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Environment, Natural Resources, and Development: The Role of the U.S. Agency for International Development

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International Project

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TABLE OF CONTENTS

APPENDICES

SUMMARY

In 1977, the President and the Congress provided to the U.S. Agency for International Development a clear mandate to assist developing countries to protect and maintain their environment and natural resources. AID was directed to insure the environmental soundness of its own projects, to make special efforts to protect the land, soil, forest, water and wildlife essential to sustainable development and human well being, and to help developing countries to build their own environmental protection capabilities. "Environment and Natural Resources" was added to the list in the Foreign Assistance Act of major functional sectors which are to be the focus of U.S. bilateral aid.

The need for more effective efforts to protect the environment and to maintain the natural resource base is becoming increasingly apparent to developing country governments, AID and other development assistance agencies. A few countries, such as Haiti and the Sahelian nations, already have suffered ecological disasters where natural systems have collapsed after years of abuse. In many other aid receiving nations, forests and agricultural lands are deteriorating under pressure from increasing demands for food, energy, and materials. Overcutting of woodlands, overcropping and over-

grazing of agricultural lands, and the lack of proper conservation measures are contributing to destruction or decline of millions of acres of productive lands in the developing world with consequent losses of agricultural production and national income. Yet the impact is the greatest upon the rural poor who are the most dependent on natural resources -- the soil, trees, water and wildlife -- for their livelihood and well being.

AID already has underway or proposed several activities responsive to the Congressional and Presidential directives. A number of AID projects seek to protect or maintain the natural resource base of host countries, through soil erosion control, reforestation, rangeland management, and improved irrigation methods. Environmental assessments or impact statements are being integrated into AID project design procedures. Finally, the agency is helping a number of host countries to develop their institutional and informational capabilities with such programs as natural resource surveys using remote sensing data, the development of natural resource management laws, policies, and agencies, and training and technical assistance in resource planning, protection, and management.

Yet the dimensions of the environmental challenges facing developing countries, as well as of their government's

ability (along with other donors) to tackle them, remain ill-defined. The available information is rather limited. In order to assure that AID begins to address these problems systematically and before crises occur, we recommend that beginning in FY 79, AID carry out a thorough review of environment and natural resource problems and institutional capabilities in each host country. The survey would provide a much needed information base not only for further development of AID projects in the Environment and Natural Resources sector, but also for host governments and other aid agencies.

I. Introduction

Since World War II, the natural resources of many developing countries have come under severe pressures. Expanding populations, together with rapidly growing demands for food, energy, and shelter, are taxing land, soil, forests, water, and wildlife throughout the developing world. The deterioration of the natural resource base in a number of poorer countries undermines their capacity to meet the basic needs of their people and to achieve sustainable development.

A few countries, such as Sahelian nations and Haiti, already have suffered ecological disasters when life-supporting natural systems collapsed after years of abuse. In the Sahel, overcropping and overgrazing made millions of acres of productive, semi-arid lands extremely vulnerable to drought. The dry years of 1968-1974 accelerated the decline of these lands, changing some into deserts and resulting in famine throughout the region.[1] In Haiti, over three-quarters of the country's forests have been leveled over the past fifteen years, primarily to make charcoal for cooking and heating. With the trees removed, groundwater supplies diminished, soil erosion increased, and downstream hydroelectric generators and irrigation canals were clogged with sediment. The destruction of the forests

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1/ Glantz, "The U.N. And Desertification: Dealing With A Global Problem," Desertification, Environmental Degradation In And Around Arid Lands, (Glantz, ed., 1977).

may even have affected Haiti's climate. A succession of severe droughts since 1974 triggered a crisis early this year when the Haitian people were faced with serious shortages of food, water, and electrical energy.[2]

Environmental stress is not limited to these countries. A 1976 survey carried out by personnel in U.S. Embassies on population policies and the effects of population growth in other countries found that 43 of the 69 developing nations profiled were experiencing problems with overcropping and/or overgrazing, resulting in serious soil erosion (28 countries) and declining soil fertility (12 countries). In 24 countries, the heavy destruction of forests was found to be hampering food production. A number of these were experiencing water problems due in large part to deforestation: sixteen suffered periodic water shortages and ten increased flooding. Eight of the more arid nations were facing very serious difficulties on irrigated farm lands due to salinization, waterlogging, and siltation.[3]

2/ Montalbano, "Haiti--A Paradise Lost To Starvation, Drought," Chicago Tribune, May 1, 1977, at 18; Weil, "A Report On Soil Erosion And Prospects For Land Restoration In Haiti" (AID, April 1, 1977); Josephson, "Building The Third World," Environmental Science And Technology 852 (September 1977); Conservation Foundation Letter, "Haiti: A Study In Environmental Destruction" (November 1977).

3/ Paul P. Demko, Jr., The Food People Problem: Can The Land's Capacity To Produce Food Be Sustained? (Paper presented to the U.N. Conferences on Water and Desertification, 1977). The survey was initiated by a circular cablegram from the Office of Population Affairs, Department of State, in late 1976. U.S. Embassies were asked, among other things, to assess the environmental impacts

(footnote 3 continued on next page)

Environmental abuse is both a cause and effect of poverty, especially in rural areas where most of the developing world's poor live. Programs to slow population growth, to improve food production, and to provide new sources of rural employment and energy will ease the burden on the ecosystems of developing countries. However, sustainable improvement in the lives of the rural poor cannot be achieved unless a higher priority is given to the maintenance and protection of the natural resource base. In Losing Ground: Environmental Stress And World Food Prospects, Erik Eckholm writes:

> [R]eform and development efforts will not achieve their aims if they are not also suffused with an ecological ethic that recognizes the conjugal bond between humankind and the natural world from which there can be no divorce. Environmental deterioration requires direct attention in its own right; at the same time, the balance of nature will not be preserved if the roots of poverty, whatever they may be, are not eradicated.4

There is growing awareness of the seriousness of these

3/ (continued) of population growth. Mr. Bente, then a member of the staff of the Council on Environmental Quality, used the still classified responses to compile the composite data for his paper. Our recent requests to the Department of State for the declassification of those portions related to environmental impacts is under consideration and should be granted shortly.

4/ Erik Eckholm, Losing Ground: Environmental Stress And World Food Prospects 24 (1976). Losing Ground, co-sponsored by the United Nations Environment Programme ("UNEP"), is the best overview to date of environmental conditions in developing countries. Eckholm notes that the precise rates and costs of ecological deterioration in one nation or another are generally not available. Yet he argues that in many countries corrective action cannot wait for definite results from scientific studies of natural resource conditions, because these will take too long. Losing Ground 186.

problems in many developing countries. A number, including Zaire, Indonesia, the Philippines, Gabon, Ghana, Brazil, and Costa Rica, have established ministries or special high-level commissions concerned with natural resource conservation and environmental protection. However, most still lack the informational, technical, legal, and institutional capability for effective environmental regulation and planning. In particular, the ecological consequences of development schemes often are not given adequate consideration, despite the expensive lessons of the past. For example, a major British-financed plan was initiated in the late 1940's to produce groundnuts on 3,000,000 acres of savannah lands in East Africa. The scheme was begun hastily without adequate ecological studies. As a result, there were unanticipated, severe environmental problems, including soil infertility and erosion. By 1951, it was clear that the multimillion dollar project had failed.[5]

A recent instance involves one of Colombia's largest hydro-electric dam projects located on the Nare River. Here there may be a failure to take into account environmental factors outside the project area. A recent study by the World Bank, which loaned some of the $200 million spent so far on the partially constructed El Penol dam, warned

5/ Tassell, "The Impact Of Technological Developments On Soils In East Africa," The Careless Technology: Ecology And International Development 570-571 (Farvar and Milton, eds., 1972).

of severe soil runoff from uncontrolled settlement upstream. Unless immediate measures are taken, the dam will rapidly lose its water storage capacity due to sedimentation.[6] Similarly, in other poor nations, new irrigation projects, penetration roads, and factories have resulted in unintended ecological impacts involving significant economic costs and sometimes causing human suffering.[7]

In the past year, the President and the Congress have given the Agency for International Development (AID) a clear mandate to help to protect the environment and natural resources of developing countries. On May 23, 1977, President Carter said: ". . . I am convinced that in the long run, development programs that are environmentally sound will yield the most economic benefits." The President directed the Administrator of AID to ensure full consideration of the environmental soundness of proposed development assistance projects and asked the Administrator to make available to developing countries assistance in environment and natural resources management.[8]

In August 1977, Congress passed the International Development and Food Assistance Act of 1977, which adds "Environment and Natural Resources" to the list of major functional sectors, which are to be the focus of U.S. development assistance.[9]

6/ Lernoux, "Ecological Disaster Threatens Colombia's Hydroelectric Projects," World Environment Report, December 5, 1977, at 3.

7/ See generally Farvar and Milton, supra note 5.

8/ Council on Environmental Quality, "The President's Message On The Environment," The President's Environmental Program, at M-11 (1977).

9/ International Development and Food Assistance Act of 1977, § 113(b), 22 U.S.C.A. § 2151(b)(1)(2) (Supp. 3, November 1977).

It also created a new Section 118 of the Foreign Assistance Act of 1961, as amended, which provides:

> The President is authorized to furnish assistance under this part 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, wildlife, and other resources upon which depend economic growth and human well-being, especially that of the poor.10

This paper describes two pressing environmental challenges to sustainable development in many aid-receiving countries: destruction of tropical forests and deterioration of agricultural lands. While it is premature to evaluate fully AID's response to these challenges, the paper provides examples of proposed and ongoing projects falling within the new Environment and Natural Resources sector. The paper examines AID's efforts to assure the environmental soundness of its own projects and to help other countries to increase their ability to protect and manage their natural resources, and recommends what needs to be done now by AID in the Environment and Natural Resources area.

10/ § 113(a), 22 U.S.C.A. § 2151p (Supp. 3, November 1977).

II. Destruction Of Tropical Forests

AID Assistant Administrator for Asia, John H. Sullivan, recently warned that "the destruction of forests hampers economic growth in developing countries." He pointed out:

> Trees are not only beautiful, they support life around the globe . . . we need forests. We need them because they provide oxygen and help control temperature and climate. They collect and store rainfall, provide a wildlife habitat and prevent soil erosion.[11]

Tropical forest resources are being lost at an accelerating rate throughout Asia, Africa, and Latin America. It is estimated that one-third of South America's native forests, one-half of Africa's and two-thirds of South East Asia's have been destroyed by human activities. In Latin America alone, some 5 - 10 million acres of forest lands are cleared each year. By the year 2,000, it is possible that no virgin tropical forests will remain standing.[12]

One of the principal reasons for the clearing of tropical forest lands is their use for the production of crops and livestock. In many areas, the topography or soils of tropical forest lands are not well suited to intensive agriculture.[13]

11/ AID Press Release, October 27, 1977.

12/ Walter Parham, "Environmental Consequences of Vanishing LDC Forest Resources" (Draft) (AID Offices of Science and Technology, 1977). United Nations Economic Commission for Latin America, El Medio Ambiente En America Latina (1976). Attached as Appendix 1 is a preliminary survey by Dr. Parham of deforestation problems in developing countries.

13/ A recent National Research Council panel estimated that most of the world's potentially arable, but unfarmed lands lies in the tropics of Africa and South America, amounting to some one

(footnote 13 continued on next page)

Once the protective tree cover is removed, the natural nutrient cycle is broken and the soil is subject to rapid nutrient depletion and to erosion by wind and water. Unless massive amounts of fertilizer are applied, crop yields may drop as much as 50% within the first few years, followed by total crop failures.[14] In Ecuador,[15] Indonesia,[16] Peru,[17] and other developing nations, tracts of cleared forest land have become substantially less productive or have been totally abandoned.

The need for firewood also threatens tropical forest areas. Firewood accounts for approximately 70% of the total

13/ (continued) billion hectares. About 70% of this land is covered by soils that, if handled properly, could produce high yields. The panel, however, notes that much research is needed before crops can be grown there economically and without adverse environmental effects. Such research would include the development of a world-wide data base on soils, which would relate physical characteristics of soil, environmental conditions, and appropriate uses of the soil. The panel cautions that the plans of some countries, such as Brazil and Peru, to open up new areas of their hinterlands to settlers-farmers will fail, unless the plans are carefully evaluated. National Research Council, World Food And Nutrition Study: The Potential Contributions Of Researc 88-90, (NAS, 1977).

14/ Chang, "The Agricultural Potential Of The Humid Tropics," The Geographical Review, 356 (1968); Goodland and Irwin, "Amazonian Forest and Cerrado: Development and Environmental Conservation" Extinction is Forever 214 (1977).

15/ U.N. Economic Commission for Latin America, El Medio Ambiente En America Latina 81 (1976).

16/ Payne, "The Roles Of Domestic Livestock In The Humid Tropics The Use Of Ecological Guidelines For Development In The American Humid Tropics 142, 146 (International Union For Conservation Of Nature And Natural Resources, 1975).

17/ Watters, Shifting Cultivation In Latin America 239 (U.N. Food And Agriculture Organization ("FAO"), 1971).

energy consumed in developing countries, and the demand is growing at an estimated rate of 1% per year. In several developing countries, such as Upper Volta and Ethiopia, whole forests are being consumed to meet fuel needs.[18]

Although the rural poor are putting the most pressure on forest resources, commercial timber operations are contributing to their loss. Several developing countries have expanded logging operations principally for export markets. For example, Indonesia increased its exports of logs from 1.5 million cubic meters in 1963 to 18 million in 1974. Many developing countries still lack adequate forest management and reforestation programs. The resulting overexploitation may lead to exhaustion of this resource, rural unemployment, and shortages of building materials, paper, and other wood products.[19]

The loss of tropical forests is affecting other sectors of developing country economies and contributing to human suffering. The preservation of forests are critical to the protection of watersheds. The trees help moderate downstream water flows and prevent soil runoff. The deterioration of critical forest

18/ United Nations Environment Programme ("UNEP"), The State Of The Environment: Selected Topics -- 1977 Report Of The Executive Director, UNEP/GC/88, at 24 (March 14, 1977); Clark University Program for International Development, The Environmental Context Of Development: An Analysis Of National Environmental Situations And Persistent Problems In Eastern And Southern African Nations, Sec. IID, at 2 (AID, 1976).

19/ Bene, Beall, and Cote, Trees, Food And People: Land Management In The Tropics (Canadian International Development Research Centre, 1977).

watershed areas have been linked to destructive floods in India, Pakistan, Bangladesh,[20] and Panama.[21] The water supplies of Panama City and other Third World cities may be endangered by deforestation.[22] The resulting increased soil loads in rivers have shortened the useful life of dams in Indonesia[23] and the Philippines[24] and reduced power output from hydroelectric dams in Kenya[25] and Haiti.[26] In the Philippines, the economic loss attributable to the rapid sedimentation of the Ambuklao Dam is estimated at more than $25 million over the next fifteen years, unless watershed protection and reforestation measures are undertaken.[27]

Tropical forests also have value as a reservoir of

20/ UNEP, supra note 18, at 20.

21/ Croat, "The Role Of Overpopulation And Agricultural Methods In The Destruction Of Tropical Ecosystems " 22 Bioscience 465 (August 1972).

22/ AID, "Panama FY 79 Loan Project: Reforestation And Resource Protection" (Program Identification Document ("PID") 1977); Parham, supra note 12, Annex I, at 2.

23/ The useful life of the Jatiluhur dam has been cut by deforestation upstream from 60 to less than 10 years. Aden, "The Relevance Of Environmental Protection In Indonesia " 4 Ecology Law Quarterly 991 (1975).

24/ AID, "Philippines FY 78 Project: Agro-Forestation," Appendi 5, at 3 (Project Review Paper, 1976).

25/ World Environment Report, September 27, 1976, at 3.

26/ Ewel, supra note 2, at 5.

27/ AID, Philippines FY 78 Project, supra note 24, at 3.

genetic resources and as habitat for game and other wildlife. Of all the earth's biomes, tropical forests have the greatest abundance and diversity of species. Between one-fifth and one-half of all the world's plant and animal species are found there. This genetic reservoir has made and can make a significant contribution to modern agriculture, medicine, pharmaceuticals, and industry. For example, only 2% of the world's 200,000, largely tropical, flowering plants have been tested for alkaloids, an important group of drugs used to treat several forms of cancer, including leukemia, cardiac complaints, and hypertension. As many as one-half of all prescriptions written in the U.S. contain as the sole or main ingredient a natural drug, often imported from the tropics.[1] The destruction of forests thus means the loss of species of great potentia value to humankind.[28]

In a number of developing countries, forest-dwelling peoples have traditionally depended on wild animals and plants as a source of food and income. In the Ucayli area of the Amazon forest of Peru, wild game and fish provide 85% of the

28/ Myers, "An Expanded Approach To The Problem Of Disappearing Species," 193 Science 198 (July 16, 1976); Meyers, "Garden Of Eden To Weed Patch: The Earth's Vanishing Genetic Heritage," 6 NRDC Newsletter 1 (Mary Roisner, ed., Jan./Feb. 1977). The National Research Council noted the importance of stocks of genetic materials for plant and animal breeding. It recommends in particular efforts to conserve natural habitats that have especially diverse flora. National Research Council, supra note 13, at 73.

meat eaten by families. In Ghana, wildlife provides 61% of locally consumed protein.[29] The maintenance of tropical forests in such areas often is worthwhile to prevent cultural disruption and further population movement into urban areas.[30]

AID has begun to recognize the seriousness of the deforestation problem in many developing nations. A number of forest management and reforestation projects have been proposed.[31] Two examples are a Watershed Management Project in Panama, and an Agro-Forestation Project in the Philippines.

Virtually all the forests of the Pacific watershed of central and western Panama have been leveled, threatening farm lands, hydroelectric facilities, and urban water supplies. AID has proposed a $10,000,000 loan to Panama to restore and protect forests in these and other parts of the country.[32] Planned activities include the reforestation of cleared areas to check soil loss and the development of a trained forest service to enable Panama to manage more effectively its remaining forest reserves.

In the Philippines extensive "slash and burn" agriculture and excessive lumber operations have contributed to widespread

29/ FAO, Food And Environment 28 (1977).

30/ Bene, Beall, and Cole, supra note 19, at 28-29.

31/ Attached as Appendix III are descriptions of other ongoing or proposed AID activities regarding environment and natural resources.

32/ AID, "Panama FY 79 Project: Reforestation And Resource Protection" (PID, 1977).

deforestation. The three year Agro-Forestation Project calls for $6.5 million in grants and loans.[33] In addition to the reforestation of some of the country's five million hectares of denuded forest lands, the project involves the planting of trees and shrubs with crops to increase agricultural productivity. The trees protect the crops from soil erosion and help maintain soil fertility. They also provide food and wood materials for the local population. The Agro-Forestation Project appears to be well-designed, providing both longer-term protection of the natural resource base and more immediate social and economic benefits.

33/ AID, Philippines Fy 78 Project, supra note 24.

III. Deterioration of Agricultural Lands

Millions of acres of valuable crop and grass lands throughout the developing world are deteriorating under the crush of increasing food needs. The accompanying loss of per capita agricultural productivity already is being felt in many poorer countries. Unless this trend is reversed, the implications for the well-being of millions in the developing world are ominous.[34]

Virtually all developing nations must increase food production to feed larger populations.[35] Some 1.5 billion people in the developing nations directly depend upon agricultural lands for their employment and livelihood. Once these lands are damaged, their rehabilitation, if possible at all, requires difficult, prolonged, and expensive measures. Developing countries simply cannot afford to lose them.

Perhaps man's most precious natural resource is the thin layer of topsoil which covers the 10% of the earth's surface used to grow crops.[36] As topsoil erodes, the fertility of the

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34/ Attached Appendix III-1 is a survey of aid-receiving countries experiencing a deterioration of agricultural lands.

35/ The National Research Council estimates that developing countries must increase food production by 3-4% per year for the duration of this century. This increased production must come almost totally from higher yields on existing land, as opposed to expansion of crop areas. National Research Council, supra note 13, at 38,39.

36/ See Brown, Redefining National Security 14-20 (Worldwatch Institute, 1977).

land declines until it can no longer support agricultural production. Worldwide, the rate of erosion has accelerated. It is estimated that during the period 1975-2000, some 300 million hectares of productive land will be seriously degraded due to erosion.[37] The major causes are overcropping, improper agricultural practices, and lack of conservation measures. For instance, the reason for continually falling agricultural yields in Lesotho is described as follows:

> . . . this is due to a tragic population/land cycle. As population grows there is increasing pressure to use land more intensively. This results in shorter fallow periods and the utilization of marginal lands which have lower productivity. The next step is that land fertility declines, erosion increases, and yields decline. The overall result is still more population pressure on scarce land resources and subsequent accelerating deterioration. In Lesotho's case, the problem is especially serious because the traditional agricultural system has been extractive, with little thought given to the long run implications of cultivation practices used. The GOL [Government of Lesotho] is determined to reverse these trends . . . 38

Soil erosion is one of the most serious environmental problems facing Pakistan. Some 36% of the total land mass of Pakistan is suffering from water erosion and another 40% from wind erosion.[39] Similarly, in Colombia three-quarters of the

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37/ UNEP, supra note 18, at 21.

38/ AID, "Botswana/Lesotho/Swaziland FY 78 Project: SADPT II," Appendix B, at 66 (Project Review Paper, 1976).

39/ Aftab, "CENTO Nations Plagued by Soil Erosion and Watershed Depletion," World Environment Report, December 5, 1977, at 3-4.

land is affected by erosion. The devastation is greatest in mountainous regions of the country, where farmers fail to employ proper environmental safeguards in hillside cultivation. A three-year study, financed by the Colombia Bank of the Republic and assisted by France, estimates the resulting loss of agricultural production at $571 million. In addition, some 5.2 million acres have been lost permanently to erosion and another one million are seriously eroded. One-third of Colombia's land, including all its coffee growing areas, is affected by moderate erosion.[40]

In many developing countries, irrigated crop lands hold the only hope for increased production. Yet improper water management is contributing to decreased yields on more than a third of the world's irrigated areas.[41] The U.N. estimates that the equivalent of 125,000 additional hectares of irrigated land is lost every year to soil waterlogging and increases in salinity or alkalinity of soils. Virtually all developing countries with large-scale irrigation systems are experiencing these problems, with the worst problems occurring in Middle

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40/ Lernoux, "Lack of Environmental Safeguards Causes Colombian Erosion," World Environment Report, September 26, 1977, at 2.

41/ The National Research Council Panel found that: "Water use in irrigated agriculture is too often grossly inefficient. Known principles and techniques are not applied, often because of policy and institutional restrictions. Present practices [illegible] productivity. More often they waste both water and energy and degrade water quality." National Research Council, supra note 13, at 90.

Eastern and South Asian nations.[42]

Also under growing pressure are the earth's grass or range lands, which provide forage for 2.7 billion cattle, sheep, goats, and water buffalo. These domesticated animals are important sources of food, energy, and industrial raw materials. Yet uncontrolled increases in the numbers of animals have resulted in overgrazing in large areas of several developing nations. Once the protective vegetal cover is destroyed or severely damaged, grasslands are subject to accelerating soil erosion by wind and water and declining carrying capacities.[43]

The grasslands, particularly those of East Africa, have present and potential economic value as habitat for the earth s remaining large herds of wildlife. The protection of these lands and wildlife already is essential to Kenya, where tourism

42/ Worldwatch Institute, The Global Environment And Basic Human Needs: Trends and Problems (Forthcoming Report to the Council on Environmental Quality, 1978).

The World Bank is undertaking large-scale projects in Egypt and Pakistan to reduce losses from salinization, alkalinization, and waterlogging of irrigated land. The Egyptian Drainage Project involves expansion and rehabilitation of drainage facilities, including the reclamation of saline and alkaline lands 1 million hectares in area. The Project is estimated to have a 25% internal economic rate of return. The same economic benefits are expected in Pakistan's Khaipur II Groundwater and Salinity Control Project, which seeks to improve drainage on irrigated lands. U.N. Desertification Conference, Economic and Financial Aspects of the Plan to Combat Desertification, A/CONF. 74/3/Add. 2, at 12 (1977).

43/ Brown, supra note 36, at 16.

is the single largest source of foreign exchange. There are encouraging signs that game cropping or ranching could become in certain areas an important use of marginal grasslands. The domestication of well-adapted wild species, such as the eland, is a further prospect.[44]

During the last few years, considerable attention has been focused upon the effects of severe overgrazing and overcropping in semi-arid lands. Such abuses, especially when accompanied by prolonged drought, can result in the transformation of productive crop and range lands into deserts. A recent United Nations Conference found that "desertification" afflicts nations on all continents. Worldwide, about 6% of the earth's surface now consists of man-made deserts, with deserts claiming an additional 5-7 million hectares per year.[45]

The rural poor of the developing world are the most likely to suffer from the effects of desertification. As the basis of their livelihood declines, they face destitution and possible starvation. The case of the Sahel is well known. In Latin America, a region of Chile which was recently self-sufficient in agriculture required a $1 million worth of food relief in 1972 because of desertification.[46] Asian and Near Eastern

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44/ FAO, supra note 29, at 28-29, 34-35; Luisigi, "Some Environmental Factors in Food Production in Kenya" (U.N. World Food Conference, 1974).

45/ Eckholm and Brown, Spreading Deserts -- The Hand of Man (Worldwatch Institute, 1977); International Union for Conservation of Natur. and Natural Resources, "Message from Dr. Mostafa K. Tolba 3 IUCN Bulletin 43 (August/September, 1977).

46/ AID Office of Science and Technology, "Desert Encroachment on Arable Lands: Significance, Causes and Control" 5 (August 1972).

countries losing agricultural lands to deserts include Pakistan, India, Syria, and Jordan.[47]

AID projects focusing on the rehabilitation and preservation of agricultural lands include an Integrated Rural Development Project in Jamaica and a Land Conservation and Revegetation Project in Senegal.[48] In Jamaica, serious soil erosion problems have limited the agricultural productivity of small farmers, who grow nearly all that country's domestic food on small hillside plots. An AID loan of $13,000,000 was proposed in September 1977 to help finance an integrated rural development scheme in erosion control and watershed protection, which is supportive of the government of Jamaica's goal of ensuring that all agricultural land is retained and utilized as efficiently as possible.[49] Plans call for terracing, ditching, and pastureland treatment of 18,000 acres. In addition, 7,042 acres are to be reforested. These efforts will not only boost small farmer income, but are a precondition to effective water resource management, irrigation schemes, and downstream dam construction at a later date.

AID has proposed an $11,000,000 grant to Senegal to improve, protect, and maintain the quality of its agricultural resource base.[50] The program will seek to reverse the degradation of

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47/ Eckholm and Brown, supra note 45.

48/ Attached as Appendix III are descriptions of other ongoing or proposed AID projects concerning environment and natural resources.

49/ AID, "Jamaica FY 77 Integrated Rural Development Project" (Project Paper, 1977).

50/ AID, "Senegal FY 78 Land Conservation and Revegetation Project" (Project Review Paper, 1976). The project also calls for activities to protect forests and woodlands in Senegal.

Senegal's rangelands by overgrazing and of crop-producing areas by uncontrolled burning and soil degradation. Activities will include natural resource surveys, development of grazing management plans and revegetation in areas surrounding deep-bore wells, and planting of trees for windbreaks to slow soil erosion.

IV. Assuring the Environmental Soundness of AID's Activities

Central to AID's efforts in the Environment and Natural Resources sector is the need to assure that its own projects are environmentally sound. If U.S. development assistance is to be effective, it must be compatible with the particular social, economic, political, and environmental conditions in the host country. The failure to consider ecological factors in project design can lead to unforeseen economic and human costs.

AID's environmental sensitivity was stimulated by the passage of the National Environmental Policy Act of 1969. In 1970 AID issued regulations requiring preparation of environmental assessments only in connection with capital development projects. Starting in 1972, a number of major U.S. environmental organizations became concerned about the adequacy of AID's environmental regulations and, in particular, the environmental effects of AID's financing of pesticide exports to developing countries. These exports included pesticides, such as DDT, which were considered too dangerous for use here, and had had their registrations cancelled or suspended. In 1973, the Chairman of the Council on Environmental Quality asked the AID Administrator to prepare an environmental impact statement ("EIS") on its pesticide activities.

AID continued to refuse to do so or to establish procedures to require the consideration of the environmental effects of all its activities. In April 1975, the Environmental Defense

Fund, the National Audubon Society, the Sierra Club, and the Natural Resources Defense Council filed suit to obtain AID compliance with the National Environmental Policy Act. In December 1975, AID agreed to a settlement whereby it would prepare a programmatic EIS on its pest control programs and publish new regulations.[51]

On June 30, 1976, AID issued new environmental regulations.[52] The regulations require that a brief Initial Environment Examination (IEE) be completed for each proposed AID project. The IEE serves as the basis for a threshold decision whether or not to prepare an EIS or an Environmental Assessment. An EIS is prepared on all AID actions having a significant effect on the environment of the U.S. or the commons (i.e., the oceans), and whenever else the Administrator determines it to be appropriate. Where impacts are limited to a single nation, an environmental assessment is prepared. The major difference between the statements and assessments concerns the role of the public. When an assessment is prepared, the agency is not required to provide the public here or in the host country with an opportunity for formal review and comment.[53]

51/ EDF, et al. v. AID, et al., 6 E.R. 20121 (D.D.C. 1975).

52/ 22 CFR Part 216, 41 Fed. Reg 26913 (June 30, 1976).

53/ AID Missions are to encourage host governments to make assessments available to the general public of the recipient country. 22 CFR §216.5(d).

The regulations call for AID to cooperate to the maximum extent possible with host governments in data collection, preparation of analyses, and consideration of alternatives as part of the assessment process. This collaboration will help create awareness of development-related environmental problems and to build indigenous institutions. Where there is a lack of adequate baseline data for the assessment or of local personnel with ability to contribute to the assessment, AID missions are to encourage and respond to host country requests for training and technical help. AID reserves the right to decline to participate in a proposed activity when it finds that there is reasonable risk of significant adverse environmental impacts and where efforts to include environmental safeguards fail.[54]

The responsibility for implementation of the regulations lies with each AID official empowered to authorize funds, so as to ensure that environmental considerations are integrated and weighed with others at every level. The position of AID Environmental Coordinator was created to serve as a central source of guidance and coordination within the agency. Each AID Bureau, Mission, and major office is to designate an officer to serve as a coordinator and contact point on environmental issues.[55]

54/ 22 CFR §216.5(b).

55/ The AID Environmental Coordinator is Albert C. Printz. He is now located in the Office of Science and Technology. Our understanding is that the position will be transferred to the Bureau of Program and Policy Coordination, a location more central to the operation of the agency. At present, three of the four AID Regional Bureaus have Environmental officers; only the Bureau for the Near East lacks one.

AID's experience with the new regulations appears to have been positive. The Final Programmatic EIS on the AID Pest Management Program was published in May 1977. The statement resulted in a shift in AID policy on pesticides. AID now plans to decrease its assistance to developing countries for the procurement of pesticides and to place greater emphasis on technical assistance and research to promote integrated pest management techniques. AID will no longer provide pesticides which have had their registrations cancelled or suspended by EPA, except in emergencies or where a thorough analysis shows that there is no other practical alternative.[56]

During the last year, AID has completed 20-30 environmental assessments of proposed projects. These include a malaria control project in Sri Lanka,[57] a rural feeder roads project in Guyana,[58] and an irrigation project in the Philippines.[59]

Two major deficiencies in AID's implementation of the new environmental procedures are failure to assess other agency-wide programs and country programs, and a lack of sufficient environmentally-trained AID Mission personnel. With the exception of the EIS on pest management programs, AID's environmental analyses

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56/ AID Press Release, May 13, 1977.

57/ Gerberg and Wilcox, "Environmental Assessment of Malaria Control Project--Sri Lanka" (AID, August 1977).

58/ Environment Consultants, "Environment Assessment--Guyana Roads Project" (AID, September 1977).

59/ Luker, "Environmental Assessment BiCol Integrated Area Development II--A (Bula Minalabac) " Appendix C (AID Project Paper, May 1977).

have focused on individual projects in a recipient country. Other programs which are agency-wide or carried out in several countries would benefit from thorough environmental review. Two examples are housing and rural electrification. Perhaps more importantly, AID should examine the environmental effects of its program of assistance in each host country. A generic environmental assessment would be undertaken, along with already required economic and social analyses, during the preparation of long-term aid agreements with other countries and of annual AID country program plans. This would enable AID and host country governments to consider environmental and natural resource factors at a much earlier stage of development planning.

AID appears to have relied primarily upon outside contractors to prepare assessments. Virtually none of AID's Missions have personnel capable of carrying out environmental reviews (AID/Manila is an exception). As a result, the establishment of cooperative working arrangements with host government counterparts on environmental assessments of proposed projects has lagged. While a program to train AID Mission personnel in environmental basics will be undertaken in 1978, there is a need to station more environmental experts in host countries.

Overall, AID has made considerable progress in its efforts to assure the environmental soundness of its projects, an objective reaffirmed by the President in May and during Congressional consideration this year of the

Environment and Natural Resources amendment to the Foreign Assistance Act. Within the international development assistance community, AID is emerging as a leader in promoting economic development based upon careful evaluation of environmental constraints and costs.[60]

60/ For a preliminary review of the environmental policies and assessment procedures of multilateral development financing agencies, see International Institute for Environment and Development, Multilateral Aid and the Environment: A Study of the Environmental Procedures and Practices of Nine Development Financing Agencies (1977).

V. Building the Informational and Institutional Capabilities Of Developing Countries

The responsibility for the protection and management of natural resources and the environment ultimately rests with developing country governments. Yet many developing nations are poorly equipped for these tasks. Some, such as Costa Rica, still lack national laws or policies on natural resources.[61] Many others, such as Zaire, do not have an adequate resource data base upon which to make sound development decisions.[62] Most are in need of more technically-trained personnel to carry out natural resource conservation and management programs.

AID has undertaken or proposed a number of activities to help build environmental, informational, and institutional capabilities. One important effort is to enable developing nations to use satellite remote sensing data. For example, it has been proposed that AID establish a regional center in Asia for training and assisting government personnel in analysis of data from the LANDSAT and ERTS satellites. The Government of Bangladesh views remote sensing as a means for improved weather forecasting in order to avoid developments in areas subject to destructive floods and typhoons, while the Government of Indonesia wants a better understanding of the conditions of their rivers and

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61/ AID, "Land Productivity and Rural Employment - Costa Rica FY 78 Project " 43 (Project Paper, 1976).

62/ AID, "ERTS - Zaire FY 77 Project" (Project Paper, 1977).

the impact of a lack of watershed conservation efforts. The center would be located in Bangkok, Thailand, under the direction of the U.S. Geological Survey.[63]

An example of a more traditional approach is a proposed project in Botswana. The Government of Botswana promulgated in 1975 a Tribal Grazing Lands Policy to stem the continuing deterioration of land resources by livestock. The policy establishes areas for large commercial stockholders, small stockholders, and farmers. Not covered by this policy are thousands of Botswana Bushmen who depend upon hunting and gathering for subsistence. They live in parts of Botswana with few stockholders and large, economically exploitable populations of wild animals.

The Botswana Government supports the creation of Wildlife Management Areas (WMA) to promote sustained use of wild animals and plants by the Botswana people as an alternative to agriculture. For example, a number of herbs have been identified in the WMA's which could be gathered and marketed for use in pharmaceuticals and industry. Wild animal herds, if properly managed, could be a commercial source of meat and hides. The objective of the Government is gradually to assimilate these isolated people into the wider economy of Botswana. The proposed five-year technical assistance and training project would assist the Government in surveying

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63/ AID, "Remote Sensing for Agriculture-Asia Regional Project" (Draft PID, 1977).

and administering the WMA's.[64]

It is the rural poor of developing nations who are most dependent upon renewable natural resources. They suffer most from resource abuse and ill-planned development efforts. The overriding objective of U.S. foreign aid to provide sustainable improvement in the lives of the poor would be well served by increased emphasis upon building the capability within developing countries government for effective conservation, protection, and utilization of their natural resources.

64/ AID, "Wildlife Development for Rural Poor -- Botswana" (Draft PID, 1977).

VI. The Environment and Natural Resources Sector: What Needs to Be Done

The decision by Congress this summer to add an Environment and Natural Resources sector to the Foreign Assistance Act confirmed a growing recognition by developing country governments, AID, and other donors of the interdependence of human well-being, economic growth, and a sound environment. As illustrated in this paper and Appendix III, AID already has taken steps to help developing countries protect and maintain their environment and natural resources. Such activities were supportive of and compatible with the "New Directions" legislation of 1973.

The Environment and Natural Resources sector did not add a totally new dimension to AID's work. Rather, it made clear AID's mandate to address the severe environmental and natural resource problems hampering developing countries. In the absence of clear authority, AID's efforts had been piecemeal and subject to torturous justification. In some aid-receiving countries, signs of severe environmental stress were ignored until disaster struck.

In order to assure that AID addresses these problems systematically and before crises occur, we recommend that beginning in FY 1979, AID carry out a thorough survey of environmental and natural resource problems and institutional capabilities in each host country. The objective would be to identify environmental problems and assess the ability of

the host country to solve them. The attached appendices on the deterioration of forests and agricultural lands in aid-receiving countries reflect the inadequacy of such data available to decision-makers in Washington. In particular, the economic costs related to environmental degradation in developing countries have not been established, with few exceptions.

The survey should be carried out by AID Mission officials, in cooperation with host country counterparts. Where the Mission lacks the necessary expertise, it should be provided by contract personnel. We estimate that the total cost of the review would not exceed $1,500,000 (62 countries at about $24,200 per country). So as to assure its quality, we suggest that the results of the survey be reported to Congress. The survey would provide a much-needed information base not only for AID but for host countries and other development agencies.

APPENDIX J

DRAFT

LDC Deforestation Problem

- A Preliminary Data Base -

This summary is intended to provide the reader with a rough measure of (a) the rate at which LDC forests are being lost, (b) the areal extent of the problem, and (c) the broad gaps in the overall data base.

In LDCs some 90 percent of the wood used is for firewood and charcoal. The rate of increase of the use of wood in LDCs nearly parallels their rate of population growth. However, LDC populations are projected to double in about 25 years while during the same time most of their forest cover is projected to be removed. Clearly, the LDC deforestation problem has a direct impact on their energy problems but it is equally clear that deforestation is having significant negative effects on their physical and biological resources by increasing soil erosion and flooding, decreasing water quality and its availability, by causing extinction of wildlife and plant species, and by eliminating a source for building materials, paper products and chemicals.

Dr. Walter Parham
DS/OST
December 30, 1977

COUNTRY OR REGION	PERCENT OF FOREST REMAINING	RATE OF DEFORESTATION	OTHER DATA	REFERENCE
All tropical moist forests	58-41	At least 11,000,000 ha/yr.	16,000,000 sq. km. of forest originally. 9,350,000 sq. km. left.	(1)
Latin America	63%	--	--	(1)
Amazon Basin lowland forests	75%	As much as 4 percent/yr.	3,500,000 sq. km. of forest. 2,600,000 sq. km. left.	(25)
Haiti	--	50 percent in last 4 years. Elimination of forests in 15 yrs.	--	(2)
Colombia	--	2,500,000 acres deforested/yr. 80 percent forest loss in 25 last years.	--	(3)
	74%	Projected loss of 330,000 ha/yr from 1962 to 1985.	--	(1)

COUNTRY OR REGION	PERCENT OF FOREST REMAINING	RATE OF DEFORESTATION	OTHER DATA	REFERENCE
Bolivia	--	Projected Loss of 167,000 ha/yr from 1962 to 1985.	--	(1)
Brazil	--	Projected loss of 743,000 ha/yr from 1962 to 1985.	--	(1)
Ecuador	52%	Projected loss of 52,000 ha/yr from 1962 to 1985.	--	(1)
Peru	--	Projected loss of 49,000 ha/yr from 1962 to 1985.	--	(1)

2

COUNTRY OR REGION	PERCENT OF FOREST REMAINING	RATE OF DEFORESTATION	OTHER DATA	REFERENCE
Venezuela	--	Projected loss of 174,000 ha/yr from 1962 to 1985.	--	(1)
	--	--	Forest covered 45 percent of Western Llanos in 1950, 30 percent in 1975, and is projected to cover 16 percent in year 2000.	(23)
Panama	50%	15,000 ha/yr.	16 percent of total land area deforested by slash-and-burn in central & western pacific watershed alone.	(4)
	--	--	80% of Gatun Lake watershed as well as about 40% of Madden Lake watershed deforested since 1952.	(22)
Costa Rica	38%	50,000 ha/yr. Elimination of forests by yr., 2000.	Replanting 1,000 ha/yr.	(5)
	--	60,000 ha/yr.	--	(1)
West Sumatra	64%	--	--	(6)
Thailand	35%	--	--	(1)
	37%	60% forested in 1960.	--	(7)
		50% forested in 1970.		

COUNTRY OR REGION	PERCENT OF FOREST REMAINING	RATE OF DEFORESTATION	OTHER DATA	REFERENCE
Singapore	6%	--	--	(8)
Borneo	--	--	As much as 1/3 of rain-forest lost between 1945-1970.	(9)
Java	12% (Satellite Data)	--	--	(10)
Nepal	--	--	About 10,000 sq. km. so devoid of vegetation that area has entered the desertification process.	(11)
Indonesia	--	Total deforestation in about 100 yrs.	--	(12)
	--	--	500 timber firms have obtained concessions for 10,600 sq. miles of forest with the agree-ment that all be cut within 20 yrs.	(13)

COUNTRY OR REGION	PERCENT OF FOREST REMAINING	RATE OF DEFORESTATION	OTHER DATA	REFERENCE
Paraguay	-- 66%	-- Projected loss of 170,000 ha/yr from 1962 to 1985.	7 of 16 Departments had average of 31% forest cover in 1945, and only 18% in 1976. A 58% loss in 31 yrs. --	(14) (1)
India	--	--	Reportedly 3,400,000 ha. of forests have been destroyed in India in last three decades for agricultural purposes, river valley projects and as a result of industrial and urban expansion.	(24)
Nicaragua	--	11.8 percent of forest loss from 1968 to 1975.	Pacific, Central/North and Atlantic regions lost 20 percent of forests from 1963 to 1975. Agricultural frontier growing at 500 sq. km./yr. but rate of 600 sq. km/yr. by 1980's.	(15)
Southeast Asia, South Asia, Pacific	58%	--	--	(1)

COUNTRY OR REGION	PERCENT OF FOREST REMAINING	RATE OF DEFORESTATION	OTHER DATA	REFERENCE
Philippines and Malaysia lowland forests	--	Total deforestation in 5-10 yrs.	--	(25)
Indonesia and New Guinea lowland forests	--	Total deforestation in 15-20 yrs.	--	(25)
Thailand	--	Northern Thailand losing 5-7 percent of forests/yr.	--	(10)
	35%	Country losing 300,000 ha/yr.	--	(1)
Bangladesh	--	10,000 ha/yr.	--	(1)
Laos	--	300,000 ha/yr.	--	(1)

COUNTRY OR REGION	PERCENT OF FOREST REMAINING	RATE OF DEFORESTATION	OTHER DATA	REFERENCE
Papua New Guinea	70% - 94.9%	20,000 hr/yr.	--	(1)
Vietnam	--	North Vietnam losing 10,000 ha/yr.	--	(1)
Malaysia	--	150,000 ha/yr.	--	(1)
Philippines	Less than 20% (Satellite data).	--	Was thought to have 35-50% forest cover remaining before satellite survey.	(10)
	57%	9% decrease in 25 yrs.	--	(16)
	--	--	Some 1,650,000 household heads involved in slash-and-burn agriculture.	
	--	--	Now 19,560 sq. miles of denuded forest land, and is increasing at 1,000 sq. miles/yr.	(17)
	--	260,000 ha/yr.	--	(1)

4

COUNTRY OR REGION	PERCENT OF FOREST REMAINING	RATE OF DEFORESTATION	OTHER DATA	REFERENCE
Africa	48%	--	--	(1)
Gambia	4%	8% forest cover remaining in 1968. 56% remaining in 1945.	--	(18)
Burundi	--	Total deforestation in 7 yrs.	--	(19)
Ghana	--	50,000 ha/yr.	--	(1)
Madagascar	--	300,000 ha/yr.	--	(1)
Ivory Coast	--	Losing 400,000 ha/yr.	--	(1)
	--	--	30% forest loss between 1956-1966 determined by aerial surveys.	(10)

COUNTRY OR REGION	PERCENT OF FOREST REMAINING	RATE OF DEFORESTATION	OTHER DATA	REFERENCE
Ethiopia	--	200,000 ha. deforested a year. Total deforestation in 20 years.	--	(20)
Senegal	--	--	320 sq miles of woodlands destroyed by fire in 1973 alone.	(21)
Morocco, Tunisia, Algeria	11% (around 1950)	--	--	(10)

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APPENDIX II

The following chart documents environmental deterioration of agricultural lands in 36 developing countries which have or will receive assistance from AID. It is based upon a review of published reports and of materials provided by nongovernmental experts, AID and other development agencies. The available data is limited. Extensive national studies of agricultural natural resources apparently have never been undertaken in many developing countries and just started in others. Only a few estimates of the magnitude, rate, and economic cost of crop and grass land deterioration have been made. Much more information is a prerequisite for effective efforts to maintain the productivity of agricultural lands throughout the developing world.

Country/Region	Description of Deterioration	Cause of Deterioration	Other Data	Source
WORLD	SOIL EROSION 2500 million metric tons of soil is loss each year because of erosion (1). Soil loss is 2.3 the natural rate (2). Between 1975-2000, an estimated 300 million hectares*of land will be lost to soil degradation caused mostly by erosion (3). WATERLOGGING & SALINITY 125,000 hectares of irrigated land is degraded mainly by waterlogging and salinity each year (1). Over 50% of the world's irrigated area affected by salinization (2). *1 hectare = 2.4 acres	Major causes are overcropping, intensified slash-and-burn agriculture, overgrazing, and cultivation of sloped land (4).	$3,280 million lost in agricultural production due to waterlogging and salinity each year (3).	(1)(3)(4) UNEP, 1977. (2) Judson, 1968. (1)(3) U.N. Desertification Conference, Econom. & Financial Aspects, 19 (2) SCOPE, 1976.

Country/Region	Description of Deterioration	Cause of Deterioration	Other Data	Source
WORLD	DESERTIFICATION 1/9 of the world's surface affected by desertification (1). About 6% of the world's total surface is manmade desert (2), with deserts claiming another 5-7 million hectares every year (3). 3,200,000 hectares of rangeland degraded annually (4). 2,500,000 hectares of rainfed cropland are degraded annually (5).	Major causes include: overgrazing, overcropping, farming on marginal areas, and accelerated soil erosion (6).	78 million people inhabit arid or semi-arid lands wasted by desertification (7). $6,720 million lost in agricultural production due to rangeland deterioration annually (8). $5,625 million lost in agricultural production due to deterioration of rainfed agriculture annually (9).	(1) Glantz, 1977. (2) Eckholm , 1976. (3,6) Tolba, 1977. (4,5,8,9) U.N. Desertification Conference, Economic and Financial Aspects, 1977. (7) U.N. Desertificatio Conference, An Overvie 1977.
LATIN AMERICA	Erosion of agricultural land by water, in economic terms, is perhaps the most serious environmental problem in Latin America (1). 5%-20% of the land area of Latin America affected by erosion (2).			(1,2) U.N. Water Conference, 1977.

Country/Region	Description of Loss	Cause of Deterioration	Other Data	Source
BOLIVIA	Areas throughout the country are threatened by desertification (1).			(1) Tolba, 1977.
-Andean Region	Severe soil erosion problems (2).			(2) Monheim, 1974.
-Altiplano	Severe soil erosion and declining soil fertility resulting in lower crop yields and abandonment of land (3).	Overcropping and overgrazing.		(3) Eckholm, 1976.
-Central and Southern Valley Regions	Accelerated erosion of cultivated land and pasture, resulting in lower agricultural productivity (4).	Overcropping and overgrazing		(4) AID, Bolivia FY 78 PID.
CHILE	25% of land affected by soil erosion problems. 5% is severely eroded (1).			(1) CEPAL, 1976.
-Atacama Region	Spreading desert (2).			(2) AID, Desert Encroachment, 1972.
-Coquimbo Region	This 1450 sq. km. area is suffering from deterioration of pastures, loss of top soil on steep slopes, declining agricultural productivity, and desertification (3).	Overcropping and overgrazing		(3) U.N. Desertification Conference, Synthesis of Case Studies, 1977.

Country/Region	Description of Loss	Cause of Deterioration	Other Data	Source
COLOMBIA	75% of country's land surface affected by soil erosion (1). 5.2 million acres permanently lost to erosion (2). 426 million tons of soil lost because of erosion each year (3).	Poor farming practices, particularly the failure to employ environmental safeguards in hillside cultivation.	$571 million lost in agricultural production (4). Erosion, landslides, and sedimentation are the most important physical problems influencing development and productivity in the country (5).	(1-4) World Environment Report, Sept. 26, 1977. (5) Liggett, 1974.
-Llanos	Deterioration of savannah lands (6).	Overgrazing		(6) Hills, 1974.
COSTA RICA				
-Guanacaste Province	Serious soil erosion damage to agricultural land.	Burning and spread of cattle ranching.		Stein, 1960.
-Intermontane Valley and Candelaria Highlands.	Severe soil erosion problems.	Cultivation of crops and grazing on sloped land.		
DOMINICAN REPUBLIC	Erosion of hillside farmlands.	Use of marginal lands for crop cultivation and poor farming practices.		AID, Dominican Republic FY 78 PRP.
-Cibao Valley	Serious waterlogging and soil salinity problems on irrigated land.	Improper irrigation management.		

Country/Region	Description of Deterioration	Cause of Deterioration	Other Data	Source
ECUADOR				
-Coastal Region	Areas of declining fertility and soil erosion (1)	Overcropping and monoculture farming (1).		(1)(3)(4,5) CEPAL, 1976.
-Inter-Andean between Loja and Cuence	3/4 of the once cultivated area has been abandoned because of soil erosion (2).			(2) Gourou, 1968.
-Inter-Andean and Sierra Region	Serious soil erosion affecting agricultural production (3).			
-Palmira Desert	Spreading desert (4).			
-Provinces of Chimborazo and Loja	Increasing desertification (5)			

Country/Region	Description of Deterioration	Cause of Deterioration	Other Data	Source
EL SALVADOR	90% of the land lacks sufficient vegetal cover leading to intense erosion (1). 77% of total land surface affected by accelerated erosion (2).			(1) U.N. Water Conference, 1976. (2,3) Eckholm, 1976.
-Northern Mountains	Complete loss of top soil in many areas (3).	Overcropping and overgrazing.		
GUATEMALA	Soil erosion is a national problem (1). 71.3% of total land used for agriculture, pasture, and forest affected by erosion (2). About 68,626 square kilometers are severely affected (3).	Major causes--overgrazing and overcropping (5), and failure to practice contour farming (6).	Enormous physical and economic losses resulting from erosion (7).	(1) AID, Guatemala FY 78 Project Paper. (2-3)(7) Flannery, 1974. (5) Goodland & Tillman, 1973.
-Altiplano	98% of lands in this important agricultural region affected by erosion. As a result soil productivity is reduced (4).		Per capita food production and food consumption declined in 1975 from 1965-71 levels (8).	(8) IFPRI, 1977.

Country/Region	Description of Deterioration	Causes of Deterioration	Other Data	Source
HAITI	Severe soil erosion (1). Due to soil loss through erosion, the total amount of land available for cultivation is declining each year (2).	Overcropping, farming on sloped land.	Less than 10% of Haiti's land is suitable for intensive agriculture (3). Per capita food production declined in 1975 from 1969-71 levels (4).	(1) AID Mission Cable, 1977. (2)(3) Ewel, 1977. (4) IFPRI, 1977.
HONDURAS -Northwestern Section	Severe soil erosion, exposed surface bedrock and reduced soil fertility (1).	Intensive land use on steep slopes .	Per capita food production and food consumption declined in 1975 from 1969-71 levels (2).	(1) Olson, 1977. (2) IFPRI, 1977.
NICARAGUA	44% of the country's 2.71 million acres suitable for annual cultivation are severely eroded, i.e., total loss of top soil with a partial loss of subsoil.	Farming without conservation practices, particularly on hillsides and marginal areas.	Small farmers are the most affected by the abuse and depletion of the natural resource base.	AID, Nicaragua FY 78 Project Paper.

Country/Region	Description of Deterioration	Cause of Deterioration	Other Data	Source
NICARAGUA (continued)				
-Pacific Departments of Leon and Chinandega	Severe soil erosion affects 350,000 hectares of good farm land.	Mono-culture farming, over-grazing, and clearing wooded slopes.		
-North-Central Department of Nueva Segovia	Soil erosion problems.	Slash and burn agriculture and lack of conservation.		
-Pacific and West Central Regions	Areas affected by soil erosion.	Lack of ground cover, over-grazing, burning of pastures, woodland and crop lands.		
PANAMA	1,235,000 acres of farm land are affected by serious soil erosion.	Slash and burn agriculture farming on sloped land.		AID, Panama FY 78 PID.
PARAGUAY	Severe soil erosion and declining soil fertility.	Slash and burn agriculture.		AID Mission Cable, 1977.

Country/Region	Description of Deterioration	Cause of Deterioration	Other Data	Source
PERU				
-Andean Region	Severe soil erosion and abandonment of land (1).	Overcropping and farming on sloped land.	Southern half of the region includes almost 1/2 of the country's cultivated land, yet produces only about 1/6 of national income attributed to agriculture (2).	(1) Monheim, 1974. (2) Eckholm, 1976.
	Soil depletion lowering agricultural productivity (3).			(3) AID, Peru FY 78 Project Paper.
-Chiura-Piura River Basin	In the San Lorenzo project area water salinity caused a reduction in yields on 4,000 hectares of irrigated land and abandonment of another 4,000 hectares (4).	Water salinity, inadequate drainage, and excessive water requirements.		(4) CEPAL, 1977.
AFRICA				
-East and Southern	Declining land fertility and soil erosion (1).			(1) AID, REDSO Mission Cable, 1977.
-North	Estimated 240,000 acres of grasslands destroyed annually (2).			(2) Semple, 1971.
-Sahel	250,000 square miles of agricultural and grazing land lost to Sahara in the past 50 years (3). Deterioration of croplands and pastures (4).	Overcropping, overgrazing, and the expansion of agriculture into unsuitable climatic regions.	10 to 20 tons of soil per hectare lost a year by erosion (5).	(3) AID, Desert Encroachment, 1972. (4) Warren and Maizels, 1976. (5) UNESCO, 1975.

Country/Region	Description of Deterioration	Cause of Deterioration	Other Data	Source
BOTSWANA -Limpopo Basin	Desertification (1). Deteriorating grasslands (2). Advanced deterioration of land resources (3).	Overgrazing.		(1) Tolba, 1977. (2,3) Clark University 1976.
CHAD -Southern Region -Western and Northwestern Regions	Soil erosion and depletion of soil fertility (1). Deteriorating land resources (2). Sahara encroachment on grazing lands (3).	Overgrazing	Per capita food production and food consumption declined in 1975 from 1969-71 levels (4).	(1,2) AID, Chad FY 78 PRP, 1976. (3) AID, Desert Encroachment, 1972. (4) IFPRI, 1977.
ETHIOPIA	Areas of severe desertification and desert encroachment (1). Estimated 1,000,000 tons of soil lost annually due to erosion (3). Waterlogging and salinization of irrigated land (4).		Per capita food production and food consumption declined in 1975 from 1969-71 levels (2).	(1) Glantz, 1976. (2) IFPRI, 1977. (3) Ware-Austin, 1970. (4) Berry and Ford, 1977.

Country/Region	Description of Deterioration	Cause of Deterioration	Other Data	Source
ETHIOPIA (continued)				
-Awash Valley	Deterioration of grazing lands. Serious soil erosion and depletion on farm lands (5).	Overcropping and overgrazing.		(5) Emmanuel, 1973.
-Eritrea and Tigre Provinces	Severely eroded land with low agricultural productivity (6).	Overcropping and overgrazing.		(6) Eckholm, 1976.
-Highlands	Severe erosion and loss of top soil (7).	Improper land use.		(7) Plotzi, 1974.
GAMBIA	Increase of marginal and eroded land from 8.2% to 51.6% of total land area (1).		Per capita food production and food consumption declined in 1975 from 1969-71 levels (3).	(1,2) AID, Gambia FY 78 Project Paper, 1976.
	Serious soil erosion problems, decreasing soil fertility and declining food production (2).	Slash and burn agriculture, cropping without fallow, and overgrazing.		(3) IFPRI, 1977.
KENYA	Serious soil erosion on farmlands, impedes national agricultural growth (1).	Poor farming practices.	Per capita food production and food consumption declined in 1975 from 1969-71 levels (3).	(1) Clark University, 1977.
	Destruction of pasture lands (2).	Overgrazing.		(2) Imisigi, 1974.
				(3) IFPRI, 1977.

Country/Region	Description of Deterioration	Cause of Deterioration	Other Data	Source
KENYA cont.				
-Thiba Tana Catchment	One-third of this 9,460 sq. kilometers catchment area is eroded.	Overgrazing & cutting trees for charcoal.		(4) Odingo, 1975.
LESOTHO	Land erosion is a serious national problem (1).		In period 1950-1970, 40% drop in production of major crops, due in large part to erosion (3).	(1) AID, FY 78 Submission to the Congress.
	7% of arable land has been lost to severe soil erosion, with another 2,500 acres lost annually (2).	Poor farming practices, overgrazing, and heavy rainfall.		(2,3) AID, Lesotho FY 78 Project Paper.
MALI	Deterioration of grazing lands (1).	Overgrazing.	Per capita food production and food consumption declined in 1975 from 1969-71 levels (3).	(1,2) AID, Desert Encroachment, 1972.
-Northern Section	Sahara encroachment of grazing lands (2).			(3) IFPRI, 1977.
MAURITANIA	Serious deterioration of natural resources (1).	Continued overutilization of land resources.		(1,2) AID, Mauritania, FY 78 Project Paper, 1976.
	Deterioration of pasture lands (2).			

Country/Region	Description of Deterioration	Cause of Deterioration	Other Data	Source
MAURITANIA cont.	Heavy wind erosion of arable land (3). Area around these towns has been stripped of vegetation, creating severe soil erosion and dune encroachment (4).	Overgrazing		(3) AID, Desert Encroachment, 1972. (4) AID, Mauritania FY 78 Project Paper, 1976.
NIGER -Agadez and Azawak Regions	Declining productivity of agricultural lands (1). Severe desertification of 100,000 sq. kilometers area, 10% of Niger's land area (2).	Soil erosion, shifting sand dunes, deteriorating pastures, overgrazing, expansion of agriculture into unsuitable climatic regions, and drought.	Per capita food production and food consumption declined in 1975 from 1969-71 levels (3).	(1) Warren and Maizels, 1976. (2) U.N. Desertification Conference, Synopsis of Case Studies, 1977. (3) IFPRI, 1977.
SENEGAL -Northern and Central Region	Desertification (1). Serious soil erosion causing reduced crop productivity (2). Deteriorating grasslands (3). 822,000 hectares of land degraded (4).	Overgrazing, burning, and wind erosion.	In between 1975-76, 2-3 million hectares of land indiscriminately burned (5).	(1) Tolba, 1977. (2)(4,5) Senegal FY 78 Project Review Paper, "Land Conservation and Revegetation", 1976. (3) Warren and Maizels, 1976.

Country/Region	Description of Deterioration	Cause of Deterioration	Other Data	Source
SUDAN	Waterlogging and salinization of irrigated land (1).			(1) Berry and Ford, 1977.
-Kordofan Province	Southward spread of desert at 5-10 Km a year (2).		In last 17 years deserts have expanded 90-100 kilometers southward (4).	(2) Tolba, 1977.
-Savannah Zone	Serious soil erosion and rapid loss of natural pastures (3).		Zone covers 60% of the country containing 70% of the population (5).	(3,5) Yaccub, 1974. (4) Eckholm, 1976.
SWAZILAND	Serious deterioration and accelerating erosion of grazing lands.	Overgrazing and poor land use.		Ministry of Agriculture for Swaziland, 1974.
TANZANIA	Serious soil erosion on farmlands (1).	Poor farming practices.	Per capita food production declines in 1975 from 1969-71 levels (3).	(1) Clark University, 1976.
-Ulugaru Mountain	Severe soil erosion on cultivated slopes (2).	Inadequate soil conservation measures.		(2) Temple, 1972. (3) IFPRI, 1977.
UPPER VOLTA	Accelerating soil erosion (1).			(1)(3)(4) Upper Volta FY 78 IPP, "Agricultural Human Resources Development."
	Areas of severe rangeland deterioration (2).	Overcropping and overgrazing.	94% of the population depend almost exclusively on agriculture (4).	
-Mossi Plateau	Soil depletion (3).	Overpopulation and inadequate crop rotation.	Per capita food production and food consumption declined from 1969-71 levels (5)	(3) Upper Volta FY 78 IPP "Volta Valley Development". (5) IFPRI, 1977.

Country/Region	Description of Deterioration	Cause of Deterioration	Other Data	Source
NEAR EAST				
EGYPT	30% of total irrigated land waterlogged or salt-affected (1).		Per capita food production declined in 1975 from 1969-71 levels (2). Agricultural land is only 3% of the total land area (3).	(1) SCOPE, 1976. (2) IFPRI, 1977. (3) AID, FY 78 Budget Submission to the Congress.
JORDAN				
-Steppe Zone	Rangeland deteriorating to semi-desert (1).	Overgrazing.	Agricultural land is only 14% of total land area (3).	(1) Eckholm and Brown 1977. (2) Eckholm, 1976.
-Jordan River Valley	12% of irrigated project area affected by salinization and waterlogging (2).			
SYRIA	Desertification (1). 50% of country's total irrigated land is salt-affected or waterlogged (2).		While total acreage in cotton production has increased because of irrigation, yields dropped by 1/3 due to increased salinity and waterlogging (4).	(1) Tolba, 1977. (2)(4) UNESCO, 1975. (3) Eckholm and Brown 1977.
-Steppe Zone	Rangeland degraded to semi-desert (3).	Overgrazing.		

Country/Region	Description of Deterioration	Cause of Deterioration	Other Data	Source
ASIA				
INDIA	140 million hectares of the country's total area of 328 million hectares seriously affected by soil erosion (1). 6 million hectares of land affected by salinity and waterlogging (2).		Extensive soil erosion and waterlogging, together with their attendant ills, have already contributed very significantly, though insidiously, to the impoverishment of the land and people (3).	(1-3) Vohra, 1975.
INDONESIA				
-Java	Serious soil erosion and loss top soil (1) and abandonment of land (2).	Improper farming practices on hillsides.	Soil erosion is creating an ecological emergency in Java ...it is no exaggeration to predict that a disaster in Java, which could undermine other progress, is in the making within the next half century, unless urgent attention is given to reclamation (5).	(1,4) Smithsonian, 19 (2,3,5) U.S. State Department, Cable, 1976.
-Outer Islands	13 million hectares are severely eroded and abandoned (3).			
-Sumatra	Major soil erosion problems (4).	Poor land management.		

Country/Region	Description of Deterioration	Cause of Deterioration	Other Data	Source
NEPAL	Soil erosion is a major national problem (1). Deteriorating pasture lands (2).		Per capita food production declined in 1975 from 1969-71 levels (7).	(1) Eckholm,1976. (2,6) IBRD,1973.
-Hill and Mountain Regions	Accelerating soil erosion seriously affects agricultural productivity (3).	Farming without conservation practices (5) and exploitation of marginal land (6).	60% of the population concentrated in the hill region which contains only one-third of the country's arable land (8). The hill economy may reach a point of no return in the next few years if effective action to reverse the decline of natural resources is not taken without delay (9).	(3,5,9) Tribhuvan University,1974. (4) UNEP,1977. (7) IFPRI,1977. (8) Feldman and Fournier,1976.
-Eastern Hills	38% of the land area consists of fields abandoned because of lost top soil (4).			

Country/Region	Description of Deterioration	Cause of Deterioration	Other Data	Source
PAKISTAN	Desertification (1). 72% of total land area affected by soil erosion (2). 13% of total irrigated land affected by salinity or water-logging (3).		Per capita food consumption declined in 1975 from 1969-71 levels (7). Spending $2,000 per hectare to rehabilitate 14,500 hectares affected by waterlogging or salinization (8).	(1) Eckholm and Brown, 1977. (2) FAO, 1977. (3)(6) SCOPE, 1976. (4)(5) World Food Program, 1974. (7) IFPRI, 1977. (8) IBRD, Annual Report, 1976.
-Kaghan and Daur Valleys	20,000 acres of grazing land depleted (4).	Overgrazing.		
-Northwest Frontier	Vast areas stripped of top soil and abandoned (5).	Overcropping.		
-Punjabi Section	80% of irrigated land is salt-affected or waterlogged (6).			
PHILIPPINES	Severe soil erosion of hillsides (1).	Slash and burn agriculture on sloped land.		(1-3) AID, Philippines FY 78 Project Paper.
	Deterioration of pastures; in some areas, carrying capacities of these lands have been reduced by over 50%, other areas have been abandoned (2).	Burning of grasslands.	Restricts the country's national goal of self-sufficiency in beef production (3).	
			Per capita food production and food consumption declined in 1975 from 1969-71 levels (4).	(4) IFPRI, 1977.

Country/Region	Description of Deterioration	Cause of Deterioration	Other Data	Source
SRI LANKA			Per capita food production and food consumption declined in 1975 from 1969-71 levels.	IFPRI, 1977.

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APPENDIX III

AID ENVIRONMENT AND NATURAL RESOURCES ACTIVITIES

The legislative history of the Environment and Natural Resources amendments to the Foreign Assistance Act suggests the types of activities AID should undertake to maintain and restore the natural resource base essential to sustainable development and human well-being. These include watershed protection, natural resource surveys, soil conservation, water and air quality improvement, wildlife habitat preservation, reforestation, salinization and waterlogging control, and training of necessary personnel. S. Rep. No. 95-161, 9th Cong., 1st Sess. 32 (1977); H. Rep. No. 95-240, 95th Cong., 1st Sess. 33 (1977).

To our knowledge, AID has not yet compiled a list of on-going or proposed projects within the Environment and Natural Resources sector. On the following pages are descriptions of a number of such projects which we identified through examination of AID's FY 78 Congressional Presentation and conversations with a number of AID personnel. They should not be regarded as a comprehensive review of AID efforts in this area, but rather as a rough sampling. The projects described are ones where the focus is upon environmental protection or natural resource management. It should be noted that many of these projects are only proposed and may not be approved. Omitted are a number

of integrated rural development schemes where soil conservation or reforestation are minor components. Where a project is described in the body of this paper, it is noted as "See text, at __".

LATIN AMERICA

BOLIVIA

Project: Renewable Natural Resource Protection, FY 1978
No.: 511-0470 (Draft Project Identification Document ("PID

Soil erosion in Bolivia is a serious national problem. The agricultural resource base is being destroyed by poor land and water management practices. The Altiplano and Central and Southern Valleys of Bolivia, heavily populated and long cultivated, have been stripped of protective tree and plant cover due to overcropping and overgrazing. As a result, these regions are subject to high rates of erosion and water loss. Newly cleared farmlands also are suffering from soil erosion. Under this $740,000 grant, AID will support the establishment of an Erosion Control Division in the Ministry of Agriculture, as a national institution to deal with the problem of the deterioration of the soil and water resources in Bolivia. AID technical advisors will help the Division in the formulation and implementation of applied research, soil and water management assessments, and a plan of action for improved land management. At the field level, the AID grant will provide equipment and materials for agricultural research extension stations. The stations will work with small farmers to promote the adoption of improved soil and water management techniques so as to increase food production.

COSTA RICA

Project: Remote Sensing Pilot Project, FY 78
No.: 515-0144 (PID, September 8, 1977)

During recent years, serious damage to the natural resource base in Costa Rica has become evident. Expansion of industry and urbanization in the Central Valley have taken prime lands from intensive agricultural production. Cattle ranching and logging operations have extended throughout the country. Deforestation for pasture development in parts of Guanacaste and Puntarenas provinces has brought serious soil erosion, sedimentation of streams and rivers, lowering of ground water levels, and alluvial damage to prime agricultural lands. Irrational exploitation by a few individuals in Costa Rica is creating long-term environmental problems for the nation.

The Costa Rican Government is aware of the seriousness of the situation, but lacks specific land use data on which to base programs of land conservation and management. Under this $200,000 grant, AID will provide technical assistance, training, and equipment to establish a remote sensing aerial photographic capability in Costa Rica. This system will enable the Government to collect and analyze quickly and accurately natural resource information.

HAITI

Project: Baseline Data Aerial Photography, FY 79
No.: 521-0110 (PID, May 31, 1977)

At present, Haiti lacks a timely and accurate information base necessary for development planning. This $3 million grant will fund a four-year effort to produce a country-wide set of aerial photographic maps and to assist the Haiti Government's Geodetic and Cartographic Service in establishing an aerial photo analysis unit. The data to be collected by the unit will include the extent of deforestation, location and types of erosion, the amount of land suitable for intensive agriculture, and location of available water resources.

HONDURAS

Project: Water Resources Management, FY 78
No.: 522-0134 (PID, 1977)

The combined $5.3 million loan-grant project will assist the Honduran National Program of Management and Administration of Water ("PMAA") to develop and manage water resources. The first stage of the project, began with a grant in FY 76, is helping PMAA inventory and analyze water resource data and conduct feasibility studies of water-related land use projects. The grant provides training for technicians, extension agents, and other PMAA personnel. The proposed second stage loan will fund several multi-purpose demonstration projects and additional feasibility studies. Suggested pilot projects include soil conservation and water harvesting, land reclamation and salinity problems, and watershed management.

JAMAICA

Project: Integrated Rural Development, FY 77
No.: 532-0016 (Project Paper ("PP"), July 29, 1977)

See text, at 19.

NICARAGUA

Project: Renewable Resource Management, FY 78
No.: 524-0129 (Project Review Paper ("PRP"), November 11, 1

The abuse of Nicaragua's renewable natural resources is beginning to hamper development in rural areas. Deforestation, soil erosion, overgrazing, and misuse of water and wildlife resources are extensive. Nicaragua's policies and institutions concerned with natural resource conservation and management are fragmented and inadequate. There is a lack of baseline data and of planning for natural resource development and use.

The proposed $.5 million grant would assist the Government of Nicaragua to design and establish a consolidated Institute of Renewable Natural Resources ("IRENA"). AID would provide technical services and training to IRENA in such areas as organizational design, renewable resource legislation and economics, forest and soil management, zoology and agricultural ecology. One of IRENA's first projects would be the implementation of a Comprehensive Resource Inventory and Evaluation System.

AFRICA

BOTSWANA

Project: Range and Livestock Management, FY 77
No.: 690-0015 (PP, April 22, 1977)

The purpose of the project is to build the capacity of the Government of Botswana ("GOB") to manage effectively communal ranching. In a March 28, 1975 address, GOB President Sir Seretse Khana explained:

> "The time has come to tackle the subject about which there is a lot of talk and not much action -- the better use and development of our land. As our human population and numbers of our cattle and other livestock increase, there is a growing danger that grazing will be destroyed by uncontrolled use of communal grazing areas by ever-growing numbers of animals. Once grazing has been destroyed, it is extremely difficult to get grass re-established. And under our communal grazing system it is no one individual's interest to limit the number of his animals. If one man takes his cattle off, someone else moves his cattle in. Unless livestock is somehow tied to specific grazing areas, no one has an incentive to control grazing. . . we are faced with a situation that demands action."

The project, began in FY 1973, has been revised after expenditures of $1.3 million and the recognition that range management techniques cannot be transferred without adaption to particular local social and economic conditions. The proposed 3-year $1.8 million grant would provide to the GOB technical assistance and training concerning range management policies and techniques and appropriate livestock technologies.

Project: Wildlife Developments for Rural Poor, FY 77
No.: (Draft PID, 1977)

See text, at 28.

CHAD

Project: Integrated Rural Development, FY 78
No.: 677-0015 (PRP, November 26, 1976)

The proposed five-year, $21 million grant for integrated rural development in Chad includes some activities for the maintenance and protection of the natural resource base in the project areas. The productive potential of Chad's agricultural lands is deteriorating due to overgrazing, soil erosion and soil depletion. There are plans for reforestation using acacia trees. The trees will serve as windbreaks and living fences, which will help to slow erosion and stabilize land uses. The trees will also provide a much-needed source of charcoal.

The PRP also asks for $235,000 for a 4-month soil survey of the project areas. At present, there are no soil maps indicating soil characteristics and suitabilities for various uses. Without this information, it is impossible to make soil management decisions, such as which land should be used for intensive farming, which areas are best left for pastures or forests, and which areas are prone to erosion. The survey will rely on remote sensing data with extensive verification on the ground. Its results are to be used by the team preparing the Project Paper.

THE GAMBIA

Project: Soil and Water Management, FY 78
No.: 635-0202 (PP, June 20, 1977)

The agricultural resource base in Gambia is under increased pressure. Overgrazing, overcropping, resulting severe soil erosion and declining soil fertility are recognized by the Gambian Government as constraints on reaching their goal of agricultural production stability. The $700,000 grant will assist the Government to create national policies and programs for improved soil and water management. A new Soil and Water Management Unit will be established within the Ministry of Agriculture and Natural Resources. U.S. specialists, including a plant ecologist, will run the Unit for the first three years, after which they will be replaced by Gambians trained with project funds. The Unit will conduct soil and water surveys, compile a technical soil and water management manual, and initiate village programs. Extension agents, also trained under the grant, will help farmers to improve agricultural practices and adopt conservation measures.

LESOTHO

Project: Land and Water Management, FY 77
No.: 690-11-120-048 (PP, June 1974)

Project: Southern African Development Personnel and Training, FY 78
No.: 690-0030.2 (PRP, April 1977)

Project: Thaba Bosiu Rural Development, FY 78
No.: 690-11-120-031 (PP, June 1977)

Soil erosion is the major agricultural problem in Lesotho, where virtually all the arable land is affected by accelerated soil run-off due to improper cropping practices and overgrazing. The Government of Lesotho (GOL), a resource-poor country with few development alternatives, has recognized the importance of preserving its soil in order to reverse declining agricultural productivity. The GOL has given a high priority in its five year development plan to soil conservation and livestock management. Accordingly, AID has proposed three related FY 78 grants.

Under the Land and Water Management grant, AID will continue to participate in a multi-donor project, begun in 1975, to provide technical assistance and training to the GOL for sound land use and management. As part of this project, a Conservation Division in the Ministry of Agriculture was established and staffed. The Division is responsible for the preparation of land use plans and the provision of assistance in designing sound GOL agricultural programs. With

the help of AID-funded experts, the Division is undertaking soil conservation measures, including terracing, grassed waterways, and fencing. A portion of the grant is allocated for training GOL personnel in soil and water management at universities in the U.S. and in other African countries. The overall objective of the project is to create a technical cadre in Lesotho able to maintain and expand present conservation efforts.

The related "SADPT II" grant will provide U.S. technical personnel to the GOL in positions such as soil conservation, animal management and production, agricultural planning, farm management, and extension services. Grant funds will also be used to train GOL individuals to fill jobs presently held by Americans.

The third AID grant provides similar technical and training assistance, focusing on the large GOL rural development project in the Thaba Bosiu of Lesotho, a 300,000 acre dry-farming catchment. AID's FY 78 grant will continue support of a soil conservation project and of Conservation Planning Units, which are to design plans for suitable land use and conservation practices in selected areas of Thaba Bosiu.

MALI

Project: Land Use Capability Inventory, FY 78
No.: 688-0205
(Congressional Presentation, "Sahelian Africa" at 314, 1977)

AID will assist the Government of Mali in performing a land and water resource inventory and in developing an institutional capacity to use land use planning in project design. In FY 78, a $.5 million grant will be used for technical assistance with work on a large scale land use potential map and for training of ten Malians in various aspects of land use planning.

MAURITANIA

Project: Renewable Natural Resources, FY 78
No.: 682-0205 (PP, 1977)

The purpose of the 5-year project is to survey natural renewable resources and to undertake a number of pilot activities in the development of an integrated program of renewable resources management and conservation for Mauritania. The resource base of Mauritania is limited; 80-95% of the land lies either in the Saharan or Sahelian zone. Overcropping, overgrazing, soil erosion, and desertification are major problems. Proposed activities to be funded under a $3.5 million grant include dune stabilization projects, natural revegetation programs, development and management of forest reserves, and range management efforts. The project also has a large training and education component to build Mauritania's institutional capability for resource management and development planning.

SENEGAL

Project: Land Conservation and Revegetation, FY 78
No.: 685-0219 (PRP, November 30, 1976)

See text, at 18-19.

ZAIRE

Project: ERTS-Zaire, FY 77
No.: 660-0071 (PP, June 21, 1977)

The $435,000 grant will help the Government of Zaire to develop a capability to use satellite maps in planning and implementation of development programs. Analyses of satellite resource data can provide overall information on a specific resource or geographic region and thereby a basis for assessing more effectively both the short and long term impacts of proposed development plans.

NEAR EAST

EGYPT

Project: Water Use and Management, FY 76
No.: 263-0017 (PP, June 1976)

Inefficient water use is contributing to decreased yields on Egypt's irrigated croplands. In addition, there have been increases in waterlogging, salinization, and incidence of water-vectored diseases. The proposed 5-year, $8 million grant would assist the Government of Egypt to develop and demonstrate improved irrigation water management methods. It would include soil fertility and water use surveys, salinity balance experiments, and pilot tests of new techniques.

ASIA

REGIONAL

Project: Remote Sensing for Agriculture, FY 78
No.: 498-0253 (Draft PID, June 29, 1977)

See text, at 27-28.

NEPAL

Project: Resource Conservation and Utilization, FY 79
No.: 367-0132 (PID, June 26, 1977)

Throughout the highlands of Nepal, land and water resources are deteriorating due to extensive deforestation, heavy erosion, landslides, and decreasing soil fertility. The severity of Nepal's environmental problems was recognized in the AID/Nepal Development Assistance Program but it concluded that these problems would be left to other donors and the Government of Nepal. As a result of the failure of these agencies to tackle Nepal's growing environmental crisis, the proposed $12,000,000 grant calls for a multi-donor effort, led by AID, to reduce soil erosion damage, develop new sources of energy, and reforest denuded mountain slopes. Planned activities include testing new erosion control methods and watershed management techniques; development of alternatives for land unsuitable for crops, and reforestation projects. The five year program also will strengthen the institutional capacity of Nepal in resource conservation and management.

PAKISTAN

Project: On Farm Water Management, FY 78
No.: 391-4130 (PP, April 30, 1976)

Poor water management practices in Pakistan have resulted in extensive waterlogging and salinity which annually make thousands of acres of land unsuitable for cultivation. The purpose of this five-year project is to obtain more effective use of water in irrigation, thereby reducing waterlogging and salinity problems. The FY 78 loan of $15 million is the second under this project, which will fund major repairs and improvements (i.e., better drainage, precise leveling) throughout the country's vast system of irrigation canals. AID will provide technical assistance to encourage farmers to adopt better irrigated crop and water management techniques.

SRI LANKA

Project: Agricultural Base Mapping, FY 77
No.: 383-0045 (PP, August 26, 1977)

The proposed loan of $4.5 million would assist Sri Lanka in aerial mapping of the island-nation. The funds also will be used to set up a "User Assistance Center" within the Survey Department of the Ministry of Agriculture which will aid other Sri Lanka Government agencies in analysis and interpretation of maps and related data. The maps would provide required base information for land use planning, agro-ecological analysis, soil conservation planning, and watershed management.

TECHNICAL ASSISTANCE

AID's Bureau of Technical Assistance has underway or proposed a number of research, training and other projects concerning environment and natural resources. Such activities include regional workshops on Energy, Resources, and Environment, integrated pest management research, and a demonstration renewable resource plantation. In September, 1977, AID and the Department of State reached an agreement under which the Secretariat of the U.S. National Committee for Man and the Biosphere Program (USMAB) will provide AID with technical assistance in the areas of environmental protection ard natural resource management. USMAB will serve as a coordinator between AID and other cooperating agencies -- EPA, Agriculture (U.S. Forest Service), and Interior (National Park Service) -- on environmental matters. USMAB will provide technical input regarding AID's environmental assessment procedures and environmental training and support programs for AID Regional Bureaus and Missions.