.*

74. *Id.* THE WORLD BANK, BRAZIL: INTEGRATED DEVELOPMENT OF THE NORTHWEST FRONTIER i-vi, 1-3 (1981) [hereinafter NORTHWEST FRONTIER].

75. Thayer, *The Carajas Iron Ore Project - A Boost to Amazon Development*, BRAZILIAN BUSINESS, Aug. 1972, at 13-14.

76. *Behind the Scene in Carajas: The Geological Picture and Details of the Iron Ore Discovery*, ENGINEERING & MINING J., Nov. 1975, at 151-52.

77. GOVERNMENT POLICIES, *supra* note 69, at 41.

78. NORTHWEST FRONTIER, *supra* note 74, at 7.

and by 1987, approximately 1.2 million people lived in the state.<sup>79</sup>

Associated with these grand schemes are the Brazilian laws that actually encourage deforestation. The government has largely exempted agriculture from taxation. Additionally, improved land and land used for crops or pastures are subject to lower property taxes. In fact, in the state of Rondonia, only half of the land owners actually paid rural property taxes, and for those who did pay, their payments averaged only five dollars.<sup>80</sup> Agrarian reform has also contributed to the problem. Squatters can claim up to 3,000 hectares and can claim even more by filing applications in the names of relatives. Moreover, given the country's fiscal crisis indicated by a 933 percent Inflation in 1988, virtually no one saves money, and Brazilians find investing in cheap Amazon land very attractive.<sup>81</sup>

These schemes probably helped to integrate the historically remote Amazon into the Brazilian nation state and led to economic development in the region. Nevertheless, the construction of roads, colonization, cattle ranching/agribusiness, lumbering, mining, and other enterprises emphasizing quick returns on investment capital have contributed to extensive and potentially catastrophic deforestation. One study from 1980 estimated "that road construction is responsible for twenty-six percent of deforestation in the Amazon, small farming and colonization for thirty-one percent, lumbering (the clearing of trees for sale) for only four percent, and agribusiness and cattle ranching for thirty-eight percent."<sup>82</sup> Cattle ranching is also the least cost-effective use because raising one million dollars worth of cattle for market requires the destruction of one hundred square kilometers of forest. In comparison, extracting one million dollars worth of rubber destroys only 6.8 square kilometers of forest.<sup>83</sup>

---

79. GOVERNMENT POLICIES, *supra* note 69, at 35.

80. The ridiculously low figure of \$5.00 is found in GOVERNMENT POLICIES, *supra* note 69, at 39.

81. *How Brazil Subsidizes the Destruction of the Amazon*, THE ECONOMIST, Mar. 18, 1989, at 69.

82. Grainger, *supra* note 6, at 6, 11-13. These figures should probably be revised in light of developments in the mining and power sectors. When not sold as timber, the trees are usually cut with chain saws and then the trunks are burned. However, a number of reports surfaced in the early 1970s that the Brazilians were also using dioxin-based chemical defoliants to destroy the trees. See Venhecke, *Taming Brazil's Wild West*, ATLAS WORLD PRESS REV., July 1975, at 15-19; *Journal do Brasil* (May 19, 1974). The VEJA comparisons are found at *supra* note 7, at 90.

83. VEJA, *supra* note 7, at 90. Brazil is Latin America's leading producer and exporter of beef. The U.S.D.A. reports that in 1986 and 1987 Brazil produced 4,300,000 metric tons of



### B. *Environmentalists*

According to the current Brazilian Ambassador to the United States, Marcilio Marques Moreira, one should not imagine that all Brazilians want to burn their future.<sup>84</sup> Brazil's press is beginning to call for the protection of the rain forest. One of the country's most popular weekly magazines, *Veja*, devoted nearly an entire issue to the problems of deforestation.<sup>85</sup> In addition, there is an extremely vocal minority willing to challenge the environmental policies of the government, sometimes at considerable peril to themselves. A strong example of this minority is agricultural engineer Jose A. Lutzenberger,<sup>86</sup> one of Brazil's best known environmentalists and defenders of the Amazon.

Other private organizations exist that are concerned with the protection of the Amazon rain forest. The Foundation for Nature (FUNATURA) concerns itself with the public policy aspects of deforestation and plans to target members of the Brazilian Constitutional Assembly and state lawmakers with deforestation seminars and workshops.<sup>87</sup> The Society for the Protection of Natural Resources (SOPREN) with its headquarters in Belem, promotes excursions to the forest and has participated in television programs advocating the region's preservation.<sup>88</sup> The National Campaign for the Defense and Development of the Amazon (CNDDA) is the old-

---

beef and veal. Exports of all meat including pork totalled 1,155,000 tons for the years 1985-87. U.S. DEP'T OF AGRICULTURE, 1988 AGRICULTURAL STATISTICS 301, 304 (1988). Then too, activities like cattle ranching discourage the equitable distribution of land. In Brazil, 70 percent of rural households lack enough land to support themselves. A. Riding, *The Struggle for Land in Latin America*, N.Y. Times, Mar. 26, 1989, § 4, at 1, col. 1.

84. Moreira, *Don't Imagine Brazil Wants to Burn Its Future*, N.Y. Times, Feb. 18, 1989, at 28, col. 3.

85. *VEJA*, *supra* note 7.

86. "Lutz," as he is called by his friends, is playing the same role in Brazil today as Rachel Carson played in the United States in the early 1960s. It might be more accurate to say that he is the combined Rachel Carson, Paul Ehrlich, Amory Lovins, and David Brower of Brazil because he fights pesticides, overpopulation, energy waste, and nuclear power. In addition, he founded Brazil's strongest association for protection of the environment, AGAPAN. *Environmental Struggles in Brazil: An Interview with Jose Lutzenberger, Brazil's Leading Environmentalist*, 30 BUS. & SOC'Y REV. 53-59 (1981). AGAPAN is the Portuguese acronym for the Gaucho Association for the Protection of the Environment. O. VALVERDE & TACITO LIVO REIS DE FREITAS, O PROBLEMA FLORESTAL DA AMAZONIA 50-53 (1980).

87. FUNATURA's contributions are mentioned in WORLD WILDLIFE FUND, TROPICAL FORESTRY PROGRAM, Program Design and Description of Ongoing Projects, Policy Research §2 (January 1989) [hereinafter TROPICAL FORESTRY PROGRAM] (available from The Conservation Foundation in Washington, D.C.).

88. O. VALVERDE & TACITO LIVO REIS DE FREITAS, *supra* note 86.

est of the organizations. Established in 1968 the Campaign sponsored numerous panels and conferences and publishes its own journal, *The Brazilian Amazon in Focus* (*A Amazônia Brasileira em Foco*).<sup>89</sup>

Finally, there is the recently established Virgin Forest Foundation (Fundação Mata Virgem). This Brazilian non-profit corporation was created to make the Amazon rain forest a vast preserve. Its president Jean Pierree-Dutilleux, is a Belgian filmmaker and photographer who won an academy award for his documentary, "Raoni," named after the chief of the Megkronotis tribe of the Kayapo.<sup>90</sup> The tribal chief approached Dutilleux seeking his help in raising public concern for the protection of the rain forest and the preservation of Indian culture. Dutilleux, Raoni, and rock musician Sting are currently involved in efforts to raise \$3.5 million for the foundation.<sup>91</sup> Unfortunately, these Brazilian non-governmental organizations (NGOs) are underfunded and understaffed. AGAPAN, frequently described as "Brazil's strongest association for the protection of the environment," has only 600 members and operates within the one state of Rio Grande do Sul.<sup>92</sup>

More importantly, two recent tragic incidents underscore public and private opposition to the environmental movement in Brazil. Francisco Mendes Filho was a rubber tapper in his home state of Acre and had helped to unionize other rubber tappers and ranch hands in the area. Realizing that the destruction of the trees destroyed not only his livelihood but jeopardized the future of the entire region, Mendes resisted efforts to burn the forest for cattle pasture. He traveled to Washington, D.C. to argue against funding by the Inter-American Bank for a road extension through Acre. Mendes was instrumental in blocking funding for the project, yet his high visibility proved to be a liability. On December 22, 1988, Francisco Mendes Filho was assassinated by cattle ranchers whose destructive activities in the forest he had bravely opposed.<sup>93</sup>

---

89. *Id.* at 51-53.

90. Hogue, *Indians and Whites Still at War in Brazil's Interior*, N.Y. Times, Oct. 6, 1980, at 1, col. 1.

91. Amar, *Environmentalists Band Together to Heal Planet*, Daily Bruin, May 16, 1989, at 1, col. 1 (UCLA newspaper).

92. Telephone interview with Oswaldo Valdez of AGAPAN, in Porto Alegre (May 10, 1989). For purposes of comparison, the World Wildlife Fund has 23 national organizations around the world and over one million regular supporters. WWF, *supra* note 10, at 25.

93. Cousteau, *Environmentalists Pay With His Life*, L.A. Times, Mar. 12, 1989, at 16. See also *Murder in the Amazon* (PBS television broadcast, Apr. 11, 1989).

In October of 1988, Dr. Darrell Posey, an American anthropologist and biologist who had been working in the Brazilian Amazon, traveled to Washington, D.C. with two Kayapo Indian leaders in an effort to convince officials in the State Department, the Treasury Department, and the World Bank to stop funding hydroelectric projects that were destroying millions of square kilometers of forest. After their return to Brazil, Posey and the Indians were arrested under the Brazilian Foreign Sedition Act.<sup>94</sup> This obscure law forbids foreigners from interfering with internal Brazilian policy. The fact that the Kayapo were the "original" Brazilians seems to have been lost on authorities. Moreover, when Kayapo leader Kube-i appeared in a Belem court to make a statement, the judge refused to admit him because he was not "acculturated" (i.e., he was not wearing a suit). The same judge ordered psychiatric examinations to determine the extent of this resistance to "acculturation." If convicted, the trio face up to three years in prison and possible expulsion.<sup>95</sup>

## VI. BRAZILIAN LAW

A survey of Brazilian environmental law reveals a long-standing legal concern for the nation's natural patrimony. Indeed, protection of the Amazon has been elevated to a constitutional guarantee. Still, as discussed earlier, the mere existence of laws does not ensure that the laws will be enforced. Brazil's efforts to preserve the rain forest leave much to be desired.

### *A. The Brazilian Constitution and Environmental Protection*

On May 25, 1988, the Brazilian Constitutional Assembly adopted an entire chapter on environmental protection.<sup>96</sup> The chapter begins with Article 225 which declares that "everyone has the right to an ecologically balanced environment for the common welfare of the people."<sup>97</sup> Under the chapter, the public power is charged with preserving and restoring essential ecological processes

---

94. Lei No. 6815, art. 124, 44 COLETÂNEA DE LEGISLAÇÃO [COLETÂNEA] 404 (lex 1980).

95. R. Chepesiuk, *The Amazon In Conflict*, 7 J. DEF. & DIPL., Feb.-Mar. 1989, at 53-55. See also *No Shirts, No Shoes, No Justice*, 14 GREENPEACE, Jan.-Feb. 1989, at 5.

96. CONSTITUIÇÃO FEDERAL [C.F.] Capítulo VI, art. 225 (Braz.).

97. *Id.*

and the country's genetic integrity and diversity.<sup>98</sup> It is likewise responsible for controlling the production, commercialization, and employment of techniques, methods, and substances that pose a risk to life, the quality of life, and the environment.<sup>99</sup> In keeping with these broad mandates, environmental impact reports for "work that is a potential cause of significant environmental degradation" are required.<sup>100</sup> Moreover, those whose "conduct and activity is considered injurious to the environment . . . will be subject to penal and administration actions independent of their obligation to restore the damage they have caused."<sup>101</sup> Environmental education at all levels is also to be promoted.<sup>102</sup> Most importantly, the new constitution gives national endowment status to the Amazon forest.<sup>103</sup>

Although some observers criticized the Assembly for not including a passage that would have recognized "crimes against the environment," others like Jose Lizarraga, the United Nation's top Latin American official for environmental affairs praised the chapter as the world's most advanced legislation on environmental protection.<sup>104</sup>

The chapter itself like all important works of legislation did not arise *ex nihilo* but reflects an evolving international environmental consensus. Article 225 calls for the preservation of the environment as an individual right: "Everyone has the right to an ecologically balanced environment" ("Todos tem direito ao meio ambiente ecologicamente equilibrado").<sup>105</sup> This wording is essentially a paraphrasing of similar articles in the Portuguese Constitution of 1976<sup>106</sup> and the Spanish Constitution of 1978.<sup>107</sup> Likewise, the right to environmental information which appears in the new Brazilian Constitution in article 225 appeared 14 years earlier in

---

98. *Id.* § 1, I, II.

99. *Id.* § 1, V.

100. *Id.* § 1, IV.

101. *Id.* § 3.

102. *Id.* § 1, VI.

103. "The Brazilian Amazon forest, the Mata Atlantica, the Serra do Mar, the Patanal, and the Coastal Zone are national patrimony, and their utilization will be according to law, within conditions that assure the preservation of the environment and also with respect to the use of natural resources." *Id.* § 5.

104. *Comprehensive Measure Adopted Signaling Change in Approach to Environmental Issues*, 11 Int'l Env't Rep. (BNA) No. 6, at 316-317 (June 8, 1988).

105. CONSTITUIÇÃO FEDERAL [C.F.] Capitulo VI, art. 225 (Braz.).

106. CONSTITUIÇÃO DA REPUBLICA PORTUGUESA Capitulo 11, art. 66 (Port.).

107. CONSTITUCION ESPAÑOLA Capitulo 111, art. 45 (Spain).

the Yugoslavian Constitution of 1974<sup>108</sup> and again in the Spanish Constitution of 1978 in article 124.<sup>109</sup>

The new constitution is also the successor to numerous previous Brazilian constitutions which sought to protect the environment. The Imperial Constitution of 1824 only prohibited industries which posed a significant threat to the health of citizens.<sup>110</sup> The Constitution of 1934 went further "dispensing protection on natural beauty and on Brazil's historical, artistic, and cultural patrimony."<sup>111</sup> The federal government was given jurisdiction over sub-surface resources, fishing, hunting, and significantly, Brazil's forests.<sup>112</sup> The Constitution of 1937 was similarly concerned with the protection of natural, historical, and artistic monuments. However, article 18 of that constitution called for the protection of livestock and plants from disease and other harmful agents.<sup>113</sup> The Constitution of 1946 was more or less indistinguishable from its predecessor with one important addition. It gave citizens "popular action", the right to have government action injurious to the environment declared void.<sup>114</sup> There is no evidence that this provision was ever exercised.<sup>115</sup>

The Constitution of 1967 maintained the "necessity of preserving the environment" and assigned to the national government the power to legislate on general matters of health, hunting, fishing, mining, and water.<sup>116</sup> In 1969, a timorous provision was inserted providing that proprietors who misuse their land might be impeded from receiving government benefits.<sup>117</sup>

Throughout the documents, common themes emerge. For example, since 1934, all the constitutions have called for the preservation of the natural patrimony perceived as part of a sacred pub-

---

108. USTAV SOCIJALISTIČKE FEDERATIVNE REPUBLIKE JUGOSLAVIJE (Constitution Socialist Federal Republic Yugoslavia).

109. Mello de Camargo Ferraz, Milare, Mazzilli, *O Ministério Público e a questão ambiental no Constituição*, 294 REVISTA FORENSE 155-57 (1986) [hereinafter Mazzilli].

110. CONSTITUIÇÃO POLITICA DO IMPERIO DO BRASIL art. 1789 (Braz.).

111. CONSTITUIÇÃO DA REPÚBLICA DOS ESTADOS UNIDOS DO BRASIL arts. 10, 111, 148 (Braz.).

112. *Id.* art. 5.

113. CONSTITUIÇÃO DOS ESTADOS UNIDOS DO BRASIL art. 18 (Braz.).

114. CONSTITUIÇÃO DOS ESTADOS UNIDOS DO BRASIL (Braz.).

115. In 1965 the National legislature passed law number 4717 which implemented the public action provision of the 1946 Constitution. There is no evidence, however, that this law was ever utilized to impede Amazonian deforestation. Giamo, *supra* note 65, at 553.

116. CONSTITUIÇÃO DO BRASIL (Braz.).

117. Mazzilli, *supra* note 109.

lic domain. Nevertheless, protection of the Amazon was never underscored until the promulgation of the 1988 constitution. It is still too early to gauge the impact of elevating the protection of the forest to constitutional status; however, given Brazil's poor record in environmental protection, it seems that the language of the new constitution will remain largely symbolic.

### B. Statutory Law

Brazilian legislation aimed at the responsible management of forests is not a recent phenomenon. Both the Vargas regime in 1934 and the military dictatorship in 1967 promulgated forestry codes.<sup>118</sup> Both codes classified forests into different categories for exploitation, called for the creation of new national parks, required the hiring of rangers and other inspectors, and provided severe penalties for "infractions" committed against the forest. Neither code, however, provided for the financing of these activities. Recognizing the inadequacy of these aspirational codes, in 1978, the federal government created an interministerial group (Grupo de Trabalho Interministerial), whose purpose was the drafting of a master plan for the Amazon to be submitted to the legislature.<sup>119</sup> The final document called for the preservation of the indian tribes and the creation of biological reserves, stations, and parks covering an area of fifty million hectares.<sup>120</sup> The so-called fifty percent rule, intended to prevent deforestation, has proven largely ineffectual. This legislation prohibits landowners from clearing more than half of their holdings in the forest. If enforced, the statute carries a fine of \$1,000, an enormous sum for the small farmer.<sup>121</sup> However, owners and authorities have ignored the laws. In Rondonia, for example, some settlers have cleared a full ninety percent of their property.

General environmental legislation first appeared in the 1940s. The old Brazilian penal law promulgated in 1940 was of limited scope since it only authorized prosecution where the damage to the environment substantially affected public health (e.g., in cases of the poisoning or pollution of drinking water). Although the code of 1969 represented the first instance in Brazilian law that air pollu-

---

118. CÓDIGO FLORESTAL 1934 (available in the New York Library Botanical Garden); CÓDIGO FLORESTAL 1967 (available in the U.S. Library of Congress, Washington, D.C.).

119. O. VALVERDE & TACITO LIVO REIS DE FREITAS, *supra* note 86.

120. *Id.*

121. GOVERNMENT POLICIES, *supra* note 69, at 35.

tion was singled out as an offense, it was not an improvement over its predecessors, as it never entered into force.<sup>122</sup>

The Brazilian environmental law of 1981 like the 1969 penal code has been ineffective. For example, polluters were to be fined between \$7 and \$7,000 for violations. As of 1984, the maximum penalty was never imposed, and most firms find it cheaper to pay the nominal penalties than to institute control measures.<sup>123</sup>

### C. *The Environmental Bureaucracy*

Brazil is not bereft of government organs responsible for the protection of the environment and particularly, with the preservation of the rain forest.<sup>124</sup> The major institution for implementing forestry policies is the National Institute of Forestry Development (IBDF). Established in 1967, as a semi-autonomous organization connected with the Department of Agriculture, the IBDF is responsible for conservation and reforestation in the Brazilian national parks.<sup>125</sup>

Another agency involved with forestry matters is the special Secretariat for the Environment (SEMA) in the Ministry of the Interior. SEMA was established in 1973 to monitor Brazil's use of natural resources and the environment. Thus far, the agency has created a 266,000 hectare ecological preserve to study the flora and fauna of the region. Federal environmental agencies, especially the IBDF, however, are widely perceived as weak institutions.<sup>126</sup> Even the Brazilian ambassador to the United States acknowledges that these "national agencies lack sufficient means and work under very difficult conditions."<sup>127</sup> For example, Brazil has approximately 400 forest guards to protect 15 million hectares of national park

---

122. Paulo José da Costa Junior, *Direito Penal Ecologico*, 77 REVISTA DA FACULDADE DE DIREITO 123, 128 (Jan.-Dec. 1982).

123. *Reform Would Provide Criminal Sanctions for Those Who Violate Environmental Laws*, INT'L ENV'T REP. (BNA) No. 8, at 252 (Aug. 8, 1984). The Brazilian situation reminds one of Montesquieu's comment, "quand je vais dans un pays, je n'examine pas s'il y a des bonnes lois, mais si on execute celles qui y sont, car il y a des bonnes lois parthout." MONTESQUIEU, "NOTES SUR L'ANGLETERRE," QUEVRES COMPLETES 331, 332 (Editions du Seuil 1964).

124. For a comprehensive discussion of Brazilian environmental legislation and the environmental bureaucracy, see PAULO AFFONSO LEME MACHADO, *DIREITO AMBIENTAL BRASILEIRO* 9-18 (1982).

125. NORTHWEST FRONTIER, *supra* note 74, at 45.

126. *Id.*

127. Moreira, *supra* note 84.

land.<sup>128</sup> Moreover, in the entire country there is not one airplane to combat forest fires.<sup>129</sup>

Apparently in response to international criticism of the Brazilian environmental regime, President Sarney outlined a plan called *Nossa Natureza* (Our Nature). The plan involved (1) zoning the Amazon for agriculture, mining, and other uses funded in part by the FAO, (2) a temporary suspension of raw timber exports, (3) creating seven million acres of new national park land, and (4) aiming studies at the expansion of Indian reserves. Sarney planned to spend \$350 million on the project in its first two years.<sup>130</sup> However, detractors are lining up to assail the initiative. The budget would be overseen by a council controlled by the military and administered by the "usual ineffective or corrupt federal bureaucracies."<sup>131</sup>

On balance, Brazilian law has proven remarkably ineffectual as an instrument of rain forest conservation. Although the constitutional status of the region gives some cause for hope, the continuing attempts by those in power to develop and integrate the region and the limited budgets of government environmental agencies charged with the protection of the forest suggest that deforestation will continue on its accelerated course.

## VII. INTERNATIONAL ENVIRONMENTAL LAW

Because the destruction of the Amazon rain forest may have

---

128. Memorandum to Senator Gore, Senator Heinz, and Senator Kasten from Timothy Wirth (Mar. 16, 1989) (summarizing March 1, 1989 meeting with Barber Conable, World Bank President) (available from the University of Miami Inter-American Law Review, Coral Gables, Florida). In addition to fazendeiros (ranchers) and their pistoleros (gunmen) opposed to conservation efforts, these rangers are likely to face drug traffickers. The U.S. State Department believes that the Amazon is the next narcotics "frontier" and that traffickers in neighboring countries are likely to cross the border. Brazil produces the continent's only ether (a necessary ingredient in cocaine production), as well as *epadu*, a local variety of coca. Its quality is lower than that of other cocas but it can be produced in vast amounts. Smith, *Ingenuity of Drug Lords on the Rise*, L.A. Times, Apr. 14, 1989, at 1, col. 1. The fifteen million figure is from Burley, *The Tropical Forestry Action Plan: Recent Progress and New Initiatives* in BIODIVERSITY 403 (E.O. Wilson ed. 1986). Another source reported in 1983 that there were 87,644 square kilometers of parks and other preserves in the country. SUTTON, WHITMORE & CHADWICK, TROPICAL RAIN FOREST ECOLOGY AND MANAGEMENT 418 (1983).

129. The non-existent plans are mentioned in *Many Fires Ravage Brazil's Coastal Jungles*, N.Y. Times, Mar. 7, 1989, at 5, col. 1.

130. Sherrill, *supra* note 59, at 67.

131. Hecht & Cockburn, *Lands Trees and Justice: Defenders of the Amazon*, THE NATION, May 22, 1989, at 696.



international effects, it is prudent to survey the applicable rules of international law. In the twentieth century, a corpus of international customary law has emerged to encourage the responsible utilization of natural resources. These explicit or implicit guidelines have sought to promote trade among nations while discouraging pollution and other global environmental problems.

### A. Case Law

The modern body of environmental jurisprudence is founded on a fundamental tenet of the ancient Roman legal tradition: *sic utere tuo ut alienum non laedas* or use your own property in such a manner as not to injure that of another.<sup>132</sup> The *Trail Smelter*<sup>133</sup> and *Corfu Channel*<sup>134</sup> cases are evidence that this basic principle exists today. In *Trail Smelter*, a Canadian smelter emitted sulfur dioxide fumes which allegedly caused damage to livestock, crops, and other property in the United States. The arbitral tribunal held that under international law, Canada was responsible for the conduct of the Smelter company.<sup>135</sup> It stated:

No State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein; when the case is of serious consequence and the injury is established by clear and convincing evidence.<sup>136</sup>

Likewise, in the famous *Corfu Channel Case*, the International Court of Justice declared, "Every State is bound to take preventive measures to forestall the execution in its territory of criminal or prejudicial acts to the detriment of other States or of their nationals. . . ."<sup>137</sup>

### B. United Nations Activities

The United Nations provides a more comprehensive source of

---

132. 9 ENCYCLOPEDIA OF INTERNATIONAL LAW 125 (1986).

133. *Trail Smelter Case* (U.S. v. Can.), 3 R. Int'l Arb. Awards 1905 (1938 & 1941).

134. *Corfu Channel Case* (U.K. v. Alb.), 1949 I.C.J. 4. The case arose out of the mining of British warships in the Corfu Channel off of the Albanian coast. The ships suffered extensive damage and a number of sailors were killed. *Id.*

135. *Trail Smelter*, 3 R. Int'l Arb. Awards at 1965. See also *Affaire du Lac Lanoux* (Spain v. Fr.), 12 R. Int'l Arb. Awards 281 (1957).

136. *Trail Smelter*, 3 R. Int'l Arb. Awards at 1965.

137. *Corfu Channel*, 1949 I.C.J. at 44 (Individual opinion by Judge Alvarez).

law for international environmental problems than individual case law. In 1972, the United Nations Conference on the Human Environment held in Stockholm adopted two principles. Principle 21 affirms a nation's rights to exploit its own resources providing that such exploitation does not damage the environment of other nations. Principle 22 requires that "[s]tates shall cooperate to develop further the international law regarding liability and compensation for the victims of pollution and other environmental damage caused by activities within the jurisdiction or control of such States to areas beyond their jurisdiction."<sup>138</sup>

Commentators have observed that Principle 21 suffers from a fundamental tension. This stems from the dual function of the principle:

On the one hand, states have a sovereign right to decide policies for the management, development, allocation, distribution, and other matters of exploitation of their own resources; . . . they also have the correlative duty to ensure that the resultant activities do not injure the environmental interests of others or common environmental interests."<sup>139</sup>

Arguably, Principle 20 imposes a duty on nations to notify other countries of activities that may have a negative impact on the environments of other countries. Principle 20, drafted at the Stockholm conference, reads:

Relevant information must be supplied by States on activities or developments within their jurisdiction or under their control whenever they believe, or have reason to believe, that such information is needed to avoid the risk of significant adverse effects on the environment in areas beyond their national jurisdiction.<sup>140</sup>

This first proposal, however, was shelved by the Brazilian delegation. They argued that "[no] state is obliged to supply information

---

138. *Draft Declaration on Human Environment*, U.N. Doc. A/Conf.48/4, Annex, para. 20, at 4 [hereinafter *Draft Declaration*].

139. J. SCHNEIDER, *WORLD PUBLIC ORDER OF THE ENVIRONMENT: TOWARDS AN INTERNATIONAL ECOLOGICAL LAW AND ORGANIZATION* 21 (1979). Principle 21 was updated by the international community in 1979 when the United Nations General Assembly adopted a set of principles entitled "The Conservation and Harmonious Utilization of Natural Resources Shared by Two or More States" for the formation of bilateral or multilateral conventions. *THE WORLD RESOURCES INSTITUTE AND THE INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT*, *WORLD RESOURCES* 1987, 181-82 [hereinafter *WORLD* 1987].

140. *Draft Declaration*, *supra* note 138, at 4.

under conditions that in its founded judgment, may jeopardize its national security, economic development or its national efforts to improve environment."<sup>141</sup> During the conference, Brazil conducted feasibility studies on whether to construct a hydroelectric facility on the Parana River. Argentina feared such a facility might cause floods or other environmental damage and sought consultations with its larger neighbor.<sup>142</sup> Their dispute focused on the strength of the duty to warn as proposed in draft Principle 20. As a compromise, a substantially weakened proposal was eventually adopted by the United Nations General Assembly. This solution proved to be unsatisfactory, and two years later the United Nations General Assembly adopted the Charter of Economic Rights and Duties of States. It requires:

co-operation between States in the field of the environment, including co-operation towards the implementation of principles . . . on the Human Environment, will be effectively achieved if official and public knowledge is provided of the technical data relating to the work to be carried out by states within their national jurisdiction, with a view to avoiding significant harm that may occur in the environment of the adjacent area.<sup>143</sup>

The United Nations World Charter for Nature is another source of international environmental law.<sup>144</sup> Its preamble sets forth the major theme of the document: "Lasting benefits from nature depend upon the maintenance of essential ecological processes and life support systems and upon the diversity of life forms, which are jeopardized through excessive exploitation and habitat destruction by man."<sup>145</sup> Article 7 requires that "[i]n the planning and implementation of social and economic development activities, due account shall be taken of the fact that the conservation of nature is an integral part of those activities."<sup>146</sup> Article 9 requires that "[t]he allocation of areas of the earth to various uses shall be planned, and due account shall be taken of the physical constraints, the biological productivity and diversity of the natural

---

141. J. SCHNEIDER, *supra* note 139, at 159.

142. *Id.*

143. *Id.* at 160.

144. *World Charter for Nature*, G.A. Res. 7, 36 U.N. GAOR Supp. (No. 51) at 17, U.N. Doc. A/51 (1982), reprinted in Wood, *The United Nations World Charter For Nature: The Developing Nation's Initiative to Establish Protections for the Environment*, 12 *ECOLOGICAL* L.Q. 977 (1985).

145. *Id.*

146. *Id.* at 993.

beauty of the areas concerned.<sup>147</sup> Finally, Article 11(b) requires that "[a]ctivities which are likely to pose a significant risk to nature shall be preceded by an exhaustive examination, their proponents shall demonstrate that expected benefits outweigh potential damage to nature, and where potential adverse effects are not fully understood, the activities should not proceed."<sup>148</sup>

### C. *Regional Conventional International Law*

In the field of environmental protection, international law as derived from custom and United Nations resolutions, may be inadequate instruments because they necessarily set forth general principles. Regional treaties, on the other hand, allow states to formulate obligations with specificity and frequently provide forums for dispute resolution. However, the only regional treaty of significance regarding Brazil's deforestation is the Treaty for Amazonian Cooperation signed by the eight countries whose territory includes part of the Amazon Basin: Bolivia, Brazil, Colombia, Peru, Ecuador, Guyana, Surinam, and Venezuela.<sup>149</sup> Like United Nations resolutions, the treaty is aspirational in tone and has justly been characterized as a "lengthy and detailed agreement to agree."<sup>150</sup> Before formal negotiations, the Brazilians convinced other signatories that the convention would be useful for national security purposes and for discouraging internationalization of the region. The treaty provides for scientific and technical exchanges and underscores the need to "maintain the ecological balance within the region and preserve the species" in an annual conservation report. These provisions, however, can be juxtaposed with Article VI in which the parties agree that "the exclusive use and utilization of natural resources within their respective territories is a right inherent in the sovereignty of each state."<sup>151</sup> The pact does not provide for the protection of indigenous peoples nor does it disturb domestic regulations aimed at natural resources.

On balance, the decisions of international tribunals, the activities of the United Nations, and the one regional pact of significance suggest a formulation requiring liability for actual damage,

---

147. *Id.*

148. *Id.* at 994.

149. Treaty for Amazonian Cooperation, July 3, 1978, 17 I.L.M. 1045.

150. 9 ENCYCLOPEDIA OF INTERNATIONAL LAW 355, 358 (1986).

151. *Id.*

as well a duty to warn other countries of reasonably foreseeable environmental consequences. Still, as a solution to the problem of deforestation, international law remains problematic. United Nations activity in the environmental area can be cited as evidence of customary international law and can serve as a source of moral persuasion. However, it does not have independently binding force.<sup>152</sup> For example, Brazil's emphasis on national sovereignty and its refusal to provide "notification" in the face of its environmentally detrimental projects strongly suggests that it will not accept the jurisdiction of international tribunals nor will Brazil apply the precedents of *Trail Smelter* or *Corfu Channel* in its municipal courts.<sup>153</sup>

### VIII. GLOBAL EFFORTS

Conventional international law has also created international organizations designed to protect the environment. A number of these institutions work to preserve rain forests throughout the world. However, their efforts have been hampered by the competing commercial interests of their members, their relative immaturity, and limited funding.

#### A. UNEP

Established in 1972, the United Nations Environmental Program (UNEP) is the international agency responsible for collecting environmental data and formulating and disseminating environmental policies.<sup>154</sup> It is officially empowered to coordinate the environmental activities of UN agencies and to promote domestic programs. Nevertheless, UNEP is precluded from criticizing or

---

152. U.N. recommendations and studies "are not in and of themselves a form of international legislation." The activities of the U.N. and other international bodies, however, may be cited as evidence of customary international law. M.W. JANIS, *AN INTRODUCTION TO INTERNATIONAL LAW* 43-44 (1988).

153. *Trail Smelter*, 3 R. Int'l Arb. Awards at 1905; *Corfu Channel*, 1949 I.C.J. at 4.

154. WORLD 1986, *supra* note 8, at 198-99. Recent events, however, suggest that UNEP may soon be the most influential leader in international environmental cooperation. Its executive director, Mostapha Tolba, played a major role in the conclusion of the 1987 Montreal Ozone Protocol and the 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. P. Hass, *Politics of International Environmental Cooperation* 171, presented at the Conference on Technology-Based Confidence-Building: Energy and Environment, at St. John's College, Santa Fe, N.M., July 9-14, 1989 (available from the Center for National Security Studies, Los Alamos National Laboratory).

praising member countries for their individual treatment of the environment. Moreover, the program is extraordinarily small. With a budget of only 30 million dollars and a permanent staff of 160, UNEP has been criticized as little more than an "environmental conscience."<sup>155</sup> However, in an effort to encourage responsible forest management, UNEP has agreed to pool its limited resources with the much larger International Tropical Timber Organization.<sup>156</sup>

### B. TFAP

In recent years, the United Nations has mounted campaigns specifically aimed against deforestation. Their most ambitious attempt is the Tropical Forest Action Plan (TFAP) announced in November, 1985. The Plan's purpose is essentially the reduction of deforestation through responsible management.<sup>157</sup> The Plan was jointly developed by the UN's Food and Agriculture Organization (FAO), the United Nations' Development Programme, the Bilateral Development Agencies, the World Bank and other development banks, and several non-governmental organizations (e.g., the World Resources Institute), and representatives of more than sixty tropical countries including Brazil.<sup>158</sup> The plan involves three areas: fuel wood and social forestry, conservation of forest ecosystems, and institution building with corresponding education and training. To finance these activities, the group has recommended spending \$8 billion over five years.<sup>159</sup> Although seemingly large, this sum represents only a doubling of developmental assistance in forestry and related agriculture.<sup>160</sup>

To oversee and coordinate the plan, the FAO first established an *ad hoc* group, the Tropical Forestry Advisory Group which is comprised of forestry advisors from the development assistance community and from non-governmental organizations (NGOs). During the first year of TFAP's existence, the advisory group met

---

155. WORLD 1986, *supra* note 8, at 198-99.

156. UNEP, ITTO, *Agree to Pool Resources for Forest*, 11 Int'l Env't Rep. (BNA) No. 6, at 339 (June 8, 1988).

157. WORLD 1987, *supra* note 139, at 73.

158. For a comprehensive description of the plan, see FAO's *Tropical Forestry Action Plan*, 38 UNASYLVA 152 (1986). The TFAP optimistically recommended that \$485 million be spent on Brazil alone. See *Tropical Forests*, *supra* note 17, pt. III, at 22.

159. *Tropical Forestry Action Plan*, 38 UNASYLVA 152 (1986).

160. Burley, *supra* note 128, at 404.

three times to coordinate international grants and loans from the World Bank and other financial institutions. The FAO also established a special secretariat in Rome to implement the plan.<sup>161</sup>

In 1987, efforts were made to increase NGO activity under the plan. The World Resources Institute and the Environmental Liaison Centre co-sponsored workshops in Nairobi, Panama City, and Bangkok. These workshops were designed to promote citizen participation. Additional conferences were sponsored by the FAO and held in Bellagio, Italy to move the plan forward. The subsequently-issued "Bellagio Statement" called for broader research priorities and further participation by local groups.<sup>162</sup>

### C. ITTO

The International Tropical Timber Organization (ITTO) is another important international organization concerned with tropical forest management. The ITTO is essentially a trade association that brings together producers and importers of tropical timber to encourage production through improved forest management and marketing. The organization is headquartered in Yokohama, Japan and is responsible for implementing the International Tropical Timber Agreement (ITTA).<sup>163</sup> The ITTA came into force under the aegis of the United Nations Commission for Trade and Development (UNCTAD) after nearly a decade of wrangling to secure its ratification. The agreement was adopted in November, 1983 by thirty-six producing countries, including Brazil, and thirty-three consuming countries.<sup>164</sup> Presently, there are forty-two signatories, twenty-four consuming countries, and eighteen producing nations. These countries account for seventy percent of all tropical forests and ninety-five percent of tropical timber exports.<sup>165</sup> Funding for the ITTO is provided by member countries and the World Wildlife Fund (WWF) which sees the group as more dynamic than a larger TFAP.<sup>166</sup> In fact, representatives from the WWF's Tropical For-

---

161. WORLD 1987, *supra* note 139.

162. *Id.*

163. WORLD 1988, *supra* note 44, at 84-85. See also U.N. CONFERENCE ON TRADE & DEVELOPMENT, INTERNATIONAL TROPICAL TIMBER AGREEMENT, U.N. Doc. TD/TIMBER/11/Rev. 1, U.N. Sales No. E. 4. II.D.5 (1983).

164. WORLD 1986, *supra* note 8, at 197.

165. T. HPAY, THE INTERNATIONAL TROPICAL TIMBER AGREEMENT: ITS PROSPECTS FOR TROPICAL TIMBER TRADE, DEVELOPMENT AND FOREST MANAGEMENT, (IUCN/IIED Tropical Forest Policy Paper No. 3).

166. WORLD 1988, *supra* note 44, at 84-85.

estry Program serve on the U.S. delegation to the ITTO Council.<sup>167</sup>

In 1987, the ITTO approved sixteen different projects including a study of massive forest rehabilitation in Borneo and "multiple purpose" forest management which involves the harvest of wood and many minor forest products.<sup>168</sup> In the summer of 1988, the Organization met in Rio de Janeiro, Brazil where it agreed to start its first high-profile project in forest management. The new project begun in September involves a thorough inventory of all usable plant species in a 247,000 acre reserve in the Antimari Forest in the state of Acre. Successive stages of the project will study the rate and quantity at which forest products can be responsibly harvested and replanted. In the final stages, companies will be established to process the products. Loggers will be excluded and products like rubber, Brazil nuts, resin, and medicinal plants will be extracted instead. The estimated cost of the project is \$3 million, and Japan has already pledged \$2 million.<sup>169</sup>

Adam Markham of the WWF has hailed the project as a "watershed decision toward conservation of the tropical forest," while John Medeiros, the head of the U.S. delegation, called the plan "superlative."<sup>170</sup> However, Japan's involvement in this conservation effort is seen by some critics as hypocritical and a matter of grave concern. Japan is the largest importer of tropical hardwoods, consuming a staggering forty percent of the world trade.<sup>171</sup> As trees vanish in Southeast Asia, Japan focuses on scrutinizing the diminishing, but still vast Brazilian reserves. Japan initially agreed to provide \$300 million to complete a stretch of highway connecting the Brazilian city of Rio Branco with Lima. Environmentalists assailed the project as an ecological disaster. In addition to millions of trees felled to make way for the road, environmentalists argue that the highway would provide Japanese loggers with access to the remaining trees in the region.<sup>172</sup> Following pressure from President Bush, Japan is currently reevaluating its role as a creditor.<sup>173</sup>

---

167. House, *Timber Producers, Users Talk of Saving Forests*, Wash. Post, July 23, 1988, at A19, col. 1.

168. TROPICAL FORESTRY PROGRAM, *supra* note 87.

169. WORLD 1988, *supra* note 44, at 84-85.

170. Simons, *Plan for Amazon Backed in Brazil*, N.Y. Times, July 3, 1988, at 9, col. 1.

171. House, *supra* note 167.

172. Simons, *Brazilian Is Looking to Japan to Link Amazon to the Pacific*, N.Y. Times, Feb. 19, 1989, at 1, col. 1.

173. The project alarmed U.S. Senators Heinz, Gore, Shelby, and Wirth, and President Bush reportedly asked Prime Minister Takeshita of Japan whether his government had plans to finance the highway. "Takeshita said Japan had yet to receive a request from Brazil



Japan is likely to remain the major player in the ITTO for many years to come. Under the ITTA, Japan is assured a substantial bloc of votes in the ITTO. As the World Resources Institute explains:

Votes are allocated by means of a complex formula, with producers dividing 1,000 votes according to the export value of their timber trade, and the area of forest they possess. Thus, Latin America, which has only seven percent of the tropical timber trade, receives additional votes because it has seventy percent of the world's tropical forests. Each consumer nation gets ten votes when it joins, plus additional votes calculated according to the volume of its timber imports. Japan, with 398, has more votes than any other consumer nation and needs the support of only a few other countries to swing the balloting its way.<sup>174</sup>

In contrast, the United States refusal to pay its ITTO dues handicapped its participation in the organization. Nations which have not fully paid their 1987 dues, including the U.S., no longer have a vote. Also, "several consumers have raised the idea of refusing Council approval for project activities in countries who are in arrears."<sup>175</sup> Therefore, while the U.S. remains in arrears, it will not have a voice in the important question of whether to extend or renegotiate the agreement, nor will it have a voice in determining the tenure of the executive director.<sup>176</sup>

## IX. THE ROLE OF DEVELOPMENT ASSISTANCE

With a staff of 6,000 and enormous capital resources, the World Bank leads in developmental assistance to the third world. The bank funds hundreds of projects worldwide worth \$14 billion annually. However, "because of the sheer size of the World Bank's projects . . . the Bank's activities are inherently more likely to

---

for funding." Memorandum to Members of the South American Congressional Delegation to Brazil (CODEL) (Senators Heinz, Gore, and Shelby, Congressmen Bryant and Sikorski, and Mr. Thomas Lovejoy) from Timothy Wirth (Dec. 1988) at 3 [hereinafter CODEL Memorandum]. The story of the President's call is found in Sherrill, *supra* note 59, at 67.

174. WORLD 1986, *supra* note 8, at 197.

175. Excerpts from the Report of the U.S. Delegation Spring Meeting of the International Tropical Timber Organization (ITTO) 7 (1988)(available from the University of Miami Inter-American Law Review, Coral Gables, Florida).

176. U.S. Dep't of State Summary of the Int'l Tropical Timber Council, Fifth Session in Yokohama, Japan (Nov. 9-16, 1988) (available from the University of Miami Inter-American Law Review, Coral Gables, Florida).

have environmental side-effects than those of small agencies."<sup>177</sup>

The Bank set forth its own environmental procedures and regulations in 1984. These requirements ostensibly attach importance to environmental questions within projects sponsored by the Bank and within the economic sector work of the Bank. However, the Bank's guidelines relate to industrial and processing techniques rather than agricultural development or the construction of dams and roads. Most of the Bank's loans are earmarked for these latter activities.<sup>178</sup> Moreover, until 1987, the task of reviewing the environmental impact of 300 new projects annually, coupled with the management of hundreds of ongoing projects, fell on only three people.

Promises by the World Bank's president, Barber Conable, to improve the Bank's environmental record have not materialized. Currently, the Bank has a central environmental department staffed by twenty-three appointees and four smaller "assessment units" which monitor projects in the Bank's four operating regions: Asia, Africa, Latin America and the Caribbean, Europe and the Middle East. The director of the central environmental department, however, has little independent authority and must report to a vice president and a senior vice president. The assessment units are similarly hampered by insufficient budgets and a lack of authority to alter designs to reflect environmental concerns.<sup>179</sup>

The World Bank has agreed to work with the TFAP to preserve the world's remaining rain forests. However, as with other environmental problems, Brazilian deforestation has been given only superficial consideration. Indeed, most experts agree that the Bank's funding of development projects has been disastrous. Since 1981, the World Bank has approved \$457 million for the POLO-NOROESTE road extension and settlement project.<sup>180</sup> Despite assurances by the Brazilian government that the project would not threaten the indigenous people, the Indians are experiencing a public health disaster. On the Indian reservations, epidemics of tuberculosis, malaria, measles, and influenza are decimating the population. The reservations have also been violated by squatters,

---

177. WORLD 1986, *supra* note 8, at 199.

178. Rich, *Funding Deforestation: Conservation Woes at the World Bank*, THE NATION, Jan. 23, 1989, at 88-93.

179. *Id.*

180. Telephone interview with Bruce Rich of the Environmental Defense Fund, in Washington, D.C. (July 20, 1989).

miners, and loggers, and at least twenty people have been killed.<sup>181</sup>

Presently, the World Bank has approved \$350 million in new loans for the area: \$150 million for public health measures and \$200 million for agricultural consolidation. The first loan will go to the notoriously corrupt and inefficient Brazilian Indian health organization, FUNAI.<sup>182</sup> The second loan is earmarked for development in Rodonia. These programs will fail unless affected groups are consulted and economic data is accumulated and examined.<sup>183</sup>

In addition to the road building and colonization schemes, the World Bank has also funded plans to construct 136 dams in Brazil over the next 20 to 25 years, of which 79 will be in the Amazon.<sup>184</sup> Twenty-five dams presently under construction will "displace a total of 91,000 people and flood an area of nearly 4000 square miles (10,723 square kilometers), almost the size of Connecticut."<sup>185</sup> Critics are particularly concerned about the construction of two dams which may be a part of the Altamira-Xingu River complex in the State of Para. If built, the two dams would create the largest man-made lake in the world and inundate the Kayapo lands.<sup>186</sup> Not surprisingly, studies show that many of the dams are not needed and that energy "could be freed up" by improvements in industrial efficiency and conservation.<sup>187</sup>

In 1986, the World Bank loaned \$500 million to the Brazilian power sector over the objections of two directors representing the U.S. and the Nordic countries.<sup>188</sup> Also, the Bank is funding a plan to provide charcoal for pig iron smelters in Para and Maranhão. Over the next twenty years, these smelters will destroy 35,000

---

181. Memorandum to Interested Groups Regarding Update on World Bank Projects in Brazil and Continued Deforestation from Bruce Rich (Environmental Defense Fund, Washington, D.C.) (Feb. 21, 1989) at 2-4 [hereinafter Rich Memorandum].

182. *Id.* at 3-4.

183. *Id.*

184. *Id.* at 7.

185. *Id.* at 8. Without going into specifics, even the World Bank admits that the Power Sector projects have "negative impacts." See *World Bank Support to Environmental Programs in Brazil 2* (Available from World Bank, Washington, D.C.).

186. *Indians Join EDF, NWF in Criticizing World Bank on Amazon Basin Dam Projects*, 11 Int'l Env't Rep. (BNA) No. 5, at 191 (Mar. 9, 1988).

187. Rich Memorandum, *supra* note 181, at 9. "The cost of efficiency investments are estimated at \$8 billion (using 1985 undiscounted values), whereas [producing] an additional 19 thousand megawatts is estimated to cost \$38 billion." *Id.*

188. *Id.* at 7. A subsequent disbursement for the project has been suspended following fierce opposition by environmental groups and legislators. Telephone interview with Steve Schwartzman of the Environmental Defense Fund, in Washington, D.C. (May 24, 1989).

square miles, an area the size of Indiana.<sup>189</sup>

Another source of external development assistance is the smaller Inter-American Development Bank (IADB). Until recently, the IADB's only environmentally-trained staff member was a geographer hired in 1983 to work as a soils specialist. Presently, the Bank has an environmental staff of three positions.<sup>190</sup> Not surprisingly, the IADB has been the subject of intense criticism by environmental organizations and legislators. In 1987, the Bank threatened to suspend funding for the extension of Highway 364, the principal highway through the POLONOROESTE project, because of the lack of concern for the environment displayed by the Brazilians. Continued funding of the highway was conditioned upon whether the government would create rain forest reserves with Indian lands clearly demarcated. The Bank gave the Brazilians sixty days to comply or face a loss of disbursements. The threat proved to be empty. The Brazilians stubbornly refused to abide by the conditions and the IADB did nothing. In response, U.S. Senators Daniel Inouye and Robert Kasten co-sponsored a bill which cut IADB funding by eighty percent.<sup>191</sup>

#### X. DEBT-FOR-NATURE SWAP

Thomas Lovejoy of the Smithsonian Institute created a "Debt-For-Nature Swap" approach to the problem of deforestation. The swap approach involves the purchase of debt by a non-profit environmental organization in return for environmental concessions by the debtor country. At the time of the proposal, Dr. Lovejoy was the WWF's Executive Vice President in Washington, D.C. He noted that "it was very appropriate to help reduce the international debt owed by developing countries in ways that allow them to reinvest in their natural resources."<sup>192</sup> Because of hyperinflation and political instability, many third world nations are viewed as serious credit risks. Therefore, the holders of the debt are often willing to sell the loans at less than face value or for a

---

189. Rich Memorandum, *supra* note 181, at 8.

190. *Multilateral Development*, *supra* note 30, at 710-11. As of April 1989, one position was still vacant.

191. Congress cuts IADB Funds 80 Percent Due to Objections to Environment Record, 11 Int'l Env't Rep. (BNA) No. 1, at 28 (June 13, 1988) (\$258 million was reduced to \$50 million).

192. WWF, *supra* note 10, section "Debt Swaps." See also Sanction, *Hands Across the Sea*, TIME, Jan. 2, 1989, at 63.

substantial discount. Debt-swapping has already succeeded on a small scale. For example, the U.S. based organization, Conservation International, purchased \$650,000 of Bolivian foreign debt discounted \$100,000 on the Wall Street secondary market. In exchange, the Bolivian government agreed to set aside three conservation areas totalling 3.7 million acres.<sup>193</sup> Other swaps have recently been arranged by the WWF in Ecuador and in Costa Rica. The WWF bought \$1 million worth of Ecuadorian debt from Bankers Trust at the discounted price of \$354,500. The Fund then transferred the outstanding loan payments to an Ecuadorian conservation group, the Fundacion Natura, which will use the money to protect national parks and wildlife.<sup>194</sup>

The debt-swap approach seems a particularly efficacious solution to the problem of deforestation for three reasons. First, the magnitude of the debt, estimated at \$115 billion in 1989, should make Brazil eager to negotiate.<sup>195</sup> Second, given the suspension of loan payments by former Brazilian President Sarney in 1987 and the possibility of Brazil's future default, it is likely that U.S. creditors, who hold most of the loans, will resort to dramatic discounting. President Sarney said, if necessary, he will suspend payments on the debt again.<sup>196</sup> Finally, recently adopted IRS rulings allow U.S. banks substantial deductions for certain debt-swap arrangements.<sup>197</sup>

Negotiations with the United States, however, may be hampered by the Brazilian perception of North American hypocrisy. America, after all, achieved its status as a rich, industrialized country in part by destroying most of its forests, exploiting its natural resources, and polluting on an unprecedented scale.<sup>198</sup> Moreover, the U.S. Forest Service continues at an alarming rate to permit the

---

193. Shabecoff, *Bolivia to Protect Lands in Swap for Lower Debt*, N.Y. Times, July 14, 1987, at C2, col. 2; *Bolivia Axes Debt by Saving Its Forest*, Boston Globe, July 14, 1987, at 1; *Buy Bonds, Save Rain Forests*, N.Y. Times, Sept. 5, 1987, at 22, col. 1.

194. Sanction, *supra* note 192, at 63.

195. Long, *Brazil Tries to Stop Slash and Burn Destruction of Rich Amazon Forests*, L.A. Times, Apr. 23, 1989, at 2, col. 1.

196. *Sarney on Brazil Debt Stance*, N.Y. Times, Nov. 26, 1987, at D7, col. 3.

197. Giamo, *supra* note 115, at 567. "A recently adopted Internal Revenue Service ruling allows a commercial bank to deduct an amount equal to the full face amount of a debt obligation issued by a central bank of a foreign country when the debt is transferred back to the central bank in exchange for currency transferred by the central bank to a U.S. charitable organization for use in charitable purposes in the foreign country. Prior law allowed the bank to deduct only the discounted market value of the donations." *Id.* (footnotes omitted).

198. Linden, *Playing with Fire*, TIME, Sept. 18, 1989, at 76.

destruction of forests on public land in the Pacific Northwest.<sup>199</sup>

## XI. CONCLUSION

Environmental concerns and conservation must be given the highest consideration. Although the Brazilian government has taken steps to protect the rain forest, its government agencies lack the manpower and financial wherewithal for effective enforcement of the laws. Given Brazil's present economic crisis, immediate steps must be taken by the international community to ensure additional forest is set aside as protected preserves.

First, international NGOs like the WWF, have been effective in developing debt-swap plans and other complex conservation schemes. Much smaller domestic organizations, like AGAPAN, must also be lauded for raising the environmental consciousness of Brazilians. The role of these citizen groups in saving the rain forest should be underscored and supported with international funding.

Second, the conservation efforts of international organizations and foreign countries must be encouraged. The holders of Brazil's enormous international debt must be challenged to enter into debt-swapping agreements to protect the forest. The United States should pay its ITTO dues and cooperate with other environmentally conscious nations to prevent Japan's transformation of the organization into an importers' cartel.

Third, agencies like the World Bank and IADB must give environmental concerns and conservation the highest consideration. The destruction of indigenous cultures and potentially valuable non-human species, the desertification of millions of hectares, and the pernicious disruption of the global climate can hardly be called responsible development.

Finally, the Brazilian government must re-examine its schemes of Amazonian integration. Efforts should be made to either check population growth or redirect migrants to non-forest areas. Furthermore, fears of forest internationalization must be allayed through global cooperation. In the end, the Brazilians must understand that the conservation of *their* forest may be essential for the preservation of *our* world.<sup>200</sup>

---

199. Dumanoski, *In Reversal U.S. Agency to Propose Listing Spotted Owl as Threatened*, Boston Globe, Apr. 27, 1989, at 9.

200. Some of these approaches have been given support by U.S. Congressmen. In the

## XII. ADDENDUM

The call for preservation of the Amazon has not fallen upon deaf ears. Although serious obstacles exist in protecting the Amazon, there is some cause for hope. While this article was in press, Brazil's recently elected President Fernando Collor de Mello announced the elimination of subsidies to farmers that have encouraged deforestation in the Amazon.<sup>201</sup> Moreover, he appointed the outspoken Jose Lutzenberger to head IBAMA, Brazil's new environmental protection agency.<sup>202</sup> With the aid of satellite photos,<sup>203</sup> five helicopters, and sixty trucks, IBAMA agents have sought out illegal fires and issued millions of dollars in fines.<sup>204</sup> Their efforts contributed to a dramatic decline in deforestation. While 8 million hectares were burned in 1987,<sup>205</sup> only 4.8 million were reported burned in 1988. Preliminary figures indicate a fifty percent decrease in deforestation in 1989.<sup>206</sup>

---

recent Congressional delegation to Brazil (CODEL), a group which also included Senator Heinz, Senator Gore, Senator Shelby, Congressman Bryant, Congressman Sikorski, and Mr. Thomas Lovejoy (of the Smithsonian Institution) made long-term recommendations for conservation in the region. Specifically, the CODEL called for the establishment of a foundation to protect a minimum of 10 million hectares in the rain forests contributed by Brazil or purchased with discounted debt to the tune of \$1 billion. Greater long term costs of inspection and supervision of the "park" by 100 trained ecologists and guards would likewise be financed by a "pool of converted debt." International involvement at all stages of this novel project are strongly encouraged.

The CODEL has also recommended formation of an Amazon Working Group under the aegis of the Smithsonian. Among other things, this group would develop a program of applied research, provide educational fellowships for training ranging from graduate to rubber tappers, create a network of Western Hemisphere parliamentarians concerned about the rain forests, and organize a consortium of universities to handle rain forest research and projects. Letter from Timothy E. Wirth to the members of the South American CODEL (Dec. 1988) (available from the University of Miami Inter-American Law Review, Coral Gables, Florida).

201. Coye, *Brazil Hatches Project To Save Amazon Forest*, Proprietary to UPI, Aug. 25, 1990 (wire service).

202. Graham, *Monday Interview; Balancing Man and Nature*, Financial Times, July 2, 1990. Lutzenberger is discussed *supra* note 86 and accompanying text.

203. A. COWELL, *THE DECADE OF DESTRUCTION: THE CRUSADE TO SAVE THE AMAZON RAIN FOREST* 202 (1990).

204. *THE WORLD RESOURCES INSTITUTE AND THE INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT*, WORLD RESOURCES 1990-91, 102 (1990) [hereinafter *WORLD 1990-91*].

205. Setzer, *supra* note 35, at 43.

206. *WORLD 1990-91*, *supra* note 204, at 102.