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ABSTRACT

Deforestation in the tropics is proceeding rapidly. It is in the interest of the United States Government to implement policies for improved management of tropical forests. The most effective approach is through development aid.

The Agency for International Development (AID) lacks the technical resources with which to adequately address the problems of tropical forestry, though the Agency does have access to an extensive network of experts in the private sector. The Department of Agriculture, including the Forest Service, has ample technical resources, and these could be used to greater advantage in support of AID. However, the Department perceives its mission as domestic and is reluctant to participate in programs for international development.

In addition to this organizational segregation of responsibility and resources, historical and conceptual obstacles to the policymaking process exist. In the United States, farmers and foresters have usually (mis)perceived their activities as unrelated. Additionally, in the forestry community, researchers and practitioners have been slow to integrate traditional conservation techniques with ecological science. Both cleavages impede the formulation of international forestry policy, as shifting farmers do most of the damage to tropical forests, the ecology of which is exceedingly complex.

Deforestation has been a problem for centuries in many parts of the world, including the United States and the tropics.[2] However, rapid de-

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1. This paper is based in part on interviews or correspondence with individuals having knowledge of U.S. policy for the management of tropical forests, many of whom are officials of the federal government. A very few references to these interviews do not cite the interviewee's name, for reasons of confidentiality. The author acknowledges the generous assistance of all those who contributed to his research, but accepts sole responsibility for misinterpretation of their comments or errors of fact.

2. U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, OTA-F-214, TECHNOLOGIES TO SUSTAIN TROPICAL FOREST RESOURCES 85-87 (Mar. 1984) [hereinafter cited as TROPICAL FOREST]; E. ECKHOLM, LOSING GROUND: ENVIRONMENTAL STRESS AND WORLD FOOD PROSPECTS 35 (1976). *See generally* GLOBAL DEFORESTATION AND THE NINETEENTH CENTURY WORLD ECONOMY (R. Tucker & J. Richards eds. 1983).

forestation of tropical regions during the last few decades, primarily in developing countries, has been the most severe manifestation of man's misuse of forests. There are currently about 7.7 million square miles of tropical forest in the world. This figure includes about 4.6 million square miles of closed or moist forest and about 3.1 million square miles of open, drier woodlands.[3] Thirteen countries account for more than 80 percent of the total moist forest, most of which is also known as tropical rain forest. In order of forested area they are: Brazil, Indonesia, Zaire, Peru, India, Colombia, Mexico, Bolivia, Papua, New Guinea, Burma, Venezuela, Congo, and Malaysia. Brazil alone has about a third of the total.[4] Approximately two-thirds of the drier open woodlands are found in tropical Africa.[5]

At least 30,000 square miles of undisturbed tropical forest are destroyed each year, especially for growing crops, grazing, or logging, though the rates of clearing vary considerably from country to country. As much as 45,000 additional square miles are seriously altered or disturbed.[6] For somewhat different reasons, deforestation is acute in both the arid and moist tropics, though the lessons learned from the study of one are sometimes applicable to the other.[7]

Tropical deforestation impinges directly on U.S. interests and has been addressed explicitly in U.S. foreign policy. The first section of this paper will explore the benefits to the U.S. of improved management of tropical forests, through a review of the causes and consequences of deforestation.

3. These figures are from TROPICAL FOREST, *supra* note 2, at 10-11, 333, which in turn cite what is considered by most experts to be the best available source of data: FOOD AND AGRICULTURE ORGANIZATION AND UNITED NATIONS ENVIRONMENT PROGRAMME, TROPICAL FOREST RESOURCES ASSESSMENT PROJECT (4 Vols.) (UN 3216.1301-78-04 1981) [hereinafter cited as FAO PROJECT]. A tropical moist forest is a "closed forest" in the humid tropics, where a "closed forest" includes "land where trees shade so much of the ground that a continuous layer of grass cannot grow. The tree cover is often multi-storied. Trees may be evergreen, semideciduous, or deciduous." In open forests, "trees cover at least 10 percent of the ground but still allow enough light to reach the forest floor so that a continuous cover of grass can grow." Open forests are prevalent in drier climates, TROPICAL FOREST, *supra* note 2, at 332-34.

4. TROPICAL FOREST, *supra* note 2, at 13.

5. *Id.* at 11, fig. 5.

6. Address by Peter Ashton to the Tropical Rainforest Workshop, conducted by the Coolidge Center for Environmental Leadership, Cambridge, Massachusetts (Apr. 21, 1984). The Food and Agriculture Organization of the United Nations estimates that during the early 1980's, 43,600 square miles were deforested each year, of which 29,000 square miles were closed forest. COMMITTEE ON FOREST DEVELOPMENT IN THE TROPICS, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, TROPICAL FORESTRY ACTION PLAN 1 (1985) [hereinafter cited as FAO ACTION PLAN]. (Hectacres were converted to square miles, as throughout this paper.)

7. Moist forests are of somewhat more immediate interest to the U.S. Their genetic stock is important for U.S. agriculture and medicine, and their wood products are valued in this country. *See infra*, note 8. However, from the perspective of the tropical countries, no such judgement can be made with respect to the relative importance of forests in dry and moist regions. Indeed, semi-arid areas of Africa, most importantly Ethiopia and the Sahel, recently have been or are now faced with a most immediate and extreme problem—famine—largely because of poor management of wooded land. *See e.g.* Brown & Wolf, *Assessing Ecological Decline*, in STATE OF THE WORLD 1986, 22, 25 (L. Brown ed. 1986).

However, there are significant obstacles to the formulation of effective policy for tropical deforestation. These impediments include: first, the organization and bureaucratic culture of the U.S. foreign policymaking community, which limit the ability of the government to address international problems with high scientific or technological content; and second, the geographical and intellectual insularity of the U.S. agricultural community, which otherwise has the potential for significantly affecting the course of deforestation. These two concerns will be addressed in the second section of the paper.

TROPICAL DEFORESTATION: CONSEQUENCES AND CAUSES

Consequences

There are several reasons for concern, on the part of both the tropical countries and the U.S., over the destruction of tropical forests. First, the global gene pool is reduced.[8] Moist tropical forests contain at least 40 percent of the estimated 4.5 million plant and animal species in the world.[9] Only about 20 percent of these have been catalogued and an even smaller proportion of the catalogued species have been screened for their potential value.[10] Of those plants that have been studied, some have been used in medicines. One prominent example is the Madagascar periwinkle, *Catharanthus roseus,* from the leaves of which the drug vincristine is derived. Vincristine has proven extraordinarily successful in treating lymphocytic leukemia, a cancer which primarily affects children. Plants are also used in drugs to treat heart disorders and other forms of cancer. Scientists have not yet been able to synthesize many of the natural ingredients in these drugs.[11]

8. "Gene pool" refers to a stock of genetic material (i.e. deoxyribonucleic acid or DNA). Every plant and animal species has DNA which is configured differently from every other species, and thus every species has unique biochemical, morphological, and other characteristics. Particular characteristics may be of value in practical endeavors such as agriculture or the manufacture of drugs. Despite the growing ability of scientists to synthesize genes, or sections of DNA molecules, for many purposes it is still much easier to use the breeding material, "germplasm," in the naturally occurring organism, or portions of the plants themselves, for the purposes discussed in the text.

9. TROPICAL FOREST, *supra* note 2, at 10, 52; Oldfield, *Tropical Deforestation and Genetic Resources Conservation,* in BLOWING IN THE WIND: DEFORESTATION AND LONG-RANGE IMPLICATIONS 277 (V. Sutlive, Jr. ed. 1980). *See generally* BUREAU OF INTERNATIONAL ORGANIZATION AFFAIRS, U.S. DEPARTMENT OF STATE, INTERNATIONAL ORGANIZATION AND CONFERENCE SERIES #300, Proceedings of the U.S. Strategy Conference on Biological Diversity, (1982); Wilson, *The Biological Diversity Crisis,* 2 ISSUES SCI. AND TECH., Fall 1985, at 20.

10. TROPICAL FOREST, *supra* note 2, at 10, 52; OLDFIELD, *supra* note 9, at 277.

11. For a detailed account of the medical applications of tropical plants, *see* Caufield, *The Rain Forests,* NEW YORKER, Jan. 14, 1985, at 59-61. *See also* Myers, *Deforestation in the Tropics: Who Gains, Who Loses?,* in WHERE HAVE ALL THE FLOWERS GONE? DEFORESTATION IN THE THIRD WORLD 2 (V. Sutlive, Jr. ed. 1980); U.S. DEPARTMENT OF STATE AND AGENCY FOR INTERNATIONAL DEVELOPMENT, PROCEEDINGS OF THE U.S. STRATEGY CONFERENCE ON TROPICAL DEFORESTATION 21 (1978) (comments by N. Myers) [hereinafter cited as STRATEGY CONFERENCE PROCEEDINGS]; *International Biological Diversity and Tropical Deforestation: Hearings before the Senate Comm. on Foreign Relations,* 99th Cong., 1st Sess. 19 (1986), (statement of Susan Shen, Director of Project

Other wild plants found in forested regions have been modified to produce some of the staples of both tropical and temperate diets, such as yams and some legumes.[12] In addition, wild tropical varieties are bred with either tropical or temperate zone crops in order to genetically fortify the cultivated plants against disease and pests.[13] In the future, yet other tropical plants might prove to be valuable sources of food in temperate regions.[14]

However, rain forest species are very sensitive to disruption of their habitat. They have low population densities, perhaps as a defense against insects and disease. In addition, their range is usually small relative to the range of temperate zone species. Therefore, destruction of even a few square miles of moist forest may bring extinction to some varieties of trees and other plants. Their unique genetic characteristics are then permanently lost. Large scale devastation of forests, as is occurring in many parts of the tropics, produces wholesale genetic waste.

The second set of consequences of tropical deforestation has to do with the nature of tropical soils. Though soil mineralogy in the moist tropics is complex and varies from area to area, it is generally not suitable to modern methods of cultivation (that is, the use of monoculture, large tracts of land, and machinery). The soil layer is thin and physically fragile, and therefore highly susceptible to erosion. It is often very high in concentrations of aluminum, silicon, and iron, which may become toxic for crops. In addition, these soils are poor in nutrients essential to most crops, especially nitrogen. When these nutrients are added as fertilizer they either become too tightly bound by the minerals in the soil to be used by the crops, or are quickly leached out by heavy rainfall. Wild plants in undisturbed moist forest have accommodated themselves to these conditions by developing mechanisms for almost complete recycling of nutrients. They live on top of, but not off of, the soil. Commercial crops lack this botanical self-sufficiency, and therefore cannot be grown easily on cleared land.[15]

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on Biological Diversity, Office of Technology Assessment, U.S. Congress) (manuscript will not be published; stenographic transcript available in the Office of the Editor, Senate Committee on Foreign Relations) [hereinafter cited as *Biological Diversity Hearings*]. *See also* Raven, *Tropical Rain Forests: A Global Reponsibility*, 90 NAT. HIST. Feb. 1981, at 28-29. *See generally* OLDFIELD, *supra* note 9.

12. Mooney *The Law of the Seed: Another Development and Plant Genetic Resources*, DEVELOPMENT DIALOGUE Nos. 1-2, (Special issue on plant genetic resources 7-23 (1985)).

13. U.S. CONGRESS OFFICE OF TECHNOLOGY ASSESSMENT, OTA 10: OTA-BP-F-18 SUSTAINING TROPICAL FOREST RESOURCES: REFORESTATION OF DEGRADED LANDS, 15-16 (1983).

14. *Tropical Deforestation: Hearings Before the Subcomm. on International Organizations of the House Comm. on Foreign Affairs*, 96th Cong., 2d Sess. 182 (1980) [hereinafter cited as *Tropical Deforestation Hearings*]. Not all tropical plants which have already proven of value are found in the forest. However, the habitats of most of them, and most of those with potential for food or medicine, are at least adversely affected by deforestation.

15. TROPICAL FOREST, *supra* note 2, at 87-89. Agricultural scientists have had a great deal of difficulty duplicating the successes of the "Green Revolution," most spectacular in South and Southeast Asia, in Africa. This is largely due to the fragility of African soils. *See, New Crop Varieties Lift Hopes for Africa*, N.Y. Times, Aug. 20, 1985, at C1, col. 1.

Clearing land for agriculture is, in general, not only unproductive, except in the short term, but also an active threat to inhabitants who depend on intact watersheds. When the forest cover is removed, the thin soil is quickly washed away in rainfall. This exacerbates flooding downstream from deforested hillsides and consequently increases loss of life and property, including more productive agricultural land.[16] In addition, soil erosion damages freshwater and coastal aquatic resources and contributes to falling groundwater tables.[17]

Finally, deforestation has caused high siltation rates in rivers, canals, and reservoirs behind hydroelectric dams, with severe negative consequences for agriculture and energy production. Among these are the Panama Canal, the irrigation system on Java, the Indus River hydroelectric system in Pakistan, the Hirakud Reservoir in India, the Ambuklao Dam in the Philippines, and the Peligree Dam in Haiti.[18] Some of these projects have been completed with U.S. and multilateral aid. Deforestation impedes the pursuit of those interests which inspired the aid: economic growth in the recipient country, which may add eventually to U.S. prosperity; political stability, which contributes to U.S. security; and humanitarian concern for the poor in those countries.

The third major effect of tropical deforestation is upon the climate. Local climate is affected in two ways. First, deforestation increases the reflectivity of the land. As a result, local temperatures may become more extreme: hotter by day and colder by night. Second, water vapor, which is normally released to the atmosphere by trees through transpiration and through direct evaporation of rainfall from leaves, is reduced when trees are destroyed. Humidity also moderates temperatures, and its loss exacerbates temperature fluctuations, reduces soil moisture in nearby areas, and may even affect regional rainfall patterns, though there is considerable uncertainty surrounding this last phenomenon. All of these effects inhibit the growth of food crops which are grown in the area.[19]

Destruction of forests, especially closed forests, could also affect the global climate by increasing the concentration of carbon dioxide in the atmosphere, though the nature of this relationship is quite uncertain as well. Increased CO_2 concentrations would probably cause global warm-

16. U.S. INTERAGENCY TASK FORCE ON TROPICAL FORESTS, THE WORLD'S TROPICAL FORESTS: A POLICY, STRATEGY, AND PROGRAM FOR THE UNITED STATES 18-19 (1980) [hereinafter cited as TASK FORCE REPORT]; World Resources Institute, The World Bank, and the United Nations Development Programme, Tropical Forests: A Call for Action, Vol. 1 8-9 (1985) [hereinafter cited as WRI CALL FOR ACTION]; E. ECKHOLM, DOWN TO EARTH: ENVIRONMENT AND HUMAN NEED 172-173 (1972).

17. *Tropical Deforestation Hearings, supra* note 14, at 192 (statement of Norman Myers, consultant in conservation and development).

18. TROPICAL FOREST, *supra* note 2, at 42-43, 46, 55, 229-230; STRATEGY CONFERENCE PROCEEDINGS, *supra* note 11, at 21-24; Ranjitsinh, *Forest Destruction in Asia and the South Pacific*, 8 AMBIO 192, 199 (1979); Postel, *Protecting Forests*, in STATE OF THE WORLD: 1984, 74, 84 (L. Brown ed. 1984).

19. Dickinson, *Effects of Tropical Deforestation on Climate*, in BLOWING IN THE WIND, *supra* note 9, at 411, 417; TROPICAL FOREST, *supra* note 2, at 42.

ing, with consequent melting of the polar icecaps, coastal flooding, and large scale changes in rainfall distribution throughout the world. There is no doubt that global CO_2 concentrations are rising significantly, primarily as a result of the burning of fossil fuels. Estimates of the additional contributions of land use changes, such as deforestation and reforestation, range from over 90 percent of the carbon added to the atmosphere from fossil fuel burning, to a *negative* contribution of about 20 percent of the fossil fuel contribution.[20] The actual effect is probably in between these two extremes, in which case deforestation, which is the dominant land use transformation, may add significantly to atmospheric CO_2 concentrations. It is likely, however, that the *decomposition* of tropical wood, either through burning (for fuel or to clear the land for agriculture), rotting, or consumption by termites, makes at least as significant a contribution as the actual loss of photosynthesis.[21]

Finally, tropical deforestation has economic impacts. Many known tropical plants have considerable commercial value.[22] Products from these plants include rubber, palm oil, and the buoyant seeds of the kapok and balsa, which are used in life belts and other flotation devices.[23] The economic value of plants which have not been studied may be considerable.

Both developed and developing countries depend on wood products derived from tropical timber. For some countries, particularly those in archipelagic South East Asia, timber-based exports are a major source of foreign exchange. However, the exploitation of tropical timber, as it is presently conducted, is certainly not sustainable. For example, consumption of tropical timber in Japan grew from 1.5 to 35 million cubic meters between 1950 and 1980; in the U.S. the figures for the same period were 0.8 to 10 million cubic meters. Total world production of tropical timber grew from 34.5 to 145 million cubic meters during the same two decades and is expected by the Food and Agriculture Organization of the United Nations (FAO) to reach 311 million cubic meters by the year 2000.[24] Among the developing countries, only South Korea and the Peo-

20. That is, land use changes, on the whole, may fix atmospheric carbon in the global biomass.

21. Clark, Cook, Marland, Weinberg, Rotty, Bell, Allison, & Cooper, *The Carbon Dioxide Question: Perspectives for 1982*, in CARBON DIOXIDE REVIEW: 1982, 3-4 (W. Clark ed. 1982). For an excellent review of the literature on deforestation and the CO_2 buildup, and a high estimate of deforestation's contribution, *see* Woodwell, *Global Deforestation: Contribution to Atmospheric Carbon Dioxide*, 222 SCIENCE 1081 (1983). *See also* Brown & Wolf, *Getting Back on Track*, in STATE OF THE WORLD: 1985, 222, 230-235 (L. Brown ed. 1985); Dickinson, *supra* note 19, at 411-441; Henderson-Sellers, *The Effects of Land Clearance and Agricultural Practices Upon Climate*, in BLOWING IN THE WIND, *supra* note 9, at 443-485; TROPICAL FOREST, *supra* note 2, at 52-53.

22. Postel, *supra* note 18, at 82-86.

23. OLDFIELD, *supra* note 9, at 287. Many of these products are produced from trees grown in plantations. These trees are usually immune from deforestation as it occurs in uncultivated regions. They are subject, however, to the general environmental degradation which accompanies such deforestation.

24. Guppy, *Tropical Deforestation: A Global View*, 62 FOREIGN AFFAIRS 928, 951 (1984).

ple's Republic of China are possibly planting more trees than they are harvesting. In most Third World countries reforestation is far from adequate to maintain current stocks.[25]

Deforestation is already having a significant negative impact on the balance of trade in several developing countries.[26] Raw log exports of Ghana, Nigeria, Thailand, and the Philippines in 1981 were from 1 percent to 15 percent of their post-1963 peaks.[27] Some such countries have recovered these financial losses by processing more wood domestically and retaining the added value. Others have not. Nigeria is a prominent example. Nigeria's log exports in 1980 were 5 percent of those in 1970. During the same period, the total export value of that country's forest products declined to 6 percent of the total value in 1970.[28] Nigeria had a negative net trade balance in forest products in 1980 which was twice as large as its positive balance in 1970.[29]

In summary, tropical deforestation has severe negative consequences for agriculture, energy production, and forest products industries in developing countries. Continued deforestation is likely to disrupt each of these sectors, contributing to economic and political instability and to human suffering. For these reasons alone it is in the interest of the U.S. to promote improved forest management. In addition, however, loss of genetic resources in the tropics may directly and adversely affect U.S. agriculture and medicine, and the increasing scarcity of forest products could affect several U.S. industries.[30]

25. Brown, *Generation of Deficits*, in STATE OF THE WORLD: 1986, 3-9 (L. Brown ed. 1986).

26. This is primarily true of countries which originally had smaller tracts of forest and which have largely depleted these.

27. Ghana's exports in 1981 were 7 percent of what they were in 1964; Nigeria's were 1 percent. Thailand's raw log exports were 8 percent and the Philippines' were 15 percent of more recent peak years. Postel, *supra* note 18, at 85.

28. *Id.* at 85. *See also* WRI CALL FOR ACTION, *supra* note 16, at 11; Ranjitsinh, *supra* note 18, at 196-199.

29. WRI CALL FOR ACTION, *supra* note 16, at 10-11.

30. The severity of the impact of shortages of forest products on U.S. industries must not be overstated, however, because the U.S. is nearly self-sufficient in, or has access to sources in other industrialized countries (especially Canada) for, many of the most commonly used wood products. *See* Zivnuska, *Research in International Forest Economics*, in RESEARCH IN FOREST ECONOMICS AND FOREST POLICY 435, 442 (M. Clawson ed. 1977).

George F. Kennan has recently suggested a moral imperative for U.S. efforts to save the tropical forests. Kennan proposes that the world is presently faced with two "unprecedented and supreme dangers": nuclear war and degradation of the natural environment.

> "Of all the multitudinous celestial bodies of which we have knowledge, our own earth seems to be the only one even remotely so richly endowed with the resources that make possible human life—not only make it possible but surround it with so much natural beauty and healthfulness and magnificence. . . . Is there not a moral obligation to recognize in this very uniqueness of the habitat and nature of man the greatest of our moral responsibilities, and to make of ourselves, in our national personification, its guardians and protectors rather than its destroyers?"

Kennan, *Morality and Foreign Policy*, 64 FOREIGN AFF. 205, 216-17 (1985).

Causes

The causes of deforestation are complex, and they must be simplified somewhat for purposes of discussion. However, three activities contribute heavily to deforestation: shifting agriculture performed by settlers (usually relocated from non-forested areas of the same country), firewood gathering, and non-sustainable logging.[31]

Indigenous peoples have practiced shifting agriculture for centuries. In drier regions they move largely because of variable rainfall and in moist areas because the soil cannot sustain continuous cultivation. However, most indigenous farmers have developed techniques for minimizing permanent damage to the forest ecosystem.

In moist forests, groups such as the Lacandon Maya of Mexico cut only small areas in the forest (essential if seeds from neighboring trees are to repopulate the clearing), grow complementary crops in close proximity, rotate crops regularly and intricately, and abandon land after a relatively short time, often after about two years, before the soil is depleted.[32] Indigenous agriculturalists do not use these techniques primarily to protect the forests, but rather to protect their crops against losses due to insects, disease, and soil depletion. These factors are much more difficult to control than in the temperate zones because of mineralogical conditions and the lack of a cold season. The effect, however, is conservation of the rain forest.

Settlers from non-forested areas, who are not familiar with the peculiarities of sylvan agriculture, are responsible for approximately 45 percent of all tropical forest clearance, though this figure varies from 70 percent in Africa to 35 percent in Latin America.[33] Population pressures and government policies in developing countries encourage the settlement of forested areas.

Governmental programs may include direct payments to individuals

31. TROPICAL FOREST, *supra* note 2, at 85-102.

32. Nations & Nigh, *The Evolutionary Potential of Lacandon Maya Sustained-Yield Tropical Forest Agriculture*, 36 ANTHROPOLOGICAL RESEARCH 1 (1980); ECKHOLM, *supra* note 2, at 137-141.

33. Postel, *supra* note 18, at 76. Conversion of tropical forest for cattle grazing has had particularly grievous effects in Latin America. Between 1961 and 1978, grazing land more than doubled in Central America, while forested land decreased by 39 percent. In 1978, six out of seven of the Central American countries were exporting more than 75 percent of their beef to the U.S. *Id.* at 77. *See generally* Myers, *The Hamburger Connection: How Central America's Forests Become North America's Hamburgers*, 10 AMBIO 3 (1981); Nations & Komer, *Rainforests and the Hamburger Society*, 25 ENVIRONMENT, Apr. 1983.

In 1864, George Perkins Marsh stated in reference to the U.S. and Canada:

> The needs of agriculture are the most familiar cause of the destruction of the forest in new countries; for not only does the increasing population demand additional acres to grow the vegetables which feed it and its domestic animals, but the slovenly husbandry of the border settler soon exhausts the luxuriance of his first fields, and compels him to remove his household gods to a fresher soil.

MARSH, MAN AND NATURE 233-34 (1965).

who move, the building of roads into the forest, and grants of land. Brazil and Indonesia have vigorous resettlement policies. Both countries have high population growth rates and, especially in the poorest areas, very high population densities (that is, in Northeastern Brazil and sections of Java). These are also the countries in which the most closed forest is being cleared. This is not to say that government policies are solely responsible for deforestation. In Brazil, Indonesia, and other densely populated countries with forested regions, many of the landless poor would move on their own. Government intervention does, however, accelerate this migration.

Some observers believe that there is enough non-forested agricultural land in Brazil for most of the population, and that in encouraging resettlement in forested areas the Brazilian government has been primarily trying to avoid the political problems associated with land redistribution.[34] The situation is somewhat different in Indonesia, as there is little fertile land left on Java for the expanding population. In these and in other tropical countries, however, population dynamics and political motives are complex. The governments of Brazil, Indonesia, Thailand, Malaysia and a few other tropical countries are in fact quite cognizant of the need for improved forestry practices. Some countries, notably India and Peru, have developed highly professional forest services.[35] However, governments are severely constrained by complicated land tenure systems dating back to colonial and pre-colonial eras,[36] differential population growth rates among socio-economic groups, and their domestic and international economic requirements (for example, foreign debt),[37] as well as by the entrenched interests of political elites.

Given current population growth rates and the other constraints on the governments of developing countries, more forest will surely be converted

34. Guppy, *supra* note 24, at 938-944; Westoby, *Who's Deforesting Whom?* 14 BULL. INT'L UNION CONSERVATION NATURE (Oct.-Dec. 1983), at 124, 125. *See also Tropical Forest Development Projects, Status of Environmental and Agricultural Research: Hearings Before the Subcomm. on Natural Resources of the House Comm. on Science and Technology.* 98th Cong., 2d Sess. 17-18 (1984) (statement of Jose Lutzenberger), *cited in* Rich, *The Multilateral Development Banks, Environmental Policy, and the United States,* 12 ECOLOGY LAW QUARTERLY 689-690 (1985). For a discussion of land use changes in the Amazon Basin, *see* Parham, Book Review, 12 POPULATION AND DEVELOPMENT REVIEW 146 (Mar. 1986).

35. The only countries in which data for the FAO's inventory of forest resources (FAO PROJECT, *supra* note 3) was collected primarily by national agencies were India, Peru, and Burma. Lanly, *Present Situation and Evaluation of Tropical Forest Resources,* 7 MAZINGIRA 2 (No. 4, 1983). *See also* U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, SUSTAINING TROPICAL FOREST RESOURCES: U.S. AND INTERNATIONAL INSTITUTIONS 23-30 (1984); RANJITSINH, *supra* note 18, at 201; TASK FORCE REPORT, *supra* note 16, at 27-28; address by Ashton, *supra* note 6.

36. TROPICAL FOREST, *supra* note 2, at 98-99; TASK FORCE REPORT, *supra* note 16, at 17; U.S. FOREST SERVICE, PASA NO. AG/TAB-1080-10-78, FORESTRY ACTIVITIES AND DEFORESTATION PROBLEMS IN DEVELOPING COUNTRIES 35 (July 1980). *See generally,* L. PYE, ASPECTS OF POLITICAL DEVELOPMENT 113-125 (1966).

37. WORLD BANK, Forestry Sector Policy Paper 33-37 (1978).

for agricultural uses. In light of this fact, governmental aid agencies and private scientific organizations, both in developing and industrialized countries, are attempting to modify the indigenous agricultural techniques described above to produce higher and more sustainable yields. "Agroforestry" is a generic term used to refer to the most important set of these techniques. Agroforestry involves interplanting trees with crops, and in some cases the colocation of livestock with crops as well. There is considerable hope on the part of all concerned that agroforestry will provide a way to use tropical forests without destroying them.[38]

Firewood collection is not as significant a problem as encroaching agriculture, but it contributes heavily to deforestation.[39] One-third of mankind uses firewood as its primary cooking fuel. Rural entrepreneurs in southeast Brazil and in India, for example, harvest tens of millions of cubic meters of wood annually to provide charcoal and firewood for urban industries and homes.[40] Ninety percent of all tropical wood that is harvested (as opposed to being cleared and left unused) is cut for energy production.[41]

Unsustainable harvesting of firewood is a particular problem in arid and mountainous areas. In both environments, trees are dispersed and relatively inaccessible. In arid regions, deforestation from fuelwood gathering leads to wind erosion and possibly to changes in local weather patterns, both of which seriously threaten agriculture. The situation is especially grievous in Africa, where desertification and famines in the Sahelian and Sudanian regions are partly the result of deforestation. In mountainous Himalayan and Andean areas, fuelwood gathering destroys watersheds, with consequences that have been discussed above.[42]

As with the predicament of shifting agriculture, there is hope that forestry technology will alleviate the firewood problem. Currently scientists are focusing on the use of fast-growing trees such as leucaena and eucalyptus. These trees would be planted in village woodlots, possibly as part of agroforestry projects, and in commercial plantations. With proper management, they might be harvested frequently enough to supply more of the energy required by both rural and urban populations.[43] Pro-

38. TROPICAL FOREST, *supra* note 2, at 220-229. For a discussion of agroforestry in the dry tropics, *see generally* NATIONAL RESEARCH COUNCIL, BOARD ON SCIENCE AND TECHNOLOGY FOR INTERNATIONAL DEVELOPMENT, PUB. NO. 1, AGROFORESTRY IN THE WEST AFRICAN SAHEL (1983).

39. ECKHOLM, *supra* note 2, at 101-113; Anderson & Fishwick, *Fuelwood Consumption and Deforestation in African Countries*, World Bank Staff Working Papers, No. 704 (1984); Laird & Haas, *Energy Efficiency as Environmental Protection: Firewood in the Third World*, Occasional Paper No. C/80-10 for Program on International Environmental Issues, Center for International Studies, Massachusetts Institute of Technology, (Nov. 1984).

40. Postel, *supra* note 18, at 78.

41. FAO ACTION PLAN, *supra* note 6, at 47.

42. *Id.* at 47-54; TROPICAL FOREST, *supra* note 2, at 91-93; WRI CALL FOR ACTION, *supra* note 16, at 5-9.

43. TROPICAL FOREST, *supra* note 2, at 186-190. Leucaena has many possible applications. *See 'Miracle plant' Tested as Cattle Fodder*, N.Y. Times, Feb. 12, 1985, at C2, col. 1.

grams for mass planting of trees, in addition to plantations, have already been successfully implemented in South Korea and, to a somewhat lesser extent, in the People's Republic of China and sections of India and Nepal.[44]

When considering agroforestry, plantations, or any other partial solution to the problems of deforestation, it must be noted that both the problems and the solutions have social and psychological as well as technical components. Most importantly, the habits and needs of the small farmers themselves must be incorporated into the policy planning process. That is, the development of "social forestry" is necessary to alleviate deforestation. One expert on agroforestry in the U.S. Agency for International Development has observed, for instance, that few farmers in developing countries will plant and protect trees as a firewood source. They are accustomed to growing crops and do not consider trees as crops. However, farmers will grow trees to provide forage or to support agricultural production, either through agroforestry or through erosion control projects.[45]

Thus, forestry must be related to agriculture not only for objective technical reasons, but also because of farmers' subjective perceptions of the relative value of the two endeavors. Neglecting these perceptions and concomitant social practices might lead development planners to, for example, entrust the care of firewood plantations to local farmers, a policy which has in fact proved ineffective. Alternatively, failure to appreciate farmers' inherent sensitivity to local ecological conditions and the primacy of agricultural production for them (dictated by socially sanctioned norms as well as the need for food) might lead policy-makers to underestimate the potential of agroforestry for alleviating permanent damage to the forests.

Logging has been discussed above. However, for the purposes of analyzing U.S. foreign policy, the role of the U.S. timber industry in tropical countries must be described in more detail. Following World War II and into the 1960's, U.S. and European companies did almost all of the logging in tropical regions, particularly in Southeast Asia.[46] Though their conservation practices were not exemplary, U.S. firms were, on the whole, a positive influence on their local and regional partners. These firms were aware of the long-term economic benefits of conservation, had learned

44. Brown & Wolf, *supra* note 21, at 231-33.

45. Letter from Michael Benge, U.S. Agency for International Development, Bureau for Science and Technology, Office of Forestry, Environment, and Natural Resources (May 28, 1985) (commenting on an earlier draft of this paper). *See also* TROPICAL FOREST, *supra* note 2, at 187-188; *Biological Diversity Hearings*, *supra* note 11, at 28-29 (statement of Nyle Brady, Senior Assistant Administrator, Bureau for Science and Technology, U.S. Agency for International Development).

46. Two-thirds of the world's tropical timber is currently harvested in Southeast Asia, though this area has only two-fifths of the world's tropical forests. Address by Malcolm Gillis, Tropical Rainforest Workshop, *supra* note 6.

sustainable forestry in the U.S., and made some attempt to apply it overseas.[47]

During the last few years, U.S. timber companies have abandoned all but a very few of their foreign concessions. In Southeast Asia, for example, foreign investment in logging currently accounts for about 30 percent of the total investment; in Indonesia 80 percent of this foreign investment is from multinationals headquartered in neighboring countries (for example, Malaysia, Singapore, and the Philippines). U.S. and European firms provide only about 6 percent of the total foreign investment.[48]

There are several reasons for the withdrawal of U.S. firms. First, Indonesia and other timber exporters have imposed rules on foreign firms requiring more domestic processing of raw logs. Indonesia's policy of "forced value added" was a major influence on the decision of Weyerhauser, the largest U.S. forest products company in Indonesia, to abandon its concession a few years ago.[49] In addition, governments have increased export taxes to retain more of the value of the timber which is extracted. Second, the worldwide recession of the early 1980's depressed timber prices and reduced the profitability of maintaining large overseas operations. The political instability and unpredictability of the regulatory environment became less tolerable as foreign profits decreased.

Finally, U.S. firms were distressed by the blatant "cut and run" tactics of local and regional companies. Weyerhauser, for example, was constrained in its attempts at reforestation by its Indonesian partner, a firm owned by the government.[50] The Indonesians needed short-term profits, invested very little in research, did not control squatters, and would not grant Weyerhauser the land tenure required for reinvestment to appear prudent. Thus, though U.S. timber companies left the tropics for primarily economic reasons, and though their conservation practices abroad were not as thorough as at home, their decisions to leave have accelerated tropical deforestation. One former U.S. Government official knowledgeable about tropical deforestation, with no ties to industry, told the author

47. *Tropical Deforestation Hearings*, *supra* note 14, at 236-37 (statement of Carl Gallegos, formerly senior research forester, International Paper Company; currently forestry official, Office of Forestry, Environment and Natural Resources, Bureau for Science and Technology, U.S. Agency for International Development). This perspective on American industry was shared by all of the forestry experts, in both government and in non-governmental organizations, with whom the author discussed this issue, most of whom had no present or former affiliations with timber companies.

48. Address by Malcolm Gillis, *supra* note 46.

49. Telephone interviews with: Mark Rey, Director of Water Quality Programs, National Forest Products Association (May 3, 1984); Peter Hazelwood, World Resources Institute (May 3, 1984); Bruce Ross-Sheriff, formerly with the U.S. Congress Office of Technology Assessment (May 7, 1984). *See also* Guppy, *supra* note 24, at 944. The Indonesian regulations were primarily aimed at firms in Singapore and Japan, where most of the value is added to Indonesian timber.

50. Guppy, *supra* note 24, at 943-44.

"It was too bad that Weyerhauser left, because they were doing the most to develop sustainable forestry [in Indonesia]."[51]

In conclusion, it is apparent that the U.S. Government can more readily ameliorate the effects of deforestation through its foreign aid programs than through attempting to manipulate trade in tropical forest products. It would be very difficult to convince import-dependent foreign traders, especially Japan, to do without; U.S. trade is not itself a major cause of deforestation; and imposing import quotas on U.S. firms, even if it would significantly alleviate the problem, would carry heavy political costs. Foreign aid, including U.S. support of certain multilateral programs, directly influences the agricultural practices in tropical countries which are the main causes of deforestation. Though we must be realistic about the extent to which modification of foreign aid policy would result in better forest management,[52] it is nonetheless clear from an overview of the causes of deforestation that this is the most promising approach open to the U. S. Government.

TROPICAL DEFORESTATION AND THE ORGANIZATION OF THE U.S. FOREIGN POLICY PROCESS

U.S. executive agencies which have been most involved with tropical deforestation are the Agency for International Development (AID) and the Department of State. The United States Department of Agriculture (USDA) and the Forest Service have the potential for playing a major role and this paper will argue that they should. Congress has also contributed heavily to the formulation of deforestation policy and its role will be reviewed.[53]

In studying the U.S. foreign policy process, bureaucratic culture provides a useful conceptual focus for understanding policy outcomes. Bureaucratic culture is defined as "shared key values and beliefs," the "social

51. Telephone interview with Bruce Ross-Sheriff, formerly Project Director, Study of Tropical Forests, Office of Technology Assessment, U.S. Congress (May 7, 1984). Ross-Sheriff makes the point somewhat less emphatically in *U.S. International Environmental Policy: Hearings Before the Subcomm. on Human Rights and International Organizations of the House Comm. on Foreign Affairs*, 98th Cong., 2d Sess. 67 (1984) [hereinafter cited as *International Environmental Hearings*].

52. Developing country governments must at least fully support, and preferably initiate, aid projects if these projects are to be very successful.

53. *See generally* Grimes, *Congress and International Environmental Policy: An Overview*, 5 J. PUB. & INT'L AFF. 84 (1984). Executive departments and bureaucrats usually assume much more initiative in making policy than their status as administrative organs would suggest, through the efforts of "entrepreneurial" career bureaucrats as well as the guidance of politically appointed senior officials. *See generally* R. CORWIN, THE ENTREPRENEURIAL BUREAUCRACY: BIOGRAPHIES OF TWO FEDERAL PROGRAMS IN EDUCATION (1983).

or normative glue that holds an organization together."[54] Once formed, it partially determines the subsequent behavior of organizations. Bureaucratic culture is shaped by both the legally mandated mission and the historical experience of an organization. Mission and history together provide a key to understanding the obstacles faced by the U.S. Government in formulating policy on deforestation and will be the theme of the following discussion.

Department of State

Within the U.S. Government, the Department of State (hereinafter within this section "the Department") has primary responsibility for foreign affairs. For more than a century, these consisted almost exclusively of bilateral relationships, and the activities to which the Department gives highest priority still revolve around the "country desks."[55] The legal, diplomatic, and bilateral character of nineteenth century U.S. foreign policy remains embedded in the bureaucratic culture of the Department, despite the fact that the world has changed in important ways.

The advent of multilateral cooperation, often under the auspices of formal international organizations, the growing involvement of other departments and agencies of the U.S. Government in foreign affairs, and the increasingly technical nature of international issues have required new approaches to foreign policy-making.[56] These developments are closely related. Many international organizations, including those which are per-

54. Smircich, *Concepts of Culture and Organizational Analysis*, 28 AD. SCI. Q. 344, 345 (1983). *See also* Riley, *A Structurationist Account of Political Culture*, *id.* at 414. Her work on organizational subcultures could illuminate certain aspects of the Forest Service's behavior within the Department of Agriculture. For an explicit consideration of *bureaucratic* culture as a special case of organizational culture, see Jones, *Transaction Costs, Property Rights, and Organizational Culture: An Exchange Perspective*, *id.*, at 454, 462-463. For a study of the relationship between bureaucratic culture and innovation within bureaucracies, see G. BRITAN, BUREACRACY AND INNOVATION: AN ETHNOGRAPHY OF POLICY CHANGE (1981). For an attempt to develop a more formal analytical approach to organizational culture, see E. Schein, *Organizational Culture: A Dynamic Model*, Working Paper No. 1412-83, Sloan School of Management, Massachusetts Institute of Technology, (1983).

55. The State Department is divided into bureaus, the most important of which are geographically oriented (*e.g.* the Bureau of African Affairs). Within each regional bureau, the smallest administrative unit is the country desk. At the country desk, a single Foreign Service Officer manages the United States's relations with a particular country or, in a few cases, with a number of geographically related small countries. For background on the bureacratic culture of the State Department, see Scott, *The Department of State: Formal Organization and Informal Culture*, 13 INT'L STUD. Q. 1 (1969).

56. *See generally* E. SKOLNIKOFF, SCIENCE, TECHNOLOGY, AND AMERICAN FOREIGN POLICY (1967); EAGLE ENTANGLED: U.S. FOREIGN POLICY IN A COMPLEX WORLD (Oye, Rothchild, & Lieber eds. 1979). On the growing complexity of U.S. foreign policymaking, see L. BLOOMFIELD, THE FOREIGN POLICY PROCESS: A MODERN PRIMER 3-5, 21-31 (1982). For sustained analysis of the conduct of foreign relations with respect to natural resources and the environment, see A. HOLLICK, U.S. FOREIGN POLICY AND THE LAW OF THE SEA (1981); J. CARROLL, ENVIRONMENTAL DIPLOMACY: AN EXAMINATION AND A PROSPECTIVE OF CANADIAN-U.S. TRANSBOUNDARY ENVIRONMENTAL RELATIONS (1983).

ceived to be the most effective, are functionally oriented. That is, they have been established to promote and manage international cooperation in specific technical fields such as health, transportation, communications, and agriculture, many of which involve international public goods. This cooperation is in the interest of most governments which actually participate in these international organizations. A lack of cooperation, for instance in placing communications satellites into orbit, would allow each country to retain autonomy, but would often involve unacceptable costs (for example, failure of the satellite communications system as a whole).[57] Because all members have a concrete interest in successful outcomes, such outcomes are more common than in international organizations with wider membership and more variegated responsibilities.[58]

However, the Department does not usually have the expertise with which to manage problems with high technical content.[59] The financial and human resources which it can apply to each issue are few, relative to other agencies more directly involved in domestic aspects of the same issues.[60] State's personnel, for the most part, are Foreign Service Officers with limited technical experience. The Department has tried since the early 1950s to develop a cadre of scientists and technologists.[61] These efforts have become somewhat more intensive since 1973, when the Department established the Bureau of Oceans and International Environmental and Scientific Affairs (OES).[62] Moreover, many of the individual Foreign Service Officers and civil servants in OES have applied considerable energy and creativity to the management of technically complex foreign policy problems. These individuals include several in the Office of Food and Natural Resources who, assisted by their counterparts in AID and the Forest Service and in cooperation with interested Congressmen, have worked to alleviate tropical deforestation. However, bureaucratic culture within the Department has supported continued emphasis

57. For theoretical background, see R. KEOHANE, AFTER HEGEMONY: COOPERATION AND DISCORD IN THE WORLD POLITICAL ECONOMY (1984).

58. The extreme case is the United Nations General Assembly.

59. *See generally* U.S. COMMISSION ON THE ORGANIZATION OF THE GOVERNMENT FOR THE CONDUCT OF FOREIGN POLICY, GPO REPORT ON THE ORGANIZATION OF THE GOVERNMENT FOR THE CONDUCT OF FOREIGN POLICY Appendix, Vol. 1 (1975), commonly known as the MURPHY REPORT.

60. For example, the Department of Agriculture has the requisite expertise on agriculture. These comments are relevant to defense as well as to civilian economic and technological issues. As weapons systems and war fighting have become more complex, State has dealt less with national security. Attempts to develop in-house expertise on arms control, a highly technical field which seems otherwise suited to diplomacy, especially through the Arms Control and Disarmament Agency, have had mixed success. Blechman & Nolan, *Reorganizing for More Effective Arms Negotiations*, 61 FOREIGN AFFAIRS 1155, 1157 (1983).

61. *See* Greenburg, *Science and Foreign Affairs: New Effort Underway to Enlarge Role of Scientists in Policy Planning*, 138 SCIENCE 122 (1962).

62. OES was formally instituted by the Department of State Appropriations Authorization Act, Pub. L. 93-126, § 9, 87 Stat. 451, 453 (1973), codifed at 22 U.S.C. § 2655 (1982).

on bilateral diplomacy and has limited the effectiveness of these efforts.[63]

Partly as a result of "cultural" constraints, the Department must rely on other agencies for guidance and, often, for policy implementation in technical fields. One manifestation of this reliance is that other agencies have assumed responsibility for representing the U.S. Government in functional international organizations. Congress is then drawn more deeply into international affairs as well, through domestically-oriented committees which formulate and oversee the budgets of these otherwise domestic agencies. The Department does retain its role as coordinator of foreign policy, though this role may be more or less titular where "low politics" is involved. A case which is relevant to tropical deforestation is that of the FAO. USDA has maintained a great deal of influence over U.S. policy with respect to the FAO since its creation in 1945,[64] though the principal representative to the FAO is an ambassador who reports to the Department and is supposed to represent the U.S. Government as a whole.

The Agency for International Development

The Agency for International Development (AID) was established in 1961 under the Department of State and continues to be a semiautonomous organization affiliated with the Department. It had several predecessors, the earliest of which was organized in the late 1940's. AID, like the Department, deals exclusively with international programs. Moreover, like the Department, AID is organized primarily around regional bureaus and country missions, though it does have substantive, or functional, bureaus as well.[65] The Agency is dominated by administrators of foreign aid who lack technical expertise, including experience with agricultural research. However, AID does give considerable financial support to other organizations which are more equipped to provide technical assistance.[66] In general, the Agency has assimilated the culture of the U.S. foreign policy community. Within AID, the Bureau for Science and Technology, which is responsible for most agricultural research, has considerably less influence than those bureaus responsible for Asia, Africa, and Latin America.[67]

63. For the latest attempt to upgrade science and technology at the State Department, *see* Walsh, *Shultz Signals Backing for Science Attachés*, 226 SCIENCE 518 (1984); Skolnikoff, *Science and the State Department: An Uncertain Alliance*, 1 ISSUES SCI. & TECH., Summer 1985, at 27.

64. E. SKOLNIKOFF, SCIENCE, TECHNOLOGY, AND AMERICAN FOREIGN POLICY 162-63 (1967); W. RASMUSSEN & G. BAKER, THE DEPARTMENT OF AGRICULTURE 184 (1972).

65. J.M. RICHARDSON, PARTNERS IN DEVELOPMENT: AN ANALYSIS OF AID–UNIVERSITY RELATIONSHIPS, 1950-66 105-106 (1969). *See also* Skolnikoff, *Birth and Death of an Idea: Research in AID*, 23 BULL. ATOMIC SCI. Sept. 1967, at 38.

66. *E.g.*, non-profit and profit making consulting firms, university scientists, international organizations.

67. The Bureau for Science and Technology has been upgraded somewhat since 1980. *See* R. MORGAN, SCIENCE AND TECHNOLOGY FOR INTERNATIONAL DEVELOPMENT: AN ASSESSMENT OF U.S. POLICIES AND PROGRAMS 11-25 (1984).

Through the early 1970's AID, along with much of the development assistance community, emphasized increasing aggregate production in developing countries for the purpose of building exports and earning foreign exchange. In the agricultural context, this meant that large scale projects were favored. Although research aimed at increasing yields was supported (but seldom performed) by AID and sometimes produced dramatic results, there was little attention given to the local effects of such agricultural projects on the environment, the long-term supply of natural resources, or on employment and patterns of income.

AID had some forestry programs during the 1960's and 1970's, but these also focused on industrial extraction and processing.[68] There was almost no connection between forestry and agriculture in AID's programs for tropical countries.[69] During the latter half of the 1970's, the Agency stopped funding forestry projects of any kind.[70]

Although funding little forestry work, AID increasingly emphasized agriculture during the 1970's. This was partly the result of Congress passing legislation in 1973 requiring AID to concentrate on the rural poor of the poorest countries, and hence necessarily on small-scale agriculture.[71] Congress had been influenced by a growing consensus within the development community expressed most forcefully by Robert McNamara, then President of the World Bank,[72] that industry and aggregate growth had been emphasized at the expense of agriculture and rural development,

68. A similar situation prevailed at the World Bank. *See* WORLD BANK, TECHNOLOGY AND SCIENCE IN WORLD BANK OPERATIONS 1.7-1.8 (1982).

69. Interview with Carl Gallegos, Office of Forestry, Environment, and Natural Resources, Bureau for Science and Technology, U.S. Agency for International Development, in Arlington, Virginia (Mar. 27, 1984). For a discussion of the emphasis on industrial extraction in the forestry program of international aid agencies, which does not specifically refer to AID, see FAO ACTION PLAN; *supra* note 6, at 93.

70. Krugman, *Forest Genetics and Foreign Policy*, 59 IOWA ST. J. RESEARCH 529, 531 (1985).

71. Foreign Assistance Act, Pub. L. No. 93-189, § 2, 87 Stat. 714, 715 (1973) amending Foreign Assistance Act, Pub. L. No. 87-195, Part I, ch. 1, 75 Stat. 424 (1961), (codified at 22 U.S.C. § 2151 (1982)). *See also* E. MORSS & V. MORSS, U.S. FOREIGN AID: AN ASSESSMENT OF NEW AND TRADITIONAL STRATEGIES 26-39 (1982). This emphasis on the rural poor as the intended recipients of U.S. foreign aid was renewed by Congress in 1975:

> Assistance. . .should be used not simply for the purpose of transferring financial resources to developing countries but to help countries solve development problems in accordance with a strategy that aims to increase substantially the participation of the poor. Accordingly, greatest emphasis shall be placed on countries and activities which effectively involve the poor in development . . . [D]evelopment assistance furnished under this chapter . . . [should be] increasingly concentrated in countries which will make effective use of such assistance to help the poor toward a better life (especially such countries which are suffering from the worst and most widespread poverty and are in greatest need of outside assistance). . .

International Development and Food Assistance Act, Pub. L. No. 94-161, § 301, 89 Stat. 849, 855-56 (1975) (amending Foreign Assistance Act, Pub. L. No. 87-195, § 102, 75 Stat. 424 (1961)), now codified at 22 U.S.C. § 2151 (1982).

72. D. MICKELWAIT, C. SWEET, & E. MORSS, NEW DIRECTIONS IN DEVELOPMENT: A STUDY OF U.S. AID 1 (1979). *See generally* R. AYRES, BANKING ON THE POOR: THE WORLD BANK AND WORLD POVERTY (1983).

resulting in structural imbalances in the economies of developing countries.

Tropical forest ecosystems are highly complex and delicate. However, although AID and the broader development community recognized the need to invigorate the agricultural sector in the 1970's, the Agency was reluctant to incorporate ecological perspectives into its programs.[73] As a result AID received a great deal of criticism from the environmental movement, initially in connection with the use of pesticides overseas. This criticism, in conjunction with lobbying and litigation, had significant results.

Prompted by the passage of the National Environmental Policy Act (NEPA) in 1969,[74] one of the most important legislative legacies of the broad-based environmentalism of the 1960's, AID established a Committee on Environment and Development in May 1971 and established procedures for evaluating the environmental impact of some of its projects.[75] NEPA required Environmental Impact Statements for all federally funded projects, exploring in detail their potential environmental effects and proposing alternative approaches.[76] AID at first found that NEPA was intended to apply only to domestic projects and performed full-fledged environmental assessments infrequently. Later in 1971, the President's Council on Environmental Quality (CEQ), which had been instituted by NEPA to oversee the implementation of the Act,[77] proposed changes in the bill to incorporate environmental impact assessment in U.S. programs for development assistance. However, it soon became clear that this would be unnecessary, as a lawsuit brought against the Agency by a coalition of private environmental organizations in 1975 resulted in AID accepting in principle the applicability of NEPA to almost all of its programs.[78]

73. For a detailed overview of the environmental effects of agriculture, see P. CROSSON & K. FREDERICK, THE WORLD FOOD SITUATION: RESOURCE AND ENVIRONMENTAL ISSUES IN THE DEVELOPING COUNTRIES AND THE UNITED STATES (1977). *See also* P. PINSTRUP ANDERSEN, AGRICULTURAL RESEARCH AND TECHNOLOGY IN ECONOMIC DEVELOPMENT 176-188 (1982).

74. National Environmental Policy Act, Pub. L. No. 91-190, 83 Stat. 852 (1969), (codified at 42 U.S.C. §4321 (1982)).

75. Much of the following discussion relies on J. Horberry, Development Assistance and the Environment: A Question of Accountability, 159-186 (Feb. 1985) (Ph.D. Dissertation, Department of Urban Studies and Planning, Massachusetts Institute of Technology). Portion reproduced as Horberry, *The Accountability of Development Assistance Agencies: The Case of Environmental Policy*, 12 ECOLOGY L. Q. 815, 840-49 (1985).

76. 42 U.S.C. §4332 (1982).

77. 42 U.S.C. §4341 (1982).

78. Environmental Defense Fund v. United States Agency for International Development, F.2d (D.D.C. Dec. 5, 1975). The stipulation states:

> The United States Agency for International Development ("AID") will prepare . . . pursuant to Sec. 102(2)(C) of the National Environmental Policy Act of 1969 . . . a detailed environmental impact statement (the "EIS") on its post management program including its pesticide activities.

Id. The stipulation becomes more general, however:

> AID recognizes its responsibilities to conduct its operations in a manner that mitigates

AID was reluctant to adopt the procedures mandated by NEPA for several reasons. In addition to doubts concerning the applicability of NEPA in foreign affairs, there were concerns that strict enforcement of environmental regulations in recipient countries would be perceived in those countries as a violation of national sovereignty. There were logistical difficulties, such as those associated with obtaining reliable data, encountered in preparing detailed Environmental Impact Statements for projects in developing countries.

A contributing factor, however, was the lack of experts trained in both agriculture and environmental studies. AID's deficiency in this respect, together with a failure of agriculturalists and foresters to communicate, detracted from the Agency's ability later in the decade to deal with deforestation in tropical countries. The Agency's small technical staff did not itself fully recognize, and could not convey to the staff of the regional bureaus, the importance of the relationship between agriculture and the forest environment.

In 1976, AID began using a more formal procedure for environmental assessment which was, according to the Agency's current Administrator, "patterned after the U.S. [NEPA] approach.[79] Nonetheless, the Agency, in the view of some environmental interest groups, the CEQ and Congress, was still moving too slowly. In 1977 Congress, prompted by environmentalists, amended the Foreign Assistance Act of 1961[80] to authorize the President, implicitly through AID, to "[f]urnish assistance . . . for developing and strengthening the capacity of less developed countries to protect and manage their environment and natural resources. Special efforts shall be made to maintain and where possible restore the land, vegetation, water. . . ."[81]

Further amendments were made to the Foreign Assistance Act of 1961 in 1979 and 1981 which specifically required AID to consider the con-

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or avoids any potential short- or long-term deleterious environmental effects of local, regional or global proportions. . . . AID will assist, to the extent possible, in strengthening the indigenous capabilities of developing countries to appreciate and evaluate the potential environmental effects of proposed development strategies and projects. . . .

AID will propose . . . and adopt environmental regulations, to assist AID in implementing the requirements of NEPA . . . [These] environmental regulations . . . will cover all aspects of AID's activities (capital assistance, technical assistance, commodity assistance, etc.).

Id.

79. *Review of the Global Environment 10 Years After Stockholm: Hearings Before the Subcomm. on Human Rights and International Organizations, House Comm. on Foreign Affairs*, 97th Cong., 2d Sess. 34 (1982) [hereinafter cited as *Stockholm Hearings*] (statement of M. Peter McPherson, Administrator, U.S. Agency for International Development).

80. 22 U.S.C. § 2151 (1982).

81. 22 U.S.C. § 2151(p) (1982). This legislation and amendments thereto are discussed in Horberry, *supra* note 75, at 842.

sequences of its programs for tropical forests.[82] This legislation was inspired by the work of individuals within AID and the Department, congressional staff, environmental activists, and a few congressmen, especially Don Bonker (D-Washington).[83] The amendments have become important factors in AID's planning and budgeting.[84]

In 1979, AID provided virtually no funds for forestry. In 1984,[85] the Agency budgeted about $52 million for projects which focused almost exclusively on forestry.[86] As of January 1982, AID had a total of 96 ongoing and planned projects with forestry components. The total "life of project" cost of the forestry components was $216 million.[87] In mid-1986, the corresponding figure was $491 million.[88]

82. International Development Cooperation Act, Pub. L. No. 96-53, § 101.b, 93 Stat. 359 (1979) (amending Foreign Assistance Act, Pub. L. No. 87-195, § 103.b, 75 Stat. 424 (1961), (codified at 22 U.S.C. § 2151(a) (1982); International Security and Development Cooperation Act, Pub. L. No. 97-113, § 307, 95 Stat. 1519, 1534 (1981) (amending Foreign Assistance Act, Pub. L. No. 87-195, § 118, 75 Stat. 424 (1961)), (codified as 22 U.S.C. § 2151(p) (1982)).

83. Bonker organized the *Tropical Deforestation Hearings, supra* note 14. He held a second set of deforestation hearings, *Deforestation: Environmental Impact and Research Needs: Hearings Before the Subcomm. on Natural Resources, Agricultural Research and Environment of the House Comm. on Science and Technology, and the Subcomm. on Human Rights and International Organizations of the House Comm. on Foreign Affairs*, 97th Cong., 2nd Sess. (1982). Finally, Bonker was largely responsible for the House Committee on Foreign Affairs requesting a study on tropical forests from the Congressional Office of Technology Assessment. TROPICAL FOREST *supra* note 2.

84. More recently, Congress has passed legislation requiring AID to give close attention to the impact of assistance on biological diversity; International Environment Protection Act, Pub. L. No. 98-164, Tit. 7, 97 Stat. 1045 (1983), adding § 119 to Foreign Assistance Act, Pub. L. No. 87-195, 75 Stat. 424 (1961), 22 U.S.C. § 2151 (1982). Congress recently considered legislation which strengthens the mandate it had previously given AID to protect tropical forests. S.Rep. 1747, 99th Cong., 1st Sess., 131 CONG. REC. 12, 919-12,920 (1985); H.Rep. 2957, 99th Cong., 1st Sess., 131 CONG. REC. 5443 (1985). Companion legislation requires AID to allocate at least $10 million for programs aimed at conserving biological diversity. S. Rep. 1748, 99th Cong., 1st Sess., 131 CONG. REC. 12,920-12,921 (1985); H.Rep. 2958, 99th Cong., 1st Sess., 131 CONG. REC. 5443 (1985). The companion bills passed the House on June 3, 1986. (For H.Rep. 2957, dealing with forests, see 132 CONG. REC. 3281 (1986); for H.Rep. 2958, dealing with biological diversity, see 132 CONG. REC. 3283 (1986). The corresponding bills have passed the Senate Foreign Relations Committee, but have not yet passed the full Senate (as of Sept. 24, 1986). *See generally Third World Progress is Painfully Slow*, CONSERVATION FOUND. LETTER, Mar.-Apr. 1986, at 1.

85. In 1984, the budgets of offices dealing with international environmental and resource issues were being cut at the State Department and the Forest Service.

86. Interview with U.S. Forest Service official, Washington, D.C. (Mar. 27, 1984).

87. U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, GPO #OTA 10: OTA-BP-F-19 SUSTAINING TROPICAL FOREST RESOURCES: U.S. AND INTERNATIONAL INSTITUTIONS 9 (1983).

88. Telephone interview with Daniel Deely, Program Manager, Forestry Support Program, Office of Forestry, Environment, and Natural Resources, Bureau for Science and Technology, U.S. Agency for International Development, Washington, D.C. (Sept. 18, 1986). All budget figures cited are approximate because it is very difficult to ascertain the exact amount AID is spending for a variety of reasons. Forestry work is often performed in the context of projects which do not primarily involve forestry. Projects which are primarily addressed to forests usually extend over a ten-year period. In addition to the inherent uncertainty in estimating costs over a decade, Congressional appropriations are subject to fluctuation.

"Food for Peace," or "P.L. 480," funds, authorized by the Agricultural Trade Development and Assistance Act, 7 U.S.C. § 1427 (1982), which are primarily used to supply food to developing

The Agency increased its forestry staff by three times between 1981 and 1983.[89] Moreover, though pre-1976 AID forestry projects focused exclusively on industrial exploitation, a great deal of the Agency's current funding is for conservation and forest management. A considerable portion is being used for projects involving the forest-farm relationship[90], especially in South Asia.[91] AID published an outline of its forestry strategy in 1984[92] which heavily emphasized the necessity of linking forestry and agriculture in development aid projects. This strategy has apparently received strong support from Peter McPherson, Administrator of the Agency,[93] and Nyle C. Brady, head of the Bureau for Science and Technology. However, within the AID bureaucracy, there is still considerable resistance to the integration of forestry, agriculture, and environmental planning.[94]

It was noted above that the most promising approach for the U.S. Government to help alleviate tropical deforestation is through foreign aid. AID is the primary development assistance agency in the government, and in several respects is well suited to design and implement policy for tropical forests. Most obviously, it has an organizational mandate to help developing countries, most of which are tropical. The Agency has made a great deal of progress during the last several years in addressing tropical deforestation and has acquired some in-house expertise in forestry. Thus, it combines the international orientation of the Department and, to a much lesser extent, the technical skill of USDA. In addition, it serves as an operational link between the Department, with which it is formally affiliated, and USDA, through certain cooperative research programs (discussed below). The Agency thus partially overcomes the dichotomy between responsibility and resources which often characterizes foreign agricultural and forestry policy.

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countries, support more tree replanting than all other U.S. foreign aid programs combined. Some P.L. 480 funds are administered by AID, but are not reflected in the figures cited in the text. The best available source of data on P.L. 480 forestry projects states that about $73 million was spent on "forestry and forestry-related activities" over the period ranging from about 1980 through about 1984. U.S. AID and USDA, Forestry Support Program, Food Aid and Forestry: Ongoing and Recently Terminated P.L. 480-Supported Projects Worldwide, Internal Interim Staff Report i-ii (Mar. 1984).

89. U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, GPO #OTA 10: OTA-BP-F-19 SUSTAINING TROPICAL FOREST RESOURCES: U.S. AND INTERNATIONAL INSTITUTIONS 9-10 (1983).

90. *International Environmental Hearings, supra* note 51, at 33-53. As is typical for all types of AID projects, most of these have been initiated by AID country missions, partially in response to requests by host governments.

91. Telephone interview with Kathy Parker, former forestry officer, U.S. Agency for International Development (Sept. 23, 1985).

92. U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT, SECTOR COUNCIL FOR ENERGY AND NATURAL RESOURCES, AID SECTOR STRATEGY: FORESTRY (1984).

93. *See International Environmental Hearings, supra* note 51, at 76 (statement of Robert O. Blake, Senior Fellow, International Institute for Environment and Development).

94. *Id.* at 102-103.

However, the appropriateness of AID for implementing such policy must be qualified. It has a much smaller budget than USDA's research divisions and a small fraction of the scientists. Moreover, while USDA's funding is quite stable, the Agency operates on a continuing resolution, which exposes it to the vagaries of opinion on foreign aid, expressed through annual appropriations bills.[95] Congress has probably felt free at times to use the Agency as a "whipping boy" for international environmental misdeeds, as few voters have any interest in its non-domestic activities, and thus few would complain about its "punishment." These attacks have occasionally demoralized Agency staff and obstructed efforts of long-term development planners.

There are at least two other factors which limit AID's ability to combat tropical deforestation on its own. First, the Agency retains a reputation in some developing countries as an agent for unpalatable foreign policy objectives of the U.S. Government.[96] An aid agency representing a self-interested U.S. Government is not in itself incompatible with improved forest management because, as we have seen, better forest management is in the interest of the U.S. In practice, however, regardless of the extent to which the U.S. Government acts to alleviate deforestation, developing country governments will probably continue to perceive foreign aid as closely linked to other U.S. interests as well.[97] These concerns of the U.S., related to security and ideology, may constrain the acceptability of forestry aid which is otherwise mutually acceptable.[98] In most developing countries, the Agency is trusted less than U.N.-affiliated organizations, such as FAO.[99]

Second, the so-called "New Directions" legislation, which required

95. This constraint is mitigated somewhat by the concern of certain Congressmen for tropical forests, who are in fact assisted by AID's flexible budgetary status.

96. For an argument that bilateral aid is intended primarily to serve the foreign policy interests of the donor, and empirical evidence to support this position with respect to the U.S., see McKinlay & Little, *A Foreign Policy Model of U.S. Bilateral Aid Allocation*, 30 WORLD POL. 58 (1977).

97. *Tropical Deforestation Hearings*, *supra* note 14, at 201 (statement of Donald R. King, former director, Office of Environment and Health, Bureau of Oceans and International Environmental and Scientific Affairs, Department of State).

98. An ideological debate which is more directly relevant to forest policy involves a program proposed by delegates from developing countries at the FAO Conference in November 1985. (On the FAO Conference *see infra*, note 148.) The plan involves storing plants which may have valuable genetic characteristics. While this proposal in itself is not very controversial, the proponents also want free access to all varieties which seed companies, generally headquartered in industrialized countries, have developed through crossbreeding tropical varieties. The U.S. strongly opposes the plan, the debate over which is reminiscent of the final months of the U.N. Conference on the Law of the Sea. During those negotiations, the claim that minerals on the seabed (like genetic resources here) were the "heritage of all mankind" hardened U.S. opposition to the treaty as a whole. The U.S., in both cases, supports the proprietary rights of private companies to the (possibly modified) natural resource in question. *See* Sun, *The Global Flight [sic] Over Plant Genes*, 231 SCIENCE 445 (1986); Schneider, *U.S. Opposes a U.N. Plan to Collect, Store Genes Essential to Food Supply*, Int'l Herald Tribune, Nov. 29, 1985, at 3, col. 1. *See also* Mooney, *supra* note 12.

99. This is significant because developing country governments must approve, fully cooperate with, and often initiate aid projects if they are to be successful.

AID to focus on the rural poor in the poorest countries, resulted in some countries with a great deal of tropical forest becoming ineligible for assistance.[100] The most notable of these is Brazil. Regardless of AID's intentions with respect to forestry, it simply cannot operate in these countries.

However, the main obstacles to improved tropical forest management are internal and involve the bureaucratic culture of the Agency. Attempts by Congress and Agency staff might have been more successful, and further progress might have been facilitated, if the prevailing attitudes toward development at the Agency were different. AID has a relatively short history, and its bureaucratic culture is not as sharply defined as that of State or USDA. However, the most consistent set of values which Agency staff and administrators shared until the mid-1970's revolved around the importance of "modernization," the core of which was industrial development and aggregate national economic growth.[101] Though agriculture is now recognized as being central to balanced development, and bureaucratic problems are recognized by senior AID officials, there are extremely few technical experts in the Agency, and their influence is still quite limited.[102] Even more constrained is the initiative of those few individual staff members who are specifically concerned with environmental side-effects of modern agriculture and with the relationship between forests and agriculture in the tropics.

In conclusion, although the U.S. Government can most readily affect the course of tropical deforestation through development assistance and although AID has considerable potential for formulating and implementing international forest policy, various factors limit the Agency's effectiveness. Therefore, the U.S. must supplement its bilateral aid with a stronger commitment to multilateral assistance. Moreover, as we will now see, it is essential that USDA becomes more involved in assisting developing countries in forestry and agriculture.

The Department of Agriculture and the Forest Service

The United States Forest Service is, for organizational purposes, part of the Department of Agriculture. USDA was created in 1862 and, after

100. For a discussion of the New Directions legislation, see *supra*, note 71 and accompanying text. *See* R. MORGAN, *supra* note 67, at 31 for discussion on countries which have become ineligible for AID assistance ("AID graduates").

101. Henriot, *Development Alternatives: Problems, Strategies, Values*, in THE POLITICAL ECONOMY OF DEVELOPMENT AND UNDERDEVELOPMENT 5, 13 (C. Wilber ed. 1979). Henriot's paper compares "modernization" or, as the author prefers to label the approach, simply "growth," with "growth with distribution." The author identifies the latter as the economic theoretical foundation of Robert McNamara's social program at the World Bank. On McNamara's program, see AYRES, *supra* note 72.

102. MORGAN, *supra* note 67, at 121. *International Environmental Hearings*, *supra* note 51, at 96 (statement of Thomas B. Stoel, Jr., Nat. Resources Defense Council). But see *Biological Diversity Hearings supra* note 11, at 24-30. Brady discusses in considerable detail the successes of AID in addressing deforestation in the tropics.

the Hatch Act was passed in 1887, focused largely on scientific research to support U.S. farmers through enhancing agricultural productivity.[103] The history of the Service is closely connected with the history of conservation in the U.S. Since the late 1800's, domestic natural resource policy has been guided by a strong conservation ethic.[104] Gifford Pinchot, a close friend of Theodore Roosevelt, embodied this ethic. Pinchot was appointed the Department of Agriculture's Chief Forester in 1898. He administered the transfer in 1905 of public forests, which were by that time substantial, from the Department of the Interior to what was then the Bureau of Forestry in USDA.[105] More generally, he had been instrumental in shifting the emphasis within the federal government from unsustainable exploitation to conservation of these forests.

Throughout the nineteenth century, almost all federal lands were administered by the Department of the Interior. It was generally understood that federal tenure was temporary, and that the Interior was responsible for transferring public lands to private ownership in order to encourage economic growth and settlement of the West.[106] During the last half of the century this understanding was codified in several natural resource "disposal laws."[107] Settlers and large businesses (for example, railroads) abused the disposal laws, and by the early twentieth century they had destroyed a third of the country's forests. As is now the case in the tropics, increased erosion, siltation, and flooding in the West were the direct result. Pinchot convinced Theodore Roosevelt to move forestry to USDA in order to better manage the exploitation of the nation's forests.[108]

103. Hatch Agricultural Experiment Stations Act, 7 U.S.C. §§ 361-361(i) (1982). For the history of the Department of Agriculture, *see generally* RASMUSSEN & BAKER, *supra* note 64. For an excellent, though somewhat dated, history of scientific research in the department, *see* T. SWANN HARDING, TWO BLADES OF GRASS (1947). *See generally* U.S. CONGRESS, OFFICE OF TECHNOLOGY ASSESSMENT, GPO #OTA 10: OTA-F-155 AN ASSESSMENT OF THE UNITED STATES FOOD AND AGRICULTURAL RESEARCH SYSTEM (1981) [hereinafter cited as AGRICULTURAL RESEARCH]; D. HADWIGER, THE POLITICS OF AGRICULTURAL RESEARCH (1982). *See generally* H. STEEN, THE U.S. FOREST SERVICE (1976); W. ROBBINS, AMERICAN FORESTRY: A HISTORY OF NATIONAL, STATE, AND PRIVATE COOPERATION (1985). For a history of recent developments, *see* M. FROME, THE FOREST SERVICE (1984).

104. U.S. COUNCIL ON ENVIRONMENTAL QUALITY, ENVIRONMENTAL QUALITY: THE ELEVENTH ANNUAL REPORT 294-296 (1980) [hereinafter cited as ENVIRONMENTAL QUALITY]; and *Stockholm Hearings*, *supra* note 79, at 1.

105. STEEN, *supra* note 103, at 74-78; ENVIRONMENTAL QUALITY, *supra* note 104, at 296. The Bureau was upgraded to a "Forest Service" later in the same year.

106. ENVIRONMENTAL QUALITY, *supra* note 104, at 295.

107. Homestead Act, 12 Stat. 392, ch. 75, § 1 (1862), 43 U.S.C. § 161, repealed by Pub. L. 94-579, Tit. VII, § 702, Oct. 21, 1976, 90 Stat. § 2728; Mining Resources Act, ch. 152, § 1, 17 Stat. 91 (1872), U.S.C. (1982); Desert Land Act, ch. 107, § 1, 19 Stat. 377 (1877), 43 U.S.C. §§ 321-323 (1982); Timber and Stone Act, ch. 151, § 1, 20 Stat. 89 (1878), 43 U.S.C. §§ 311-313, repealed by Pub. L. 206, ch. 448, Oct. 21, 1976, 90 Stat. § 2787.

108. The role of the Interior Department must not be oversimplified. Pinchot also sought transfer of forests in national parks, managed by the Park Service in the Interior Department, to the Forest Service because he did not think they should be withdrawn from exploitation. *See* Hays, *Gifford Pinchot and the American Conservation Movement*, in TECHNOLOGY IN AMERICA: A HISTORY OF INDIVIDUALS AND IDEAS 151, 157-58 (C. Pursell, Jr. ed. 1981).

The conservationists, like those who had supported the disposal laws, were motivated largely by economic considerations. However, the conservationists wanted to make the "most efficient use of natural resources over the longest period of time."[109] Classical liberal utilitarian economists such as John Stuart Mill, who influenced the conservationists, though propounding *laissez faire*,[110] believed that government should regulate private business when the costs of depleting public goods were not taken into account by the market; that is, when natural resources were scarce but this scarcity was not evident to a private sector pursuing its own short-term interest.[111]

Pinchot and others were concerned about the social as well as the long-term economic costs of market failure in these cases. Pinchot worried that the "increasing scarcity of natural resources would lead. . .eventually to social disaster."[112] Although for most conservationists the wilderness had an aesthetic appeal, their goal was not to preserve the forests, or to withdraw them from the market. Rather, their goal was to correct, through careful management by the federal government, those economic and social factors which had contributed to *unsustainable* exploitation.[113]

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109. J. PETULLA, AMERICAN ENVIRONMENTALISM: VALUES, TACTICS, PRIORITIES 34 (1980).

110. *Laissez faire* refers to the classical liberal economic philosophy of minimal governmental intervention in markets. Adam Smith is the most important early proponent of *laissez faire*.

111. PETULLA, *supra* note 109, at 34-39. Pinchot was fond of the utilitarian maxim, "the greatest good to the greatest number," as applied to the use of natural resources. Quote is from G. PINCHOT, THE FIGHT FOR CONSERVATION 48 (1967); *see also* Hays, *supra* note 108, at 156.

John Stuart Mill, though he believed deeply in the institution of private property, pointed out the limitations of this institution with respect to land and natural resources:

> . . . there is another large portion of the lands of the country [England] which are not yet private property, and to these the Society [for Land Tenure Reform] demands that the right of the nation be henceforth maintained. . . . There are, in the first place, what are called the common lands. These are said to belong to the lord of the manor. But they are not his like his private estate—to deal with as he pleases. They are not his for the principal purpose to which land is applicable—that of cultivation. Even their spontaneous produce does not belong to him exclusively. . . .The natural pasture, and the *wood* which grows wild on the land, he shares with those of his neighbours who have rights of common; and if he wants to bring the land into cultivation, he must apply to the Inclosure Commissioners who obtain for him an Act of Parliament.

MILL, ESSAYS ON ECONOMICS AND SOCIETY 688, 692-693 (J. Robson ed. 1967) (emphasis added). Elsewhere, Mill elaborates on the status of the cultivation of crops; MILL, PRINCIPLES OF POLITICAL ECONOMY WITH SOME OF THEIR APPLICATIONS TO SOCIAL PHILOSOPHY II.ii.5 (V. Bladen & J. Robson eds. 1965). He states that "The use of land in agriculture must . . . be of necessity exclusive." *Id.* at 227. The farmer must invest a great deal of time and effort into the land in order to produce crops, and he must be assured of tenure over that land during the often considerable periods of time necessary to enhance its productivity. *Id.* at 227. The posited distinction between "raw materials" and agriculture with respect to the appropriateness of private ownership, if valid, might be one intellectual tool with which to understand the clashing viewpoints of conservationist foresters and some farmers in the U.S.

112. PETULLA, *supra* note 109, at 36. *See also* STEEN, *supra* note 103, at 255.

113. Pinchot stated:

> There has been a fundamental misconception that conservation means nothing but the husbandry of resources for future generations. There could be no more serious

Contrasting conservationism with the environmental movement of the 1960's will better highlight the bureaucratic culture of the Forest Service. Though environmental activists shared many concerns with traditional conservationists,[114] the latter objected to the environmental movement's attempts to restrict the exploitation of natural resources.[115] The Forest Service, which, more than any other agency "represents" the conservationists, has over the years succeeded in inculcating a certain sense of responsibility into the timber industry. The Service has been aided in this effort by private groups and by the industry itself. The most perceptive members of industry see conservation as being in their long-term interest, as was suggested above in discussing the causes of tropical deforestation. However, because of its close relationship with industry, which continued

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> mistake. . . . The first principle of conservation is development, the use of natural resources now existing. . . . There may be just as much waste in neglecting the development and use of certain natural resources as there is in their destruction.

PINCHOT, *supra* note 111, at 42-43. *See also* PETULLA, AMERICAN ENVIRONMENTAL HISTORY 218 (1977); P. HOUSE & E. WILLIAMS, PLANNING AND CONSERVATION: THE EMERGENCE OF THE FRUGAL SOCIETY 70-71, 73-74 (1977).

114. G. Marsh, who in 1864 wrote MAN AND NATURE, is considered to be an early ecologist. MARSH, *supra* note 33. He presents "nature as a fragile balance of interrelationships between plants and animals within an easily modified landscape," PETULLA, *supra* note 113, at 220. For Marsh's role in the early development of the science of ecology, *see also* PETULLA *supra* note 109, at 32.

However, Marsh drew heavily upon the work of his conservationist contemporaries; *see* STEEN, *supra* note 103, at 8-9; Elder, *Vermonters and Wilderness: A Legacy and a Lesson*, 39 VERMONT LIFE, Autumn 1984, at 48. In fact, it would be artificial to distinguish late nineteenth century "conservationists" and "ecologists," as an articulated conservation ethic was so new and a science of ecology did not exist as such. *See* PETULLA, *supra* note 113, at 233.

Marsh argued for a very cautious approach to harvesting timber, primarily to protect watersheds; MARSH, *supra* note 33, at 194-218, 335-37.

115. As one essayist wrote somewhat polemically,

> . . .from the [environmental] movement's fundamental antipathy toward action and its reverence for the natural, it's not difficult to see how environmentalism rejected Pinchot's notion of conservation and 'wise use' in favor of the purity of preservation as expounded by John Muir. After all, Pinchot was a utilitarian and a pragmatist, urging that nature be used, but used wisely . . . Muir's preservationism disavowed Pinchot's basically utilitarian premise . . . Environmental activists especially have relegated Pinchot's ideal of Conservation to the scrap heap of discredited notions, judging it little better than a mask for corporate greed and resource exploitation.

Popovitch, *Environmentalism and the New Conservatives*, 89 AMERICAN FORESTS, 18, 51 (Mar. 1983).

See also the account of the conflict between environmentalists/ecologists and traditional conservationists in the Forest Service, Steen, *supra* note 103, at 317-323; PETULLA, *supra* note 113, at 217-18; HOUSE & WILLIAMS, *supra* note 113, at 70-72. The standard history of the "preservationists" in the U.S. is R. NASH, WILDERNESS AND THE AMERICAN MIND (1982). A useful history of the conservationists is S. HAYS, CONSERVATION AND THE GOSPEL OF EFFICIENCY: THE PROGRESSIVE CONSERVATION MOVEMENT, 1890-1920 (1969). For industry's views on conservationism and preservation with respect to forestry, *see* Alter, *Environmental Problems: Nothing New* in SCIENCE, TECHNOLOGY, AND FOREIGN AFFAIRS: GLOBAL ENVIRONMENT, COMMUNICATIONS, AND AGRICULTURE 28 (D. Bendahmane ed. 1984).

Marion Clawson believes that the environmental concerns about forestry during the late 1960's and early 1970's were different from earlier conservation "primarily in the degree of public involvement" in the former. *See American Forests in a Dynamic World*, in RESEARCH IN FOREST ECONOMICS AND FOREST POLICY, *supra* note 30, at 39, 58.

to occasionally misuse the forests, and philosophical differences with the more extreme preservationists, the Forest Service found itself confronted with an increasingly hostile environmental movement during the 1970's.[116]

This conflict was engendered in part by the bureaucratic culture of the Forest Service itself, which supported the policy of "wise use." Significantly for our purposes, the Service's conservative position with respect to the environmental movement[117] delayed the incorporation of the scientific concomitant of that movement, ecology. This delay has limited the effectiveness of the Service, and hence the government as a whole, in responding to the problem of tropical deforestation. In addressing deforestation, conservationists and ecologists must cooperate, because tropical forest ecosystems are so complex and, partly as a result, the forest-farm coupling is so strong.

In sum, conflicting demands upon the Forest Service were generated by (1) its conservationist mission and consequent duty to oversee industry's behavior; (2) conscientious industrial loggers seeking assistance of various sorts; and (3) environmentalists demanding exclusion of more forested land commercial use. This tension was superimposed upon a long-standing uneasy relationship between the Service and the Agricultural Department. Forestry, like agriculture, had been studied scientifically for some time before the Department of Agriculture was founded.[118] As a science, it seemed to belong in the research-oriented USDA. In addition to a common interest in research, the conservationists and the Department of Agriculture shared the then novel view that their goals could be legitimately and successfully pursued from within the federal government.[119]

116. Crafts, *The Dilemma of the Forest Service*, 76 AM. FORESTS, June 1970, at 8, 55-58. Crafts notes that at the same time environmental groups were growing in strength, groups representing the timber industry were also becoming more vocal—hence the Service's dilemma. *Id.* at 56, 58.

117. Burch cites research by Bond and Mawson in discussing the Service's "stolid defensiveness." Bond and Mawson found that young professionals within the forestry profession were more likely to have an ecological perspective than senior professionals. (For example, they were much more likely to agree with the statement, "When man upsets the balance of nature, he invariably harms himself.") Burch attributes this phenomenon to the profession's "trained incapacity" to incorporate young professional's "environmental and recreational vision" into its programs. This incapacity, in turn, has roots in the "origins of the profession" and the "evolution of its organizational form." Burch, *Social Aspects of Forest Policy Research*, in RESEARCH IN FOREST ECONOMICS AND FOREST POLICY, *supra* note 30, at 329. (Research by Bond and Mawson cited at 352; quotes from Burch at 352, 353.)

Edward C. Crafts, a former career forester and senior official of the Forest Service, suggested in 1970 that the Service should be more responsive to environmental concerns, and in fact "seize the [environmental] initiative" with respect to "forests and grasslands"; Crafts, *supra* note 116, at 58. *See also* Craft's comments on the Service's conservatism. *Id.* at 55.

118. MARSH, *supra* note 33, at 189.

119. Although USDA's research programs were seen in the late 1800's, as they are now, as complementary to those of the State Agricultural Experiment Stations, the former were nonetheless an innovation in centralization, and the latter received considerable funding from the federal government through the Hatch Act. Hatch Agricultural Experiment Stations Act, ch. 314, 24 Stat. 440 (1887) consolidated in Pub. L. 352, 69 Stat. § 671 (1955), 7 U.S.C. §§ 361(a)-361(i) (1982).

The Forest Service played an important role in promulgating conservationist practices to other sections of the Department and to the Interior.[120] The Soil Conservation Service was one of the more significant organizational manifestations of this movement. Originally established within the Department of Interior and then transferred to USDA, the Service was created to combat the dust storms of the 1930's, partly through reforestation.

However, USDA and its own "constituents," the farmers, have historically been somewhat reluctant to adopt conservation practices, though many now appreciate their value. The contribution of soil and water conservation to agricultural production has not in the past been as evident as that of forestry conservation to the long-term viability of the timber industry. This was partly due to the failure of the agricultural community to recognize early on that some agricultural inputs, especially soil and water, under certain physical and economic conditions, are public goods, just as forests and their accompanying watersheds must be considered "commons" for certain purposes.

As a result, the Forest Service and the Department have from time to time been at odds with one another. This was true when forestry conservation itself impinged directly on agricultural practices (especially livestock grazing in the West), and when conservationists attempted to transfer perspectives on the use of natural resources from forestry to agriculture and thus to preclude an exclusive emphasis on productivity in the latter.[122] Forest Chief William B. Greely, recognizing the problem, suggested in the 1920's that to prevent recapture of forest lands by the Interior, the Service had to forge more substantive ties with USDA.[123] In the words of one historian of forestry, the Service had to "learn to relate forestry to agriculture."[124] It was evident that many farmers during the twenties advocated the Service's return to the Interior and the subsequent subordination of conservationist tendencies in forestry management. In

120. RASMUSSEN & BAKER, *supra* note 64, at 88-99. *See also* ECKHOLM, *supra* note 2, at 47-53; HOUSE & WILLIAMS, *supra* note 113, at 74.

121. Within the U.S., concern for soil conservation predates organized forestry conservation. PETULLA, *supra* note 113, at 218-19. However, the conservation movement of the late 1800's, growing largely out of scientific forestry imported from Europe, did set a precedent for formal federal responsibility in connection with resources conservation. *See* Hays, *supra* note 108, at 155.

122. However, for an example of the Secretary of Agriculture "out-conserving" the Forest Service, *see* Letter from P. Appleby to Roosevelt, in 2 FRANKLIN D. ROOSEVELT AND CONSERVATION: 1911-1945, 478-80 (E. Nixon ed. 1957). On the other hand, Appleby resisted forestry activities in FAO. *See also* R. PHILLIPS, FAO: ITS ORIGINS, FORMATION AND EVOLUTION 140-142 (1981).

123. Though the two Departments have at times been rivals, this rivalry does not extend to Congress. Recognizing the close functional relationship of the Forest Service and the Bureau of Land Management in the Interior, the Interior Subcommittee of the House Appropriations Committee handles Forest Service appropriations as well. On the relationship between the Forest Service and the Bureau of Land Management, see *Two U.S. Agencies Plan Huge Swap of Western Land*, N.Y. Times, Jan. 30, 1985, at D21, col. 3.

124. STEEN, *supra* note 103, at 151, 254.

1922, the *Washington Post,* apparently siding with the farmers and "lamenting the fact that the Forest Service had changed from a research service to an administrative bureau. . .charged that it 'halts farmer's cows in search of a drink of water' and kept wood from the farmer. . ."[125]

Some foresters have tried over the years to make evident the relationship of conservation in general, and forest conservation in particular, with agricultural prosperity.[126] Moreover, the majority of U.S. farmers probably recognize the importance of vigorous soil and watershed conservation policy, though perceived economic imperatives or opportunities often take precedence.[127] In fact, it should not be concluded from this discussion, which focuses on discord between USDA and the Forest Service, that the relationship is primarily characterized by conflict. Certainly the Service has been content enough in the Department to have resisted all attempts over the last 80 years to move it to the Department of Interior.

Nonetheless, the Forest Service continues to meet with resistance. As

125. *Id.* at 150.

126. A number of foresters and officials of development aid agencies point out, however, that the international forestry profession as a whole fully shares the responsibility for the dichotomy between forestry and agriculture. Richard Pardo, an FAO forestry official dealing with forestry institutions, observes that indeed "agriculturalists [almost universally] either don't appreciate the relationship between forestry and agriculture, or worse yet, consider the two . . . as competitors." However, he goes on to say that "For too long forestry concentrated in timber production and timber management as its highest . . . priority, while neglecting those forest-based activities more directly related to people and to food production. . . . And now that food and fuelwood are the chief concerns of the world's rural people, we wonder why forestry is not being adequately recognized for its contribution to agricultural production." Letter from Richard Pardo, Forestry Officer (Institutions), Forestry Department, FAO, to author (Jan. 10, 1986); *see also Tropical Deforestation Hearings, supra* note 14, at 203 (statement of Donald R. King, formerly Director, Office of Environment and Health, Bureau of Oceans and International Environmental and Scientific Affairs, Department of State). *See generally infra* note 143 and accompanying text.

The U.S. Forest Service is divided into three offices. In the small U.S. Office of State and Local Forests, forester/farmer cooperation is evident. (The other two offices deal with National Forests and Research. The Office of National Forests has the largest budget of the three.) The Office of State and Local Forests assists in the management of non-federally owned forest lands, which include 80 percent of all commercial forests in the country. Much of this private forest is owned by farmers, who receive advice on conservation and, more recently, the ecology of the farm-forest systems in addition to the economic management of their plots. *See Reorganization of Natural Resource Functions of USDA: Hearings Before the Subcomm. on Environment, Soil Conservation, and Forestry of the Senate Comm. on Agriculture, Nutrition, and Forestry.* 96th Cong, 1st Sess. 43, 65-67 (1979) (statements of Bob Bergland, Secretary of Agriculture; Democratic Senator George McGovern of South Dakota).

127. During the 1970's, the high rate of inflation, continuing government subsidies, and expanding export markets encouraged many farmers to buy new land as a speculative financial investment, or to bring under cultivation idle land which they already owned. They bought land even though the new land was of marginal quality with respect to both its productive capacity and its susceptibility to soil erosion. *See* Mayer, *Farm Exports and Soil Conservation,* in 34 PROCEEDINGS OF THE ACADEMY OF POLITICAL SCIENCE, No. 3, FOOD POLICY AND FARM PROGRAMS 102, 109-111. (D. Hadwiger & R. Talbot eds. 1982). Note however, that Mayer feels that this renewed soil erosion problem is severe only in comparison with the recent past, not with the 1930's. For the impact of the international economy on farmers' behavior, *see generally* Lake, Export, Die, or Subsidize: The International Political Economy of American Agriculture, 1875-1939, paper for the 1986 Annual Meeting of the American Political Science Association at Washington, D.C. (Aug. 28-31, 1986).

the oldest governmental organization concerned with conservation, it has remained the "conservationist conscience" within the Department. Like any conscience, the Service is usually respected, sometimes ignored, and often perceived as an obstruction to the fulfillment of a desire (in this case, agricultural production). The sometimes uncomfortable relationship between the Forest Service and the Department has been exacerbated by the over-politicization of the latter. USDA began as a source of practical knowledge for the farmers, but its research duties were perceived as being, first and foremost, instrumental to its "clients" agricultural productivity. Forestry interest groups in general, and forest conservationists in particular, have never been as numerous as the farmers, and therefore have never had as much influence on USDA.

In the past this has mattered less, especially with respect to research, as the Service maintains a reasonably self-sufficient research establishment of its own. However, the situation has become worse for the foresters since World War II. During the last four decades, agriculture has become a big business, USDA has become more fully "captured" by agricultural interest groups,[128] and the Department has been increasingly asked to perform political services which have little to do with technical aspects of agriculture. The Department has become an "electoral agent of the President in the farm states" and a more active representative of farmers within the government.[129] The over-politicization of the Department is partly responsible for a decline in the quality of its agricultural research,[130] which was the original channel through which it aided farmers and in which it shared an interest with the Forest Service. Moreover, largely by default to local interests, USDA has lost some of its commitment to strong federal management of the agricultural research enterprise,[131] which it also shared originally with the Forest Service. During recent periods of economic stress for farmers, in which the Department has simultaneously become more subject to local interests and partially reduced to a broker for exports, conservation has at times been de-emphasized.[132] The result is an increase in the discomfort of the Forest Service within the Department.

128. HADWIGER, *supra* note 103, at 187-88.

129. MAYER & MAYER, *Agriculture, the Island Empire*, PROCEEDINGS OF THE AMERICAN ACADEMY OF ARTS AND SCIENCES (*Daedalus*) 83, 92 (Summer 1974).

130. On the decline in the quality of agricultural research, *see*, Fox, *USDA Struggles to Reform Its Research*, 225 SCIENCE 1376 (1984); Norman, *White House Plows Into Ag Research*, 217 SCIENCE 1227 (1982); AGRICULTURAL RESEARCH, *supra* note 103, at 22-23, 179-180, 183-184. *Cf.* HADWIGER, *supra* note 103, at 26, who claims that "One [bureau within the Department of Agriculture], the Forest Service, has enjoyed such a good reputation [for research] that it has maintained nearly complete autonomy within the USDA and has successfully resisted several major efforts to transfer it elsewhere."

131. AGRICULTURAL RESEARCH, *supra* note 103, at 13, 47; HADWIGER, *supra* note 103, at 187-191.

132. *See generally* Mayer, *supra*, note 127.

INTERNATIONAL PROGRAMS IN USDA AND THE FOREST SERVICE

Tension between the Forest Service and USDA with respect to domestic issues has weakened their cooperation in connection with international problems, including deforestation, and thus has limited the effectiveness of the U.S. Government in this field. The conservation ethic has not been a major factor in USDA's international programs. Promotion of exports has always been the Department's most vigorous international activity[133] although international sales became increasingly important during the 1970's. Now conducted primarily through the Department's Foreign Agricultural Service, export promotion has been consistent with USDA's primary mission: to enhance the economic well-being of U.S. farmers and consequently, in its view, of the country as a whole.

The Forest Service has an International Forestry Staff of 22 professionals, 15 of whom are currently under contract to AID.[134] The Staff is organized under the Office of Research, which administers three research facilities devoted to tropical forestry.[135] The members of the International Staff wish to promote conservation abroad, including unique forestry conservation techniques needed to alleviate the destructive impact of agriculture on tropical forests, although their resources are quite limited.[136]

Individual conservationists within the Forest Service and USDA, sometimes acting without formal sanction, have had some impact on conservation in other countries[137] and on U.S. foreign policy. Gifford Pinchot

133. For historical background on export promotion in USDA, see RASMUSSEN & BAKER, *supra* note 64, at 160-62. On USDA international activities, *see generally id.*, at 160-185; U.S. DEPARTMENT OF AGRICULTURE, OFFICE OF INTERNATIONAL COOPERATION AND DEVELOPMENT, FOREIGN AGRICULTURAL ECONOMIC REPORT #131, INTERNATIONAL ORGANIZATIONS AND AGRICULTURAL DEVELOPMENT, (M. Kriesberg ed. 1981); *see also* AGRICULTURAL RESEARCH, *supra* note 103, at 151.

134. These figures are accurate as of September 1986. The total number of professional foresters has increased from about 16 in 1984, primarily due to increases in AID funding for forestry in developing countries.

135. The three facilities are the Pacific Southwest Forest and Range Experiment Station, the Institute of Tropical Forestry in Puerto Rico and the Institute of Pacific Islands Forestry in Hawaii. U.S. Congress, Office of Technology Assessment, see note 13, Sustaining Tropical Forest Resources: U.S. and International Institutions 11-12 (1983).

136. In 1985, the budget of the Forest Service was about $2.1 billion. The budget for the Office of Research was about $125.5 million, and that of the International Forestry Staff about $0.5 million. Almost all of the International Staff's budget is for salaries, and it receives more funds from AID than it does through its own budget. Letter from David A. Harcharik, Director of International Forestry, Office of Research, U.S. Forest Service to author (Feb. 3, 1986).

137. Hugh H. Bennett, founder of the Soil Conservation Service, was one of the most effective of these international spokesmen. He vigorously advocated better soil conservation practices in Venezuela, Guatamala, Honduras, Mexico, South Africa, Canada, and other countries. Walter C. Lowdermilk was another prominent conservationist in the Department who travelled extensively from about 1915 through the 1940's to teach farming methods which incorporated conservation techniques. He focused on the Middle East and China. HARDING, *supra* note 103, at 197, 214-215. Forest Service staff observe that "Successes [in forestry conservation in developing countries] are nearly always based on the efforts of one key individual, whether [foreign aid] donors are involved or not. That key individual is usually a local person." U.S. FOREST SERVICE, *supra* note 36, at 23. U.S. conservationists probably inspired some of the early leaders in developing countries.

himself worked with foreign foresters during his early years, and he would have had a significant impact on U.S. foreign policy had not Franklin D. Roosevelt died early in his fourth term as President. Pinchot and Roosevelt believed that depletion of natural resources was one of the main causes of war.[138] They emphasized the negative social and economic consequences of deforestation, especially as it had occurred in the Middle East. Pinchot convinced Roosevelt to hold an international conference on conservation immediately following World War II. However, the Department felt that such a conference would draw attention away from the nascent FAO, which would, in State's view, be an adequate champion of conservation. Roosevelt did not agree,[139] but died before he could personally organize the conservation conference.[140] Thus, conservation never became a salient foreign policy issue at the highest level of government, though President Jimmy Carter, inspired by the new environmentalism, was quite concerned about tropical deforestation and supported measures to alleviate it.[141]

USDA, the Forest Service, and Multilateral Aid Programs

As Roosevelt had perhaps feared, the FAO failed, in many foresters' views, to promote conservation vigorously enough. Until the 1960's, forestry was assigned a low priority within the Organization, which, like other international organizations founded at the time, received heavy support from the U.S. USDA officials were active in the FAO from the start. There is evidence that some of them resisted giving forestry a larger

138. Political scientist Nazli Choucri has extensively examined, both theoretically and empirically, the relationship between population, resource use, and technological development on the one hand, and international conflict on the other. For her early work, which is quite relevant to the present discussion, see *Population, Resources, and Technology: Political Implications of the Environmental Crisis*, in WORLD ECO-CRISIS: INTERNATIONAL ORGANIZATIONS IN RESPONSE 9 (D. Kay & E. Skolnikoff eds. 1972).

139. Roosevelt did however, support the formation of FAO.

140. STEEN, *supra* note 103, at 255. Correspondence between Roosevelt and Gifford Pinchot, Secretary of State Cordell Hull, and acting Secretary of State Edward R. Stettinius, Jr., and between Stettinius and W.L. Clayton, Assistant Secretary of State for Economic Affairs, in FRANKLIN D. ROOSEVELT AND CONSERVATION, *supra* note 122, at 591-94, 599-600, 606-08, 612-16, 634-41, 644-48. *See also Id.* at 632-33.

141. *See* PUBLIC PAPERS OF THE PRESIDENT OF THE UNITED STATES: JIMMY CARTER 983 (1977); PUBLIC PAPERS OF THE PRESIDENT OF THE UNITED STATES: JIMMY CARTER 414, 2971-2972 (1980-81). President Richard M. Nixon was also very supportive of measures to protect the environment within the United States. In addition, Nixon was in office during the United Nations Conference on the Human Environment, held in Stockholm in 1972, at which the United States played a strong leadership role. Carter is cited here for the prominence of international environmental issues during his Administration and for the particular attention he gave to tropical forests. On Carter's concern for the international environment, *see* 3 C.F.R. § 356(1980), 42 U.S.C.S. § 4321(n)(t) (1982). This Executive Order, in part, confirmed the applicability of NEPA in international programs of U.S. Government agencies.

role,[142] despite the efforts of concerned foresters, including those of the U.S. Forest Service, and despite the obvious personal concern of Roosevelt.

This does not imply either malicious intent on the part of the agriculturalists nor unusual foresight on the part of the foresters. The former were simply transferring their concern with production of food to the international arena, in which hunger was a much greater problem than in the U.S. The latter did believe that forestry conservation was important around the world. However, they had little knowledge about unusually complex tropical ecosystems or the need for integrating forestry and agriculture, to an extent which had not been necessary in the U.S.[143] However, the common perception in the U.S. that the domestic missions of USDA and the Forest Service were unrelated, or even incongruent, has contributed heavily to the failure of the FAO to integrate forestry and agriculture more fully within its own development programs.[144]

142. PHILLIPS, *supra* note 122, at 140-142 (discussing the history of FAO). *See generally* GOVE HAMBIDGE, THE STORY OF FAO (1955); W. Marshall, The Administrative Organization and Operation of the Food and Agriculture Organization of the United Nations, 1945-1951: A Critical Analysis, Ph.D. Dissertation, Department of International Relations and Organization, American University (June 1951).

143. As discussed in note 126, foresters' emphasis on timber production and management in the developed countries contributed as much to the mutual isolation of forestry and agriculture as farmers' narrow approach to food production. Production-oriented forestry, supported by conservationism, was transplanted to the developing countries via the colonial system. (The emphasis in former tropical colonies of European powers on forestry preserves for industrial timber operations, rather than integration of forestry with local farms, is treated in FAO ACTION PLAN, *supra* note 6, at 86-87.) Foresters in developing countries, trained in "Northern" methods, still tend to ignore "community," "social," "environmental," and "agro-" forestry. *Id.* at 86. (FAO goes on to say that "Collectively, all that is intended by such terms, is the restoration of forest cover in all its productive forms outside forest reserves and in a way that is of maximum benefit to the neglected, traditional agricultural sector." *Id.* at 86.)

Some empirical evidence for foresters' role in the forestry-agriculture split is provided by sociologists Lawrence Busch and William B. Lacy. Busch and Lacy, in a study of the attitudes of agricultural scientists in thirteen disciplines toward a variety of issues, found that forestry researchers were the least likely to perceive their work as aiding developing nations (plant pathologists were most likely); were among a group which saw their work as least likely to reflect "alternative approaches to agriculture"; and were least likely to perceive their research as reflecting the imperatives of the "world food crisis." Forestry scientists did see their research as relevant to "environmental issues" and "energy issues." L. BUSCH & W. LACY, SCIENCE, AGRICULTURE, AND THE POLITICS OF RESEARCH, 194, 216-21 (1983).

144. FAO did not begin as an agency which implemented programs for development. During the first five years of operation, it focused on technical studies and disseminating information. Many of these studies were devoted to European problems. As more colonies gained independence during the late 1940's and early 1950's, FAO's field program grew and its attention shifted to the developing world. On the distinctionbetween the "Field Programme and the "Regular Programme," *see generally* text and authorities, *infra*, note 149. Field activities were aided by the creation within the U.N. of the Expanded Program of Technical Assistance, a precursor of the U.N. Development Program, which heavily supplemented FAO's regular program budget. *See* Moyer, FAO As a Structure of Power: The Reality of Its Limitations, paper for the 1986 Annual Meeting of the Midwest Political Science Association at Chicago, Ill. 1-2 (Apr. 9-12, 1986).

This is significant because FAO, though its highest priority is producing food, nonetheless has the largest forestry staff of any international organization.[145] In addition, the U.S., which provides the largest financial contribution to the Organization, continues to have considerable influence over its policies.[146] Most importantly, the State Department has recently suggested that the FAO is the multilateral organization whose mission and skills are most appropriate for addressing the problems of tropical deforestation.[147]

However, the U.S. delegation to the FAO Conference[148] includes no foresters. Moreover, the U.S. Government, acting through USDA, has not vigorously encouraged the application of FAO's resources to the alleviation of deforestation. Meanwhile, the Organization's Regular Programme[149] budget for forestry, as a percentage of the total, decreased

145. In 1980, there were between 300 and 400 forestry experts working for FAO in the field and about another 77 working at FAO headquarters in Rome. *Tropical Deforestation Hearings. supra* note 14, at 205-206 (statement of Samuel H. Kunkle, Forest Hydrologist, USDA). Most of the foresters in the field were "directly involved in forestry development projects—establishing nurseries, planting trees and improving management practices." *Id.* at 206.

146. *See* Moyer, *supra* note 144, at 31.

147. Statements of Bill Long, Director, Office of Food and Natural Resources, Bureau of Oceans and International Environmental and Scientific Affairs, U.S. Department of State (June 1984), discussed the evolution of U.S. interaction with multilateral organizations in connection with tropical deforestation as follows:

> Four years ago the United States asked UNEP [United Nations Environment Program] to take the lead in tropical forestry, to work out an international plan. It subsequently made some useful steps along that line. The determination was later made by the United States and other Nations that the FAO should take that responsibility on, and so we think now that is the time to shift the UN focus and put the burden on the FAO. Whether the FAO is prepared to do the job that we would like them to do remains to be seen. We have been skeptical, and concerned about the lack of progress, and we intend to press the FAO harder. We did just that in Nairobi [UNEP Governing Council meeting] last month. Our message to UNEP was that 'you've done your work and catalyzed a world wide effort to lay out the program framework; but now there is another specialized agency that should pick up the ball'.

International Environmental Hearings, supra note 51, at 6. *See also Tropical Deforestation Hearings, supra* note 14, at 201 (statement of Donald R. King, formerly Director, Office of Environment and Health, Bureau of Oceans and International Environmental and Scientific Affairs, Department of State).

UNEP grew out of the United Nations Conference on the Human Environment, held in Stockholm in 1972, and was intended to be a coordinating and planning, not a programmatic, organization. The limitations of UNEP with respect to the alleviation of tropical deforestation are inherent in this mission. FAO, on the other hand, is a programmatic organization, and its limitations, alluded to by Long, are of quite a different nature. Their elucidation is one goal of this paper. FAO (especially FAO foresters) and UNEP have had "turf" battles over the deforestation issue parallel to the conflict between private environmental groups and the Forest Service in the U.S. State Department officials, including Long, have helped mediate these disputes.

148. The supreme governing body of the Organization, is made up of national representatives who meet regularly every two years.

149. Horberry, *supra* note 75, at 858 explains:

> The FAO administers two programs—the Regular Programme and the Field Programme. A major difference between the two programs is that they receive funds from different sources. The Regular Programme is funded directly by the FAO member governments.
>
> The Field Programme is funded primarily by outside funds from the United Nations

by half between 1969 and 1983.[150] Members of the International Forestry Staff and AID staff who participate in FAO's Committee on Forestry[151] and Committee on Forest Development in the Tropics (CFDT)[152] have lobbied directly with FAO for a larger percentage of the budget, but without success.[153]

FAO has the potential for developing and implementing very effective policies for forestry conservation in the tropics. This potential is illustrated in the excellent research and field work on tropical forestry which the Organization has already performed. Previous activities include the best available global inventory of forest resources.[154] Stephen B. Preston, an academic expert on tropical forestry, observed in 1980:

> [FAO] has been the single most potent factor in the development of any types of forestry practices in the tropics since its very inception, and this is certainly continuing today. One of the areas in which it has had particular influence has been in the development of educational institutions to provide trained manpower in the tropical countries. With [one notable exception] . . . in India, it is very difficult to think of any forestry school in tropical countries that has not developed with the leadership, or support, of FAO. It certainly has been an extremely important factor in this area, and also in leadership in the management of forests for all users.[155]

Recently, CFDT has tried to promote tropical deforestation as a problem which FAO must address more actively. The Committee began to develop a tropical forestry action plan[156] at its sixth session in 1983. At the Committee's request, a series of "tropical forests action programs" were

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Development Programme . . . and Trust Funds . . . [provided by bilateral donors, normally . . . for particular types of activities or regions, or. . .by the recipient government itself].

150. Forestry received 8.5 percent of regular program funds in 1969 and about four percent in 1982. North American Forestry Commission, FAO Forestry Activities: Review Biennium 1982-1983 and Programme of Work and Budget for 1984-1985. Manuscript presented at the twelfth session of the North American Forestry Commission of the FAO at El Paso, Texas 2 (Feb. 20-24, 1984); interview with a U.S. Forest Service official, Washington, D.C. (Mar. 27, 1984). In the 1986-87 two-year budget, forestry is still receiving four percent of the regular program budget. THE DIRECTOR-GENERAL'S PROGRAMME OF WORK AND BUDGET FOR 1986-87 [hereinafter cited as FAO PROGRAMME].

151. The Committee members are outside experts, some of whom are on the staff of the U.S. Forest Service, that advises the Council. The Council in turn is the second-level governing board of the Organization, which meets regularly in between conferences. The Council has 49 members. The United States has always been a member.

152. CFDT is a statutory body that was founded in the mid-1970's. CFDT includes representatives of 45 FAO member governments. The U.S. delegation to CFDT has almost exclusively included AID personnel and members of the International Forestry Staff. CFDT is the institutional author of FAO's TROPICAL FORESTRY ACTION PLAN, *supra* note 6.

153. Interview, *supra* note 150.

154. FAO PROJECT, *supra* note 3.

155. *Tropical Deforestation Hearings*, *supra* note 14, at 213 (statement of Stephen B. Preston, Associate Dean and Professor of Natural Resources, School of Natural Resources, University of Michigan).

156. FAO ACTION PLAN, *supra* note 6.

drafted by the FAO Forestry Department and studied by a group of outside experts. The resulting document was reviewed and endorsed by CFDT at its seventh session in June 1985. It was then presented at a special session of the Ninth World Forestry Congress, supported largely by FAO and held in Mexico City, lending the plan considerable visibility.[157] Finally, the plan was the subject of a meeting of representatives from donor countries and international organizations in The Hague in November 1985.[158]

The plan was intended to be, and in fact has become, a set of guidelines on the basis of which national governments, other international organizations, and non-governmental organizations may structure and coordinate their activities. Perhaps the most important outcome of FAO's planning process has been the World Resource Institute's (WRI) action plan, which is explicitly modelled on FAO's.[159]

The World Bank and the U.N. Development Program (UNDP) cooperated closely with WRI on its tropical forestry plan, which lays out in detail a five-year funding schedule (1987-91) in five problem areas[160] for each of about 20 developing countries. Former World Bank President A.W. Clausen endorsed the goals of the plan. At least one forestry expert in the Bank suggests that Clausen's support was important in the formulation of a forestry program for Africa which commits the Bank to doubling its lending in this field over the next three years.[161] In any event, it is clear that the Bank is placing more emphasis on forestry conservation and sustainable agriculture, despite continuing support of projects which are destroying large tracts of rain forest.[162]

157. Another factor which brought attention to the Action Plan was the FAO Council's declaring 1985 the International Year of the Forest. On the Council, *see supra* note 151. This declaration was based on a great deal of research and organizational work within the Forestry Department, the Committee on Forestry, and CFDT. As the events of 1985 suggest, the declaration had substantive intent.

158. Letter, *supra* note 126. The preceding historical account of the action plan is taken almost verbatim from this letter. Pardo notes that "[a]lthough the TFAP was initiated by FAO, it is the result of cooperative action. . ." *Id.*

159. WRI CALL FOR ACTION, *supra* note 16. WRI is a private, non-profit organization based in Washington, D.C., founded in 1982 to perform policy research and to advise governments and international organizations on resource issues. The Institute was established with funds from the MacArthur Foundation, which continues to be a principal source of support. WRI assembled a nine-member task force composed of some of the most prominent experts on and statesmen for tropical forests, who collectively are the authors of the Institute's report. The Task Force included the Secretary of the Environment for Brazil and a former Secretary of the Environment for India.

160. WRI took these categories directly from FAO's action plan: fuelwood and agro-forestry, land use and upland watersheds, forest management for industrial uses, conservation of moist tropical forest ecosystems, and institutions for research, training, and extension. WRI CALL FOR ACTION, *supra* note 16, at v.

161. Letter from John Spears, Forestry Advisor, World Bank, to author (Feb. 27, 1986).

162. On the Bank's "official policy commitments to environmental planning," see Rich, *The Multilateral Development Banks, Environmental Policy, and the United States*, 12 ECOLOGY L. Q. 681, 703-12 (1985). On the environmental damage caused by the Bank's development assistance, *see id.* at 688-703.

In one project currently being funded, the Bank is loaning $20 million to Malawi for fuelwood

This is important with respect to FAO. The Organization has the technical resources and personnel to carry out ambitious tropical forestry plans,[163] but is dependent on other agencies for funds and policy guidance,

planting; *A Review of Multilateral Development Bank Environmental Policies: Hearings Before the Subcomm. on International Development Institutions and Finance of the House Comm. on Banking, Finance and Urban Affairs*, 99th Cong., 2d Sess. 5 (1986) [hereinafter cited as *MDB Review Hearings*]. The Bank had five "nonplantation," *e.g.* social forestry, agro-forestry, conservation, forestry projects in 1975 costing $34.4 million. The Bank had 12 such projects in 1985 that cost $332 million. *Id.* at 141.

However, the World Bank and, to a somewhat lesser degree, the regional Multilateral Development Banks (MDB's) have received considerable criticism from both representatives of non-governmental environmental groups in the U.S. Government and U.S. Treasury Department officials. The Treasury Department is the lead agency in dealing with the MDB's. These critics claim, with varying intensity, that the World Bank has failed to abide by environmental guidelines set forth by the Banks themselves in 1980, or by recommendations offered by Congress. *Draft Recommendations on the Multilateral Banks and the Environment: Hearings Before the Subcomm. on International Development Institutions and Finance of the Comm. on Banking, Finance and Urban Affairs*, 98th Cong., 2d Sess. 36 (1984).

The World Bank has committed $434 million to Brazil for the Northwest Region Integrated Development Program (Polonoroeste), a continuing project which involves the resettlement of hundreds of thousands of people to a very large forested area whose soil cannot sustain continuous cultivation. *MDB Review Hearings, supra* this note, at 76. The Bank has given a series of loans totalling about $600 million to Indonesia for relocating families from Java to the heavily forested outer islands. *Id* at 77-78, 115-116. The Polonoroeste project in particular has become a notorious environmental disaster. *E.g. Critics Fault World Bank for Ecological Neglect*, Conservation Foundation Letter 5 (Nov.-Dec. 1984); *Third World Progress is Painfully Slow*, Conservation Foundation Letter 1 (Mar.-Apr. 1986).

Stipulations attached to the loans required careful consideration of effects on forests. However, critics charge that requirements have been partially neglected by both Brazilian authorities and Bank officials, resulting in tremendous damage to forested areas. The World Bank, temporarily suspended payment of $250 million to Brazil for Polonoroeste in 1985, largely due to pressure on environmental grounds from the U.S. Executive Director of the bank. More importantly, in Jan. 1985, the U.S. Executive Director of the Inter-American Development Bank (IDB) effectively vetoed a road-building project in Brazil's Acre State, near the Polonoroeste project, because of its potential impact on the rain forest. This is the first time in the IDB's 27 year history that the U.S. has not voted in favor of a loan to Brazil, and the action has apparently resulted in more careful reflection within the Banks on environmental consequences of loans. *See MDB Review Hearings, supra* this note, at 36, 48, 57, 69. These cases illustrate that the U.S. can exercise a great deal of influence within the MDB's, despite the considerable inertia within the latter in connection with promoting sustainable forestry and agriculture.

See generally Environmental Impact of Multilateral Development Bank-Funded Projects: Hearings Before the Subcomm. on International Development Institutions and Finance of the House Comm. on Banking, Finance and Urban Affairs, 98th Cong., lst Sess. (1983); *Tropical Forest Development Projects, Status of Environmental and Agricultural Research: Hearings Before the Subcomm. on Natural Resources of the House Comm. on Science and Technology*. 98th Cong., 2d Sess. (1984).

The World Bank announced, in its annual report released Sept. 22, 1986, that its loan authority may nearly double by 1990. Moreover, the Bank announced a "major extension" of its environmental policies, including programs to ensure that development progresses "without undue ecological damage." Phrases from annual report *quoted in* Rowen, *World Bank May Nearly Double Loans for Third World by 1990*, Wash. Post, Sept. 22, 1986, at A25, col. 4. Rowen states that these changes are "in response to pressure from Congress and environmental interests during the past year." *Id.*

It is likely that much of the analysis of forestry and agriculture within U.S. AID, text *supra* is relevant to the MDB's.

163. All knowledgeable observers of policy for tropical forests agree that developing country governments must at least participate heavily in, if not initiate, forestry programs if they are to be successful.

especially in connection with its field activities.[164] Ernst Haas and his colleagues have observed that:

> FAO is usually no more than a junior partner in those operations [field programs]. Whatever distinctive approach the organization may have to offer, it is severely constrained by the prerogatives of national governments and the dictates of more influential multilateral agencies on which it is dependent for support. In both content and focus, its field activities are still largely shaped by the resolutions of UNDP [United Nations Development Program] and the investment criteria of the World Bank.[165]

FAO and the international funding agencies, the World Bank, UNDP, and UNEP (U.S. Environment Program), are interdependent. FAO has an abundance of expertise in agriculture and forestry and has the freedom to initiate research programs[166] (for example, with UNEP, the Tropical Forest Resources Assessment Project)[167] and propose international policies (for example, Tropical Forestry Action Plan).[168] However, it relies heavily on UNDP and, to a lesser extent, the World Bank, for funding its technical assistance programs in the field.[169] FAO must convince those organizations, in addition to the national governments who provide Regular Programme funds, of the value of its proposals. We might speculate that WRI and international foresters associated with FAO were at least partially motivated by this requirement when they included the World Bank and UNDP in WRI's elaboration and extension[170] of FAO's Action Plan.[171]

The U.S. can apply pressure at several points in the international tropical forestry policy-making process. The State Department, guided by OES and working through its Bureau for International Organization Affairs, can attempt to change UNDP priorities, despite declining U.S.

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164. On the distinction between FAO's "Regular Programme" and "Field Programme," *see supra*, note 149.

165. E. HAAS, M. WILLIAMS, & D. BABAI, SCIENTISTS AND WORLD ORDER: THE USES OF TECHNICAL KNOWLEDGE IN INTERNATIONAL ORGANIZATIONS 276 (1977). But *see* Horberry, *supra* note 75 at 863-64. Horberry states:

> The FAO is barely accountable to members or external agencies for the quality of field projects, mainly because the developing countries expect the FAO to respond to project proposals with a minimum of interference, and because the funding sources exercise very limited influence over the identification and preparation of projects.

Id. at 863-864.

166. FAO does not ordinarily perform the research itself; it contracts out to various research centers. HAAS, WILLIAMS, & BABAI, *supra* note 165, at 268).

167. FAO PROJECT, *supra* note 3.

168. FAO ACTION PLAN, *supra* note 6.

169. FAO's proposed regular program budget (internally funded) for 1986-87 was $448 million. Its estimated extra-budgetary resources from UNDP, etc. were $649 million. FAO PROGRAMME *supra* note 150, at 66. In 1982, UNDP funded 50.7 percent of FAO's total field program budget of $279 million; FAO, THE DIRECTOR-GENERAL'S PROGRAMME OF WORK AND BUDGET FOR 1984-85 164 (1983). FAO 10: C83/3.

170. WRI CALL FOR ACTION, *supra*, note 16.

171. FAO ACTION PLAN, *supra* note 6.

influence within the central U.N. bureaucracy.[172] Through the Treasury Department, and in turn through the U.S. Executive Director, the government has considerable influence over the World Bank. The official in the Department who coordinates U.S. participation in multilateral development banks has in fact argued strongly for more careful consideration of the effects on forests early in the Banks' project evaluations.[173] OES, since the World Bank's Polonoroeste disaster in Brazil,[174] has been actively involved in reviewing the environmental consequences of the Bank's project proposals.[175] Because the U.S. already has more influence in the World Bank than in the U.N., the government might usefully work to further enhance the Bank's leverage, relative to that of UNDP, on FAO, and derivatively increase U.S. capacity to determine multilateral forestry policy. In addition, the U.S. Government should consider transferring some of the funds which it contributes to UNDP, and which are subsequently paid to FAO for the latter's field programs, to trust funds specially earmarked for forest conservation. The U.S. would have more influence over trust funds than it has over UNDP grants to FAO. Finally, Congress can encourage the work of nongovernmental organizations, such as WRI, for example through repeated oversight hearings on the performance of international organizations with respect to tropical forests[176], at which representatives of the non-governmental groups are invited to testify.

However, USDA has the most influence within FAO of any U.S. agency.[177] Though we must recognize that no one country, much less one

172. UNDP is part of the U.N. proper, while FAO is an independent, but U.N.-affiliated, organization. Horberry observes that:

> While some of the [FAO] donor [primarily developed country] members favor stricter review and evaluation of the Field Programme. . .many developing countries oppose tighter control or evaluation of UNDP projects. . . . Recipient governments enjoy greater independence in identifying and preparing [FAO] projects funded by UNDP than they do in projects funded by other agencies.

Horberry, *supra* note 75, at 862.

173. *See generally supra* note 162.

174. *MDB Review Hearings, supra* note 162, at 21-27, 30-32.

175. *Id.* at 35, 56-57. *See generally supra* note 162 and accompanying text. Congress, in late 1985, instructed the Treasury Department to in turn instruct the U.S. Executive Directors of the Multilateral Development Banks to "vigorously promote" a number of environmental policies within the Banks. This action was unusual enough in itself, as the specific policies of the Executive Directors are generally considered to be the prerogative of the Administration. It was even more unusual appearing as it did within an omnibus continuing appropriations bill. *See* H.J. Res. 465, Pub. L. No. 99-190, § 540, 99 Stat. 1291, 1309-1310 (1985), 22 U.S.C. § 286(e)-1(h), 2621 (1982).

176. *See generally* hearings, *supra* notes 11, 14, 162.

177. Haas and his colleagues, in an extensive empirical study of the attitudes of scientists and other technical experts in international organizations, found that:

> "A majority of our sample [of FAO technical experts] feel that it is becoming easier to achieve agreement on the role of science in program-making. But 80 percent also say that the proper target for operationalizing this growing consensus is provided by specific national governmental agencies, that is, by the highly specialized and issue specific counterparts of the international officials.

HAAS, WILLIAMS, & BABAI, *supra* note 165, at 281. The authors also observe that FAO programs "must conform to the overall emphasis set by the [member] governments." *Id.* at 268. The most

agricultural department, can dictate FAO policy[178], it is clear that USDA has failed to exert the substantial influence which it does possess within the Organization to advance improved management of tropical forests. As we have seen, this improved management is in the interest of the U.S. Government as a whole.[179] The deep roots of this failure are the tendency in temperate countries, such as the U.S., to ignore the relationship between agriculture and forestry and a consequent lack of cooperation between USDA and the Forest Service.

USDA, the Forest Service, and Bilateral Assistance

USDA has participated in bilateral aid for agriculture and forestry. Beginning in 1938, the Department began formally implementing overseas technical assistance programs, although it had been doing so on an *ad hoc* basis before that time. Concerned Presidents (for example, Truman), AID and its predecessors, and the State Department have provided most of the initiative for these programs. The State Department and the aid agencies have provided funding because USDA, until recently, lacked explicit budget authority for international activities.[180] However, the Department has not considered technical assistance central to its function and, for the most part, it has tried to avoid fostering overseas competition with U.S. farmers. Programs have been very small relative to USDA's domestic activities and have been mainly directed toward increasing supply of products essential to the U.S. economy or national security, but which cannot be produced domestically.[181]

More recently, USDA has been the governmental organization primarily responsible for implementing agricultural research programs funded by AID.[182] However, USDA, which has expertise in agriculture and agricultural research but views its role as domestic, has usually been reluctant to allow its expert staff to work on interagency research teams and thereby lose the benefit of their skills. Most agricultural and forestry scientists within USDA have themselves been hesitant about engaging in such research, as international activities tend to slow their promotion within

powerful is still the U.S.

178. Horberry discusses the considerable difficulty with which FAO policy is influenced by any outside organization. Horberry, *supra* note 75, at 860-65.

179. *See generally supra*, note 147.

180. Early technical assistance programs, therefore, are among the first instances of the State Department enlisting the aid of other governmental organizations in connection with technical international issues.

181. *E.g.*, immediately after World War II, rubber and quinine.

182. However, non-governmental land-grant colleges and the multilateral Consultative Group on International research have performed much more AID-funded research.

the domestically oriented Department and, to a somewhat lesser degree, the Service.[183] Thus, USDA has tended to impede AID's attempts to accelerate cooperative research for agricultural development.

Congress, in close coordination with concerned individuals within USDA, attempted to strengthen the Department's foreign aid programs, but met with limited success. The Food for Peace Act of 1966[184] authorized USDA to undertake a research program in tropical agriculture, in cooperation with developing countries. Congress permitted spending up to $33 million annually. However, USDA never requested this much money, citing conflict of interest with domestic responsibilities. In 1975, USDA spent $500,000 for two research stations in Hawaii and Puerto Rico.[185] In 1980, spending rose to $2.8 million under this program.[186] Spending remains "domestic in orientation," however, contrary to the intent of the Congressional sponsor of this bill.[187] Thus, when USDA is not prompted by AID, it tries less energetically to address the problems of the tropics.

In 1975, Title XII was appended to the Foreign Assistance Act of 1961.[188] This was done, in part, to establish a Board for International

183. AGRICULTURAL RESEARCH, *supra* note 103, at 157. There is no dependable career track in international agriculture or forestry in USDA or the Forest Service. Even in AID, where generalist aid administrators still dominate, international technical experts are at some disadvantage, though career opportunities are much better at the Agency and have been improving during the 1980's. Furthermore, the U.S. does not participate in FAO's Associate Expert Program, in which young scientists can gain experience with tropical agriculture and forestry. The Peace Corps does provide such opportunities, but Peace Corps volunteers on leave from USDA or AID often experience difficulties upon return to their agencies. On U.S. participation in FAO's Associate Expert Program, see TASK FORCE REPORT, *supra* note 16, at 45; *MDB Review Hearings*, *supra* note 162, at 54; *Tropical Deforestation Hearings*, *supra* note 14, at 208. On career tracks for natural resource and environmental experts in AID, see *International Environmental Hearings*, *supra* note 51, at 96. On improvements in this area within AID since 1980, see *id.* at 52. The role of the Peace Corps was brought to the attention of the author by John M. Yavorsky, consultant in tropical forestry. Letter to author (Jan. 20, 1986). But on the Peace Corps, see *Biological Diversity Hearings*, *supra* note 11 at 30 (statement of Nyle Brady, Senior Assistant Administrator, Bureau for Science and Technology, U.S. Agency for International Development). Brady states that the Bureau of Science and Technology in AID has renewed a cooperative agreement last year with the Peace Corps. The partnership has resulted in an increase in the number of Peace Corps volunteers trained in natural resources and forestry from 200 in 1980 to 500 in 1985, "and has increased several-fold the number of forestry volunteers working in close association with AID bilaterally funded forestry projects." *Id.* at 30.

184. Food for Peace Act, Pub. L. No. 89-808, Tit. IV., § 40G(a)(4), 80 Stat. 1526, 1537 (1966), 7 U.S.C. § 1691 (1982).

185. AGRICULTURAL RESEARCH, *supra* note 103, at 158. Most of the tropical forest on U.S. territory is on Hawaii and Puerto Rico.

186. *Id.* at 159.

187. *Id.* Furtick, The Role of U.S. Food and Agricultural Research in International Development 19-21 (Nov. 1980) (unpublished manuscript prepared for the Office of Technology Assessment, U.S. Congress, as background in the preparation of Tropical Forest, *supra* note 2).

188. Foreign Assistance Act, Pub. L. No. 87-195, 75 Stat. 424 (1961), (codified as amended at 22 U.S.C. § 2151 (1982)), appended by International Development and Food Assistance Act, Pub. L. No. 94-161, Tit. XII, 89 Stat. 849, 861-869 (1975).

Food and Agricultural Development (BIFAD).[189] The purpose of such action was to incorporate more fully the expertise of the land-grant colleges in development programs. A majority of the board members was to be drawn from the colleges, and a minority was to be selected from the private sector. The Congressional sponsors of the bill wanted the Board to be established within USDA because the Department already had very close ties with the agricultural schools. However, Secretary Earl Butz and other officials, anticipating intense criticism from domestic agricultural interest groups, declined. They argued that development programs were incompatible with the Department's domestic mission. BIFAD was subsequently placed within AID.[190]

In 1977, Congress included a section in the farm bill requiring the Department to actively cooperate in development assistance.[191] Like Title XII, this legislation was promoted by the National Association of State Universities and land-grant colleges, which were eager to formalize and expand their role in international agricultural research. Section 1458 authorizes the Secretary of Agriculture to:

> (1) expand the operational coordination of the Department of Agriculture with institutions and other persons throughout the world performing agricultural research and extension. . .;
>
> (2) assist the Agency for International Development with agricultural research and extension programs in developing countries;
>
> (3) assist United States colleges and universities in strengthening their . . . agricultural research and extension relevant to agricultural development . . . ; and
>
> (4) further develop within [USDA] highly qualified experienced scientists who specialize in international programs, to be available for the activities described in this section.[193]

This legislation primarily served to legitimize ongoing international activities. It provided few additional funds.[194] Nonetheless, it has served to

189. International Development and Food Assistance Act, Pub. L. No. 94-161, § 312, 89 Stat. 864 (1975) (adding s298 to Foreign Assistance Act, Pub. L. No. 87-195, 75 Stat. 424 (1961). *See also* AGRICULTURAL RESEARCH, *supra* note 103, at 155-156; MORGAN, SCIENCE AND TECHNOLOGY FOR DEVELOPMENT: THE ROLE OF U.S. UNIVERSITIES 10-16 (1979).

190. Agricultural Research, *supra* note 103, at 155.

191. National Agricultural Research, Extension, and Teaching Policy Act, Pub. L. No. 95-113, § 1458, 91 Stat. 981, 1016 (1977); § 1458 amended by Agriculture and Food Act, Pub. L. No. 97-98, 95 Stat. 1213, 1313 (1981), 7 U.S.C. §§ 1281, 3291 (1982).

192. Furtick, *supra* note 190, at 28.

193. National Agricultural Research, Extension, and Teaching Policy Act, Pub. L. No. 95-113, § 1436, 91 Stat. 981, 1015-1016 (1977).

194. Telephone interview with Robert Ayling, former Director of Planning and Policy Analysis and Evaluation, Division of International Affairs and Planning, Office of International Cooperation and Development, USDA (Sept. 23, 1985). "The Farm Bill" (Food Security Act, Pub. L. No. 99-198, Tit. XIV; 99 Stat. 1359, 1542 [1985]) amended National Agricultural Research, Extension and Teaching Policy Act, Pub. L. No. 95-113, 91 Stat. 981 (1977) further strengthened legislative authority for international programs in USDA.

improve cooperation between USDA and AID, primarily through the Office of International Cooperation and Development (OICD) within the Department.

OICD was established in May 1978 by the Carter Administration to help implement Section 1458 programs. Most of the Department's international activities[195] were consolidated within the Office. Presently, all AID contracts with USDA are managed by OICD. Although OICD is primarily a coordinating agency for agricultural research programs of importance to developing countries, the Office has some funds of its own for research. More importantly, OICD is the only office within USDA whose responsibilities are exclusively international.

OICD has begun to provide a channel through which tropical foresters may utilize the technical resources of USDA and the Forest Service.[196] AID's growing forestry program, which increasingly emphasizes conservation, agroforestry, and "social forestry," has benefited from the general improvement in cooperation between USDA and AID which OICD affords. Most notably, Section 1458 and OICD have facilitated the growth of a joint USDA/AID Forestry Support Program,[197] which has in turn strengthened agroforestry development projects considerably. Although USDA participants in the Support Program are usually foresters, agriculturalists have also contributed to the program.[198] Most importantly, in an organizational cultural environment not conducive to interdisciplinary research and technical assistance to developing countries, OICD provides a haven of sorts for bureaucrats within the Department who have an interest in international programs, including programs dealing with tropical deforestation.

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195. Excluding export promotion, conducted by the Foreign Agricultural Service. The Department of Agriculture has a congressional mandate to work with "AID graduate" or "transitional" countries which are not poor enough to qualify for AID assistance. *See* Agriculture and Food Act, Pub. L. No. 97-98, § 1436, 95 Stat. 1213, 1313 (1981). *See generally supra* note 71. OICD has conducted projects with such countries, almost exclusively on a reimbursable basis.

196. However, OICD, like AID, has been considerably more successful in recruiting scientists and technicians from land-grant colleges than from USDA proper. Letter from William R. Furtick to Robert C. Stowe (Oct. 15, 1986). For research on forest genetics in both tropical and temperate regions supported by OICD and AID, see Krugman, *supra* note 70, at 535-37.

197. The Congressional Office of Technology Assessment says of the Forestry Support Program:

> AID has. . .received support [in connection with tropical forestry] from a Resource Support Services Agreement with the U.S. Forest Service. . . . The resulting Forestry Support Program provides natural resource specialists to help AID projects around the world. In addition, the Forestry Support Program acts as a clearinghouse to put AID in touch with forestry and natural resource consultants and institutions as they may be needed.

Sustaining Tropical Forest Resources: U.S. and International Institutions (Background Paper #2 to *Tropical Forest, supra* note 2, at 9.) All funds which AID provides for the Forestry Support Program pass through OICD.

198. In addition to supporting interagency programs, OICD has used some of its own funds to support research on tropical forestry and agriculture within the Department.

Conclusion

The Department of Agriculture is almost exclusively oriented toward domestic affairs, and has been reluctant to apply its resources to the problems of developing countries. Moreover, in the United States, agriculture and forestry are generally (mis)perceived as unrelated. In temperate regions, this misperception has had negative, but not disastrous, consequences, and therefore farmers and foresters can afford to sustain it. In the tropics, the consequences have been dire.

Lack of appreciation of the forest-agriculture relationship has led to tension between the Forest Service and USDA. Similarly, it has led to a dichotomous perspective at FAO, which continues to rely heavily on U.S. support, and in which the USDA is the primary representative of the U.S. Government. Within the Forest Service, conservationists have been reluctant to incorporate ecological approaches to forestry, partly because of organizational and philosophical conflict between the Forest Service and private environmental groups.[199] Thus they have failed to contribute as much as they might have to solving the problems of the tropics.[200]

These biases are largely the result of bureaucratic cultural constraints within the organizations, and have inhibited effective governmental policy to improve the management of tropical forests. Nonetheless, USDA's considerable technical resources are applied to forestry/agriculture problems in tropical countries through some AID projects, and OICD has strengthened USDA's role in development. However, OICD's budget is small and its own programs, as well as the AID cooperative projects which it administers, continue to be viewed within the Department as peripheral to USDA's mission. The Forest Service has increasingly incorporated ecological science in its programs. Similarly, the International Forestry Staff has integrated conservation and ecology in its tropical projects. Again, international activity is very limited, but the organizational, as well as the technical, potential exists for addressing tropical deforestation more vigorously.

SUMMARY AND CONCLUSIONS

The case of tropical deforestation illustrates the U.S. Government's failure to incorporate more fully the expertise of domestic agencies in addressing important, but very technical and complex, international problems involving natural resources and the environment.[201] In order for the

199. *See generally supra* note 115.

200. For an unusual discussion of the relative value of the "conservationist" and "preservationist" positions (though the latter term is not used and "conservation" is used loosely) with respect to U.S. foreign policy, see Kaplan, *Resource Conservation and Foreign Policy,* 1 WORLD POL. 257 (1948). Kaplan mentions reforestation. *Id.* at 261.

201. *See, e.g.,* AGRICULTURAL RESEARCH, *supra* note 103, at 157.

U.S. to more effectively alleviate forest management in the tropics, the Department of Agriculture, including the Forest Service, must become more involved in foreign policy.

USDA commands a much larger budget than the State Department or AID, has many more scientists on its staff, and has more direct influence over the largest potential sources of multilateral expertise in tropical forestry. However, the mission of the Department is defined by administrative tradition and consensus among U.S. agriculturalists as being almost exclusively domestic. Thus, while the State Department and AID have the responsibility, USDA has the financial, technical, and political resources. The net result is difficulty in coordinating responsibility and resources.[202]

André and Jean Mayer, in an article published in 1974 entitled "Agriculture, the Island Empire," stated that:

> Intellectually and institutionally, agriculture has been and remains an island—a vast, wealthy, powerful island. . . .As it developed into an intellectual discipline in the nineteenth century, it did so in academic divisions which were isolated from the liberal arts center. . . .[It] also developed its own scientific organizations . . . and its own public. It even has a separate political system—executive departments at the state and federal levels, and legislative committees . . . which operates with remarkable independence. The strength of this complex is formidable. No President of the United States can be elected against the farmers, in spite of their declining number. . . . For most of its history, the United States was a predominantly agricultural country. Agriculture has been an area of particular emphasis and success for American science. Thus it has played a central role in the formation of American scientific institutions and American attitudes toward science. At the same time, in large part because of its early success and broad clientele, agriculture has become separated from the mainstream of American scientific thought.[203]

USDA's isolation has been evident in its resistance to the scientific disciplines associated with two social movements: conservationism, arising largely out of scientific forestry in the late 1800's, and ecology, which

202. An Interagency Task Force on tropical deforestation has made the issue more visible within the government and has helped to improve AID's tropical forestry programs. TASK FORCE REPORT, *supra* note 16. However, it has not, and cannot resolve the larger problems of inappropriate segregation of international and domestic responsibilities within the government and the "cultural" constraints on reallocation of resources within USDA in favor of tropical agriculture and forestry.

203. Mayer & Mayer, *supra* note 129, at 87-88. USDA has made some attempts to integrate environmental planning into its domestic programs. *See generally* OFFICE OF ENVIRONMENTAL QUALITY, USDA, FIRST ANNUAL REPORT ON AGRICULTURE'S CONTRIBUTION TO A BETTER ENVIRONMENT (1980). However, a considerable portion of this report was devoted to conservation programs already in place.

became a part of the "mainstream of American scientific thought" in the 1970's. Both disciplines are indispensable for managing tropical forests and agriculture, while neither is necessary in the short run for managing U.S. agriculture.

Most bureaucracies resist change, and we have examined this resistance through the lens of bureaucratic culture. Moreover, USDA's emphasis on domestic agriculture is, for the most part, appropriate.[204] However, when bureaucratic mission or predilection significantly obstructs cooperation with internationally oriented agencies—cooperation which is intended to more effectively implement U.S. foreign policy—then bureaucratic culture becomes pathological with respect to overall government functioning. Because USDA has so much potential for resolving the technical problems associated with tropical deforestation, its inflexibility has serious consequences for governmental attempts to formulate deforestation policy.

In addition to admitting the nearly universally conservative nature of bureaucratic culture, we must also be realistic about the probable persistence and, often, the desirability of interest groups' influence on domestically-oriented agencies, and the relative lack of public concern with the State Department and AID. The international agencies are more autonomous, vis-a-vis special interest groups, than USDA. This inevitably renders problematic any proposed role for USDA in international development assistance.

However, the specific problem we are examining involves more than just bureaucratic conservatism and interest group politics. It also involves the insularity of the U.S. agricultural community as a whole, a community which, in practicing the oldest science, has perhaps become scientifically otiose as well as organizationally inflexible. This insularity is reflected in a lack of cooperation between USDA and AID and, within each of these organizations, between agriculturalists on the one hand, and conservationist foresters and environmental scientists on the other.[205]

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204. This emphasis is at least understandable, given the political imperatives driving the Department's behavior.

205. Robert O. Blake, Senior Fellow at the International Institute for Environment and Development, stated in 1984:

> One of the biggest problems that all AID agencies [offices, bureaus] have, without any question, is the tendency for foresters and agricultural people not to talk to each other or even to misunderstand each other, remedying this is, in the next five years, will be one of the biggest problems that AID and other organizations like the World Bank face

International Environmental Hearings, supra note 51, at 72. Thomas B. Stoel, Jr., Director of International Programs at the Natural Resources Defense Council, added:

> AID should develop an overall strategy in this area, environment and natural resources. It now has an environment sector strategy; it has a forestry strategy. . .in order to. . .make sure that the kind of neglect that's occurred in this last year does

Several specific changes in policy, in addition to those suggested above in connection with multilateral organizations, might render the U.S. Government better able to assist developing countries in the management of tropical forests.[206] The State Department has a legislative mandate to formulate and implement foreign policy in technical fields, largely through OES,[207] and its organizational ability to do so should be enhanced. Both the State Department and AID should have more technical personnel, with more influence within their organizations, and with better access to mainstream career tracks. Even if AID continues to contract out much of its technical work, many more in-house experts are needed to set priorities and to supervise and evaluate agricultural and forestry projects.

Most importantly, USDA should become more actively involved in tropical issues through multilateral and bilateral aid programs. OICD should have the capability to undertake some of its own programs in the field, and its budget should be expanded correspondingly. OICD-funded tropical forestry programs would complement AID's projects (including those conducted with USDA cooperation) because OICD has more immediate access to USDA's research organization. USDA should more vigorously encourage programs for sustainable agriculture and forestry in FAO, and the Forest Service should be represented at the highest levels of FAO.

However, organizational reform is not sufficient to effect a change in USDA's behavior. There will continue to be sharp limitations on the efforts of individuals and organizations, in the public and private sectors, in bilateral and multilateral forums, if there is not also a more fundamental cultural transformation within the agricultural community. U.S. agriculturalists must become less insular, geographically and intellectually. This transformation is much more difficult to effect than organizational change. Yet only if such a transformation occurs will the required support for programs to improve tropical forestry be forthcoming from the Department of Agriculture, its domestic "clientele," and its multilateral counterparts.

> not recur, it would be good to have an overall strategy . . . .particularly relating it to the Agency's biggest overall sector, agriculture, which. . . .tends to be thought of completely separate from these issues.

Id. at 88. (For AID's forestry sector strategy, see *supra* note 92.) Michael Benge, a forestry officer in AID with extensive experience in agro-forestry, notes: "[t]he reason why we (the developers) are failing in forestry is because we fail to relate it to agricultural production." Comments on an earlier draft of this paper from Michael Benge, *supra* note 45.

206. *See also* the recommendations of the Interagency Task Force on Tropical Forests, TASK FORCE REPORT, *supra* note 16, at 41-50.

207. OES was established by Congress to "have responsibility for matters relating to oceans, environmental, scientific, fisheries, wildlife, and conservation affairs"; Department of State Appropriations Authorization Act, Pub. L. No. 93-126, § 9, 87 Stat. 451, 453 (1973), 22 U.S.C. § 2655 (1982).