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DRAFT ENVIRONMENTAL PROFILE OF HONDURAS

PERSONAL AUTHORS - SILLIMAN, J. R.
HAZELWOOD, PETER

CORPORATE AUTHORS - ARIZ. UNIV. OFFICE OF ARID LAND STUDIES

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DRAFT
ENVIRONMENTAL PROFILE
OF
HONDURAS

PREPARED BY THE
ARID LANDS INFORMATION CENTER
OFFICE OF ARID LANDS STUDIES
UNIVERSITY OF ARIZONA
TUCSON, ARIZONA
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An Introductory Note on Draft Environmental Profiles:

The attached draft environmental report has been prepared under a contract between the U.S. Agency for International Development (A.I.D.), Office of Science and Technology (DS/ST) and the U.S. Man and the Biosphere (MAB) Program. It is a preliminary review of information available in the United States on the status of the environment and the natural resources of the identified country and is one of a series of similar studies now underway on countries which receive U.S. bilateral assistance.

This report is the first step in a process to develop better information for the A.I.D. Mission, for host country officials, and others on the environmental situation in specific countries and begins to identify the most critical areas of concern. A more comprehensive study may be undertaken in each country by Regional Bureaus and/or A.I.D. Missions. These would involve local scientists in a more detailed examination of the actual situations as well as a better definition of issues, problems and priorities. Such "Phase II" studies would provide substance for the Agency's Country Development Strategy Statements as well as justifications for program initiatives in the areas of environment and natural resources.

Comments on the attached draft report would be welcomed by USMAB and DS/ST and should be addressed to either:

Jim Corson
AID/MAB Project
Department of State
Room 515, SA-2
Washington, D.C. 20520

Molly Kux
Office of Science & Technology
U.S. A.I.D.
Washington, D.C. 20523

prepared by:

James Silliman
Peter Hazelwood
Aird Lands Information Center

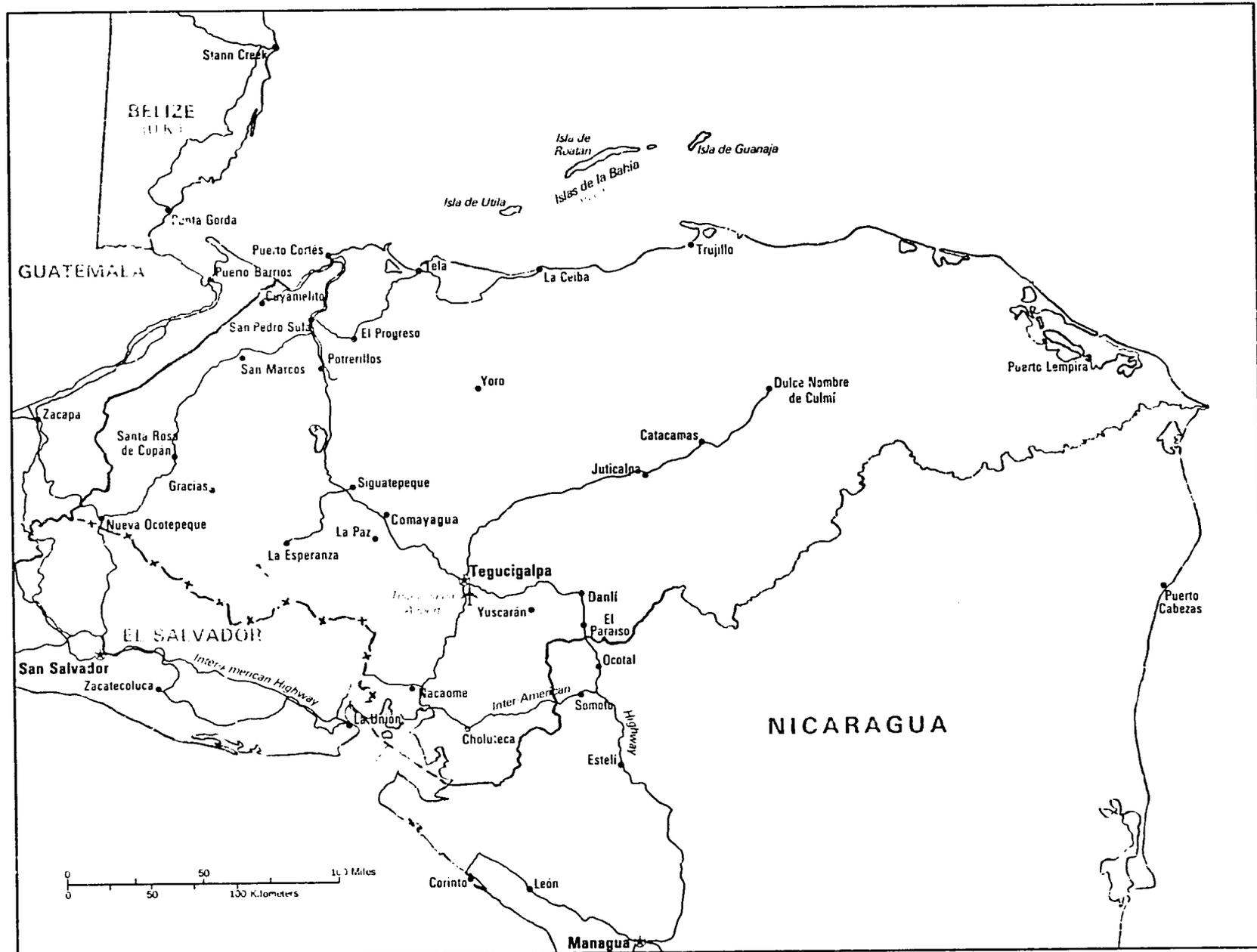
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Honduras



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 Lambert Conformal Projection
 Standard parallels 9°20' and 14°40'
 Scale 1:340,000
 Boundary representation is
 not necessarily authoritative

— Railroad
 — Road
 ✈ Airport

SUMMARY

Honduran environmental problems stem from two fundamental sources: the failure of traditional agricultural systems to use the land in a lasting and efficient way, and the failure of modern administration to establish or enforce sound environmental policy. These problems are currently reaching crisis proportions due to the ever increasing exploitation of marginal lands by a rapidly expanding population and the implementation of more ambitious natural resource exploitation programs, particularly in forestry. The major problems may be summarized as follows:

Deterioration and erosion of soils. Traditional slash and burn cultivation systems and the emigration of small farmers to more and more marginal lands, particularly on slopes, is causing loss of fertility and erosion of soils. Alluvial and valley soils best suited to intensive cultivation are frequently used for less productive and less labor intensive pastureland.

Excessive exploitation of forests. Honduran forests are being cut at a rapid pace by the rural population for lumber and firewood and to clear new land for cultivation. In addition, the Honduran Forest Development Corporation (COHDEFOR) is on the verge of a large scale lumber and pulp cutting project in the largest remaining pine forest in Olancho. Planning for sustained yield and considerable reforestation and forest protection efforts are required to ensure that Honduras does not completely exhaust its forests.

National land use policy. The key to solving Honduras' environmental problems is the establishment of an effective national land use policy. This must be based on a reliable survey of existing resources and land use patterns, towards which the National Cadaster Program (PCN) and Ministry of Natural Resources (MRN) are currently progressing. It also requires the various national agencies involved with natural resources and land use to coordinate and cooperate in the design and implementation of their programs, a goal which has yet to be met. Ultimately, a successful land use program will require the provision of economic alternatives for the small farmers who are currently forced to expand onto marginal lands.

Natural reserves. Until a land use policy can be established, natural reserves are the most effective alternative for conserving Honduran natural resources, especially the native flora and fauna. These should be designed to encompass samples of the diverse ecosystems found in Honduras. A number of excellent reserves and parks have been proposed, but national legal protection has not been forthcoming. The proposed Rio Platano Biosphere Reserve is particularly deserving of recognition, since it encompasses some of the last remaining Caribbean lowland forest.

Environmental law and monitoring systems. Honduras has a small but potentially useful body of environmental law, but it is seldom enforced. Improvements in environmental legislation are suggested in the National Environmental Plan for 1979-83, but chances for implementation are apparently slim. Honduras lacks standards for environmental pollutants and the technical capability to monitor them. Fortunately, pollution problems are not yet unmanageable, but the lack of standards and monitoring systems may soon make them so.

1.0 Introduction

This draft environmental profile is the result of a twelve week review of information in the United States on the natural resources and environment of the Republic of Honduras. This is the first step in the process of developing an environmental profile for use by the U.S. Agency for International Development and government officials of Honduras. The next step in this process should be a field study to evaluate the information in this draft, obtain additional information, define issues, problems, and priorities, and provide direction for future efforts in the management, conservation and rehabilitation of environmental resources in Honduras.

The information and interpretations presented in this report are preliminary and are not intended to be sufficiently detailed or accurate for development planning. Most of the background documents for this survey were gathered in Washington, D.C. by Peter Hazelwood. Additional information was gathered in Tucson, Arizona, by James Silliman through the resources of the Arid Lands Information Center. All analysis and writing were done by James Silliman. The Arid Lands Information Center also provided editorial and secretarial services; particular thanks to Susan A. Parker, Director of the Center, who provided invaluable cooperation and assistance. The cooperation of personnel at AID and the National Park Service is gratefully acknowledged, especially Bob Otto, Bureau Environmental Officer, and James Corson, AID/MAB Project Coordinator. Willie Cornell of the Office of Arid Lands Studies graciously provided three of the figures.

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2.0 General Description

2.1 Geography and Climate ^{1/}

2.1.1 Geographic Features

The Central American Republic of Honduras, located between 13 and 16 degrees north latitude, is bordered by Nicaragua to the southeast, El Salvador to the southwest, and Guatemala to the west. The nation has an extensive Caribbean coast on the north, as well as a small Pacific coast on the south at the Gulf of Fonseca. The second largest Central American republic, Honduras' total area is 112,088 sq. km., of which about 80 percent is mountainous terrain 300 to 2000 meters in elevation. Ridges and peaks reach 2400 meters in the north and 2850 meters in the west. The lower, flatter areas of the country include the Caribbean coastal plain, the Mosquitia region in the northeast, the Pacific coastal plains, and the river valleys penetrating towards the interior. Offshore territory includes the Bay Islands and the Swom Islands in the Caribbean, and three islands in the Gulf of Fonseca.

Four geographic regions may be distinguished:

- 1) The hot and humid eastern lowlands and lower mountain slopes include 20 percent of the land area but are sparsely populated, and are still largely covered with forest.
- 2) The northern coastal plains and mountain slopes include 13 percent of the land area and 20 percent of the population, and have economically important banana plantations and livestock industries.
- 3) The cooler and drier central highlands, with 65 percent of the area and 70 percent of the population, are rugged, mountainous, and covered with numerous small farms (see Fig. 4).
- 4) The Pacific lowlands and lower mountain slopes, with only 2 percent of the land area and 5 percent of the population, are drier than the Caribbean lowlands, and produce sesame seed and cotton.

¹Sources:

Glick. 1980.
Kramer and Arcoleo. 1980.
U.S. AID. 1978.
U.S. AID. 1980.

2.1.2 Rainfall

As expected from the geographic complexity of Honduras, rainfall patterns are also complex. Figure 1 shows annual isohyets for the Honduran region. Prevailing easterlies from the Caribbean drench the Caribbean coast, particularly in the east, with more than 2400 mm of rain annually. A pocket of equally high Caribbean rainfall occurs in the valley just north of Lago Yojoa. The interior highlands receive less rain, with less than 1000 mm per year falling in the driest areas near Tegucigalpa. Finally, the Pacific coast, while wetter than the interior, is drier than the Caribbean coast. These patterns are only generalities, since local topographic conditions cause considerable variation, particularly between windward and leeward sides of mountains. For example, Morolica, located in a rainshadow in the northeastern part of the Department of Choluteca, receives less than 400 mm of rain annually, while the windward coastal region just 30 km south receives more than 2200 mm per year (Kramer and Arcoletto 1980).

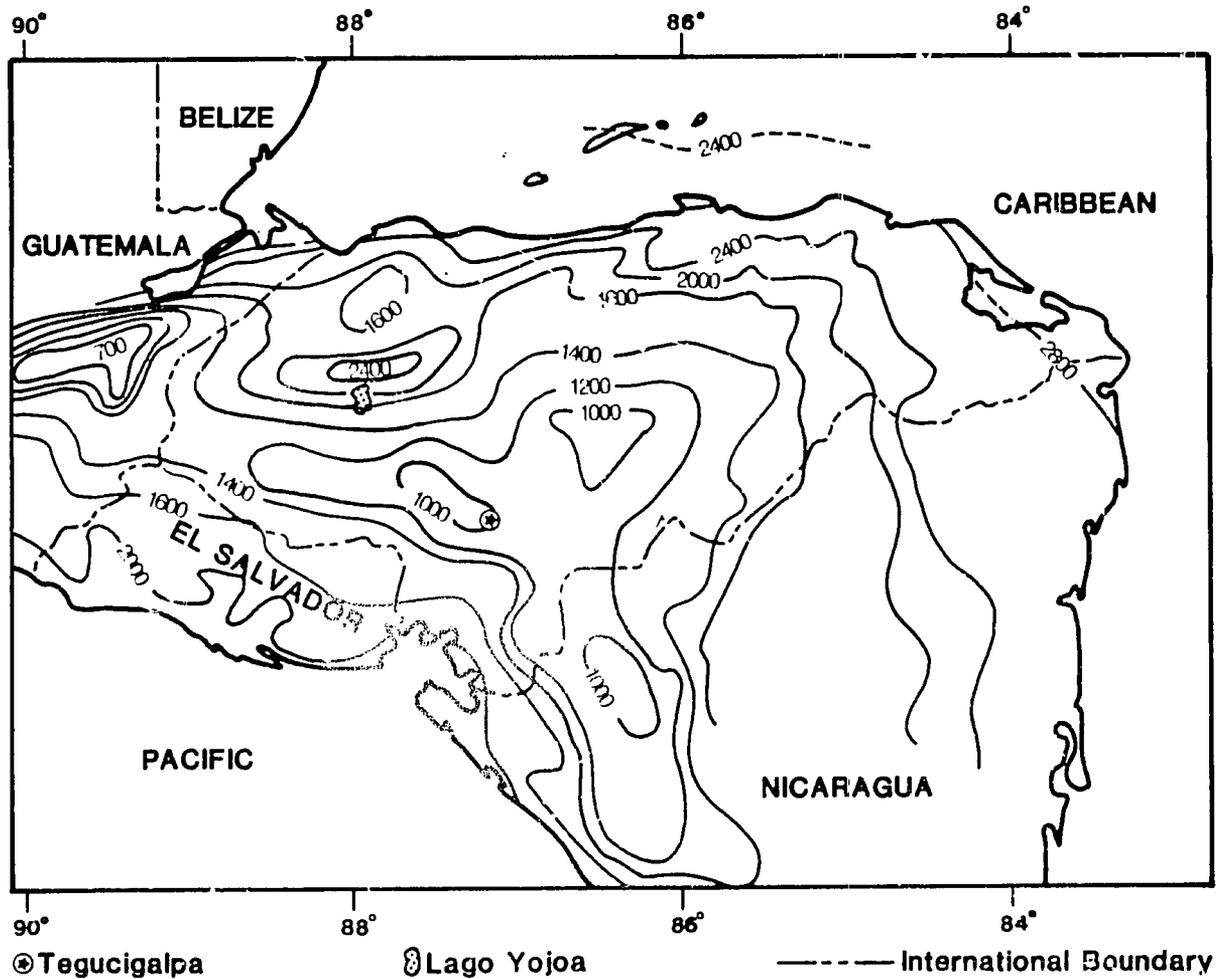


Figure 1: Annual Isohyets (mm) for the Honduran Area of Central America.

Source: World Meteorological Organization. 1979.

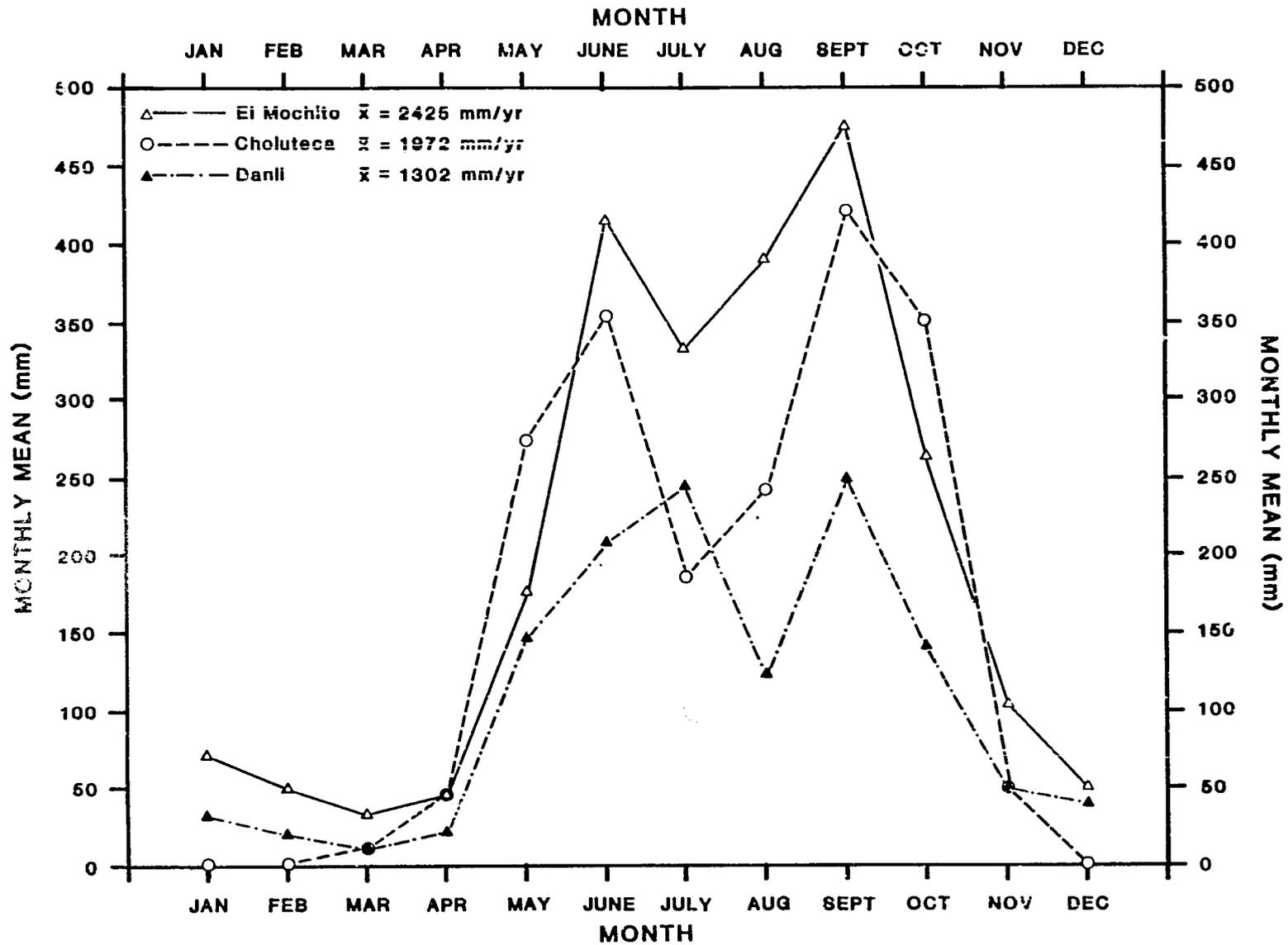


Figure 2. Monthly Mean Rainfall Patterns for Three Stations.
 Sources: Betancourt and Dulin, 1978. Kramer and Arcoleo, 1980.

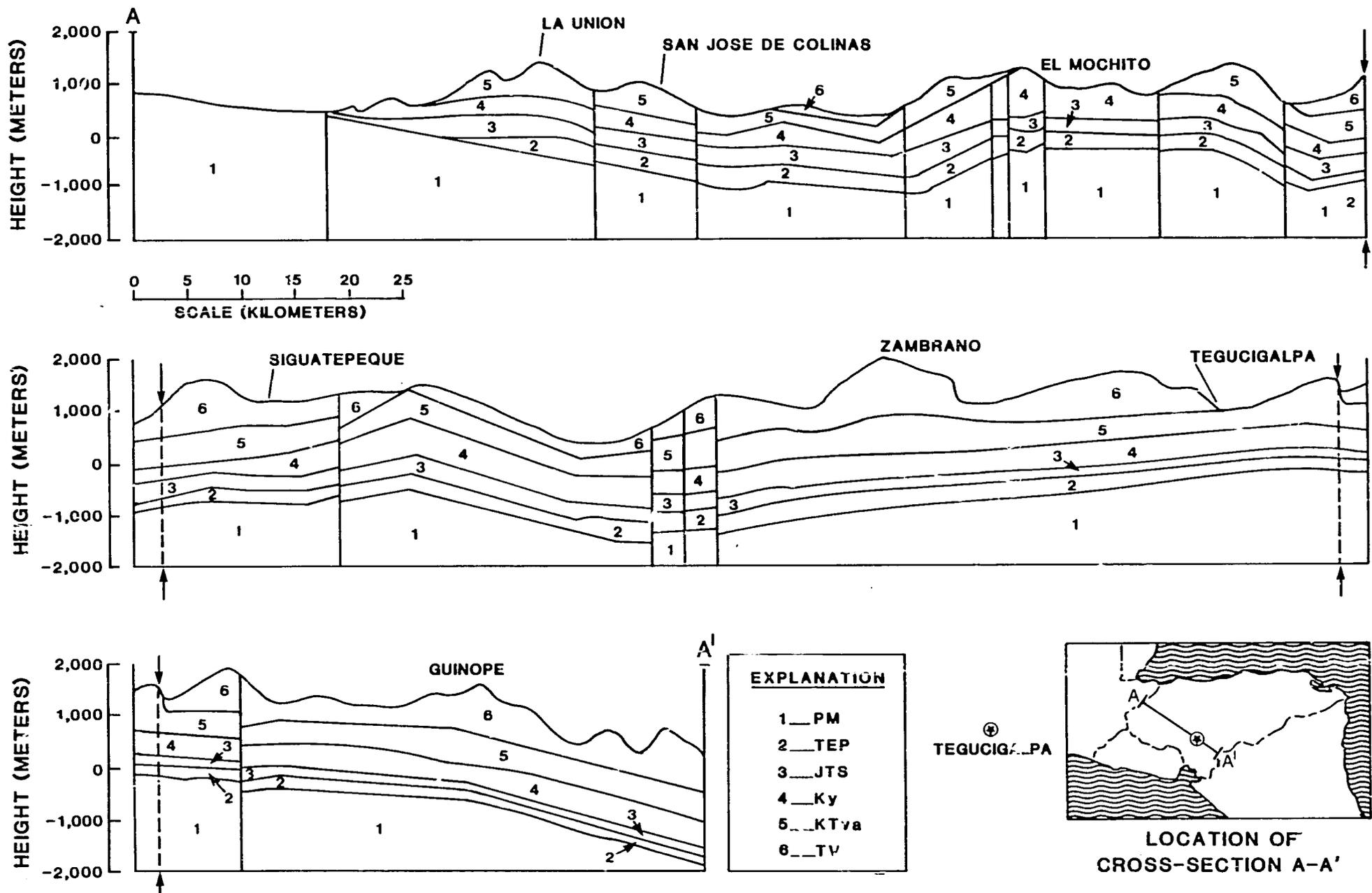


Figure 4. Geologic Cross-section from NW to SE through Tegucigalpa. See text for description of formations.

Source: Instituto Geografico Nacional. 1974.

The Honduran dry season runs from November to April, with a minor dry spell or "canicula" during July-August in the midst of the rainy season. The dry season is most pronounced in the Pacific lowlands and least defined in the wettest Caribbean regions. These trends are illustrated in Fig. 2, showing monthly mean rainfall for a station near Lago Yojoa with a Caribbean pattern (EJ Mochito), a station in the interior east of Tegucigalpa (Danli), and a station near the Pacific coast (Choluteca). Annual variation in relative humidity tends to correspond to rainfall, ranging from 60-80 percent in most areas.

2.1.3 Temperature

A country of tropical latitudes, Honduras' temperatures are determined primarily by elevation. Coastal lowlands below 500 meters have mean annual temperatures from 26° to 28°C. The north coast is occasionally affected from October to April by cool northern winds. Annual means in mountain basins and valleys between 500 and 2000 meters range from 16° to 24°C. Tegucigalpa, at an elevation of 1007 meters, has mean monthly temperatures ranging from a low of 19.5°C in January to a high of 23.5°C in May, with extreme recordings of 10°C in December and 32°C in May. Zones above 2100 meters have annual means as low as 14° to 15°C.

2.1.4 Hurricanes

The northwest coast is the area most frequently threatened by hurricanes. Major storms have occurred each decade in Honduras, with serious damage in 1935, 1954, 1969, and 1974. Hurricane Fifi, of September 1974, was the most destructive of these, causing the loss of 12,000 lives and over 200 million dollars damage, of which the major loss was to the banana plantations which provide 40 percent of the country's exports. Erosional losses and landslides caused by high winds and heavy rainfall were to some extent inevitable in areas with steep slopes and soft parent rock, but losses were made worse by inappropriate land use and lack of regulatory devices for floodwaters (UNEP 1976).

2.2 Population ^{2/}

2.2.1 Cultural and Political Background

Centuries before the Spanish arrived in the 16th century, what is now western Honduras was part of the Old Mayan Empire, with urban centers near present day Copan. The Lenca, descendants of the Mayas, con-

²Sources: Glick. 1980.
U.S. AID. 1980.
U.S. Department of State. 1979.
World Bank. 1978.

tinue to live today in western Honduras, one of two areas of the country where indigenous peoples predominate. The other is the Mosquitia region of the northeast, where forest-dwelling peoples numbering 35,000 live, including the Miskito, Payas, Sumo, and Xicague. Pure-blooded indigenous peoples comprise only about 7 percent of the population, and are declining in number. By far the largest ethnic group is the "mestizo", meaning mixed Spanish and native, which constitutes 90 percent of the total population. The remaining 3 percent are caucasian or black. Spanish is the official language, and Roman Catholicism the dominant religion.

Most Hondurans (62 percent) live in rural areas, and most of the work force (56 percent) is employed in agriculture. Much of the rural population is composed of landless laborers (47 percent) with an average annual per capita income of US\$63, compared with US\$271 for the entire population. Most of the rural poor live in agriculturally marginal areas, and use local natural materials for construction and fuel. The typical diet consists of corn, beans, yucca (manioc), platano, and rice, with occasional supplements of meat or fish. Although education is compulsory there is a dearth of rural schools and only about 47 percent of Hondurans are literate.

Honduras gained its independence from Spain with the formation of the Federal Republic of Central America in 1821, together with Guatemala, El Salvador, Nicaragua, and Costa Rica. The five component states separated to form independent governments in 1838, and in the following century, Honduras experienced 67 different heads of state. The last 40 years have seen more stability and social progress in Honduras, although military coups were used to gain government control in 1955, 1963, 1972, 1975, and 1978. The current constitution was drafted in 1965, and a new one is scheduled for 1980. The transience of political figures and programs has created greater emphasis on short-term economic and social programs than environmentally sound long-term planning for sustained yield. However, the Government of Honduras has recently demonstrated a greater awareness of environmental problems, and steps are being taken to formulate a national land use policy.

2.2.2 Population Growth and Distribution

The last official census was in 1974, when the total population was found to be 2,653,857, with 47 percent younger than age 15, 50 percent between 15 and 64, and 3 percent over 65. According to the World Bank (1978), the annual growth rate from 1961 to 1976 was 2.7 percent, which is less than the rate of natural increase, due to emigration of El Salvadorean residents in Honduras after the 1969 border dispute. Crude birth rate and death rate for the period 1970-75 were 49.3 per 1000 and 14.6 per 1000, respectively. Population growth projections from the University of Chicago Community and Family Study Center (Tsui 1979) are given in Table 1.

Table 1 Projected Population, 1975-2000

(All Numbers in Thousands)

	<u>Year</u>					
	1975	1980	1985	1990	1995	2000
Total	2887	3485	4173	4972	5863	6801
Female	1448	1745	2076	2466	2906	3369
Male	1439	1740	2097	2506	2957	3432

Source: Tsui. 1979.

Regional inequalities in population density are marked, with the west generally denser than the east, and the highlands denser than the lowlands (Tables 2 and 3). Density figures in Table 2 are more recent (from U.S. AID 1980a, no source given), but similar enough to those in Table 3 (from U.S. AID 1978), that the same source was probably used for both. The original source given by U.S. AID 1978 is a 1970 report (Caceres P. 1970) too old to have correct figures for the present population, but probably still a good index of national population patterns. Almost all towns of 10,000 or more occur in a central corridor running from the Pacific coast through Tegucigalpa to San Pedro Sula in the northwest.

Urban populations are growing at a rate faster than the natural rate of increase, indicating migration to urban areas from the countryside. Urban populations, now 38 percent of the total, are expected to rise to 55 percent by the year 2000 (U.S. AID 1980a). Most of this growth will be in the two largest cities, Tegucigalpa (1978 population: 268,000) and San Pedro Sula (1978 population estimate: 251,000), which today have 54 percent of the total urban population and are growing at an annual rate of 6.2 percent.

Table 2. Population Per Sq Km of Arable Land by Region.

<u>Region</u>	<u>Pop/sq km</u>
Western Highlands	1024
Central Region	326
Central-Eastern Highlands	250
Lowlands	49

Source: U.S. AID. 1980a.

2.2.3 Health and Nutrition

Detailed statistics on health conditions in Honduras were not accessible for this report, but general indicators show a poor

Table 3. Regional Population Distribution

Region	Relative Population Density (1)	Absolute Density (2)	Area (Percentage)	Population (Percentage)
West	1,218	21	16.0	16.0
Central	326 (196)*	43	12.5	23.8
North-Central	250	22	13.5	7.6
South	186	52	4.5	10.8
Northwest	151 (107)*	52	8.5	19.6
Southeast	50	6	19.5	5.3
North	46	17	7.6	5.3
East	5	1	<u>17.9</u>	<u>0.9</u>
TOTAL			100.0	100.0

(1) Relative population density here is the number of inhabitants per sq km of arable land.

(2) Absolute population density is the number of inhabitants per sq km of total area.

* The number in parentheses excludes the large urban centers of Tegucigalpa and San Pedro Sula, respectively.

Source: U.S. AID. 1978.

level of health. The crude death rate (14.6 per 1000) is high, as is infant mortality (117.6 per 1000). Infant mortality is higher in rural areas (128.1 per 1000) than in urban areas (85.1 per 1000), reflecting the lower availability of health care in the countryside. Life expectancy for the average Honduran is just 53 years.

Infant mortality from gastro-intestinal disease caused by contaminated water supplies is the number one health problem. Other important diseases include malaria, hepatitis, and chagas. Malnutrition is another widespread problem. The average Honduran gets 94 percent of the recommended caloric intake, but only 56 percent of the recommended protein intake.

Family planning is supported officially and by the private Honduran Association of Family Planning, which operates family planning services and clinics. The number of acceptors of birth control devices is estimated at 20,700 as of 1978.

2.3 Land Use ^{3/}

Land use figures for the entire country shown in Table 4 appear to be the most comprehensive estimates currently available. U.S. AID (1980b) referred to the increases in eroded lands (from 3.5 to 6.8 percent of total lands) and cultivated pastures (from 6.4 to 9.4 percent of total lands) from 1970-72 to 1975-77 as evidence of deforestation and its effects, but various anomalies in the figures suggest that comparisons of the two periods are hazardous. For example, the area in tropical hardwoods is shown to increase by 835,000 ha, and fallow land completely vanishes, both rather unlikely events over a period of five years. Figures in Table 4 are probably best used only as general indications of land use patterns.

According to Table 4, about 59 percent of Honduran land is forested, and 25 percent is used for agriculture. Forests are about 60 percent tropical hardwoods (in the Mosquitia region) and 40 percent pine (scattered through the highlands). About half of the agricultural land is used for pasture, either natural or cultivated. Most farms are small (5 ha or less), but most of the agricultural area (56 percent) is in large commercial farms greater than 50 ha (Table 5).

2.1.3 Crops

Areas planted in various crops, based on figures developed by the Ministry of Natural Resources and quoted by U.S. AID (1978), are shown in Table 6. The current total of 707,340 ha shown in the table

³Sources: Cliff. 1987.
U.S. AID. 1980a.
U.S. AID. 1980b.
U.S. AID. 1978.

Table 4. Land Use in 1970/1972 and in 1975/1977

(1,000 ha and %)

	1970/1972		1975/1977	
	<u>10³ ha</u>	<u>%</u>	<u>10³ ha</u>	<u>%</u>
A. <u>Forest Areas and Non-Utilized Land</u>	<u>6,544.9</u>	<u>56.91</u>	<u>7,380.0</u>	<u>65.85</u>
1. Tropical Hardwoods	3,408.3	29.64	3,920.0	34.98
2. Eroded Lands and Other	397.8	3.46	760.0	6.78
3. Pine Forest Areas	2,738.8	23.82	2,700.0	24.09
B. <u>Agricultural Land</u>	<u>3,869.0</u>	<u>33.64</u>	<u>2,800.0</u>	<u>24.98</u>
1. <u>Cultivated Land</u>	<u>1,370.5</u>	<u>11.92</u>	<u>1,769.1</u>	<u>15.78</u>
a. Crops	634.8	5.52	719.6	6.42
b. Cultivated Pastures	735.7	6.40	1,049.5	9.36
2. <u>Non-cultivated Land</u>	<u>2,498.5</u>	<u>21.73</u>	<u>1,030.9</u>	<u>9.20</u>
a. Potentially available	1,824.5	15.87	741.0	6.61
b. Natural Pastures	449.6	3.91	289.9	2.59
c. Fallow Land	224.4	1.95	-	-
C. <u>Urban Areas, Mangroves and Swamp Areas</u>	<u>1,086.1</u>	<u>9.44</u>	<u>1,028.8</u>	<u>9.18</u>
D. <u>Total Geographic Area</u> ^{1/}	<u>11,500.0</u>	<u>100.00%</u>	<u>11,208.8</u>	<u>100.00%</u>

¹The total area was officially modified after 1972.

Table 5

Number of Farms and Amount of Farmland by Farm Size Category, According to 1974 Agricultural Census

FARMSIZE	Number of Farms	% of Total	Area of Farms	% of Total
Less than 1 hectare	33,774	17.3	21,534	0.8
1-2 hectares	38,643	19.8	53,584	2.0
2-3 hectares	28,699	14.7	69,865	2.6
3-5 hectares	23,631	12.1	93,696	3.5
5-20 hectares	47,478	24.3	468,983	17.6
20-50 hectares	15,164	7.8	461,464	17.5
Greater than 50 "	7,908	4.0	1,485,949	56.0
TOTAL	195,297	100.0	2,655,095	100.0

Source: U.S. AID. 1978.

Table 6. Current and Projected Areas (10³ ha) of Important Crops
(Year of current census given in parentheses)

	<u>Current</u>	<u>Projected (1983)</u>
<u>Basic Grains</u>		
Corn (73-74)	319.9	386.1
Beans "	70.4	70.4
Rice "	14.8	14.8
Sorghum "	59.0	59.0
Wheat (73-77)	0.2	0.8
<u>Vegetables</u>		
Tomatoes (73-74); potatoes, onions, garlic, cabbage	3.39	4.12
<u>Starchy Crops</u>		
Banana (73-74)	42.7	51.4
Plantain (77-78), Yucca (73-74)	11.5	21.2
<u>Fruits</u>		
Oranges, lemons (75)	2.45	2.05
Pineapple (75-77)	1.0	3.1
Melons (75-77)	1.5	2.5
Cashew (77)	0.9	7.9
<u>Oil Seed Crops</u>		
African Palm (78)	2.8	7.6
Coconut (73-74)	3.8	4.5
Sesame (73-74); peanuts (78); soybeans (75-77); castor beans (77-78)	3.5	5.38
<u>Other Cash Crops</u>		
Cacao (75?)	0.5	1.0
Sugar Cane (?)	35.0	45.2
Coffee (?)	116.5	121.2
Tobacco (?)	10.3	12.7
Cotton (?)	7.7	13.7
TOTAL	707.84	834.25

Source: U.S. AID. 1978.

agrees reasonably well with the figure of 719,600 ha given in Table 4. The most important crops in terms of area covered are corn (319,900 ha), coffee (116,500 ha), beans (70,400 ha), sorghum (59,000 ha) and bananas (42,700 ha). Corn and beans are grown throughout Honduras, mostly on small farms. Sorghum is grown mainly in the southern coastal plain, but is becoming more common in the west and central regions. Coffee is cultivated on hillside farms in most of the highlands, and most bananas are grown in large commercial plantations on the north coast.

Almost half of the rural Honduran population lives on small farms from 1 to 35 ha in size. These small farmers employ traditional agricultural techniques, including slash-and-burn agriculture on hillside farms and the use of such simple hand tools as the machete, hoe, ax, and digging stick. The two-ox plow is used on the southern coastal plain and in some highland valleys. Small farmers generally do not use fertilizer, pesticides, or other modern agricultural technology (Table 7). Small farms, with the majority of the rural population, are more likely to be situated on hillsides, unsuitable soil, or other marginal agricultural land than the large commercial farms. Conversion of small farm lands to more suitable uses therefore amounts to a considerable social problem.

Table 7. Use of Agricultural Technology by Farm Size

Size of Farm (ha)	Total No. in Country	No. and % Using Fertilizer	No. & % Using Bought Seed	No. & % Using Some Type of Input*
1- 3	101,116	2,923 (2.9)	2,354 (2.3)	8,921 (8.8)
3- 5	23,631	1,062 (4.5)	562 (2.4)	2,896 (12.3)
5-10	28,259	1,615 (5.7)	926 (3.3)	4,514 (16.0)
11-20	19,219	1,428 (7.4)	922 (4.7)	4,239 (22.1)
21-50	15,164	1,509 (10)	1,264 (8.3)	4,814 (31.7)
51 or more	7,908	1,609 (20.3)	1,650 (20.9)	4,284 (54.1)
TOTAL	195,297	10,146 (5.2)	7,678 (3.9)	29,663 (15.2)

*fertilizer, insecticides, fungicides, herbicides, veterinary products and bought seed.

Source: U.S. AID. 1978.

The use of fertilizer, pesticides, mechanized equipment and other technology in Honduran agriculture is confined mostly to large commercial farms (Table 7). The crops on which these expenditures are made are the economically important export crops with a good market. Thus, in 1976 almost 70 percent of the pesticides and disinfectants used in the country were used on bananas, pineapple, sugarcane, tobacco and cotton. In the same year, over 70 percent of the fertilizer imported was used on bananas, pineapple, sugarcane, tobacco and coffee. The overall level of fertilizer use in 1976 was about the same as for 1971 and 1973, indicating a levelling of demand. Irrigation is another technique found primarily on large, commercial farms. Of roughly 50,000 ha under irrigation, 35,000 are in large banana plantations, and another 5000 are devoted to sugarcane and other export crops. Irrigation has priority in government projects to increase agricultural production, but progress has been hampered because inadequate information on soils and streamflow has caused faulty design planning.

2.3.2 Livestock

Cattle are by far the most numerous livestock animals in Honduras (Table 8). They are raised throughout the country, mostly on small farms, with some 80 percent found on farms of less than 50 ha. Cattle are least common in the southwestern departments bordering El Salvador and in the departments of Colon and Gracias a Dios in the northeast. In 1976, the General Directorate of Statistics estimated the cattle population at 1,646,432 head, a figure projected by the Directorate of Sectoral planning to increase to 2,523,729 head by 1983, based on a 6.3 percent growth rate (U.S. AID 1978).

About half of Honduras' 2,800,000 ha of agricultural land is in pasture (Table 4). By 1983, the national cattle herd will require 2,461,400 ha of pasture, an increase of 66 percent from that available in 1976. Calculations based on herd size and available pasture in 1976 show that 127,400 head must have been grazed in scrub and forest lands, while the remaining 42 percent of the herd was supported on natural or cultivated pasture.

Table 8. Livestock Numbers

(year of estimate in parentheses)

Cattle (76)	1,646,432
Swine (75)	846,000
Sheep (75)	10,000
Horses, Asses, Mules (75)	453,000

Source: U.S. AID. 1978.

Information on range quality and range management practices throughout Honduras was not available, but the following observations from the Choluteca watershed near Tegucigalpa (U.S. AID 1980b) seem to

have general application. The most common pasture grasses are natural grass and sown jaragua grass (*Hyparrhenia rufa*), a bunch grass which spreads by seeding. During the rainy season, forage is abundant and pastures are undergrazed, but during the dry season pastures are low yielding or dominated by inedible overgrown jaragua plants and then become overgrazed. A common method of eliminating overgrown jaragua plants at the end of the dry season is to burn the pasture. Pasture rotation and other advanced range management techniques are generally not employed.

2.3.3 Forest Lands

Although there is no doubt that a considerable area of Honduran forest lands has been denuded, there appear to be no reliable or consistent estimates of either the area suited to forest or the extent of deforestation. Cliff (1980) cites a 1974-77 estimate from COHDEFOR (Honduran Forest Development Corporation) of 7.4 million ha of forest soils, of which 1.7 million ha is classed as degraded. Cliff also cites "observers'" estimates of potential forest land at 9.0 million ha, meaning an additional 1.6 million ha are denuded, for a total of 3.3 million ha of deforested land. Some U.S. AID (1978, 1980b) reports give 2.2 million ha as the area of deforested land, but this is apparently an old estimate based on aerial photos taken in the 1960s.

The causes of deforestation are more clear. They are cutting for firewood and lumber, clearing for agriculture, and uncontrolled burning. Firewood consumption is estimated at 4.4 million cubic meters per year (U.S. AID 1980b), and firewood sources are particularly depleted around the urban centers of Tegucigalpa, San Pedro Sula, and Choluteca. Lumber production (Table 9), which amounts to some 1 million cubic meters annually, was 98 percent pine in 1978, and was of generally high quality wood cut from mature and overmature forests. Fires, which are particularly damaging to young trees, burned pine forest areas of 1,000,000 hectares in 1974, 60,000 ha in 1978, and over 2,000,000 ha in April 1980. An unknown area of forest is continually being cleared for planting of crops by small farmers, and eventually becomes pasture once the soil is exhausted. Estimates of the rate at which Honduran forest reserves are being depleted range from 50-60 thousand ha per year (Cliff 1980) to 30,000 ha per year (U.S. AID 1980b).

The Honduran Forest Development Corporation (COHDEFOR) is responsible for the management of all forest resources, both public and private, in Honduras. A semi-autonomous agency, COHDEFOR is governed by a Board of Directors headed by the Chief of State, but must generate its own funds and otherwise operate like a business. Its major source of income is the sale of lumber for export; hence much of its activity is necessarily directed to the harvesting and marketing of timber. However, COHDEFOR is also responsible for forest protection and reforestation, activities which are carried out by the local forest districts (Fig. 3).

Table 9. Production and Export of Lumber

Year	Total Production Million Board Feet	Percent Exported ^{1/}
1970	139	N.A.
1971	236	"
1972	262	"
1973	305	"
1974	285	"
1975	203	94.7
1976	246	73.0
1977	259	73.0
1978	261	51.0

¹ N.A. = figures not available

Source: Cliff. 1980.

Figure 3. Forest Districts Established by COHDEFOR



Source: Cliff. 1980.

COHDEFOR has had considerable success with administering the National Forestry School (ESNACIFOR) and establishing a thorough forest management demonstration program at Las Lajas in the El Cajon watershed of the Comayagua district, but has had problems in performing other functions (Cliff 1980), among which are the following:

- failure to set harvest rates for timber so as to guarantee long-term exploitation;
- lack of coordination with other government planning agencies, resulting in a loss of influence in the national planning process and leading in some cases to the inappropriate establishment of agriculture in forest lands;
- failure to establish proper procedures and incentives for reforestation; and
- use of a stumpage pricing system which encourages waste.

Cliff (op. cit.) reported good progress in COHDEFOR's fire control program, but doubts about this program's effectiveness have recently been raised by the extensive fires of April 1980 (U.S. AID 1980b). In sum, COHDEFOR appears to have the tools to operate an efficient national forestry management program, but requires more effective administration.

2.3.4 Land Use Planning and Policy

There is currently no up to date comprehensive land use plan for Honduras. The old land use potential studies by Plath (1964, 1967) remain the best available, but they are dated and are based on inadequate data. The lack of a land use plan can be traced to two causes: the lack of fundamental data necessary to determine appropriate land use, and the absence of one effective government agency with responsibility for establishing and enforcing a land use plan (U.S. AID 1980b).

Most surveys of land use and natural reserves are carried out by two government agencies, the National Cadaster Program (PCN) and the Ministry of Natural Resources (MRN). The Natural Resource Department (DRN) of the PCN makes surveys and maps of soils, forests, hydrological and climatological conditions, ecological life zones, actual land use, and land tenure. The Department of Climatology and Hydrology (DCH) of the Directorate of Water Resources (DRH) of the MRN operates hydrologic and climatologic stations and has produced a climatic atlas and hydrologic reports. Various other agencies, including the Honduran Forest Development Corporation (COHDEFOR), the National Water Service (SANAA), the National Meteorological Service (SMN), and the National Electric Energy Company (ENEE) collect meteorological and natural resource data. However, the total capacity for data collection and surveys is far below what is required for effective land use planning. Lack of trained personnel, lack of

field, laboratory, and data-processing equipment, and lack of coordination between agencies all contribute to the problem of insufficient information for land use planning.

Responsibility for natural resources management and land use planning is split among several agencies, including the Ministry of Natural Resources (MRN), the Agrarian Reform Institute (INA), the Honduran Forest Development Corporation (COHDEFOR), and the Superior Economic Planning Council (CONSUPLANE). The activities of these agencies are often mutually independent, competitive, or counter-productive. For example, INA has established agricultural settlements in forested lands regarded by COHDEFOR as unsuitable for agriculture. The Agricultural Policy Commission (CPA), established in 1977, has interagency coordinating functions and has made progress in resolving the lack of direction in land use planning, but its political future is uncertain. In the meantime, Honduras' political management problems and lack of a comprehensive land use plan are causing increasingly severe environmental consequences.

Although lacking a comprehensive land use plan, Honduras has set some land use policies and has completed various land use studies and projects, among which the following are notable:

- CONSUPLANE included a proposed National Program for Environmental Protection and Improvement in the five year (1979-83) National Development Plan, and the MRN has proposed a water law (Ante-Proyecto de Ley General de Aguas, July 1978) which establishes a National Water Council for multi-purpose utilization and administration of water resources. Both the water law and the National Environmental Plan delineate specific Protected Zones to control exploitation of water and forest resources. The National Development Plan also identifies three major watersheds in advanced stages of deterioration: the Chamelcon in the west, the Ulua in the north, and the Choluteca in the south.
- COHDEFOR, besides operating the Las Lajas forest management project (Section 2.3.3), has also instituted a watershed management program in the Sierra de Omoa near San Pedro Sula as a response to the flood damage caused by Hurricane Fifi in 1974.
- Surveys and management proposals have recently been completed for several watersheds. Among these are studies of the Choluteca (U.S. AID 1980b, Kramer and Arcoleo 1980) and the Lago Yajoa watersheds (Betancourt and Dulin 1978) both of which deal with problems of agricultural land management, soil erosion, and forest management in densely populated watersheds, and a proposal to establish the Rio Platano on the relatively unpopulated northeast coast as a Man and the Biosphere Reserve (Glick 1980).

- The Plan Maestro Vial, which addresses the condition of the country's valleys, where alluvial soils most suitable to agricultural production are found, concludes that valley soils are frequently underutilized, and that greater agricultural production could be achieved by more intensive use of these lands than by opening up new lands.

Various other standards for land use in watersheds have been attempted, but have rarely been enforced for lack of Honduran government agency with sufficient information or authority to enforce them.

3.0 Environmental Resources

3.1 Geology and Soils^{4/}

3.1.1 Geologic Formations

The major geologic formations of Honduras have been mapped at 1:500,000 scale by the Instituto Geografica Nacional (1974). The map is too large and detailed for reproduction here, but a geologic transect through the central highlands (Fig. 4, *ibid*) is sufficient to illustrate the general features, and serves as a basis for the following discussion.

The oldest underlying stratum is composed of Paleozoic metamorphic rock (PM), mostly schists, quartzite, granite, and gneiss. On top of this lies a series of Cretaceous marine sedimentary deposits described as follows:

- TEP: Dark gray claystone and shales with thin beds of siltstone, interstratified with sandstone beds. The shales contain Upper Triassic plants.
- JTS: Redbeds, interbedded conglomerates, quartz sandstone, mudstone, shale and volcanic rocks.
- Ky: Marine calcareous rocks, including limestone, shale, calcilutite, marls, dolomite, and calcarenite.
- KTva: Redbeds, mudstones, shale, sandstones, quartz conglomerate and limestone.

In the Upper Cretaceous, orogenic processes caused lifting and folding of these strata, resulting in faults, fissures, and slipping. More recently, probably during the Tertiary, there was considerable volcanic activity which produced the uppermost layer of volcanic rocks (TV), including pyroclastics and sedimentary rocks of volcanic origin. The uppermost stratum in coastal and valley areas, particularly the low-lying Mosquitia region, consists of recent continental and marine sediments, including talus deposits, gravel terraces, and alluvial and colluvial deposits.

3.1.2 Mineral Deposits, Oil and Coal Reserves

The mining sector is small, but because most of the production is exported, it is important, contributing about 4 percent of the GDP. Gold mining, formerly important, had declined to 66 Kg in 1974. In

⁴Sources: Betancourt and Dulin. 1980.
Kramer and Arcoleo. 1980.

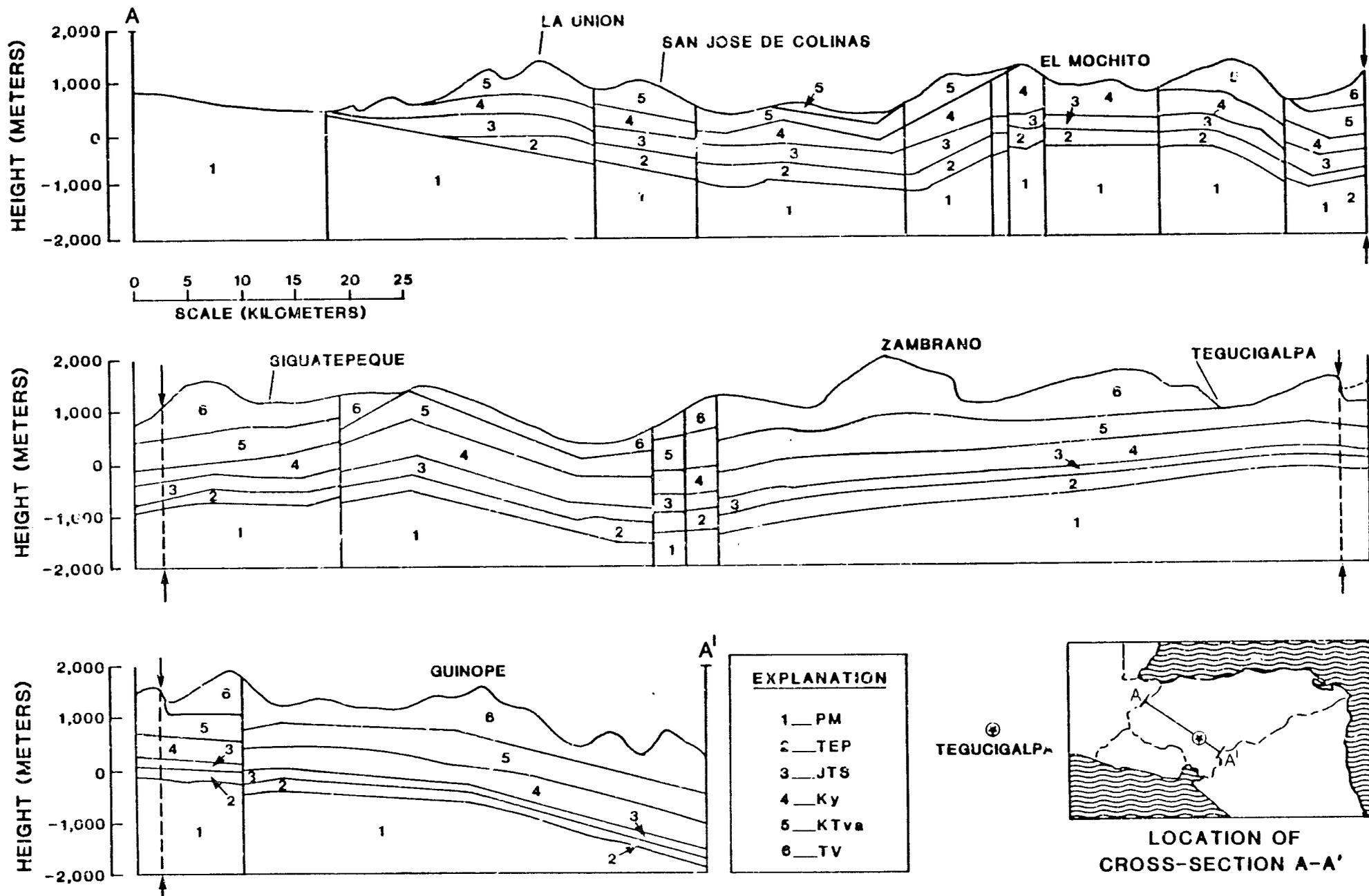


Figure 4. Geologic Cross-section from NW to SE through Tegucigalpa. See text for description of formations.

Source: Instituto Geografico Nacional. 1974.

1975, mineral production included 23,300 tons of lead, 30,000 tons of zinc, and 99 tons of silver. Other mineral deposits include antimony, iron, mercury, and copper. More detailed information on mineral resources was not available, except for the following summary of oil and coal reserves from MITRE (1980a, 1980b).

Oil exploration has not found any significant petroleum deposits. Drilling concessions have been granted for the northern coastal shelf, and Texaco is currently drilling there.

Estimates of coal reserves are very inexact, in terms of both quantity and quality. The National Investment Corporation (CONADI) states that proven reserves in the Department of Ocotepeque total over 15 million tons of high-ash lignite. Economic studies are required to determine if mining is feasible.

3.1.3 Soils

Soil surveys currently available for Honduras are general and unreliable (Kramer and Arcoleo 1980). The most general studies are those of Castellanos and Simmons (1968) and the FAO soil map of Central America. The National Cadaster Program (PCN) has produced more detailed surveys of selected areas (e.g. PCN 1975c, 1975d). The following qualitative information is summarized from several sources (Betancourt and Dulin 1978, U.S. AID 1978, Kramer and Arcoleo 1980).

The best agricultural soils are found in the coastal plains and major river valleys, and amount to about 18,000 sq km. The extensive coastal plain soils of the Mosquitia region are continental and marine sediments including silt, gravel, and sediment terraces which become waterlogged or marshy in the wet season. River valley soils are alluvial, somewhat sandy near the rivers but giving way to clays away from the rivers. Most are probably deficient in nitrogen and may lack phosphorous, magnesium, manganese and other minor elements. Upland mountain soils are mostly derived from acidic pyroclastic rock and are shallow and stony, with a high potential for erosion. They are generally deficient in nitrogen and phosphorous and are not suitable for annual crops, although they are frequently used for that purpose.

Valley soils with moderate to slow drainage are generally planted in crops, while those with poor drainage are used for pasture. Clayey mountain soils on moderate slopes are used for annual crops, coffee, fruit trees, or pasture. Forests are usually restricted to those areas with the steepest slopes.

3.2 Water Resources

3.2.1 Water Resources Information and Administration

Information on water resources in Honduras is scanty and frequently unreliable. U.S. AID (1978) reported that streamflow data for 48

gauging stations with 5 or more years of record was not published due to a large number of errors in the basic data. A detailed management study of the Choluteca watershed (Kramer and Arcoleo 1980) found little data for flow rates of tributaries to the Choluteca and no data for suspended sediment loads. Groundwater resources are likewise not inventoried.

Administrative problems of overlapping responsibilities between agencies and lack of interagency coordination discussed with regard to land use (Section 2.3.4) seem to apply to water resources as well. U.S. AID (1978) comments on the lack of consultation between the seven public agencies responsible for water resources: ENEE, SANAA, MNR, COHDEFOR, Ministry of Public Health, SECOPT, and INA. Maintenance of Honduras' 49 hydrological stations is the responsibility of the Water Resources Unit of the MNR (U.S. AID 1980b), although the source for streamflow data reported by Kramer and Arcoleo (1980) is the National Autonomous Aqueduct and Sewage System Service (SANAA).

3.2.2 Water Resources Availability

During an average year, river discharge to the Caribbean is estimated at an average of 2950 cubic meters per second (cumecs), and that to the Pacific at 280 cumecs, for a total of over 100 billion cubic meters per year. Total groundwater is estimated by the Water Resources Directorate (DRH) of the MRN at 10 billion cubic meters, with a safe yield of 290 cumecs. Currently, however, only 40 cumecs of surface water are used for irrigation, practically no groundwater is used, just 5 percent of the available hydropower potential is utilized, and combined industrial and potable water use is small.

The supply of surface water is ample for the country as a whole, but its distribution is not uniform. Many of the areas with highest population density and demand are located in zones with lower water yields. During the dry season, Honduran rivers discharge only about 40 cumecs as compared with six times that amount in the wet season. This low surface-water flow, combined with rainfall irregularities in the wet season, makes crop cultivation without irrigation hazardous in much of the country (U.S. AID 1978).

3.2.3 Urban and Rural Water Quality

Functioning water-supply systems provide only a low volume of water to communities, with 87 percent of the urban population and 14 percent of the rural population supplied. In rural areas water is not treated in any way and few urban communities have disinfection systems. Sewage services are even less widespread than water supply services, with only 40 percent of the urban population and 9 percent of the rural population served. Sewage from the city of Tegucigalpa is released untreated into the Choluteca River. Rural sanitary systems consist mostly of latrines.

Water is rationed during the dry season in high population centers because of the severe drop in river flows. Pollutants become con-

centrated and hazardous at this time. Peak flows, on the other hand, tend to develop rapidly with high runoff during the wet season, carrying large sediment loads and causing floods. These effects are partly the consequence of an accelerated hydrological cycle in many major watersheds, including the Choluteca, Ulua, Aguan, Patuca, Gascoran, and Chamelcon river basins. The acceleration is caused by the lack of water-holding capacity of the soil, due to deforestation and inappropriate land use.

Water quality is an increasingly serious problem owing to pollutants from mineral, industrial and organic wastes. Though there is no precise information on the degree of contamination of most of the surface waters in the country, recognised problem areas include Lago Yojoa, the Choluteca and Mozamulca rivers, Los Jutes Lagoon, and the Quebrada of the Angeles Valley.

3.3 Vegetation

3.3.1 Vegetative Communities

A complete national flora of Honduras has yet to be written. Broad general descriptions and maps of vegetative communities exist (Holdridge 1962, UNDP 1965, U.S. AID 1967), but these lack complete accounts of the vegetative communities and are getting out of date. More detailed and up to date treatments can be found for specific areas (Betancourt and Dulin 1978; Cruz et al. 1978; Honduras, Escuela Agricola Panamericana 1977; Honduras, Programa de Catastro Nacional 1975a, 1975b, 1979; Kramer and Arcoleo 1980). The following discussion is based on the more recent accounts of specific areas located in various representative regions of Honduras. These include the relatively dry Pacific slope and central highlands area of the Choluteca watershed (Kramer and Arcoleo 1980), the humid central region surrounding Lago Yojoa (Betancourt and Dulin 1978), and the Caribbean lowlands surrounding the Rio Platano (Glick 1980). The Choluteca and Lago Yojoa watersheds are much disturbed, while the Rio Platano is not. Figure 5 shows the location of the three watersheds.

Figure 5



Location of the Choluteca (1), Lago Tojoa (2) and Rio Platano (3) Watersheds

3.3.1.1 Choluteca Watershed

Three major vegetative communities are found in the Choluteca watershed: premontane broadleaf subtropical forest, open pine stands, and spiny subtropical forest. These can be broken down more explicitly by elevation and forest type. The following survey begins at the Pacific coast and works upland towards Tegucigalpa.

Vegetation of the alluvial plains of the Pacific coast (0-100 meters) includes three forest types: coastal mangrove swamp, green delta and bottomland, and jicaro (*Crescentia alata*) plains. Coastal mangrove swamp is dominated by two species of mangrove (*Rhizophora mangle*, *R. samoensis*), and includes other halophytes (*Conocarpus erecta*, *Laguncularia racemosa*, *Avicennia bicolor*, *A. gerinans*). Green delta and bottomland forest (Table 1, Appendix III) is found on fertile soil and has been much cleared for agriculture. The natural forest is composed of broadleaf evergreen trees, dominated by guanacaste (*Enterolobium cyclocarpum*) and ceiba (*Ceiba pentandra*), and has many vines. Jicaro plains forest occurs on soils of low fertility and is mostly cleared for crops and pasture. The natural vegetation (Table 1, Appendix III) includes trees 8-12 meters tall, predominantly jicaro, dense brush, and open grassy areas.

Vegetation of the lower montane zone (0-700 meters) includes five forest types: open pine forest, mixed species, pine-

dominant forest, semi-deciduous montane forest, semi-deciduous plains forest, and deciduous montane forest. The open pine forest, dominated by ocote pine (*Pinus oocarpa*) is disturbed by fire, overgrazing, and poor exploitation practices. The mixed species, pine-dominant forest type (Table 2, Appendix III) is open like the pine forest. Semi-deciduous montane forest (Table 2, Appendix III) has a dense overstory about 20 meters high. This forest has been degraded by timber cutting and clearing for agriculture and much is now second growth dominated by shrubs. According to Kramer and Arcoleo (1980) cacti are supposed to be common in this type, but none are given on their species list. Semi-deciduous plains forest (Table 2, Appendix III) has open canopy and has been cleared for agriculture so that most is now second growth. The low commercial value of most species in this type limits exploitation. Deciduous montane forest (Table 2, Appendix III) is similar to the jicaro plains forest, but occurs on steep slopes and does not completely drop its leaves in the dry season. Although Kramer and Arcoleo (op. cit.) mention jicaro as a typical tree of this forest, it is not in their species list.

Vegetation of the premontane zone (700-1500 meters) includes six forest types: pine forest, broadleaf-dominant forest, mixed pine and matorral forest, and sweetgum forest. Species lists for all forest types except pine forest are given in Table 3, Appendix III. The pine forest, dominated by grasses and *Pinus oocarpa*, is used for grazing and is subject to fire. Both the mixed-species, pine-dominant forest and the mixed-species broadleaf forest are heavily exploited for grazing and woodcutting; the broadleaf forest, composed of semi-deciduous hardwoods, is only partially exploited. The mixed pine and matorral forest includes broadleaf shrubs and is partially degraded by fire, overgrazing, forest cutting, pine resinification techniques, and roads and trails. Sweetgum forest includes pine, oak, and various deciduous species, and is often used for coffee cultivation. Erosion is not a problem in sweetgum forest.

With the exception of sweetgum forest, all forest types found in the premontane zone also occur in the montane zone (> 1500 meters, Table 4, Appendix III). Montane broadleaf forest is dense cloud forest little affected by fire but damaged by erosion near roads. Shrubby species are replacing conifers as a result of fire in the mixed pine and matorral forest. The pine and mixed species forest types are all exploited moderately to heavily for grazing, fuelwood, and timber.

3.3.1.2 Lago Yojoa Watershed

According to Betancourt and Dulin (1978), the vegetation of the Lago Yojoa watershed falls into two zones: very humid subtropical forest (up to 1500 meters), and very humid lower montane forest (above 1500 meters). Practically no virgin stands of

very humid subtropical forest remain in the area, the forest having been reduced by timber cutting or clearing for agriculture so that only small islands remain. Very humid lower montane forest occurs on very steep slopes and is therefore less exploited. An incomplete list of 160 species collected or observed in the area is given in Table 5, Appendix III. With its high rainfall and elevational variation, the watershed must have a much richer flora, but the present list probably includes the more common species.

3.3.1.3 Rio Platano Watershed

The vegetation of the Rio Platano watershed has been only superficially surveyed. Cruz et al (1978) includes a list of some 300 species from the area, certainly a small percentage of the total. Glick (1980) gives a general description of the major vegetative communities from which the following account is summarized.

Coastal colonies are dominated by mangrove, *Rhizophora mangle*. The sandy coastal beach area, subject to strong winds and sea flooding, is dominated by *Coccoloba uvifera*, *Rhizophora mangle*, *Laguncularia racemosa*, and *Cocos nucifera*. Coastal savannah is found just behind the beach and extends about 10 km inland. Vegetation in the savannah is sparse due to poor, impermeable soils and periodic burning for grazing and hunting. The dominant forms are a pine (*Pinus caribea*) and two palms (*Palms yagua* and *Pavrotis* spp.) Gallery forest occurs along the riverbank in this region. The dominant species are *Inga* spp., *Cecropia* spp., *Lanchoarpus* spp., *Albizza carbonaria*, *Ochroma lagopus*, *Heliconia* spp., and *Pachira aquatica*. Further inland is primary forest with an open understorey and a thin layer of litter. Trees have buttressed roots, and the forest is diverse. There are many epiphytes and parasites, including bromeliads and orchids. Large trees include *Carpa guianensis*, *Swietenia macrophylla*, *Pterocarpus* spp., and *Cedrela odorata*. On the exposed areas and poor soils of higher elevations is a less diverse cloud forest type of vegetation. Cleared areas along the river are in various stages of succession, with secondary hardwoods such as *Salix humboltiana*, *Inga* spp., *Pithecolobium* spp., and *Ceiba pentandra*.

3.3.2 Timber Resources and Forest Plantations

The question of the extent of forest lands and proportion of pine and hardwood forest is discussed in Section 2.3; also see Table 4. The following description of timber resources and forest plantations is derived from U.S. AID (1978).

The pine forest consists largely of *Pinus oocarpa* in the mountains and *Pinus caribea* on the Caribbean coastal plain in Gracias a Dios. *P. oocarpa* is common in Central America and produces good lumber. *P. caribea* is closely related to the slash pine of the southwestern United States. Both species pro-

duce commercial grade resin. A limited amount of commercial *Pinus pseudo-strobus* occurs at the higher elevations in the mountains. All species are generally found on the poorer soils.

U.S. AID (op. cit.) quotes "recent estimates" of pine timber volume at 50,000,000 cubic meters of which 20 percent is inaccessible by current Honduran logging methods. Pine forest has been damaged by repeated fires, dendroctonus beetle infestations, timber cutting, and migratory agriculture. Most fires are ground fires, reducing seedling recruitment rather than destroying mature trees. The pine zone is grossly understocked, with 30 cubic meters per ha instead of an expected 200 cubic meters per ha. Some mature pine stands are too old and too genetically poor for reproduction of high quality stands, and will therefore be harvested. The majority of the pine forest, however, will be managed on a forty year cycle sustained yield basis.

The hardwood forest is a complex mixture of up to about 200 species per 100 ha. Hardwood forests are best developed on good mountain soil or in the lowlands with tropical humid and subhumid conditions. Utilization to date has been a high-grading process with inferior timber left standing. About 34 species are used for some 20 different purposes, though mahogany and cedar are the principal species in demand for export.

Little is known about the quality and volume of the hardwood forest. Experience elsewhere in the tropics indicates expected volumes of 150 cubic meters per ha, with perhaps 20 percent usable by present standards. The Canadian International Development Agency is assisting COHDEFOR to inventory the species composition and soil conditions in the hardwood forest, as well as to estimate volume and growth rate and to develop management techniques. Until more background information is available, foresters must be very cautious in exploiting these potentially fragile forest reserves.

No estimates of the area of managed forest plantations in Honduras could be found. COHDEFOR operates a seed bank and nursery system, and plans to eventually plant 10,000 to 15,000 ha annually. In 1977, 2650 ha were scheduled for planting, using *Pinus oocarpa*, *Pinus caribea*, and several hardwoods.

3.4 Fauna and Conservation Measures

3.4.1 Native Terrestrial Fauna

Systematic treatments of the native Honduran terrestrial vertebrate fauna have been written for mammals (Goodwin 1943), birds (Monroe 1968), and reptiles and amphibians (Meyer and Wilson 1971, 1973). Incomplete faunal lists for specific watersheds are found in Betancourt and Dulin (1978) for Lago Yojoa and in Cruz et al. (1978) for Rio Platano. While these lists have value for their distribu-

tional information, they contain little or no information about population sizes and are therefore of limited use for establishing guidelines for the protection of particular species.

The Red Data Book compiled by the Survival Service Commission of the International Union for the Conservation of Nature and Natural Resources (1976) lists the following threatened species occurring in Honduras:

Giant Anteater	(<i>Myrmecophaga tridactyla</i>)
Ocelot	(<i>Felis pardalis</i>)
Margay	(<i>Felis wiedii</i>)
Jaguar	(<i>Panthera onca</i>)
Caribbean Manatee	(<i>Trichechus manatus</i>)
Central American Tapir	(<i>Tapirus bairdii</i>)
Golden-cheeked Warbler	(<i>Dendroica chrysoparia</i> , winters in the Cerro Cantoral region of southern Honduras)

The Honduran Emerald (*Amazilia luciae*) is a hummingbird which occurs only in Honduras; its status there is unknown.

The National Environmental Plan for 1979-83 (CONSUPLANE 1978) includes a project for "bio-ecological and economic" studies of wildlife, described as follows:

"This is a national level project with the purpose of carrying out basic studies of species with significant economic value or in danger of extinction, to determine the possibilities of commercialization and domestication, as well as the need for absolute protection. The Directorate of Renewable Natural Resources, through the Department of Wildlife and Natural Resources, is currently studying some species of commercial interest.

"This study will include populations, habitat conditions, national distribution, reproductive cycle, food habits and migration.

"The project includes 14 subprojects at an approximate cost of 1,511.2 thousand Lempiras."

The 14 subprojects mentioned refer to various animal groups deemed worthy of study either for their commercial or game value, or their endangered status, or both. They are deer, Psittacidae (parrots), ducks (migratory and resident), doves and pigeons, crocodiles, reptiles and amphibians, felines, manatee, tapir, waterbirds, birds of prey, Cracidae (guans, curassows, chachalacas), Cebidae (monkeys), and Tepescuintle (Paca), Guatusa (Agouti), and armadillo.

According to UNEP (1976), the Wildlife Department of DIRENARE has prohibited hunting of White-tailed Deer (*Odocoileus virginianus*) and Brocket Deer (*Mazama americanus*) during the pregnancy and suckling period, the Muscovy Duck (*Chairina moschato*) during the nesting period, and has restricted hunting of "such migratory

species as" the White-winged Dove (*Zinaida asiatica*) from October to February. Whether these measures have been effectively enforced is not known.

3.4.2 Fisheries Resource ^{5/}

Estimates of the number of fish species off the Honduran coasts are 312 for the Pacific and 712 for the Caribbean, of which 110 are rated as commercial. The quantity and proportions of commercial species, however, are not known.

The annual fishing catch in both oceans is about 3,000 metric tons, making fisheries about the sixth most valuable foreign exchange earner. About 74 percent of the catch is shrimp and lobster; the remainder is whitefish and small quantities of clams, oysters, crabs, and conchs. Of the 4300 fishermen on both coasts, about 660 are shrimp and lobster fishermen who man the 206 boat fleet. Most are artesanal fishermen who use small boats and canoes and fish by primitive methods. Continuing efforts to organize them to use better methods and develop better landing facilities have resulted in the formation, to date, of eight cooperatives with 426 members.

Data on the fish from inland lakes, rivers and streams is sketchy. Continental waters are estimated to have about 62 species of fish, but there is no information on the size of populations or the proportion acceptable for consumption. The catch in continental waters is unknown, but is likely to be considerable based on surveys from El Salvador, where 27 percent of the total annual catch is from rivers, lakes, and lagoons.

Various aquaculture projects have been attempted with limited success. Sea Farms has shrimp ponds in the Gulf of Fonseca and the Department of Fisheries has a one hectare demonstration shrimp pond at Ampala. Catfish production from ponds operated by foreign companies in northern Honduras reached 180,000 lbs. in 1973 before Hurricane Fifi destroyed the operation. U.S. AID is promoting aquaculture of tilapia and carp at two stations, one near Comayagua and another in Olancho. Two efforts to farm freshwater shrimp (*Macrobrachium rosenbergii*) are in operation, one by the private company Aquafinca de Camarón, and one by the Department of Fisheries; both operations have had production problems.

All government responsibility for fisheries is given to the Department of Fisheries of the Ministry of Natural Resources. At present the Department is understaffed, underequipped and underfinanced. To help overcome the staffing problem, the Japanese Government is assisting in the creation of a Marine Technology School, with help from U.S. AID.

⁵Source: U.S. AID. 1978.

3.4.3 Reserves and Protected Areas

Although the creation of various national parks and reserves has been recommended by several sources (e.g. IUCN 1974; OAS 1978; CONSUPLANE 1978; LaBastille 1978, 1979; Anon. 1979), legal status apparently has not yet been granted to any of them. The list of proposed national parks, biological reserves, wildlife refuges, national recreation areas, and national natural monuments included in the National Environmental Plan for 1979-83 (CONSUPLANE 1978, see Table 10) represents the closest approach to a national policy on the formation of protected areas. Honduras has not ratified the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere enacted by the Organization of American States (OAS 1980), and therefore has no international commitment to support the concepts of protection of natural areas encouraged by the convention. For a further discussion of national environmental policy, see Appendix I.

The area most likely to be first to achieve legal recognition as a national park is La Tigre, a mountain range near Tegucigalpa traditionally protected as a watershed reserve for the city. The range reaches an elevation of 2310 meters and is forested with oaks, liquidambar, and pines, and has a cloud-forest formation at the summit.

Another area which has received considerable recent attention is the Rio Platano Watershed (see Section 3.3.1.3). It has been proposed as a biosphere reserve for the United Nations sponsored Man and the Biosphere Program, for which it seems particularly well suited. Current national support for protection of the area comes primarily from the Directorate of Renewable Natural Resources (DIPENARE) and the Anthropological and Historical Institute of Honduras, while international support has been offered by the Tropical Agricultural Center for Research and Training (CATIE), the International Union for Conservation of Nature and Natural Resources (IUCN) the Man and the Biosphere Program, and the World Wildlife Fund. The area supports populations of such endangered species as the Caribbean Manatee, Central American Tipir Harpy Eagle, and the spotted cats, and is inhabited by about 1500 Miskito and 17 Paya Indians. Descriptions of the area may be found in Cruz et al. (1978), Glick (1980), La Bastille (1978, 1979), and Anon. (1979).

Other potential areas which have attracted considerable national and international attention are the Bay Islands off the Caribbean coast, and the Lago Yojoa region. The Bay Islands have some of the finest coral reefs in the Western Hemisphere, and a study made for the Central American Bank for Economic Development recommends the reefs around Roatan for a marine national park (La Bastille 1978). Lago Yojoa qualifies as a multiple use reserve by virtue of its uses for fishing, for a hydroelectric reservoir, as a vacation spot, and for the remnants of natural forest still found on mountain slopes around the lake. The Lago Yojoa project is complicated by the number of Honduran government agencies with an interest in the

region, but the cooperation of COHDEFOR and DIRENARE, as well as the international agencies CATIE, FAO, and UNDP in the production of a multiple use plan (Betancourt and Dulin 1978) represents a positive step.

Table 10. Proposed Reserves and Protected Areas

	<u>Source</u>
National Parks	
La Tigra (Tegucigalpa)	1,2,3
Cusuco (San Pedro Sula)	1,2,4
Islas de la Bahia	1,2,3,4
Cerro Azul-Meámbar (Lago de Yojoa)	1
Biological Reserves	
Rio Platano Watershed	1,2,3
Montaña de Celaque	1,2
Pico Bonito (Atlantida - Yoro)	1
Cerro Santa Barbara-Montaña Poza Azul (Lago Yojoa)	1,2
Trifinio (Honduras, Guatemala, El Salvador)	1,3,4
Wildlife Refuges	
Mosquitia Lakes and Swan Islands	1
Gulf of Fonseca Mangroves	1,2,4
Northern Lagoons: Los Micos	1
Pico Pijol (Yoro)	1,2
National Recreation Areas	
Lago de Yojoa	1,3,4
Copan Ruins Watershed	1
North Coast Beaches	1
National Natural Monuments	
Montaña El Chile Waterfall	1
Petrified Forest	1
Thermal Springs	1
Caves and Caverns	1
Others (not included in National Environmental Plan)	
Cerro Ocote National Forest	2
Montaña Pisoco National Forest	2
Lachua National Park	2
Nombre de Dios Reserve	2
Mosquitia Frontier Park	4

Sources: 1 = CONSUPLANE 1978
 2 = OAS 1978
 3 = C.A.T.I.E. 1978
 4 = I.U.C.N. 1974

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4.0 Environmental Problems

This section is devoted to a brief review of the major environmental problems in Honduras. They are organized in two categories: land use problems, which include problems of watershed conservation, agricultural efficiency, and forest management, and rural and urban development problems, which cover the detrimental effects of intensive development in both urban and rural environments. Environmental problems are covered in other sections of the report as well; readers are particularly referred to the sections dealing with land use (Section 2.3), fauna and conservation measures (Section 3.4), and the appendices dealing with environmental law (Appendix I) and energy (Appendix II) for further information on these particular environmental problems.

4.1 Land Use Problems ^{6/}

4.1.1 Problems Caused by Current Agricultural Practices

Major land use problems are caused by uncontrolled agricultural settlement and the underuse and misuse of agricultural lands. Consequences of these practices are accelerated erosion; increased flooding and siltation of valleys with damage to fields, irrigation works, reservoirs and settlements; decreased streamflow in the dry season; and inefficient agricultural production.

Approximately 75 percent of Honduran land is on slopes steeper than 25 percent. Since the danger of erosion is so high on slopes, agricultural use of these lands must be carefully planned and must include the use of terraces, vegetative barriers, and crops with good soil protection and holding qualities. However, most sloped land in Honduras is cleared by small farmers with no knowledge of soil conservation techniques. Land is generally cleared by burning, which destroys all cover and leaves the soil open to erosion. Fires also spread easily to forested areas, destroying young trees and stopping the natural regenerative process. Manual weeding of fields in June, just after planting in early May, tends to loosen soil which later washes away with the rains. Corn plants on poor soils are extensively spaced so as to allow more soil nutrients per plant, but this also tends to expose soils to erosion. In areas with pasture, cattle trails often lead to gully erosion. Other range management problems are outlined in Section 2.3.2.

Small farmers are often forced to occupy slopes of marginal value for crop production because the more fertile and stable alluvial soils have been long since occupied by large land holders. Much of

⁶Sources: U.S. AID. 1978.
U.S. AID. 1980b.
UNEP. 1976.

the alluvial land has been put to pasture rather than crop production, resulting in inefficient use of the land. Much of the land currently in pasture was formerly crop land. Recently cleared areas are first planted in annual crops, but are then rapidly converted to pasture as soil fertility decreases. According to the National Cadaster Program (PCN), 50 percent of the alluvial land in the Sula and Cuyamel valleys is used for cattle and dairy pasture. The Master Valley Plan (Plan Maestro Vial), completed in the early 1970s, states that lands under cultivation in Honduras are used at about 25 percent of their potential, partly due to inappropriate uses and partly due to low level technology. Greater agricultural production would be achieved most efficiently by better use of existing lands rather than by clearing new lands.

Watershed damage caused by current practices can be substantial. Soil erosion in the Choluteca watershed currently amounts to a loss of 22 tons per ha per year. At this rate, the top 3 cm of soil, which is most valuable to agricultural productivity, will be lost in 22 years. Soil from the Ulua River watershed is disappearing at an annual rate sufficient to cover 25,000 ha to a depth of 20-25 cm. In less than three generations, flooding in the valleys and alluvial plains, already serious, will be beyond the capacity of Honduras to manage with its own financial resources, and environmental damage will be irreversible. Loss of soil from sloped lands and compaction caused by grazing also inhibits the ability of the land to regenerate natural cover. Besides the Choluteca and Ulua watersheds, other areas being severely damaged at present include the Chamelcon and Upper Patuca watersheds.

4.1.2 Forest Resource Management ^{7/}

Honduran pine and hardwood forests located in the central highlands and on the north coast form a natural resource of major importance and are the basis for a planned large scale timber operation. Sawmills to be installed at Bonito Oriental and La Union will start processing timber in 1981 and 1982. However, forest reserves are not as extensive as originally thought, and exploitation rates are rapid, raising the possibility that commercial stands will be depleted within a short period after the new mills begin, leaving a costly forest industry without viability. Although fuelwood supplies are not yet endangered, demand is expected to increase rapidly and may cause further problems. Rural Hondurans, who currently depend on forest reserves for fuel and construction wood, are likely to be most severely affected.

U.S. AID (1980b) quotes "recent" studies by the National Planning Council (CONSUPLANE) that estimate forest resource depletion at a rate of 30,000 ha per year, equivalent to 3.1 million cubic meters.

⁷Sources: Cliff. 1980.
U.S. AID. 1979.
U.S. AID. 1980b.

The rate is expected to double in 1980 with new exploitation of the Olancho reserves for timber and pulp. At this accelerated rate, pine forests could be completely exhausted by the year 2000. The FAO/HON/78/005 Forestry Project report cited by Cliff (1980) estimates that present wasteful cutting practices will result in all mature pine forest being cut over in 12 years, with the exception of the northern Olancho and La Mosquitia areas. U.S. AID (1979) cites a CIDA estimate that commercial stands will be depleted within 8 to 10 years after the proposed harvesting in the Olancho reserve is started. Fuelwood demand is estimated in a 1978 CONSUPLANE report as 2,766,758 tons per year, about 4 to 5 times as much as current demands for lumber. Fuelwood sources are already severely depleted around the urban centers of Tegucigalpa, San Pedro Sula, and Choluteca. A steel mill planned for Agalteca requires 80,000 tons of charcoal (640,000 cubic meters of wood) per year, equivalent to that provided by a 30,000 ha fuelwood plantation.

Under these circumstances of rapidly increasing demand on the forest reserves, effective management and planning is of utmost importance. COHDEFOR, the national agency charged with forest management, appears to have the proper mandate, but has not been an effective management agency (Cliff 1980). Some of the problems, discussed in Section 2.3.3, include a failure to set realistic harvest rates and stumpage prices, a lack of incentives for reforestation, and a management which is reluctant to take firm stands on difficult issues or cooperate effectively with other national agencies.

4.1.3 National Land Use Policy

Many of the land use problems discussed above are the result of the history of economic and social development in Honduras and Central America generally. These are too complex for discussion here, but the interested reader is referred to excellent summaries in UNEP (1976) and UNESCO (1980), which also include recommendations for future directions in Central American land use planning.

Perhaps the biggest single environmental problem in Honduras today is the lack of an effective integrated economic development and land use policy. Information required to support land use and environmental planning is also required, including a survey of current land use and the monitoring of environmental change. It is important that measures supportive to a rational land use policy also be implemented, including the education of rural Hondurans concerning effective measures to conserve the land, the provision of alternatives to clearing more land for subsistence farmers, and the coordination and cooperation of national agencies in carrying out a national land use policy. Further discussion of land use planning problems in Honduras can be found in Section 2.3.4. Until an effective land use policy is established and enforced, Honduras will continue to suffer the consequences of unregulated exploitation of land and forest reserves, ultimately causing their irreparable loss.

4.2 Urban and Rural Development Problems

4.2.1 Pollution by Agricultural Pesticides

Both Caltagirone et al. (1972) and ICAITI (1977) agree that environmental poisoning by the indiscriminant use of agricultural pesticides is a general problem in Central America. Consequences of unregulated pesticide use include poisoning of human beings, higher rates of malaria, and higher costs of both malaria and crop pest control. Human poisoning is caused by careless handling of pesticides and their tendency to be stored in human fat, while malaria mosquito and crop pest control problems are caused by the development of resistance to pesticides by these insects. According to ICAITI (op. cit.), by the mid 1970s mosquitos already had begun to develop resistance to DDT substitutes with OMS-33 (Propoxur, Baygon), which were used in the early 1970s because DDT alone was no longer effective.

Fortunately, pesticide problems are not as serious in Honduras as in the bordering nations of Guatemala, El Salvador, and Nicaragua. Pesticide use in Honduras is lower than in these countries, both in total volume and in volume applied per unit area. However, the lack of measures regulating pesticide use in Honduras could easily lead to serious consequences. There are no laws that regulate the import, formulation, sales, or use of pesticides in Honduras. Insecticides are carelessly handled, and insecticide residues on vegetables for domestic consumption are not monitored. Imported insecticides are commonly repackaged in Honduras without proper labels. Similar problems exist with respect to herbicides. Appropriate measures should be enacted before pollution problems reach critical levels.

4.2.2 Water Supply and Waste Disposal in Tegucigalpa

Water supply and waste disposal systems in Tegucigalpa have been surveyed by Kolbusch and Orlich (1978). Two systems provide the city's drinking water: Los Laurales (60 percent) and El Picacho (40 percent). The quantity of water is as yet no problem, with the two plants expected to satisfy Tegucigalpa's water needs for 5 to 10 more years. The water distribution system is in poor condition, however, and causes various problems. Among the distribution problems mentioned by Kolbusch and Orlich (op. cit.) are the discontinuous treatment of water, causing subpressure in supply lines, and the presence of numerous illegal private wells without treatment facilities. Seepage into the municipal water distribution system caused by subpressure or faulty water lines apparently is the cause of an increase in colibacteria sickness during the rainy season and caused a hepatitis epidemic in 1977. The lack of a sewage treatment system in Tegucigalpa also contribute to surface water contamination and, ultimately, contagion of disease through the drinking water. Fear of contamination through seepage also causes technicians to over-chlorinate the water supply.

The municipal and garbage collection equipment is in good condition and the sanitary landfill is satisfactory. However, besides the municipal landfill, there are 200 to 300 small open dumps, often with slowly burning fires, many of which are located on the river banks of the city.

One recommended measure to cope with water supply and waste disposal problems is the establishment of an environmental agency to set water quality and waste disposal standards, as proposed in the National Environmental Plan. Renovations of the current water distribution system and the construction of a sewage treatment plant are needed and have been planned by SANAA.

4.2.3 Air and Noise Pollution in Tegucigalpa

ROCAP (1978) reports that air quality in Tegucigalpa is not a serious problem at this time. The most serious air pollution comes from a detergent factory and automobiles. Otherwise, there is little industry to contribute to particulate and gaseous pollution levels. ROCAP (op. cit.) recommends the establishment of air quality monitoring stations and air quality standards before air pollution reaches serious levels.

Noise levels in Tegucigalpa are high in the urban center. Residences are less affected than downtown offices and businesses. The international airport causes little noise pollution due to its location and limited operations. ROCAP (op. cit.) recommends the establishment of noise monitoring stations together with the air monitoring stations and the passing of noise control regulations.

4.2.4 Environmental Impacts of Proposed Development Projects

The National Environmental Plan for 1979-83 (CONSUPLANE 1978) lists 120 different development projects with potential for environmental impact. These include 31 agricultural, 4 forestry, 33 industrial, 8 mineral-industrial, 10 tourism, 12 energy, and 22 transportation projects in all stages from planning to construction. The plan calls for the establishment of an agency to review all proposed development projects with respect to their environmental consequences before they are begun. This is a worthwhile, if ambitious goal and should be implemented as part of Honduras' environmental policy. With so many projects to review, it would be desirable to establish a set of priorities for action, including such factors as the likelihood of project funding and implementation, the size and uniqueness of the ecosystem to be affected and the potential for destruction of that system, and the importance or lack of importance of the project with respect to an integrated economic development and land use policy for Honduras. In general, projects which tend to further the goals of a national land use policy, such as by increasing the agricultural production of lands best suited for the purpose and already under production, should receive priority for approval.

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Appendix I

National Environmental Law and Policy

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1. Environmental Law

Standards and practices in Honduran environmental law are generally weak. No specific standards have been set for air, noise and water quality or solid waste disposal. According to ROCAP (1978), existing environmental regulatory requirements are generally ignored. This is partly due to a lack of useful standards and a lack of such enforcement resources as trained personnel and monitoring equipment, but another major cause is governmental apathy towards environmental problems. Examples of inaction given in the ROCAP report (op. cit.) include a ten year delay to relocate a sawmill-plywood industry which caused considerable air and noise pollution in suburban Tegucigalpa, the failure to further investigate indications of serious damage to fisheries given in a brief impact statement for a pulp mill on the Caribbean coast, and the failure to stop pollution of Lago Yqjoa by mine wastes which have already caused at least three major fish kills. Governmental action seems to depend on the strength of criticism by the public and the press. In these circumstances, the existence of environmental law means little in itself.

The following summary of existing environmental law is taken nearly verbatim from ROCAP (op. cit.), with some modifications from CONSUPLANE (1978).

1.1 Pollution Control

Honduras' existing pollution control law consists essentially of its outdated Health Code (Código Sanitario, Decreto No. 75, Jan. 5 and 6 1967) and the Environmental Health Regulations (Reglamento Sanitario de Saneamiento Ambiental) issued by the Ministry of Health in 1968. Neither the Health Code nor the regulations prescribe specific emission or effluent standards or limitations. Relevant pollution control provisions are limited to general requirements or prohibitions. For example, Art. 35 of the regulations prohibits the construction of industrial projects within urbanized areas which would generate emissions or effluents that are "damaging" to human health. The regulations govern water and air quality, solid waste, subdivision development (industrial, commercial and residential) and the workplace environment (industrial hygiene).

Besides the Health Code and Environmental Health Regulations, a number of other laws deal with garbage disposal, water pollution, sewers and drains, water sources and other matters related to environmental quality. These include the Mining Code (Decreto No. 143, Oct. 26, 1981 and the Police Law (Decreto No. 7, Feb. 6, 1906). The profusion of various laws without uniform criteria is one of the major reasons a new comprehensive law for environmental protection and management

⁸Sources: CONSUPLANE. 1978.
ROCAP. 1978.

has been proposed by DIRENARE, but it has been criticized for lack of generality and lack of regional ecological standards. The following discussion concerns the health regulations unless otherwise indicated.

- Water Quality

Articles 5 and 6 of the regulations generally prohibit discharge of industrial or domestic wastewater or solid wastes into the surface waters of the country without a permit from the National Health agency (Dirección General de Salud Pública). Articles 8 and 11 give overall regulatory authority over domestic water supply and quality to the Health Agency's Division of Environmental Health (División de Saneamiento Ambiental - DSA). Article 12 gives concurrent permitting authority over water supply projects to DSA and the national water and sewage service (Servicio Autónomo Nacional de Acueductos y Alcantarillados - SANAA).

Articles 14 through 18 give the Health Agency regulatory authority over sewage system planning and treatment standards. (Sewage system planning and construction is done by SANAA in some cases, e.g. Tegucigalpa, and by municipal authorities in others, e.g. San Pedro Sula). Article 20 generally prohibits domestic and industrial wastewater discharges into surface or subsurface waters having potential recreational or water supply uses.

- Solid Waste

Articles 23 through 26 require municipalities to develop plans for collecting and disposing domestic solid wastes subject to regulatory standards and approval of the Health Agency (Articles 27 and 28 exempt municipalities from responsibility for collecting and disposing solid wastes generated by "complex" industrial processes and by agricultural uses). Recycling of solid wastes is subject to regulatory standards and approval of the Health Agency (Articles 30, 31, 36-40).

- Land Use Control

Articles 41 and 42 give the Health Agency concurrent approval authority over planning and zoning of urban and rural development. Other agencies exercising concurrent authority are the National Housing Institute (Instituto Nacional de Vivienda - INVA), the National Agrarian Institute (INA) and SANAA. Decreto Ley No. 263 gives INA the power to define land use capabilities, to determine factors detrimental to renewable resources, and to intervene in the location and size of agroindustrial projects. Articles 43 - 51 contain general subdivision development requirements (e.g. provision for public services); Articles 43, 44 and 55 give the Health Agency approval authority over new construction (industrial commercial and residential). The Municipality and SANAA also have concurrent approval authority.

- Air Quality

Articles 84 and 85 give the Health Agency permitting authority over new industrial development having a potential for causing air pollution (without limitation on the types or quantities or air contaminants involved). Article 85 generally prohibits construction of nuisance-like industrial development within urbanized areas.

Article 86 authorizes the Health Agency to prescribe vehicle emission standards or limitations (the national motor vehicle department - Dirección General Tránsito - is charged with enforcement responsibility).

1.2 Conservation of Natural Resources

- Conservation of Natural Resources - General

The Ministry of Natural Resources has overall administrative and regulatory responsibility over Honduras' natural resources (with some specific exceptions). The Ministry is responsible for creating and maintaining national parks, protecting wildlife, regulating hunting and fishing, regulating the use of pesticides, preventing soil erosion, and protecting water quality. The Ministry of Natural Resources also has permitting authority over new industries locating in rural areas. Other applicable laws are the Ley Forestal, Decreto No. 85, February 10, 1972 as amended; Ley de Sanidad Vegetal, Decreto No. 23, January 31, 1962 as amended.

- Deforestation

The Corporación Hondureña de Desarrollo Forestal (COHDEFOR) was established in 1974 and given responsibility over timber harvesting and reforestation (and related matters) such as prevention of soil erosion and protection of water quality incident to timber harvesting). Ley de la COHDEFOR, Decreto Ley No. 103, January 19, 1974; Ley Forestal Decreto No. 85, February 10, 1972, as amended, January 10, 1974.

2. Existing Legal Processes for Environmental Laws

Honduras does not have an administrative procedure law (ley de lo contencioso administrativo). Agency decisions (e.g. disapproving a permit application) are appealable initially to the agency official making the decision (recurso de reposición); further appeals may be taken to the Minister (recurso de apelación). Thereafter, appeals are available only to the Supreme Court (recurso de amparo), and only a very small fraction of such appeals are accepted for review by the Supreme Court.

Environmental regulations and standards (e.g. emission limitations) when adopted by the Health Agency would be administratively reviewable upon petition by persons or entities directly affected (e.g. by an industry required to comply).

However, because the Health Code and other existing environmental laws do not expressly provide standing to persons indirectly affected (acción popular), the general public would not have standing to petition for administrative review of regulations as standards deemed to be inadequate.

possible exception would be the new public interest group, Asociación Hondureña de Ecología (AHE), which is in the process of obtaining legal representative capacity to protect environmental quality.

3. Environmental Policy

The national planning authority of Honduras (CONSUPLANE) included an environmental plan (Plan Nacional de Protección y Mejoramiento del Ambiente) as part of the 1979-1983 five-year development plan. The plan contains a brief summary of environmental conditions, outlines objectives, strategies, and political means for improving environmental conditions, and proposes a number of environmental programs and projects to be started or completed during the five year span. Some of these have been referred to previously in this report (e.g. Sections 3.4.1, 3.4.3). The range of environmental problems addressed is large, as indicated by the following list of proposed projects taken from the plan:

- A. Program to inventory and monitor natural resources
 - 1. General survey of current land resources and usage
 - 2. Inventory of natural resources of La Mosquitia
 - 3. Inventory of available hydrological resources and their uses
 - 4. Monitoring and standardizing water quality
 - 5. Ecological and economic survey of wildlife
 - 6. Inventory of potential natural areas
 - 7. Evaluation of local resource-use methods for possible widespread use
- B. Program to plan and manage natural and cultural resources
 - 1. Land use classification
 - 2. National protected wildlands planning and management
- C. Program to evaluate and minimize environmental impact of public and private projects
- D. Program for environmental education
- E. Program for training of personnel for environmental management
- F. Program for environmental hygiene
- G. Program for soil conservation
- H. Program for reforestation and forest protection
- I. Program for improvement of job safety and hygiene conditions

The plan is comprehensive, ambitious, and sets a high quality environmental policy for the nation. The extent to which the plan will actually be followed is not clear. As is the case with environmental law, environmental policy may exist on paper but not be carried out. Kolbusch and Orlich (1978) comment favorably that "The fact that the government has already decided the financing of the plan shows the importance it attributes

to environmental problems." On the other hand, ROCAP (1978) mentions that prospects to pass legislation creating a comprehensive national environmental protection agency as discussed in the plan are not very promising and the leadership's attitude is "neutral at best." A likely result under the circumstances might be that survey programs which are not politically sensitive or restrictive to major business interests will be carried out, while the enforcement programs designed to protect the environment at the expense of government and private development projects will not be implemented.

Appendix II

Energy Resources Development

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Appendix II Energy Resources Development

An assessment of current and future energy use is found in MIRTE (1980a, 1980b), which should be consulted for more detail. The following summarizing tables and figure are from that source.

Table 1 Total resource use 1977 and 2000, in terajoules.

	1977	Year 2000	
		Case I	Case II
Hydro	6,760	43,200	43,200
Geothermal	0	0	0
Petroleum	<u>24,109</u>	<u>64,952 *</u>	<u>43,672 *</u>
Direct Uses	20,241	64,952	43,672
Electric Generation	3,045	0	0
Losses	822	NA	NA
Non-Commercial	21,213	44,464	44,464
Total Resources	52,082	152,616	131,336

* For petroleum use, Case I assumes 5.2 percent increase in annual demand, Case II assumes 3.4 percent.

Source: MITRE. 1980b.

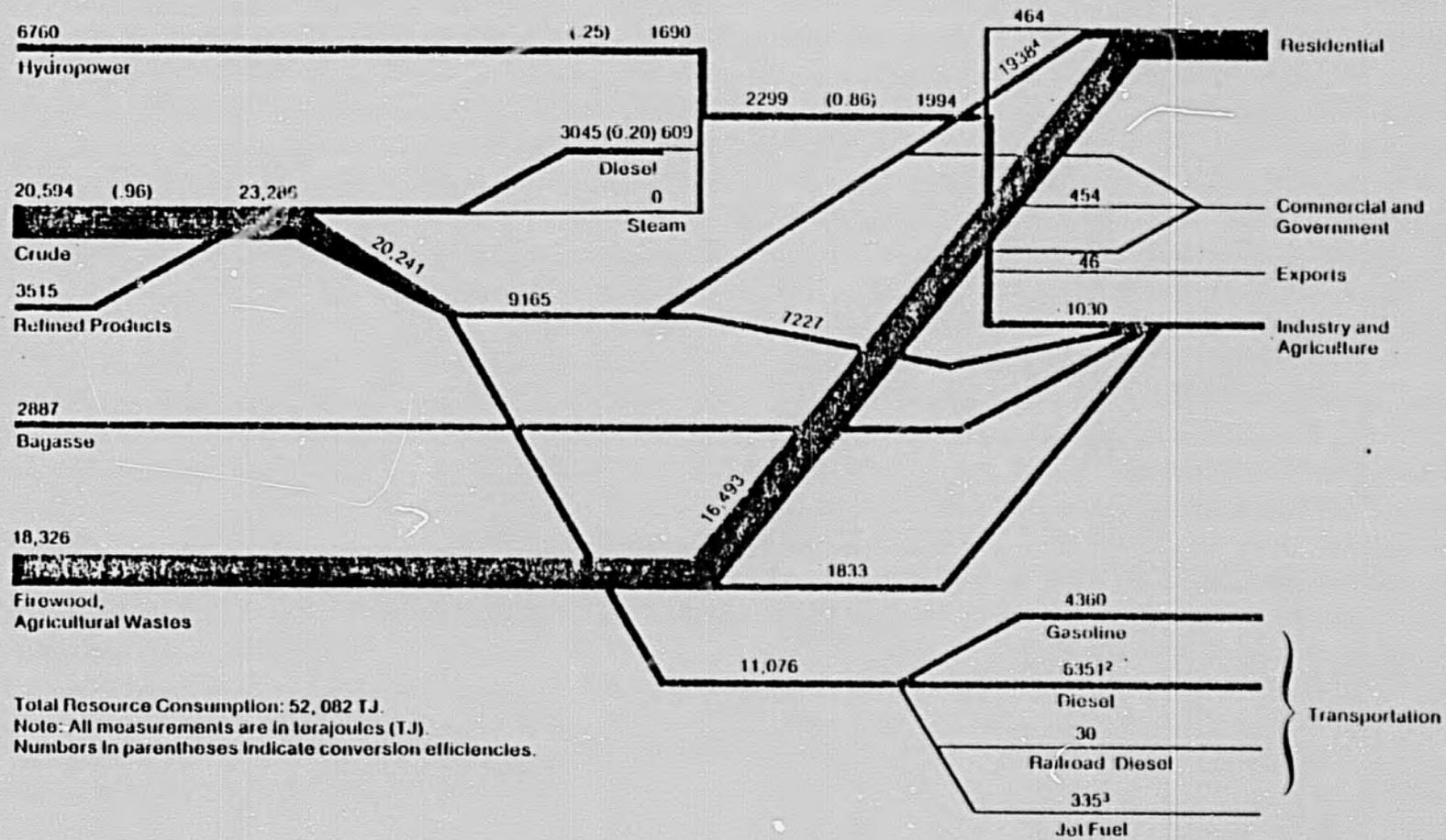


Figure 1. Energy Flow for Honduras in 1977.

Source: MITRE. 1980b.

Table 2. Current and Potential Status of Major Energy Sources.

ENERGY SOURCE	INSTITUTION	STATUS
ALCOHOL	Azucarera Cantarranas, S.A.	Seeking financing for 120,000 litres/day distillery
BIOGAS		No activity.
COAL	Corporacion Nacional de Inversiones	Completed feasibility study for extraction of 15+ million tons lignite deposits in Ocotepeque Province.
GEOTHERMAL	UNDP/World Bank	Making inventory of potential sites. Measuring temperature and conductivity. As of 1979, no possible sites had been identified.
HYDROELECTRIC	Empresa Nacional de Energia Electrica	Hydroelectric potential for the country estimated at 2800 MW, of which 109 MW is installed. Projected increases include El Cajon (292 MW), Cuyamel (525 MW), and Piedros Amarillos (210 MW).
MINIHYDRO	Empresa Nacional de Energia Electrica and Taiwan Power Commission	Completed feasibility studies for three projects of others on Potuca River with 2000-4200 KW capacity.
PETROLEUM	Ministerio de Recursos Naturales-Direccion de Minas e Hidrocarburos	Signed risk contracts with ESSO, Union Oil, Shell and Texaco for off-shore exploration. Refinery at Puerto Cortes has 16,000 BPD capacity.
SOLAR		No activity.
WIND		No activity.
WOOD	Consejo Superior de Planificacion Economica	Completed survey of national firewood use.
	Corporacion Hondurena de Desarrollo Forestal (CONDEFOR)	Experimenting with fast-growing Leucaena for fuel use. Responsible for reforestation program, research, and teaching.

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Appendix III

Vegetative Community Surveys

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Appendix III Vegetative Community Surveys

The following plant lists supplement the discussion of vegetative communities in Section 3.3.1. They are arranged in five tables, as follows:

- Table 1. Vegetation of the Pacific Coast Alluvial Plains
- Table 2. Vegetation of the Lower Montane Zone, Choluteca Watershed
- Table 3. Vegetation of the Premontane Zone, Choluteca Watershed
- Table 4. Vegetation of the Montane Zone, Choluteca Watershed
- Table 5. Vegetation of the Lago Yojoa Watershed

Table 1. Vegetation of the Pacific Coast Alluvial Plains. Forest types are green delta and bottomland (DB) and jicaro plains (JP); abundances are frequent to abundant (A), occasional to rare (O), and absent (-).

Family	Species	DB	JP
Acanthaceae	<i>Bravaisima integerrima</i>	O	-
	<i>Ruellia hookeriana</i>	O	-
Amaranthaceae	<i>Achyranthes indica</i>	O	-
Anacardiaceae	<i>Spondias mombin</i>	O	O
Annonaceae	<i>Annona squamosa</i>	O	-
Apocynaceae	<i>Stemmadenia obovata</i>	O	O
	<i>Tabernaemontana</i> spp.	-	O
	<i>Thevetia plumeriefolia</i>	-	O
Bignoniaceae	<i>Crescentia alata</i>	O	A
	<i>Tabebuia neochrysantha</i>	O	O
Bombacaceae	<i>Bombacopsis quinota</i>	-	O
	<i>Ceiba pentandra</i>	A	O
Boraginaceae	<i>Bourreria huanita</i>	-	O
	<i>Cordia alliodora</i>	O	-
	<i>C. collococca</i>	O	-
	<i>C. curassavica</i>	-	A
	<i>C. dentata</i>	A	-
Burseraceae	<i>Bursera simaruba</i>	-	O
Cactaceae	<i>Acanthocereus</i> spp.	-	O
	<i>Pereskia autumnalis</i>	-	O
Capparidaceae	<i>Capparis cynophallophora</i>	O	O
	<i>C. flexuosum</i>	O	-
	<i>C. indica</i>	O	-
Cochlospermaceae	<i>Cochlospermum vitifolium</i>	O	-
Combretaceae	<i>Combretum fruticosum</i>	O	-
	<i>Terminalia lucida</i>	O	-
Elaeocarpaceae	<i>Muntingia calabura</i>	O	-
Euphorbiaceae	<i>Cnidoculus urens</i>	-	O
	<i>Croton guatemalensis</i>	-	O
	<i>C. heterochrous</i>	-	O
	<i>C. payaquensis</i>	-	O
	<i>Jatropha curcas</i>	O	-
	<i>Sapium macrocarpum</i>	O	-

Table 1 continued

Family	Species	DB	JP
Flacourtiaceae	<i>Casearia nitida</i>	0	0
Hernandiaceae	<i>Gyrocarpus americanus</i>	-	0
Labiatae	<i>Hyptis suaveolens</i>	-	0
Leguminosae	<i>Acacia anaustissima</i>	-	0
	<i>A. costaricensis</i>	0	0
	<i>A. farnesiana</i>	0	A
	<i>A. hindsii</i>	0	A
	<i>A. nennatula</i>	-	0
	<i>Adenopodia patens</i>	0	0
	<i>A. polystachya</i>	0	-
	<i>Albizzia caribaea</i>	0	-
	<i>Andira inermis</i>	A	-
	<i>Bauhinia pauletia</i>	0	-
	<i>Caesalpinia coriaria</i>	-	A
	<i>C. eriostachys</i>	-	0
	<i>Cassia biflora</i>	-	0
	<i>C. grandis</i>	0	-
	<i>C. skinneri</i>	-	A
	<i>Enterolobium cyclocarpum</i>	A	-
	<i>Gliricidia sepium</i>	0	-
	<i>Inga vera</i> spp. <i>spuria</i>	0	-
	<i>Lonchocarpus chiapensis</i>	0	-
	<i>L. rusosus</i>	0	-
	<i>L. sericeas</i>	0	-
	<i>Mimosa carbonalis</i>	0	A
	<i>M. pigra</i>	0	-
	<i>M. platycarpa</i>	0	A
	<i>M. tenuiflora</i>	0	A
	<i>Parkinsonia aculeata</i>	0	-
	<i>Pithecolobium dulce</i>	A	-
	<i>P. saman</i>	A	-
	<i>Prosopis juliflora</i>	0	-
	<i>Sweetia panamensis</i>	0	-
Meliaceae	<i>Cedrela odorata</i>	0	-
	<i>Guarea</i> spp.	0	-
	<i>Swietenia humilis</i>	0	-
	<i>Trichilia colimana</i>	0	-
	<i>T. hirta</i>	0	-
	<i>T. trifolia</i>	0	-
Moraceae	<i>Chlorophora tinctoria</i>	0	-
	<i>Ficus insipida</i>	0	-
	<i>Ficus</i> spp.	0	-
	<i>Guatteria</i> spp.	0	-
Myrsinaceae	<i>Ardisia revoluta</i>	0	-

Table 1 continued

Family	Species	DB	JP
Nyctaginaceae	<i>Neca psychotrioides</i>	O	-
Phytolaccaceae	<i>Achatocarpus nigricans</i>	O	-
Polygonaceae	<i>Coccoloba caracasena</i>	A	-
	<i>C. venosa</i>	O	A
Rhamnaceae	<i>Karwinskia calderoni</i>	O	-
Rosaceae	<i>Licania arborea</i>	O	-
Rubiaceae	<i>Calycophyllum candidissimum</i>	O	-
	<i>Psychotria carthaginensis</i>	O	-
	<i>Randia pleiomaris</i>	O	-
Sapindaceae	<i>Allophylus occidentalis</i>	O	-
	<i>Sapindus saponaria</i>	O	-
	<i>Thouinidium decandrum</i>	O	-
Sterculiaceae	<i>Guazuma ulmifolia</i>	A	-
Tiliaceae	<i>Luehea candida</i>	O	-

Source: Kramer and Arcoleo. 1980.

Table 2. Vegetation of the Lower Montane Zone, Choluteca Watershed. Forest types are semideciduous montane (SM), semideciduous plains (SP), deciduous montane (DM), and mixed pine (MP); abundance symbols as in Table 1.

Family	Species	SM	SP	DM	MP
Anacardiaceae	<i>Anacardium excelsum</i>	O	-	-	-
	<i>Astronium graveolens</i>	O	-	-	-
	<i>Spondias mombin</i>	O	-	-	-
	<i>S. purpurea</i>	O	-	-	-
Annonaceae	<i>Annona purpurea</i>	O	-	-	-
	<i>A. squamosa</i>	O	O	-	-
	<i>Sapranthus nicaraguensis</i>	O	-	-	-
Apocynaceae	<i>Plumeria rubra</i>	-	-	A	-
	<i>P. acutifolia</i>	-	-	A	-
	<i>Rauwolfia tetraphylla</i>	-	O	-	-
	<i>Stammadenia abovata</i>	O	O	A	-
	<i>Tabernaemontana amygdalifolia</i>	-	O	-	-
	<i>T. spp.</i>	O	-	-	-
Araliaceae	<i>Dendropanax arboreus</i>	A	-	-	-
Bignoniaceae	<i>Crescentia alata</i>	-	O	-	-
	<i>Tabebuia neochrysantha</i>	O	O	-	-
	<i>T. rosea</i>	O	-	-	-
	<i>Tecoma stans</i>	O	-	-	-
Bombacaceae	<i>Bombacopsis quinata</i>	O	A	-	-
	<i>Ceiba aesculifolia</i>	-	-	-	O
	<i>C. pentandra</i>	O	O	-	-
Boraginaceae	<i>Cordia alliodora</i>	A	O	-	-
	<i>C. collococca</i>	O	-	-	-
	<i>C. curassavica</i>	-	A	-	-
	<i>C. dentata</i>	-	O	-	-
Burseraceae	<i>Bursera simaruba</i>	O	O	A	-
Cactaceae	<i>Acanthocereus spp.</i>	-	O	-	-
Capparidaceae	<i>Capparis cynophallophora</i>	-	O	-	-
	<i>C. flexuosa</i>	-	O	-	-
Cochlospermeceae	<i>Cochlospermum vitifolium</i>	O	-	A	-
Combretaceae	<i>Bucida macrostachya</i>	O	-	-	-
Compositae	<i>Combretum friticosum</i>	O	-	-	-
	<i>Eupatorium adoratam</i>	O	-	-	-
	<i>Verbesina gigantoides</i>	O	-	-	-

Table 2 continued

Family	Species	SM	SP	DM	MP
Dilleniaceae	<i>Curatella americana</i>	-	-	-	0
Ebeneceae	<i>Diospyros nicaraguensis</i>	0	-	-	-
Euphorbiaceae	<i>Cnidosculus urens</i>	-	0	-	-
	<i>Croton guatemalensis</i>	0	-	-	-
	<i>C. payaquensis</i>	-	0	-	-
	<i>Jatropha curcas</i>	0	-	-	-
	<i>Phyllanthus acuminatus</i>	0	-	-	-
	<i>Ricinus communis</i>	0	-	-	-
Fagaceae	<i>Quercus oleoides</i>	-	-	-	0
	<i>Q. peduncularis</i>	-	-	-	0
	<i>Q. skinneri</i>	-	-	-	0
Flacourtiaceae	<i>Casearia nitida</i>	0	0	-	-
	<i>C. sylvestris</i>	0	0	-	-
	<i>Xylosma flexuosum</i>	A	-	-	-
Hernandiceae	<i>Gyrocarpus americanus</i>	0	-	A	-
Hippocrateceae	<i>Hyppocratea excelsa</i>	0	-	-	-
Lauraceae	<i>Persea americana</i>	0	-	-	-
Leguminoaseae	<i>Acacia costaricensis</i>	-	0	-	-
	<i>A. hindsii</i>	0	0	-	-
	<i>A. farnesiana</i>	0	0	-	0
	<i>A. pennatula</i>	-	0	-	-
	<i>Albizzia caribaea</i>	-	0	-	-
	<i>A. chevalieri</i>	0	-	-	-
	<i>Andira inermis</i>	A	A	-	-
	<i>Bauhinia pauletia</i>	0	0	-	-
	<i>B. unguolata</i>	0	-	-	-
	<i>Caesalpinia coriaria</i>	-	0	-	-
	<i>C. eriostachys</i>	-	0	A	-
	<i>Cassia biflora</i>	0	0	-	-
	<i>C. emarginata</i>	0	0	-	-
	<i>C. grandis</i>	A	0	-	-
	<i>C. skinneri</i>	-	0	-	-
	<i>Cassia nicaraguensis</i>	0	-	-	-
	<i>Cassia xiphoidea</i>	0	-	-	-
	<i>Enterolobium cyclocarpum</i>	0	0	-	-
	<i>Eaematoxylon brasiletto</i>	-	0	-	-
	<i>Erythrina bertercana</i>	0	-	-	-
	<i>Gliricidia sepium</i>	A	0	A	-
	<i>Hymenea courbaril</i>	A	-	-	-
	<i>Inga oerstediana</i>	0	-	-	-
<i>I. punctata</i>	0	-	-	-	
<i>I. sapindoides</i>	0	-	-	-	
<i>I. vera</i> spp. <i>spuria</i>	A	-	-	-	

Table 2 continued

Family	Species	SM	SP	PM	MP
Leguminosaeae (continued)	<i>Lonchocarpus</i> spp.	-	0	-	-
	<i>L. lucidus</i>	0	-	-	-
	<i>L. minimiflorus</i>	-	-	A	-
	<i>Lonchocarpus rugosus</i>	0	-	-	-
	<i>L. sericeus</i>	0	-	-	-
	<i>Lysiloma salvadorensis</i>	0	0	A	-
	<i>L. seemanii</i>	-	-	-	0
	<i>Macheasrium arboreum</i>	0	-	-	-
	<i>Mimosa carbonalis</i>	-	0	-	-
	<i>M. platycarpa</i>	-	0	-	-
	<i>M. tenuiflora</i>	-	0	-	0
	<i>Pithecolobium dulce</i>	0	A	-	-
	<i>P. saman</i>	0	0	-	-
	<i>Pecppigia procera</i>	0	-	-	-
	<i>Prosopis juliflora</i>	-	0	-	-
	<i>Sweetia panamensis</i>	0	-	-	-
Liliaceae	<i>Yucca elephantipes</i>	0	-	-	-
Malpighiaceae	<i>Byrsonima crassifolia</i>	-	-	-	-
Malvaceae	<i>Malvaviscus arboreus</i>	0	-	-	-
Melastomaceae	<i>Miconia argenta</i>	0	-	-	-
Meliaceae	<i>Cedrela odorata</i>	0	0	-	-
	<i>Guarea swartzii</i>	0	-	-	-
	<i>Swietenia humilis</i>	0	0	-	-
	<i>Trichilia</i> spp.	0	0	-	-
Moraceae	<i>Brosimum alicastrum</i>	0	-	-	-
	<i>Castilla elastica</i>	0	-	-	-
	<i>Cecropia peltata</i>	0	-	A	-
	<i>Cholorphora tinctoria</i>	0	-	-	-
	<i>Ficus hondurensis</i>	0	0	-	-
	<i>F. maxima</i>	0	-	-	-
	<i>F. ovalis</i>	0	0	-	-
Myrsinaceae	<i>Ardisia paschalis</i>	0	-	-	-
	<i>A. revoluta</i>	0	0	-	-
Myrtaceae	<i>Eugenia hondurensis</i>	0	-	-	-
	<i>Psidium guajava</i>	0	-	-	-
	<i>P. guineense</i>	0	-	-	-
Olacaceae	<i>Ximenia americana</i>	0	-	-	-
Palmae	<i>Acromia mexicana</i>	0	-	-	-
Pinaceae	<i>Pinus oocarpa</i>	-	-	-	A

Table 2 continued

Family	Species	SM	SP	DM	MP
Piperaceae	<i>Piper</i> spp.	0	-	-	-
Polygonaceae	<i>Coccoloba venosa</i>	-	0	-	-
Rhamnaceae	<i>Karwinskia calderoni</i>	0	0	-	-
Rosaceae	<i>Couepia polyandra</i>	0	-	-	-
	<i>Licania arborea</i>	0	0	-	-
	<i>L. platypus</i>	0	-	-	-
Rubiaceae	<i>Calycophyllum candidissimum</i>	0	0	A	-
	<i>Genipa caruto</i>	0	-	-	-
	<i>Pondeletia deamii</i>	-	0	-	-
Sapindaceae	<i>Allophylus acuminatus</i>	0	-	-	-
	<i>A. occidentalis</i>	-	0	-	-
	<i>Cupanea dentata</i>	0	-	-	-
	<i>C. guatemalensis</i>	0	-	-	-
	<i>Sapindus saponaria</i>	0	0	-	-
	<i>Thoninia serrata</i>	0	-	-	-
	<i>Thounidium decadrum</i>	0	0	-	-
Sapoteceae	<i>Matichodendron capiri</i>	0	-	-	-
	<i>Pouteria mammosum</i>	0	-	-	-
Simarubaceae	<i>Alvaradoa amorphoides</i>	0	-	A	-
	<i>Simaruba glauca</i>	A	0	-	-
Solanaceae	<i>Cestrum dumetorum</i>	0	-	-	-
	<i>Solanum</i> spp.	0	-	-	-
Sterculiaceae	<i>Guazuma ulmifolia</i>	0	A	A	-
	<i>Sterculia apetala</i>	0	-	-	-
Theophrastaceae	<i>Jacquinia aurantiaca</i>	-	0	-	-
Tiliaceae	<i>Apeiba tibourbou</i>	0	-	-	-
	<i>Luehea candida</i>	0	0	A	-
	<i>Luehea speciosa</i>	0	-	-	-
	<i>Triunfetta calderoni</i>	0	-	-	-
Ulmaceae	<i>Trema micrantha</i>	0	-	A	-
Verbenaceae	<i>Cornutia pyramidata</i>	0	-	-	-

Source: Kramer and Arcoleo. 1980.

Table 3. Vegetation of the Premontane Zone, Choluteca Watershed. Forest types are broadleaf forest (B), mixed species, pine dominant (MP), mixed species, broadleaf dominant (MB), mixed pine and matorral (PM), and sweetgum (S); relative abundances of each species in each forest type are rare (R), occasional (O), abundant (A), or not recorded (-).

Species	B	MP	MB	PM	S
<i>Acacia farnesiana</i>	R	R	R	-	-
<i>Acrocomia mexicana</i>	R	-	-	-	-
<i>Andira inermis</i>	R	-	-	-	-
<i>Annona reticulata</i>	R	-	-	-	-
<i>A. seleroderma</i>	R	-	-	-	-
<i>A. squamosa</i>	R	-	-	-	-
<i>Ardisia compressa</i>	R	-	-	-	-
<i>Astronium graveolens</i>	R	-	-	-	-
<i>Buddleia americana</i>	R	-	-	-	-
<i>Byrsonima crassifolia</i>	R	O	R	R	-
<i>Caesalpinia coriaria</i>	R	-	-	-	-
<i>Calycophyllum candidissimum</i>	R	-	R	-	-
<i>Carpinus caroliniana</i>	R	-	-	-	-
<i>Casearia arborea</i>	R	-	-	-	-
<i>Cassia grandis</i>	R	-	-	-	-
<i>Cecropia peltata</i>	R	-	R	-	-
<i>Cedrela odorata</i>	R	R	-	-	-
<i>Celtis spp.</i>	R	-	-	-	-
<i>Chamaedorea pacaya</i>	R	-	-	-	-
<i>Chlorophora tinctoria</i>	-	R	-	-	-
<i>Citrus spp.</i>	R	-	-	-	-
<i>Clethera macrophylla</i>	-	R	-	-	-
<i>Clusia conferta</i>	R	-	-	-	-
<i>Cochlospermum vitifolium</i>	R	-	R	-	-
<i>Coffea arabica</i>	-	-	-	-	R
<i>Cordia nitida</i>	R	-	-	-	-
<i>Cupania dentata</i>	-	-	-	-	R
<i>Curatella americana</i>	R	R	-	R	-
<i>Dalbergie cubilquitaensis</i>	R	-	-	-	R
<i>D. tucurensis</i>	R	-	-	-	-
<i>Dialium guianense</i>	R	-	-	-	-
<i>Dodonaea viscosa</i>	-	R	-	R	-
<i>Eugenia jambos</i>	R	-	-	-	-
<i>Eupatorium daleoides</i>	R	R	-	R	-
<i>Faramea occidentalis</i>	R	-	-	-	-
<i>Ficus insipida</i>	R	-	-	-	R
<i>F. involuta</i>	R	-	-	-	-
<i>Ficus spp.</i>	R	-	-	-	-
<i>Gliricidia sepium</i>	R	-	-	-	-
<i>Guarea excelsa</i>	R	-	-	-	-
<i>Guazuma ulmifolia</i>	P	-	-	-	-
<i>Hedyosmum mexicanum</i>	R	-	-	-	-
<i>Heliocarpus donnell-smithii</i>	R	-	-	-	R
<i>Hieronyma alchorneoides</i>	R	-	-	-	-
<i>Hymenaea courbaril</i>	R	-	-	-	-

Table 3 continued

Species	B	MP	MB	PM	S
<i>Inga punctata</i>	R	-	-	R	-
<i>I. vera</i>	R	-	-	-	R
<i>I. vera</i> spp. <i>spuria</i>	R	-	-	-	R
<i>Inga</i> spp.	-	R	-	-	-
<i>Jacaranda copaia</i>	R	-	-	-	-
<i>Jatropha curcas</i>	R	R	-	-	-
<i>Juglans planchana</i>	R	-	-	-	-
<i>Licania platypus</i>	R	-	-	-	R
<i>Liquidambar styraciflua</i>	R	R	-	-	A
<i>Luehea seemannii</i>	R	R	-	-	-
<i>Lysiloma seemanni</i>	R	R	R	-	-
<i>Mangifera indica</i>	R	-	-	-	-
<i>Miconia dodecandra</i>	R	-	-	-	-
<i>Mimosa tenuiflora</i>	-	R	R	-	-
<i>Munligia calabura</i>	R	-	-	-	-
<i>Nectandra gentlei</i>	R	-	-	-	-
<i>Nectandra</i> spp.	R	-	-	-	-
<i>Neomillspaughia paniculata</i>	R	-	-	-	-
<i>Persea americana</i>	R	-	-	-	-
<i>Persea</i> spp.	R	-	-	-	R
<i>Perymenium grande</i>	R	-	-	-	R
<i>Pinus oocarpa</i>	R	O	A	A	R
<i>P. pseudostrobus</i>	R	R	-	R	-
<i>Pithecolobium arboreum</i>	R	-	-	-	-
<i>Psidium guajava</i>	R	R	-	R	-
<i>Quercus oleoides</i>	R	O	R	R	-
<i>Q. peduncularis</i>	R	O	O	R	R
<i>Q. skinneri</i>	R	R	-	-	R
<i>Q. trichodonta</i>	R	-	-	-	-
<i>Rapanea myricoides</i>	R	-	-	-	R
<i>Rheedia intermedia</i>	R	-	-	-	-
<i>Saurauia seletorum</i>	R	-	-	-	R
<i>Schizolobium parahybum</i>	R	-	-	-	-
<i>Simaruba glauca</i>	R	R	R	R	-
<i>Siparuna</i> sp.	R	-	-	-	-
<i>S. tonduziana</i>	R	-	-	-	-
<i>Sloanea zuliaensis</i>	R	-	-	-	-
<i>Spondias lutea</i>	R	-	-	-	-
<i>S. mombin</i>	-	-	-	-	R
<i>Stemmadenia donnell-smithii</i>	R	-	R	-	-
<i>Swietenia macrophylla</i>	R	-	-	-	-
<i>Symphonia globuligera</i>	R	-	-	-	-
<i>Tabebuia pentaphylla</i>	R	-	-	-	-
<i>Tabernaemontana</i> spp.	R	-	-	-	-
<i>Tecoma stans</i>	-	-	R	-	-
<i>Terminalia amazonia</i>	R	-	-	-	-
<i>Thevetia peruviana</i>	R	-	-	-	-
<i>Trema micrantha</i>	R	R	-	-	-
<i>Trichospermum</i> spp.	R	-	-	-	-
<i>Vismia mexicana</i>	R	-	-	-	R
<i>Zanthoxylum fagara</i>	-	-	-	-	R

Source: Kramer and Arcoleo. 1980.

Table 4. Vegetation of the Montane Zone, Choluteca Watershed. Forest types and abundance symbols as in Table 3.

Species	B	MP	MB	PM
<i>Alchornea latifolia</i>	R	-	-	-
<i>Alsophila salvinii</i>	R	-	-	-
<i>Brunellia mexicana</i>	R	-	-	-
<i>Bursera simaruba</i>	-	-	-	R
<i>Byrsonima crassifolia</i>	-	R	-	R
<i>Calophyllum brasiliense</i>	R	-	-	-
<i>Cecropia peltata</i>	R	R	-	-
<i>Cedrela odorata</i>	R	-	-	-
<i>Celtis</i> spp.	R	-	-	-
<i>Clethra macrophylla</i>	R	-	-	-
<i>Clusia salvinia</i>	R	-	-	-
<i>Cochlospermum vitifolium</i>	-	R	-	R
<i>Dendropanay arboreus</i>	O	-	-	-
<i>Deppea grandiflora</i>	R	R	-	-
<i>Dodonaea viscosa</i>	-	R	O	-
<i>Eugenia</i> spp.	R	-	-	-
<i>Eupatorium semi-alatum</i>	R	-	-	-
<i>Euchsia paniculata</i>	R	-	-	-
<i>Genipa caruto</i>	R	-	-	-
<i>Hedyosmum mexicanum</i>	O	-	-	-
<i>Heliocarpus donnell-smithii</i>	R	-	-	-
<i>Ilex</i> sp.	R	-	-	-
<i>Inga nubigena</i>	R	-	-	-
<i>Lippia myrioccephala</i>	R	-	-	-
<i>Lippia</i> spp.	R	-	-	-
<i>Liquidambar styraciflua</i>	R	R	R	-
<i>Luehea seemannii</i>	-	R	-	R
<i>Lysiloma seemannii</i>	-	R	-	-
<i>Miconia theoexans</i>	R	-	-	-
<i>Mimosa tenuiflora</i>	-	R	-	R
<i>Parathesis vulgata</i>	R	-	-	-
<i>Persea americana</i>	R	-	-	-
<i>Persea</i> spp.	O	-	-	-
<i>Phyllonoma laticuspis</i>	R	-	-	-
<i>Pimenta dioca</i>	R	-	-	-
<i>Pinus oocarpa</i>	-	O	A	A
<i>P. pseudostrobus</i>	R	R	R	R
<i>Podocarpus oleifolius</i>	R	-	-	-
<i>Pouteris</i> spp.	R	-	-	-
<i>Psidium guajava</i>	-	-	O	-
<i>Quercus cugeniaefolia</i>	R	-	-	-
<i>Q. oleoides</i>	R	O	O	R
<i>Q. peduncularis</i>	R	-	R	R
<i>Q. skinneri</i>	R	-	-	-
<i>Quercus</i> spp.	R	-	-	-
<i>Q. trichodonta</i>	R	-	-	-
<i>Rinorea crenata</i>	-	R	-	-
<i>Rondeletia nebulosa</i>	R	-	R	-

Table 4 continued

Species	B	MP	MB	PM
<i>Sapium spp</i>	F.	-	-	-
<i>Saurauia selerorum</i>	O	-	-	-
<i>Simaruba glauca</i>	-	R	-	R
<i>Spondias lutea</i>	-	-	-	R
<i>Symphonia globulifera</i>	R	-	-	-
<i>Synardisia venosa</i>	O	-	-	-
<i>Trema micrantha</i>	R	R	-	-

Source: Kramer and Arcoleo. 1980.

Table 5. Vegetation of the Lago Yojoa Watershed.

POLYPODIACEAE

Adiantum concinnum
A. latifolium
Blechnum occidentale
Hemionitis pinnatifida
Nephrolepis biserrata
Polypodium pectinatum
P. triseriale
Pteridium aquilinum
Thelypteris normalis

SCHIZAEACEAE

Lygodium heterodoxum

SALVINIACEAE

Salvinia rotundifolia

EQUISETACEAE

Equisetum giganteum

CUPRESSACEAE

Cupressu benthamii

PINACEAE

Pinus ayacahuite
P. caribea
P. pseudostrobus

TAXACEAE

Texus globosa

TYPHACEAE

Typha domingensis

POTAMOGETONACEAE

Potamogeton illinoensis

NAJADACEAE

Najas guadalupensis

ALISMATACEAE

Sagittaria lancifolia

POACEAE

Cenchrus spp.
Chusquea abietifolia
Coix lacryma-jobi
Echinochloa colonum
E. cruspavonis
Homolepis aturensis

POACEAE (continued)

Hymenachne amplexicaulis
Luziola subintegra
Meibomia minutiflora
Oriza latifolia
O. sativa
Panicum germinatum
Setaria spp.
Rhynchelytrum roseum
Zea mays

CYPERACEAE

Cyperus articulatus
C. flavus
Dichromena ciliata
Eleocharis intersticta
E. schaffneri
Fimbristylis dichotoma
Rhynchospora spp.

PALMAE

Chamaedorea pacaya
Geonoma spp.
Oribignya cahune

ARACEAE

Anthurium crassinervium
A. silvigaudens
Monstera spp.

BROMELIACEAE

Catopsis apieroides
Pitcairnia imbricata
Tillandsia recurvata
T. urticulata
Vriesia montana

COMMELINACEAE

Tripogandra cumaneensis

PONTEDERIACEAE

Eichhornia crassipes

SMILACACEAE

Smilax subpubescens

MUSACEAE

Heliconia humilis

Table 5 continued

MARANTACEAE

Calathea insignis
Stromanthe lutea

ORCHIDACEAE

Brasavola spp.
Epidendrum boothii
E. cochleatum
Maxillaria friedrichsthali
M. rufrescens
Pleurothallis fuegi
Sobralia decora

PIPERACEAE

Pepiromia deppeana
Piper aduncum
P. yucatanense

LACISTEMACEAE

Lacistema aggregatum

SALICACEAE

Salix humboldtiana

FAGACEAE

Quercus costaricensis
Q. oleoides
Q. skinneri

MORACEAE

Cacropia peltata
Brosimum alicastrum
Ficus involuta
Pouruma aspera

PHYTOLACCACEAE

Phytolacca icosandra

NYMPHAEACEAE

Cabomba piahyensis
Nelumbo lutea
Nymphaea ampla

ANONACEAE

Anona muricata
A. squamosa

LAURACEAE

Cinnamomum zeylanicum
Persea americana

CAPPARIDACEAE

Crataeva tapila

HAMAMELIDACEAE

Liquidambar styraciflua

ROSACEAE

Licania arborea

CAESALPINIEAE

Cassia grandis
Dialium guianense
Schizolobium parahybum
Tamarindus indica

MIMOSACEAE

Acacia spp.
Albizia idiopoda
Inga vera

PAPILIONACEAE

Andira inermis
Erythrina fusca
Vatairea lundellii

OXALIDACEAE

Biophytum dendroides

RUTACEAE

Zanthoxylum fagara

SIMAROUBACEAE

Simarouba glauca

BURSERACEAE

Bursera simaruba

MELICEAE

Cedrela odorata
Guarea excelsa
Swietenia macrophylla

MALPIGHIACEAE

Bunchosia cornifolia
Byrsonima crassifolia
Heteropteris laurifolia

VOCHYSIACEAE

Vochysia hondurensis

EUPHORBIACEAE

Acalypha arvensis
Alchornea latifolia
Caperonia castaneicolia

Table 5 continued

ANACARDIACEAE

Anacardium occidentale
Mangifera indica
Mosquitoxylum jamaicense
Spondias mombin

SAPINDACEAE

Cupania dentata

TILIACEAE

Heliocarpus donnell-smithii
Luehea spp.

MALVACEAE

Malvaviscus arboreus

BOMBACACEAE

Ceiba pentandra

STERCULIACEAE

Guazuma ulmifolia
Melochia villosa

SAURAUACEAE

Saurauia subalpina

GUTTIFERAE

Calophyllum brasiliense
Clusia flua

PASSIFLORACEAE

Passiflora trinifolia

BEGONIACEAE

Begonia lindleyana
B. manicata
Begonia oaxacane

CACTACEAE

Rhipasalis cassutlia

COMBRETACEAE

Terminalia amazonia

MYRTACEAE

Psidium guajava

MELASTOMACEAE

Arthrostemma ciliatum
Miconia dodecandra
M. ebaguensis
M. humilis

ARALIACEAE

Didymopanax morototoni

MYRSINACEAE

Ardisia compressa

SAPOTACEAE

Manilkara achras
Pouteria spp.

APOCYNACEAE

Stemmadenia donnell-smithii

CONVOLVULACEAE

Ipomoea silvicola

BORAGINACEAE

Cordia allidora

LABIATAE

Hyptis capitata
Stachys agraria

SOLANACEAE

Solanum hartwegii
S. lanceifolium
S. nudum

GESNERIACEAE

Kohleria spicata

PLANTAGINACEAE

Plantago major

RUBIACEAE

Cephaelis axilaris
Diodia brasiliensis
Hamelia patens
Palicourea galeottiana
P. triphylla
Psychotria berteriana

COMPOSITAE

Gnaphalium viscosum
Senecio arborescens
S. cobanensis
Vernonia deppeana
Zexmenia frutescens

Source: Betancourt and Dulin. 1978.

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Appendix IV

Acronyms Used in this Report

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Appendix IV Acronyms Used in this Report

1. National Agencies

- COHDEFOR: Corporación Hondureña de Desarrollo Forestal (Honduran Forestry Development Corporation)
- CONADI: Corporación Nacional de Inversiones (National Investment Corporation)
- CONSUPLANE: Consejo Superior de Planificación Económica (Superior Economic Planning Council)
- CPA: Comisión de Política Agrícola (Agricultural Policy Commission)
- DCH: Departamento de Climatología y Hidrología (Department of Climatology and Hydrology, a division of MRN)
- DIRENARE: Dirección General de Recursos Naturales Renovables (Directorate of Renewable Natural Resources, also RENARE)
- DRN: Departamento de Recursos Naturales (Natural Resources Department, a division of PCN)
- ENEE: Empresa Nacional de Energía Eléctrica (National Electric Company)
- INA: Instituto Nacional Agrario (National Agrarian Institute)
- MRN: Ministerio de Recursos Naturales (Ministry of Natural Resources)
- PCN: Programa Catastral Nacional (National Cadaster Program)
- RENARE: See DIRENARE
- SANAA: Servicio Autónomo Nacional de Acueductos y Alcantarillados (National Water and Sewage Service)
- SECOPT: Secretaría de Estado en el Despacho de Comunicaciones, Obras Públicas y Transporte (State Secretariat of Communications, Public Works, and Transportation)
- SMN: Servicio Meteorológico Nacional (National Meteorological Service)

2. International Agencies

- CATIE: Centro Agronómico Tropical de Investigación y Enseñanza (Tropical Agricultural Research and Training Center, Turrialba, Costa Rica)
- FAO: Food and Agriculture Organization of the United Nations, Rome, Italy
- ICAITI: Instituto Centroamericano de Investigación y Tecnología Industrial (Central American Institute of Industrial Research and Technology, Guatemala City, Guatemala)

ROCAP: Regional Office for Central America and Panama, Guatemala City, Guatemala; a regional office of USAID

UNDP: United Nations Development Programme

Appendix V

International AID Programs of Environmental Significance

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Appendix V. International Aid Programs of Environmental Significance ^{9/}

Almost all international assistance programs have environmental consequences of one sort or other. The following summary is confined to those projects most directly related to environmental problems. It is organized in two broad categories: (1) development projects with potential for major environmental impact; and (2) projects specifically designed to rectify environmental problems.

1.0 Development Projects with Environmental Impacts.

1.1 Agricultural and Fisheries Development

1.1.1 World Bank

Second Agricultural Credit Project (WB \$25.0 mil/GOH \$13.5 mil). This project will assist national programs of agricultural development and agrarian reform by expanding the area under food crop production, increasing livestock production, improving the contribution of the agricultural sector to export earnings and import substitution, increasing employment opportunities and improving family incomes, supporting selected institutions for further planning and development of the agricultural sector, and conserving natural resources. Major project components include a nationwide agricultural credit program, a pilot forestry program, studies of groundwater resources, and training for the staffs of COHBANA, COHDEFOR and the Planning Unit (MNR). (3)

1.1.2 Interamerican Development Bank (IDB)

Development of Fisheries (Cooperatives)

Donor Contribution: \$1.58 million.

Description: Credit to fishing cooperatives through MNR, BNG, and DIFOCOOP for small motor-boats, fishing equipment, and equipment for storing and processing shrimp and fish.

Inputs: Credit
Commodities

Status: Approved by BID, awaiting final signature by GOH. (1)

⁹Sources. Sources are indicated by number after each project description. They are:

- (1) U.S. AID. 1978.
- (2) U.S. AID. 1980a.
- (3) U.S. AID. 1980b.
- (4) TEXT system, U.S. AID Library, Washington, D.C.

1.1.3 U.S. Agency for International Development (U.S. AID)

PROJECT NUMBER 522012300
 OLD PROJECT NUMBER 52215190123
 PROJECT TITLE SMALL FARMERS TECHNOLOGIES
 PROBLEM STATEMENT LOW AGRICULTURAL PRODUCTIVITY, LOW FARM INCOME AND WIDESPREAD RURAL POVERTY RESULT FROM UNDERUTILIZATION OF LAND AND HUMAN RESOURCES IN HONDURAS. TRADITIONAL FARMING PRACTICES RELYING ON HAND TOOLS/HUMAN POWER, PRIMITIVE LAND-CLEARING TECHNIQUES, SEASONALLY INTERRUPTED WATER SUPPLY AND BRIEF PLANTING/HARVESTING TIMES COMBINE TO SEVERELY LIMIT THE PRODUCTIVITY POTENTIAL OF THE AGRICULTURAL SECTOR. IN THE PAST, GOH HAS BEEN RELUCTANT TO SUPPORT AGRARIAN REFORM.
 PROJECT STRATEGY CONDUCT AN AGRARIAN REFORM PROGRAM WHICH PROVIDES UNDERUTILIZED AND SEASONALLY UNEMPLOYED LABOR WITH APPROPRIATE LAND, FARM EQUIPMENT/POWER, BASIC SMALL BUSINESS MANAGEMENT TRAINING, EQUIPMENT MAINTENANCE/REPAIR CAPABILITY AND OTHER SUPPORT RESOURCES TO INCREASE PER FARM PRODUCTIVITY.
 PROJECT SUMMARY AID WILL FINANCE R&D AND DELIVERY OF A WIDE RANGE OF FARM TECHNOLOGIES/MGMT SERVICES/AGRICULTURAL CREDIT NECESSARY TO INCREASE FARM PRODUCTIVITY/INCOME THROUGH MORE EFFICIENT USE OF LAND/LABOR & CAPITAL/TECHNICAL ASSISTANCE. DETAILED FARM INVESTMENT PLANS SEEKING AGR INVESTMENT CAPITAL DESCRIBE REQUIRED TECHNOLOG BASED ON DIFFERING ECOLOGICAL, SOCIAL, AGRONOMIC & ORGANIZATIONAL CONDITIONS OF NEWLY FORMED FARM UNITS OF COOPERATING LANDLESS LABORERS/SUBSISTENCE FARMERS. HONDURANS CONDUCT RLD TO IDENTIFY/ACQUIRE/ADAPT FARM MACHINERY/EQUIPMENT MOST FAVORABLE TO HONDURAS. PRACTICAL TNG FOR KEY PUBLIC/PRIVATE PERSONNEL TO IMPROVE FARM SYSTEM MGMT/PLANNING/EVALUATION/EXTENSION & REPAIR/MAINTENANCE OF FARM EQUIPMENT.
 PROJECT GOAL INCREASE INCOME OF HONDURAS' RURAL POOR.
 PROJECT PURPOSE INCREASE SMALL FARMER PRODUCTIVITY BY IMPROVING ACCESS TO CHOICES OF TECHNOLOGY SUITABLE TO ENVIRONMENT AND CAPABILITIES; MAKE AVAILABLE LABOR AND LAND-COMPLEMENTING POWER AND EQUIPMENT FOR SMALL FARMER USE.
 PROJECT OUTPUTS 1.FARM SYSTEMS PLANNING/EVAL CAPABILITY 2.FUNCTIONING CAPITAL INVESTMENT/INVESTMENT CREDITS/FUNDS FINANCING SMALL FARM DEVEL NEEDS 3.RURAL TECHNOLOGY R&D IN TRACTION, WATER MGMT, STORAGE, TRANSP, PACKAGING 4.SMALL FARMER TIME/ENERGY/RESOURCES UTILIZTN SURVEYS 5.NATL/INTL LINKAGES TO TRANSFER RURAL TECHS TO FARMERS/LOCAL GROUPS 6.SMALL FARMER/SAMLL-SCALE CRAFTSMEN-BUSINESSMEN TNG MGMT/ON-FARM PRACTICES, EXTENSION, COOPS, EQUIPMENT OPERATN/REPAIR 7.FARM POWER, EQUIP, MACHINERY
 PROJECT INPUTS 1.U.S.AID: A.LOAN FOR TECHNICAL ASSISTANCE-\$600000, COMMODITIES-\$5000000, OTHER COSTS-\$4000000 B.GRANT FOR OTHER COSTS-\$500000 FOR \$7000000 TOTAL. 2.GOH: COMMODITIES-\$2500000. PROJECT TOTAL \$9500000. (4)

PROJECT NUMBER 522013700
 OLD PROJECT NUMBER 52200000137
 PROJECT TITLE RURAL TRAILS
 PROBLEM STATEMENT ONE OF THE PRINCIPAL CONSTRAINTS TO AGR DEVELOPMENT IN HONDURAS IS THE ISOLATION OF THE VILLAGES FROM LOCAL MARKET TOWNS. BECAUSE RURAL FARMERS HAVE TO DEPEND ON ERODED, OFTEN IMPASSABLE FOOT TRAILS, EXPENSIVE TO TRAVERSE VIA HEADLOAD OR MULE, RURAL FARMERS ARE HINDERED FROM MARKETING THEIR CROPS, DO NOT RECEIVE SUFFICIENT RETURN FROM CROPS, AND ALSO ARE FAILING TO RECEIVE PUBLIC SERVICES (HEALTH AND EDUCATION) TO PROVIDE SATISFACTORY LIVING CONDITIONS.
 PROJECT STRATEGY 1-YEAR PROJECT CONSISTS OF GRANT AND TECHNICAL ASSISTANCE (TA) TO TEST THE FEASIBILITY OF USING LOW-COST, COMMUNITY-MAINTAINED JEEP TRAILS FOR IMPROVED ACCESS TO RURAL COMMUNITIES IN HONDURAS. AID PROVIDES ENGINEERING SERVICE, TA FOR EVALUATION-SELECTION PROCEDURE, COMMODITIES, MATERIALS, OFFICE SPACE, SUPPLIES, ADMINISTRATIVE COSTS. PL 480 FUNDS ADMINISTERED BY CARE. GOH PROVIDES 25% OF COSTS OF BUDGET.
 PROJECT SUMMARY GRANT AND TECHNICAL ASSISTANCE (TA) PROVIDED TO THE GOVT OF HONDURAS (GOH) FOR A PILOT PROJECT TO TEST THE FEASIBILITY OF CONSTRUCTING LOW-COST, LABOR-INTENSIVE JEEP TRAILS, TO BE MAINTAINED BY THE COMMUNITY, IN ORDER TO IMPROVE ACCESS TO AND FROM ISOLATED, RURAL COMMUNITIES. DATA FROM THE PROJ WILL BE USED TO GUIDE GOH AND AID ON DESIGNS FOR FUTURE ROAD BUILDING PROGRAMS. IMPROVED TRAILS ARE ENVISIONED AS A WAY TO FACILITAE AGR MARKETING BY VILLAGERS AND TO EXTEND GOH COMMUNITY SERVICES TO VILLAGERS. PROJECT ACTIVITIES INCLUDE: 1) UPGRADEING 165 KM OF FOOT AND MULE PATHS TO JEEP TRAILS USING LABOR-INTENSIVE, ALL-WEATHER CONSTRUCTION TECHNIQUES 2) DEVELOPING A SYSTEM FOR COMMUNITY MAINTENANCE OF TRAILS USING VOLUNTEER COMMUNITY BETTERMENT COMMITTEES AND/OR MUNICIPAL GOVTS-WHICHEVER IS RECOMMENDED BY THE SUPERVISORY ENGINEER 3) COMPLETING 2-3 CASE STUDIES TO EVALUATE THE SHORT-RUN IMPACT OF THE CONSTRUCTED TRAILS SUCH AS CHANGES IN TRANSP METHODS, COSTS AND USE AND AVAILABILITY OF PUBLIC SERVICES. PROJ WILL BE DEEMED SUCCESSFUL IF: 1) TRAILS ARE POSSABLE YEAR ROUND BY 4-WHEEL DRIVE VEHICLES. 2) TRAILS ARE MAINTAINED BY THE COMMUNITY. 3) TRANSPORTATION COSTS OVER TRAILS ARE REDUCED BY AN AVERAGE OF \$1.80 PER TON PER KILOMETER. 4) DESIGNS OF TRAILS/BRIDGES ARE REFINED/ADOPTED BY THE GOH FOR USE IN ITS LABOR-INTENSIVE ROAD CONSTRUCTION PROGRAM. 5) PERSONNEL IN GOH AND COMMUNITIES BECOME ACCOMPLISHED IN APPROPRIATE ASPECTS OF TRAIL DESIGN, CONSTRUCTION AND MAINTENANCE. BENEFICIARIES WILL BE THE SMALL-SCALE, SEMI-SUBSISTENCE, MARKET-ORIENTED, RURAL AGRICULTURISTS. PROJECT WILL BE IMPLEMENTED BY THE DEPT OF LABOR INTENSIVE ROADS OF THE DIRECTORATE OF HIGHWAYS, MINISTRY OF COMMUNICATIONS, PUBLIC WORK AND TRANSPORTATION. GOH WILL PROVIDE A FULL-TIME SUPR ENGINEER, AN INSPECTOR/PROMOTER ON TECHNICIANS, ADMIN COSTS, SPACE SUPPLIES, SOCIAL SECURITY. OTHER DONORS INCLUDE CARE, WORLD FOOD PROGRAM.
 PROJECT GOAL IMPROVE THE QUALITY OF LIFE OF RURAL PEOPLE LIVING IN ISOLATED MOUNTAINOUS AREAS OF HONDURAS.
 PROJECT PURPOSE TO TEST THE FEASIBILITY OF IMPROVING ACCESS TO AND FROM ISOLATED RURAL COMMUNITIES IN HONDURAS AT LOW COST BY CONSTRUCTING EASILY-MAINTAINED JEEP TRAILS.
 PROJECT OUTPUTS 1. APPROXIMATELY 165 KM OF FOOT AND MULE PATHS UPGRADED TO NEARLY ALL WEATHER, JEEP TRAILS. 2. A SYSTEM OF MAINTENANCE FOR THE TRAILS. 3. CASE STUDIES. 4. REFINED DESIGNS FOR TRAILS, DRAINAGE AND BRIDGES. 5. TRAIL SELECTION PROCEDURE. 6. PERSONNEL TRAINED IN TRAIL DESIGN AND CONSTRUCTION.
 PROJECT INPUTS US FUNDS: ENGINEERING SERVICE: TECHNICAL ASSISTANCE FOR EVALUATION SELECTION PROCEDURE: COMMODITIES-HAND TOOLS: MATERIALS, LABOR: OFFICE SPACE, SUPPLIES AND OTHER ADMINISTRATIVE COSTS. AID'S TOTAL IS \$400000 GRANT FINANCING PLUS \$36000 IN PL 480, TITLE II COMMODITIES PROVIDED THROUGH CARE. WORLD FOOD PROGRAM--\$100000. IN DONATED FOOD COMMODITIES. GOH: \$122000. COMMUNITIES--ABOUT \$48000. ESTIMATED TOTAL COST--\$714000. OTHER

1.2 Irrigation Projects

Following is the present status of the principal water projects in the study or development stage (all from source 1):

Comayagua - The IBRD has taken the position that the tenancy problems must be resolved, an acceptable law and regulations governing the use of water must be adopted and implemented, and an organization capable of managing the project must be established and adequately staffed, before it will be willing to finance any expansion. The Federal Republic of Germany and the CADEI have been approached for financing but it is unlikely that significant assistance will be given until the basic problems are solved.

Choluteca - Tests of sub-surface water indicate that there is a serious problem of salt water intrusion. The most recent study of the area by JICA (the Japanese International Cooperation Agency) proposes a multi-purpose hydroelectric, irrigation and flood control project for the Choluteca River basin that could cost several hundred million dollars.

There is a need for a major development of surface irrigation to support the additional 15,000 hectares of sugar cane required to supply a new mill now nearing completion. An attractive feature of the project is the fact that asentamientos have been organized to grow cane for the mill. This would be a good cash crop for hundreds of small farmers in the region. There has been no clear decision as to how the water resources of the valley will be best utilized; however, and it may be several years before the various studies are completed and the necessary decisions made.

Guayape - In the Guayape, CIDA is studying an irrigation system and the IBRD an integrated program of production and credit. Asentamientos have been established in the region that will profit from the proposed 10,000 has. project. This project has all the elements necessary to give it a high priority. It may be ready for implementation in 1978-1979.

Sula - A study of integrated development for the Sula Valley is being financed by BID. This flood-control/irrigation project should receive high priority. The GOH should make sure that the project includes studies of the Guaymas area where an estimated 50,000 hectares can be improved by adequate drainage.

Quimistán - A feasibility study for 3,000 has. is being completed but tenancy problems will make it difficult to get financing from international institutions. The Florida and La Entrada projects are still at the pre-feasibility stage and have a fairly low priority.

Bajo Aguán - The Bajo Aguán is receiving major assistance from BID. Some irrigation is included in the present program but it encompasses only a fraction of the irrigation potential of the valley.

1.2.1 Further information on IDB projects in Sula and Quimistam Valleys:

Technical Assistance to the Sula Valley (ATN/TF(SP)-1336-HO)

Donor Contribution: \$750,000. Dates: Dec., 1974 - Dec. 1978

Description: Assist the Ministry of Communications, Public Works and Transportation with feasibility plans and design studies for flood control and integrated development of the Sula Valley.

Inputs: Technical Assistance

Status: 60% disbursed. (1)

Technical Assistance for the Quimistán Valley (ATN/TF(SP)-1367-HO)

Donor Contribution: \$370,000. Dates: June, 1975 - March, 1978

Description: Completion of the feasibility studies and design for the Ministry of Natural Resources of a system to irrigate 3,080 hectares in the Quimistán Valley.

Inputs: Technical Assistance

Status: 65% disbursed. (1)

1.2.3 Central American Bank for Economic Integration

Agricultural Development Study - Talanga Valley

Donor Contribution: \$988,300

Description: To help the MNR determine the feasibility of increasing crop production in the valley by constructing a dam and canal system to irrigate 6,000 hectares.

Inputs: T.A.

Status: Terms of reference for study being prepared by GOH. (1)

Integrated Agricultural Development Study - Siria Valley

Donor Contribution: \$340,00

Description: Study to help the MNR determine the feasibility of increasing crop production in the valley by constructing a dam and canal system to irrigate 5,100 hectares.

Inputs: T.A.

Status: Terms of reference for study being prepared by GOH. (1)

Integrated Agricultural Development Study - Cuyamapa Valley

Donor Contribution: \$525,000

Description: Study to help MNR determine the feasibility of increasing crop production in the valley by irrigation of 9,900 hectares.

Inputs: T.A.

Status: Terms of reference for study being prepared by GOH. (1)

1.3 Forestry Development Projects

1.3.1 Interamerican Development Bank (IDB)

a) Olancho Forest Industry Development (Venezuelan Trust Fund \$25.0 mil-1977; IDB \$59.5 mil-1976): The 1976 IDB loan will help finance the first stage of the Olancho project consisting of some 156 miles of roads to connect the port of Castilla on the north coast with sawmills and a pulp and paper plant. The Venezuelan Trust Fund (VFF) loan will capitalize the Corporacion Forestal Industrial de Olancho (CORFINO). CORFINO is a \$500 million Honduran Forestry development enterprise to develop the vast forestry reserve of Olancho. (3)

b) Miscellaneous: Other projects include general T.A. to the MNR and COHDEFOR in natural resource administration and planning. (3)

c) Olancho Industrial Development Project - Stage II (16/UF-HO)

Donor Contribution: \$25 million. Dates: June, 1977 - July, 1980

Description: Assistance to the Honduran Forestry Development Corporation in financing the construction of the main sawmill through provision of financing of the capital stock for establishing the Financial Corporation of Olancho. Also includes feasibility studies, worker housing and training programs in logging operations and mill management.

Inputs: Technical Assistance
Training
Equity Financing

Status: Undisbursed (1)

d) Olancho Industrial Development Project - Stage III

Donor Contribution: \$15.0 million.

Description: To assist COHDEFOR with the design, construction, and construction supervision of the secondary roads planned for the development of the Olancho Forest Reserve.

Inputs: Technical Assistance
Commodities

Status: Undergoing study and project document preparation. (1)

1.3.2 U. S. Agency for International Development (U.S. AID)

PROJECT NUMBER 522005600
 OLD PROJECT NUMBER 52211170056
 PROJECT TITLE FOREST MANAGEMENT
 PROBLEM STATEMENT WITH 45% OF ITS TOTAL LAND AREA CONSISTING OF COMMERCIAL FOREST LAND, HONDURAS HAS A NATURAL RESOURCE CAPABLE OF SUPPORTING A DEVELOPING AND SUCCESSFUL WOOD-PRODUCTS INDUSTRY. PRESENTLY, HOWEVER, HONDURAS LACKS A SUFFICIENT NUMBER OF PERSONNEL WELL-TRAINED IN FORESTRY TO STAFF KEY POSITIONS IN SUCH AN INDUSTRY OR IN FORESTRY-RELATED GOVERNMENT AGENCIES. THIS PERSONNEL SHORTAGE, PLUS EXISTING DEVELOPMENT-RESTRICTIVE FOREST LAWS AND THE POOR ORGANIZATION OF THE GOVT FORESTRY AGENCIES IMPEDES THE GROWTH OF SUCH AN INDUSTRY.
 PROJECT STRATEGY NINE YEAR PROJECT CONSISTS OF A GRANT PROVIDING PARTICIPANT TRAINING AND TECHNICAL ADVISORY ASSISTANCE TO DEVELOP THE PREREQUISITE PERSONNEL AND GOVERNMENTAL PLANS AND POLICIES NEEDED FOR A PROGRESSIVE WOOD-PRODUCTS INDUSTRY.
 PROJECT SUMMARY GRANT TO THE GOVT OF HONDURAS DEVELOPS THE PERSONNEL RESOURCES AND ASSISTS IN THE PRELIMINARY PLANNING NECESSARY FOR THE IMPLEMENTATION OF A PROPOSED PULP AND PAPER (P & P) INDUSTRY DEVELOPMENT PROJECT IN THE OLANCHO FOREST RESERVE. SPECIFICALLY THE GRANT PROVIDES: #1) APPROX 10 PARTICIPANT TRAINING SCHOLARSHIPS/YR (BS-LEVEL) FOR FORESTRY TRNG AT A US UNIVERSITY. RECIPIENTS ARE INTENDED FOR VITAL POSITIONS IN THE GOH FORESTRY DEPARTMENT AND IN HONDURAS' PRIVATE WOOD PRODUCTS INDUSTRY. #2) A FORESTRY TECHNICIAN TO ADVISE THE GOH MINISTRY OF NATURAL RESOURCES (MNR), SUPERIOR ECONOMIC PLANNING COUNCIL (SEPC), PULP AND PAPER COMMITTEE, THE AID MISSION, AND OTHER ORGANIZATIONS ON THE ACTIVITIES OF THE PROPOSED P & P PROJECT (AID LOAN TO PROVIDE THE INFRASTRUCTURE FOR THE P & P INDUSTRY); ADVISE ON THE ESTABLISHMENT OF A NEW FORESTRY ADMINISTRATION; INFLUENCE & COORDINATE ACTIVITIES CONDUCTED BY OTHER INTERNATL TECH ASSISTANCE ORGANIZATIONS AND OTHER PROJS RELATED TO HONDURAN FORESTS; COORDINATE THE ABOVE PARTIC TRNG COMPONENT WITH THE MNR & SEPC; ASSIST IN PROMOTING A CADASTRAL SURVEY IN THE OLANCHO FOREST RESERVE; AND ASSIST WITH THE REVISING & MODERNIZING OF HONDURAS' FORESTRY LAWS. #PRO AG(12/16/69) INDICATES THAT FUNDING WILL ALSO BE USED TO ASSIST THE MNR PULP AND PAPER FORESTRY OFFICE WITH THE DESIGN OF AN OPERATIONS & MGMT TRAINING PROGRAM FOR ITS ADMIN PERSONNEL. #PROP REVISION(12/10/70) NOTES THAT THE PARTICULAR P & P INDUSTRY ANTICIPATED TO INVEST IN THE OLANCHO FOREST AREA HAS WITHDRAWN. AS A RESULT, PROJ HAS BEEN REDIRECTED TOWARDS HELPING THE GOH DESIGN A 10-YR, NATIONWIDE, INTEGRATED FOREST DEVEL ACTION PROGRAM. PARTIC TRNG WILL CONTINUE BUT AID WILL ADDITIONALLY FINANCE A PASA WITH THE US FOREST SERVICE FOR A TEAM OF FORESTRY EXPERTS TO STUDY PAST & PRESENT FOREST ACCOMPLISHMENTS IN HONDURAS AND THE NEEDS & REQUIREMENTS FOR ADEQUATE PROTECTION, ADMINISTRATION, AND COMMERCIAL USE OF ITS FOREST RESOURCES. USING THE RESULTS OF THIS STUDY, A TASK FORCE CONSISTING OF THIS ADVISORS AND, POSSIBLY, OTHERS FROM SUCH AGENCIES AS THE FAO, OAS, OR IDB WILL DEVELOP RECOMMENDATIONS (ACTION PLAN) BY WHICH THE 10-YR DEVEL PROGRAM CAN BE IMPLEMENTED.
 PROJECT GOAL THE WOOD-PRODUCT INDUSTRY DEVELOPS INTO THE MAJOR EXPORT INDUSTRY OF HONDURAS. I
 PROJECT PURPOSE VITAL POSITIONS IN THE GOH'S FORESTRY DEPARTMENT AND IN HONDURAS' PRIVATE WOOD INDUSTRY ARE STAFFED WITH PROFESSIONALLY-TRAINED, WELL-QUALIFIED PERSONNEL. I
 PROJECT OUTPUTS APPROXIMATELY 10 HONDURANS PER YEAR TRAINED IN FORESTRY AT THE BS LEVEL. I (4)
 PROJECT INPUTS

1.4 Power Projects

The El Cajon hydroelectric project has dominated recent donor activity. This \$500 million project on the Humuya River in the northwestern part of the country will assist the nation's power agency to meet demand through 1990 as well as sell surplus energy to Guatemala and Nicaragua. In 1978, the Inter-American Development Bank (IDB) approved loans totalling \$95 million (\$77 million from the Fund for Special Operations and \$18 million in complementary financing from inter-regional capital). In 1979, the Central American Bank for Economic Integration (CABEI) approved a loan of \$30.6 million for the El Cajon project and in 1980 it is anticipated the World Bank will approve a loan of \$125 million (of which \$20 million is IDA funded) for the project. Lastly, the Canadian government has initiated discussion with the GOH regarding their possible participation in the El Cajon project. This assistance, if approved, will likely be in the neighborhood of \$35-40 million. The timing is yet to be determined.

(2)

2.0 Environmental Improvement Projects

2.1 Information Gathering Projects (U.S. AID only)

PROJECT NUMBER	522000007
OLD PROJECT NUMBER	52211999000
PROJECT TITLE	TECH SUPPORT-STATISTICAL DEVELOPMENT
PROBLEM STATEMENT	HONDURAN GOVERNMENT LACKS ACCURATE DEMOGRAPHIC AND CENSUS-RELATED DATA. THIS LACK OF DATA NECESSARILY HAS AN IMPACT ON THE GOVERNMENT'S ABILITY TO PROVIDE ADEQUATE URBAN AND RURAL DEVELOPMENT PLANS AND TO ENSURE EFFECTIVE DELIVERY OF SOCIAL SERVICES.
PROJECT STRATEGY	PROVIDE SPECIALIZED ASSISTANCE TO GOVERNMENT OF HONDURAS IN PRE-CENSAL PLANNING AND CARTOGRAPHY, AND DESIGN AND PROGRAMMING OF A NATIONAL MANAGEMENT INFORMATION SYSTEM.
PROJECT SUMMARY	AID PROVIDES SERVICES OF CENSUS GENERALIST, DEMOGRAPHIC GEOGRAPHER, AND CENSUS PROGRAMMER IN DEVELOPING AN INTEGRATED NATIONAL MANAGEMENT INFORMATION SYSTEM. SYSTEM WILL BE BASED ON THE RESULTS OF NATIONAL CENSUSES, AND EMPHASIS WILL BE PLACED ON MEDIUM AND LONG TERM DEMOGRAPHIC APPLICATIONS. A CONTINUOUS STATISTICS MAINTENANCE CAPABILITY WILL BE INCLUDED IN SYSTEM DESIGN.
PROJECT GOAL	GOVERNMENT OF HONDURAS DEVELOPS INTEGRATED NATIONAL MANAGEMENT INFORMATION SYSTEM BY FY 1978. I
PROJECT PURPOSE	ESTABLISHMENT OF ACCURATE NATIONWIDE DEMOGRAPHIC/CENSAL DATA BASE. I
PROJECT OUTPUTS	1. PRE-CENSUS PLANNING AND CARTOGRAPHY COMPLETED. 2. DESIGN AND PROGRAMMING OF NATIONAL MANAGEMENT INFORMATION SYSTEM COMPLETED. I
PROJECT INPUTS	

(4)

Information Gathering Projects (continued)

PROJECT NUMBER 522003909
 OLD PROJECT NUMBER 522117900399
 PROJECT TITLE NATIONAL DATA SYSTEMS
 PROBLEM STATEMENT *DATA SYSTEM USED BY GOVT OF HONDURAS IS POORLY DESIGNED AND UTILIZED. COORDINATION AMONG THE MINISTRIES AND AGENCIES PRODUCING AND USING DATA IS NON-EXISTENT. STATISTICS CURRENTLY GENERATED ARE DERIVED USING SUCH UNRELIABLE DATA COLLECTION AND UPDATING PROCEDURES THAT THERE IS SUBSTANTIAL DOUBT AS TO THEIR VALIDITY. THE LACK OF A SOUND INFORMATION BASE FOR GOH MANAGEMENT DECISIONS HAS RESULTED IN MISALLOCATION OF RESOURCES AND INEFFICIENT ADMINISTRATION OF VITAL ECONOMIC AND SOCIAL PROGRAMS.
 PROJECT STRATEGY *FIVE-YEAR PROJECT CONSISTS OF TECHNICAL ADVISORY ASSISTANCE AND COMMODITIES TO IMPLEMENT GOH NATIONAL DATA SYSTEM. HOST-COUNTRY PROVIDES INSTITUTIONAL SUPPORT AND LONG-TERM MAINTENANCE. OTHER DONORS INCLUDE UN, OAS, CELADE, CABEL (CENTRAL AMER BANK FOR ECONOMIC INTEGRATION) ILPES, AND ODECA.
 PROJECT SUMMARY *GRANT, TECH ADVISORY ASSISTANCE TO HONDURAS TO BEGIN IMPLEMENTATION OF NATL DATA SYSTEM. SYSTEM WILL BE BASED UPON THE PIEB PLAN- INTER-AMER STATISTICAL INSTITUTE'S OUTLINE FOR DEVELOPMENT OF STATISTICAL DATA IN DEVELOPING COUNTRIES. PLAN IS MODULAR-WITH ACTIVITIES GROUPED ACCORDING TO FOLLOWING SECTORS: 1.POPULATION & DEMOGRAPHY, 2.HOUSING & COMMUNITY DEVELOPMENT, 3.AGRICULTURE & LIVESTOCK, 4.ECONOMIC FACTORS- INDUSTRIAL TRADE SERVICES & TRANSPORTATION ACTIVITIES, 5.SOCIAL FACTORS- HEALTH, EDUCATION, MANPOWER, EMPLOYMENT, SOCIAL SECURITY, CIVIL SERVICE & RETIREMENT, AND 6.FINANCIAL MGMT. THIS PROJ WILL IMPLEMENT DEMOGRAPHIC MODULE BY PREPARING FOR 1973 POPULATION & HOUSING CENSUS AND PROVIDING DEMOGRAPHIC DATA BASE FOR NATL DATA SYST. PROJ WILL BUILD UPON SKILLS & EQUIPMENT CURRENTLY AVAILABLE WITHIN GOH. *PRE-CENSUS ACTIVITIES WILL INCLUDE PREPARATION OF MAPS FOR CENSUS-TAKING AND DEVELOPING SECTORALIZATION & CODING SYST THAT WILL PERMIT MAPS TO BE USED FOR REMAINING CENSUSES- AGRICULTURE, INDUSTRY, COMMERCE, SERVICES & TRANSPORTATION. SAMPLE SURVEYS ARE PLNND WITHIN THE SAME GEOGRAPHIC AREAS TO COMPLETE DATA BASE AND KEEP IT CURRENT. DEMOGRAPHIC STATISTICS WILL INCLUDE REGISTRATION & FOLLOW-UP SYST FOR WOMEN PARTICIPATING IN FAMILY PLNNG PROGRAMS. ALSO 1970 OAS STUDIES OF GOH DATA NEEDS WILL BE REVISED & INTEGRATED INTO PIEB PLNNG PROCESS. *US ADVISORS WILL INCLUDE STATISTICAL ADVISOR, STATISTICAL GEOGRAPHER, SYSTS ANALYST, PROGRAMMER & A PUBLICATIONS ADVISOR AS WELL AS SHORT-TERM TECHNICIANS. GOH TECH CAPABILITY WILL BE UPGRADED WITHIN DIRECTORATE GENERAL OF STATISTICS & CENSUS (DGEC). STATISTICAL CARTOGRAPHY SECTION CONSISTING OF 1 OFFICE & 9 FIELD TEAMS WILL BE ESTABLISHED. 120 SUPERVISOR/TRAINERS & 1000 CENSUS-TAKERS WILL BE TRAINED. SYSTS ANALYSIS, PROGRAMMING & PUBLICATIONS SECTIONS WILL ALSO BE ADDED. LIMITED NUMBER OF DATA PERSONNEL WILL BE PROVIDED TO OTHER GOH AGENCIES. *HOST-COUNTRY PROVIDES ADMIN SUPPORT. PRIMARY BENEFICIARIES ARE GOH PERSONNEL. *TECH ASSIST FROM OAD, CELADE, CABEL, ILPES AND ODECA WILL BE PROVIDED. LOAN IS EXPECTED FROM CABEL, BID OR AID TO COMPLETE PIEB. UN WILL PROVIDE DONATION TO 1973 CENSUS.
 PROJECT GOAL TO IMPROVE GOH MANAGEMENT OF DEVELOPMENT PROJECTS.
 PROJECT PURPOSE *PREPARATION, DEVELOPMENT, AND INSTITUTIONALIZATION OF MODULAR BASED NATIONAL DATA SYSTEMS.
 PROJECT OUTPUTS 1.PREPARATION WORK FOR DATA COLLECTION SYSTEM: A.CARTOGRAPHIC SECTION AND CARTOGRAPHIC TEAMS. B.CARTOGRAPHIC WORK FOR ENUMERATION ACTIVITIES. C.SUPERVISOR/TRAINERS & ENUMERATORS. D.ADMINISTRATIVE PREPARATIONS. E.REVITALIZED NATNL STATISTICS COUNCIL. 2.PREPARATION WORK FOR CONTROL, EDITING & CODING CENSAL & SURVEY RETURNS. 3.PREPARATION WORK FOR DATA PROCESSING & PUBLICATION. 4.COMPUTER PROGRAMMING & PROCESSING WORKLOADS. 5.DEMOGRAPHIC DATA. 6.MAINTENANCE PLAN FOR DEMOGRAPHIC STATISTICS. 7.SYSTM DESIGN FOR EACH OF THE PIEB (BASIC STATISTICAL PLAN FOR DEVELOPING COUNTRIES) PHASES. 8.CREATION AND MAINTENANCE OF DATA BASE. 9.NATIONAL DATA BANK.
 PROJECT INPUTS 1.US TECHNICIANS: A.PRINCIPAL STATISTICAL ADVISOR (AND/OR SAMPLING ADVISOR) B.STATISTICAL GEOGRAPHER. C.SYSTS ANALYST. D.PROGRAMMER. E.PUBLICATIONS ADVISOR. F.SHORT-TERM TECHNICIANS. 2.COMMODITIES: A.VEHICLES. B.EQUIPMENT. C.SUPPLIES. D.SPARE PARTS. 3.OTHER COSTS: A.LOCAL SALARIES. B.PER DIEM. C.TRAINING. (4)

2.2 Watershed, Forestry, and other Land Management Projects.

2.2.1 United Nations

a) Forestry Classification and Production and Development of Primary Industry (UN \$1.2 mil/GOH 6.1 mil): This integrated project with COHDEFOR has both intermediate and long term objectives which include: forestry classification, rural development, conservation, development of forest industries and natural resource and forestry training. (3)

b) Watershed Classification and Planning (UN \$.7 mil/GOH .7 mil): Components include: The development of watershed management plans the Yojoa and Rio Aguan areas and the strengthening and expansion of COHDEFOR technical capabilities through training and the sponsorship of special studies. (3)

c) Agricultural Extension Training (U.N. \$.6 mil/GOH \$.4 mil): This project focuses upon improved agricultural production, increased local income and improvement in the standard of living of the affected population. Immediate goals are to establish a well-organized agricultural extension service and to train agricultural extension agents and campesino promoters. (3)

d) Watershed Management (UN \$.7 mil/GOH .7 mil): Objective is to promote more rational land use in areas having an essentially forestry vocation. Project components include: the strengthening of the planning and management capacity of the watershed management unit of COHDEFOR; the initiation of integrated watershed management activities in the Yojoa Lake area; and the training of personnel. This is a follow-on to an earlier project entitled: "Planning and Execution of Measures for the Rehabilitation of the Watersheds Affected by Hurricane Fifi". (3)

e) Regional Forestry Training (UN \$.3 mil/GOH \$.3 mil): This regional project (Dominican Republic, Panama and Honduras) provides training to the National School of Forestry Sciences (ESNACIFOR) personnel in silviculture, forest and watershed classification and conservation. (3)

f) Watershed Management Project (UNEP)

(HON/77/006)

Donor Contribution: \$674,343. Dates: April 1, 1978 - 33 months

Description: Assist COHDEFOR in activities related to watershed preservation, concentrating on the watersheds of Sierra Omoa and Santa Ana and subsequently of the Aguán, the El Cajón Dam, and Lake Yojoa. T.A. are in reforestation.

Inputs: Technical Assistance
Overseas Scholarships
Equipment
Administrative support

Status: Previous assistance (HON/75/109) was completed Nov. 30, 1977.
(3)

2.2.2 Canadian International Development Agency (CIDA).

- a) Forest Inventory (CIDA \$2.0 mil/GOH \$.8 mil): To assist COHDEFOR in obtaining data necessary for the classification of the forest cover in the departments of Comayagua, Yoro and Francisco Morazan and the development of plans for the rational use of the forest resources in the Meseta Central region. (3)
- b) Institutional Support to COHDEFOR (CIDA \$2.9 mil loan/GOH \$.6 mil): To provide institutional assistance particularly in the areas of evaluation and coordination. Assistance includes T.A. and training. (3)
- c) Integrated Development in the Valley of Guayape (CIDA \$6.1 mil/GOH \$.2 mil) a broad range program to increase agriculture production. Includes conservation, improved water management and improved agricultural inputs. (3)
- d) Forest Protection and Conservation (CIDA \$1.2 mil/GOH \$.3 mil): Project will: improve COHDEFOR's firefighting methods, train fire fighting personnel and will educate the rural populace in the importance of forestry protection. Project is principally directed to the development of an adequate forestry protection system for the Department of Olancho. (3)

2.2.3 U.S. Agency for International Development (U.S. AID). Proposed Natural Resources Management Project, No. 522-0168.

a. Natural Resources Policy, Planning and Data Collection (\$5.6 million)

Natural resource policy and planning, as well as the hydrological, climatological and other natural resources data collection and analysis capacity of the Government will be improved and strengthened through the provision of training, technical assistance, equipment, and other support. The activities in this area are designed to build a basis for comprehensive and multiple purpose resource planning to take place. At the end of the Project a natural resources policy structure will be formalized, policies on land and water use will be promulgated, over one-half of the national lands will be classified on the basis of their potential use and the natural resources data agencies will have doubled both their capacity and their data base.

b. Watershed Management (\$15.2 million)

Environmentally damaging hillside farming patterns in five sub-watershed areas of the Choluteca River Basin watershed area will be halted or substantially reversed through the introduction of conservation practices, improved water management techniques, permanent and semi-permanent crops, changed cropping systems and patterns, and the reforestation of denuded and eroded areas. This effort will be directed to improving the income of the small hillside farmer within a framework of improved environmental practices. (3)

2.2.4 United Kingdom

- a) National School of Forestry Sciences/ESNACIFOR (Total financing not known): Technical assistance in collection of seeds, prevention of forest fires, and reforestation. Four experts are financed.
- b) Seed Bank at National School of Forestry Sciences (ESNACIFOR) - (Total financing not known): The establishment of a center for the collection and treatment of seeds - pine, etc.
- c) Miscellaneous: Includes soil studies in Talanga Valley, technical assistance to the MNR in Horticulture), etc. (3)

2.2.5 Others

Other bilateral and multilateral donors active in natural resource management related areas include:

- a) European Common Market (EEC \$3.2 mil loan/GOH \$6.0 mil): Assists the MNR in such diverse activities as agriculture education, production and sale of seeds and management and conservation of soils. Loan was signed in 1971 but program is continuing.
- b) Japan: The provision of volunteers who are assisting with reforestation efforts - particularly in Mosquitia.
- c) Organization of American States: Technical assistance to CONSUPLANE in agriculture and natural resource planning.
- d) World Meteorological Organization: Provision of meteorological equipment.
- e) Miscellaneous: France, Spain, Republic of Germany and Finland.

Project . other donors under consideration or in implementation include: a forestry inventory of the districts of El Paraiso and Olancho (Japan); a Forest Development Program which includes the rehabilitation of forest cover and the establishment or related wood industries in the zone of Comayagua (Spain); and technical assistance and training assistance to CONDEFOR and ESNACIFOR (Finland and Germany). (3)

Health Projects

PROJECT NUMBER 522016600
 OLD PROJECT NUMBER 52200000166
 PROJECT TITLE RURAL WATER AND SANITATION
 PROBLEM STATEMENT MUCH OF THE MORBIDITY AND MORTALITY IN HONDURAS IS CAUSED BY PARASITIC AND GASTROENTERIC INFECTIONS WHICH ARE WATER AND FECES-BORNE. ADEQUATE WATER AND SANITATION FACILITIES AND THE PERSONAL HYGIENE WHICH THEY MAKE POSSIBLE APPEAR ABLE TO ALLEVIATE THESE DISEASES. HOWEVER, LESS THAN ONE-THIRD OF THE RURAL POPULATION HAS REASONABLE ACCESS TO SAFE DRINKING WATER AND LESS THAN 1 IN 5 HAVE ACCESS TO BASIC WASTE DISPOSAL FACILITIES. AS A RESULT, THE MORBIDITY AND MORTALITY RATES ARE HIGHER IN RURAL AREAS.

PROJECT STRATEGY THREE-YEAR PROJECT CONSISTS OF A GRANT FOR TECHNICAL ASSISTANCE AND TRAINING AND A LOAN FOR CONSTRUCTION AND MAINTENANCE TO THE GOVERNMENT OF HONDURAS (GOH) TO ASSIST IN EXPANDING ACCESS TO SAFE WATER SUPPLIES AND HUMAN WASTE DISPOSAL SYSTEMS IN RURAL AREAS AND PROMOTING THEIR USE. THE GOH WILL FUND HALF THE CONSTRUCTION COSTS AND PROVIDE OTHER SUPPORT. LOCAL COMMUNITIES WILL PROVIDE UNSKILLED LABOR AND LOCAL MATERIALS. PEACE CORPS VOLUNTEERS WILL ALSO PROVIDE ASSISTANCE.

PROJECT SUMMARY A LOAN AND GRANT WILL BE PROVIDED TO THE GOVERNMENT OF HONDURAS (GOH) TO EXPAND ACCESS TO SAFE WATER SUPPLIES AND HUMAN WASTE DISPOSAL SYSTEMS IN RURAL AREAS AND TO PROMOTE THEIR USE. GRANT WILL FINANCE TECHNICAL ASSISTANCE AND SOME TRAINING. LOAN WILL HELP FINANCE ALL COSTS. GOH WILL FUND HALF OF THE CONSTRUCTION & PROVIDE OTHER SUPPORT. GRAVITY-FLOW AQUEDUCTS WILL BE CONSTRUCTED WHERE FEASIBLE. ELSEWHERE, HAND-DUG WELLS WITH HAND PUMPS WILL BE PROVIDED. ALSO, 25 WINDMILLS WILL BE INSTALLED ON AN EXPERIMENTAL BASIS. LABORATORY EQUIPMENT TO TEST WATER QUALITY WILL ALSO BE FINANCED. THE PRIME WASTE DISPOSAL SYSTEM WILL BE THE SINGLE FAMILY LATRINE. IN LARGER COMMUNITIES SEPTIC TANKS OR OTHER SYSTEMS MAY BE REQUIRED. WELLS AND LATRINES WILL BE CONSTRUCTED AND MAINTAINED BY THE BASIC SANITATION PROGRAM (PROSABA) OF THE MINISTRY OF HEALTH. OTHER DISPOSAL SYSTEMS AND AQUEDUCTS WILL BE CONSTRUCTED AND MAINTAINED BY THE NATIONAL AUTONOMOUS WATER AND SEWER AGENCY (SANAA). PROSABA PROMOTERS, SANAA TECHNICIANS, AND LOCAL VILLAGE HEALTH REPRESENTATIVES WILL INSTRUCT VILLAGE RESIDENTS IN THE USE OF WATER AND WASTE SYSTEMS AND IN THE BENEFICIAL CONSEQUENCES OF USE FOR HEALTH. PROMOTION WILL BE REINFORCED BY RADIO BROADCASTS AND VILLAGE-LEVEL MONITORING. INSTRUCTION AND TRAINING WILL ALSO BE PROVIDED IN CONSTRUCTION AND MAINTENANCE. SANAA AND PROSABA PERSONNEL WILL THEMSELVES RECEIVE TRAINING AND ASSISTANCE IN HYGIENE, PROMOTION AND TRAINING, WATER AND WASTE TECHNOLOGY, AND ADMINISTRATION. THE OFFICE OF HEALTH EDUCATION (OHE) WILL DIRECT SUCH TRAINING AS WELL AS MEDIA ACTIVITIES. SIX PERSONNEL WILL RECEIVE LONG-TERM TRAINING IN SANITARY ENGINEERING. A NATIONAL PROJECT COMMITTEE INCLUDING REPRESENTATIVES OF SANAA, PROSABA, AND OHE WILL BE FORMED TO PLAN AND COORDINATE PROJECT ACTIVITIES. IN ADDITION TO EDUCATION AND PROMOTION, VILLAGE RESIDENTS WILL BE INVOLVED IN SELECTION AND PLANNING OF WATER AND WASTE SYSTEMS, WILL HELP FINANCE AND MAINTAIN THE SYSTEMS, AND WILL PROVIDE LOCAL MATERIALS AND UNSKILLED LABOR NEEDED FOR CONSTRUCTION. PEACE CORPS VOLUNTEERS WILL ASSIST IN COMMUNITY MOTIVATION AND SYSTEM INSTALLATION.

PROJECT GOAL QUALITY OF LIFE AND ESPECIALLY THE HEALTH STATUS OF POOR RURAL HONDURANS IMPROVED.

PROJECT PURPOSE ACCESS TO, AND USE OF, SAFE WATER SYSTEMS AND HUMAN WASTE DISPOSAL SYSTEM IN RURAL HONDURAS EXPANDED.

PROJECT OUTPUTS 1. 255 AQUEDUCTS, 3,000 WELLS, 32,000 LATRINES, 25 SEWER SYSTEMS CONSTRUCTED; 2. 800 HAND PUMPS REPAIRED; 3. 9 SANITARY ENGINEERS TRAINED; 4. 100 PROMOTERS AND TECHNICIANS AND 3,000 VILLAGERS TRAINED IN MAINTENANCE; 5. 16 OBSERVATIONAL VISITS MADE; 6. CONTINUING HEALTH/HYGIENE NON-FORMAL EDUCATION SYSTEM FOR 247,000 PEOPLE DEVELOPED.

PROJECT INPUTS 1. AID: CONSTRUCTION MATERIALS, EQUIPMENT, TECHNICAL ASSISTANCE, TRAINING, BUDGET SUPPORT (\$10.5 MILLION); 2. GOH: PERSONNEL COSTS, OPERATIONAL EXPENSES, SUPPLIES (\$3,778 MILLION), COMMUNITY LABOR (\$3.917 MILLION).

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Health Projects (continued)

PROJECT NUMBER 522006500
 OLD PROJECT NUMBER 52211580065
 PROJECT TITLE MATERNAL CHILD HEALTH
 PROBLEM STATEMENT #HIGH RATE OF POPULATION GROWTH IN HONDURAS-ESTIMATED TO BE BETWEEN 3.4% AND 3.8%-THREATENS TO OUTSTRIP RATE OF ECONOMIC GROWTH. REAL GNP GROWTH IN 1967 WAS 3.8%. GOVT HAS GIVEN LOW PRIORITY TO PUBLIC HEALTH AND CORRESPONDING FAMILY PLNGG SERVICES. HONDURANS IN GENERAL ARE APATHETIC TOWARD FAMILY PLNGG. LOW POPULATION DENSITY IS FACTOR IN GENERAL APATHY & MAKES FOR HIGH PER CAPITA COST OF FAMILY PLNGG SERVICES FOR LARGELY RURAL POP. AS A RESULT, UNCHECKED FERTILITY IS THE RULE WITH INFANT MORTALITY RATES HIGH & MALNUTRITION WIDESPREAD

PROJECT STRATEGY #FOUR-YEAR PROJECT CONSISTS OF GRANT, TECHNICAL ADVISORY ASSISTANCE, PARTICIPANT AND IN-COUNTRY TRNG TO PROVIDE FAMILY PLNGG & MOTHER CHILD HEALTH SERVICES ON NATIONWIDE BASIS. USAID ALSO PROVIDES EQUIPMENT, VEHICLES, PHARMACEUTICALS AND EDUCATIONAL MATERIALS. HOST-COUNTRY INPUTS INCLUDE PERSONNEL AND LONG-TERM MAINTENANCE. OTHER DONORS INCLUDE HONDURAN FAMILY PLNGG ASSOCIATION (IPPF GRANT) AND POPULATION COUNCIL.

PROJECT SUMMARY #HONDURAS IS PROVIDED WITH GRANT, TECHNICAL ADVISORY ASSISTANCE AND COMMODITIES TO PROVIDE FAMILY PLANNING/MATEKNAL CHILD PUBLIC HEALTH SERVICES ON NATION-WIDE BASIS. PROJECT PROPOSES TO ESTABLISH 28 FIXED AND MOBILE CLINICS, PROVIDING FAMILY PLANNING SERVICES TO 32,000 WOMEN BY 1970. ADMINISTRATIVE AND TECHNICAL SUPPORT WILL BE PROVIDED BY MATERNAL/CHILD HEALTH (MCH) SECTION TO BE ESTABLISHED WITHIN MINISTRY OF PUBLIC HEALTH. #MATERNAL SERVICES WILL CONSIST OF PRE-NATAL, POST-NATAL CARE AND FAMILY PLANNING ASSISTANCE. CHILD SERVICES WILL BE LIMITED TO THOSE BELOW AGE 5 AND WILL INCLUDE NUTRITION EVALAUTIONS. UNDERNOURISHED CHILDREN WILL BE REFERRED TOFEEDING CENTERS WHEN AVAILABLE OR MOTHERS WILL BE PROVIDED WITH SUPPLEMENTARY FOODS (FURNISHED BY VOLUNTARY AGENCIES). #HEALTH EDUCATION WILL BE COORDINATED WITH MEDICAL SERVICES. INITIALLY 2 HEALTH EDUCATION SUPERVISORS AND 1 NUTRITIONIST WILL BE ASSIGNED TO MCH SECTION AND 7 EDUCATORS TO HEALTH ZONES. FIELD PERSONNEL WILL RECEIVE COURSE IN HEALTH EDUCATION EMPHASIZING CHILD CARE, COMMUNICATIONS TECHNIQUES AND USE OF EDUCATIONAL MATERIALS. #AID CONTRACTED WITH CORNELL UNIVERSITY FOR RESEARCH IN SLUM AREA OF TEGUICALPA TO DETERMINE ATTITUDES TOWARD FAMILY PLANNING. FINAL REPORT WILL INCLUDE RECOMMENDATIONS TO IMPROVE CURRENT PROJECT. #PARTICIPANT TRAINING WILL COMPRISE SMALL PORTION OF PROJECT. MINISTRY OF HEALTH WILL FINANCE BRIEF TOURS IN NEARBY COUNTRIES. AID WILL ALSO FUND EQUIPMENT, PHARMACEUTICALS AND EDUCATIONAL MATERIALS. CONTRACEPTIVES WILL BE SUPPLIED,INITIALLY,BY HONDURAN FAMILY PLANNING ASSOCIATION (IPPF GRANT) AND POPULATION COUNCIL.

PROJECT GOAL POPULATION GROWTH REDUCED IN HONDURAS.
 PROJECT PURPOSE FAMILY PLANNING SERVICES PROVIDED WITHIN PUBLIC HEALTH SYSTEM.
 PROJECT OUTPUTS 1. MATERNAL/CHILD HEALTH SECTION ESTABLISHED WITHIN MINISTRY OF HEALTH. 2. TOTAL OF 28 FIXED AND MOBILE MOTHER/CHILD CLINICS STAFFED AND EQUIPPED. 3. HEALTH EDUCATION PROGRAM IMPLEMENTED. 4. NUTRITION EVALUATION PROG INCORPORATED IN MATERNAL/CHILD HEALTH PROGRAM. 5. RESEARCH CONDUCTED TO DETERMINE ATTITUDES TOWARD FAMILY PLANNING. 6. ADVISORY AND CONSULTANT SERVICES FOR PROJECT MANAGEMENT PROVIDED.

PROJECT INPUTS

Health Projects continued

PROJECT NUMBER 522006501
 OLD PROJECT NUMBER 522115800651
 PROJECT TITLE MATERNAL CHILD HEALTH
 PROBLEM STATEMENT POPULATION GROWTH RATE IN HONDURAS IS ESTIMATED AT 3.2% WITH 46.6% OF THE POPULATION UNDER 14 YEARS OF AGE. THIS LARGE PERCENTAGE OF YOUNG PEOPLE STRAINS THE HONDURAN NATIONAL BUDGET, ALREADY LOW IN FUNDS FOR EDUCATION, HEALTH & OTHER SOCIAL SERVICES. THE EXISTING MATERNAL CHILD HEALTH-FAMILY PLANNING PROGS TO REDUCE GROWTH, RELIEVE BUDGET PRESSURES LACK A CENTRAL ADMINISTRATIVE AGENCY WHICH COULD REDUCE COSTS WHILE IMPROVING MCH-FP PROGS EFFIC, ELIMINATING DUPLICATIVE PROGS, PROVIDING SVCS WHERE MOST NEEDED, PROMOTE VOLUNTARY FP PARTICIPATION

PROJECT STRATEGY 2-YEAR PROJECT TO COMPLETE INTEGRATION OF DISPARATE MATERNAL CHILD HEALTH-FAMILY PLANNING SERVICES INTO EXISTING HEALTH MINISTRY OF HONDURAS. AID PROVIDES OPERATING FUNDS FOR CLINICS AND MOBILE UNITS AND STAFF SALARIES, COMMODITIES AND PARTICIPANT TRAINING COSTS. HOST COUNTRY PAYS TRANSFER COSTS OF MCH-FP PROGRAM TO MOH, PERSONNEL AND SOME OFFICE, CLINIC, UTILITIES COSTS. OTHER DONOR: GOVERNMENT OF GREAT BRITAIN.

PROJECT SUMMARY GRANT, COMMODITIES AND PARTICIPANT TRAINING PROVIDED TO GOVERNMENT OF HONDURAS TO COMPLETE INTEGRATION OF DISPARATE MATERNAL CHILD HEALTH-FAMILY PLANNING (MCH-FP) PROGRAMS INTO THE ADMINISTRATIVE STRUCTURE OF HONDURAS' MINISTRY OF HEALTH (MOH). WAS A FIRST STEP, THE CENTRAL MCH-FP ADMINISTRATIVE OFFICE AND WAREHOUSE WILL BE TRANSFERRED TO MOH ADMINISTRATIVE CONTROL. THE US BUREAU OF THE CENSUS WILL BE CONTRACTED ON A FASA TO HELP ESTABLISH AND LATER REVISE COMPUTERIZED MCH-FP CLIENT RECORD SYSTEMS IN THE MOH, USING NATIONWIDE MOTIVATORS, THE MOH WILL ALSO INITIATE AND ADMINISTER EDUCATIONAL PROGRAMS IN MCH-FP AND NUTRITION. NURSES, DOCTORS AND AUXILIARIES WILL BE TRAINED IN MCH-FP TECHNIQUES AND CONCEPTS FOR APPLICATION IN MOH CLINICS AT A TIME WHEN THE USE OF COMMERCIAL CONTRACEPTIVE OUTLETS WILL BE EXPANDED. SELECTED MOH STAFF WILL BE TRAINED IN ALL ASPECTS AND TECHNIQUES OF FAMILY PLANNING AND PROGRAM ADMINISTRATION IN BOTH IN-COUNTRY AND THIRD COUNTRY TRAINING PROGRAMS. PROGRAM WILL OPERATE THROUGH 34 FIXED CLINICS AND 3 MOBILE UNITS UNDER MOH'S DIRECTION. CLINICS WILL BE MANNED BY DOCTORS, NURSES, EDUCATORS, NUTRITIONISTS AND SUPPORT STAFF. DATA COLLECTED BY THIS STAFF ON MCH-FP CLIENTS WILL BE USED TO MAKE NEEDED CHANGES IN EDUCATIONAL AND ADMINISTRATIVE PORTIONS OF PROGRAM AS PROJECT PROCEEDS. PROJECT BENEFITS WILL BE AVAILABLE TO 90% OF ALL WOMEN OF CHILD-BEARING AGE IN HONDURAS. GOVERNMENT OF GREAT BRITAIN WILL CONTRIBUTE 2 LAND ROVER AMBULANCES.

PROJECT GOAL USE OF MATERNAL AND CHILD HEALTH AND FAMILY PLANNING (MCH-FP) SERVICES INCREASED IN HONDURAS. 1

PROJECT PURPOSE INTEGRATION OF MCH-FP PROGRAMS INTO ADMINISTRATIVE STRUCTURE OF HONDURAS' MINISTRY OF HEALTH (MOH). 1

PROJECT OUTPUTS 1. CENTRAL MCH-FP ADMINISTRATIVE OFFICE AND WAREHOUSE TRANSFERRED TO MOH. 2. COMPUTERIZED CLIENT RECORD SYSTEM FOR 34 MCH-FP CLINICS IN OPERATION IN MOH. 3. MCH-FP AND NUTRITION EDUCATION PROGRAMS EMPLOYING NATIONWIDE MOTIVATORS ADMINISTERED, FUNDED BY MOH. 4. CLINICAL STAFF (NURSES, DOCTORS, AUXILIARIES) TRAINED IN FAMILY PLANNING TECHNIQUES AND CONCEPTS IN USE IN MOH GENERAL CLINICS. 5. USE OF COMMERCIAL CONTRACEPTIVE OUTLETS EXPANDED. 6. MOH STAFF TRAINED IN ALL ASPECTS AND TECHNIQUES OF FP AND FP PROGRAM ADMINISTRATION. 7. PARTICIPANT TRAINING IN FP PROGRAM ADMINISTRATION IN THIRD COUNTRIES. 1

PROJECT INPUTS

Health Projects (continued)

PROJECT NUMBER 522014800
 OLD PROJECT NUMBER 52200000148
 PROJECT TITLE HEALTH SECTOR PLANNING
 PROBLEM STATEMENT THE HEALTH STATUS OF THE HONDURAN POPULATION IS CHARACTERIZED BY HIGH FERTILITY AND MORTALITY, INFECTIONS AS THE LEADING CAUSES OF DEATH AND ILLNESS, ENDEMIC UNDERNUTRITION, AND GREATEST MORBIDITY/MORTALITY IN THE MOTHER AND CHILD GROUPS. IN ADDITION, ONLY 45% OF THE POPULATION HAS ACCESS TO BASIC HEALTH SERVICES, AND THE QUALITY OF SERVICES IS OFTEN INADEQUATE, BECAUSE OF INADEQUATELY TRAINED PERSONNEL AND POOR PLANNING AND MANAGEMENT IN THE HEALTH SECTOR. WELL-DESIGNED HEALTH INTERVENTION STRATEGIES HAVE NOT BEEN IMPLEMENTED.
 PROJECT STRATEGY THE HEALTH SECTOR CONSISTS OF GRANT, TECHNICAL ASSISTANCE, AND TRAINING TO IMPROVE DECISION-MAKING AT ALL LEVELS IN PLANNING AND IMPLEMENTING BOTH LONG AND SHORT-TERM HEALTH RESOURCE ALLOCATIONS. USAID ALSO PROVIDES COMMODITIES, VEHICLES, AND EQUIPMENT. HOST COUNTRY PROVIDES SALARIES, SUPPLIES AND EQUIPMENT, VEHICLE SUPPORT, DOCUMENTS, PER DIEM, AND IN-COUNTRY TRANSPORTATION.
 PROJECT SUMMARY GRANT AND TECHNICAL ASSISTANCE ARE PROVIDED TO THE GOVT OF HONDURAS TO STRENGTHEN ANALYTICAL CAPACITIES IN HEALTH PLANNING AND MANAGEMENT AT THE CENTRAL, REGIONAL, AND LOCAL LEVELS. PROJECT COMPONENTS INCLUDE ANALYTICAL STUDIES, TRAINING, AND MGMT METHODOLOGIES. SEVEN SUB-SECTOR STUDIES WILL BE CONDUCTED IN THE FOLLOWING AREAS: ENVIRONMENTAL SANITATION PROGRAM, COMMUNICABLE DISEASE CONTROL AND EPIDEMIOLOGY PROGRAMS, HUMAN RESOURCES, MANAGEMENT, MATERIALS, FINANCE AND BUDGETARY PROCESSES, AND REGIONAL MANAGEMENT. RESULTS OF THESE STUDIES WILL BE INTEGRATED INTO AN INITIAL COMPREHENSIVE HEALTH SECTOR ASSESSMENT, WHICH WILL PROVIDE THE BASIS FOR DEVELOPMENT OF THE PROPOSED HEALTH SECTOR PROJECT. AFTER THE INITIAL ANALYTICAL BASIS HAS BEEN ESTABLISHED, VARIOUS SPECIAL STUDIES WILL BE CONDUCTED EITHER TO EXPAND THE ANALYTICAL BASIS OR TO DEVELOP DETAILED PROGRAM METHODOLOGIES NEEDED IN HEALTH SUB-SECTORS. TRAINING WILL BE PROVIDED TO 40-50 HEALTH SECTOR POLICY MAKERS, MANAGERS, AND ADMINISTRATIVE/TECHNICAL PERSONNEL IN EPIDEMIOLOGY, SANITATION, COMMUNICABLE DISEASE CONTROL, HUMAN RESOURCE DEVELOPMENT, PLANNING, ADMINISTRATION, AND HEALTH EDUCATION. LONG-TERM ACADEMIC TRAINING WILL BE USED WHEN EXTENSIVE TRAINING FOR SINGLE INDIVIDUALS IS WARRANTED, AND SPECIAL IN-COUNTRY SEMINARS WILL BE USED WHERE A GROUP REQUIRES SIMILAR SHORT-TERM TRAINING. CONFERENCES, OBSERVATIONAL VISITS, AND SHORT-TERM ACADEMIC TRAINING WILL BE USED WHERE VARIOUS INDIVIDUALS REQUIRE A VARIETY OF INPUTS. SPECIFIC MANAGEMENT METHODOLOGIES WILL BE DESIGNED, TESTED, AND IMPLEMENTED IN HUMAN RESOURCE, ADMINISTRATIVE, AND MATERIAL CONSTRAINTS AT THE REGIONAL LEVEL. ULTIMATE BENEFICIARIES WILL BE SMALL INDIVIDUAL FARMERS, AGRARIAN REFORM FARMERS AND LANDLESS LABORERS.
 PROJECT GOAL 1. HEALTH OF THE HONDURAN PEOPLE IMPROVED. 2. HEALTH SECTOR RESOURCES USED MORE EFFECTIVELY AND EFFICIENTLY.
 PROJECT PURPOSE DECISION-MAKING IMPROVED AT ALL LEVELS IN PLANNING AND IMPLEMENTING HEALTH SECTOR RESOURCE ALLOCATIONS FOR BOTH THE SHORT AND LONG-TERM.
 PROJECT OUTPUTS 1. 7 SUB-SECTOR ANALYSES, 1 SUMMARY ASSESSMENT DOCUMENT AND 7-14 SPECIAL STUDIES RECOMMENDING PRACTICAL AND ECONOMIC SOLUTIONS TO IDENTIFIED SECTOR CONSTRAINTS CONDUCTED. 2. 40-50 GOH HEALTH SECTOR MANAGEMENT/TECHNICAL PERSONNEL AND 4-5 TRAINERS IN EPIDEMIOLOGY AND COMMUNICABLE DISEASE CONTROL, SANITATION, HUMAN RESOURCES DEVELOPMENT, PLANNING, ADMINISTRATION, AND HEALTH EDUCATION TRAINED. 3. 1-2 REPORTS PRODUCED DESCRIBING THE DESIGN AND RESULTS OF IMPROVEMENTS.
 PROJECT INPUTS USAID: TECHNICAL ASSISTANCE, \$262,000; PARTICIPANT TRAINING, \$50,000; COMMODITIES, \$41,000; OTHER COSTS, \$122,000. GOH: TECHNICAL ASSISTANCE, \$100,000; PARTICIPANT TRAINING, \$26,000; COMMODITIES, \$27,000; OTHER COSTS, \$59,000

Health Projects continued

PROJECT NUMBER 522006502
 OLD PROJECT NUMBER 52211580065
 PROJECT TITLE MATERNAL CHILD HEALTH

PROBLEM STATEMENT HIGH RATE OF POPULATION GROWTH IN HONDURAS-ESTIMATED TO BE BETWEEN 3.4% AND 3.8%-THREATENS TO OUTSTRIP RATE OF ECONOMIC GROWTH. REAL GNP GROWTH IN 1967 WAS 3.8%. GOVT HAS GIVEN LOW PRIORITY TO PUBLIC HEALTH AND CORRESPONDING FAMILY PLNGG SERVICES. HONDURANS IN GENERAL ARE APATHETIC TOWARD FAMILY PLNGG. LOW POPULATION DENSITY IS FACTOR IN GENERAL APATHY & MAKES FOR HIGH PER CAPITA COST OF FAMILY PLNGG SERVICES FOR LARGELY RURAL POP. AS A RESULT, UNCHECKED FERTILITY IS THE RULE WITH INFANT MORTALITY RATES, HIGH & MALNUTRITION WIDESPREAD

PROJECT STRATEGY FOUR-YEAR PROJECT CONSISTS OF GRANT, TECHNICAL ADVISORY ASSISTANCE, PARTICIPANT AND IN-COUNTRY TRNG TO PROVIDE FAMILY PLNGG & MOTHER CHILD HEALTH SERVICES ON NATIONWIDE BASIS. USAID ALSO PROVIDES EQUIPMENT, VEHICLES, PHARMACEUTICALS AND EDUCATIONAL MATERIALS. HOST-COUNTRY INPUTS INCLUDE PERSONNEL AND LONG-TERM MAINTENANCE. OTHER DONORS INCLUDE HONDURAN FAMILY PLNGG ASSOCIATION (IPPF GRANT) AND POPULATION COUNCIL

PROJECT SUMMARY HONDURAS IS PROVIDED WITH TECHNICAL ASSISTANCE, TRAINING AND COMMODITIES TO CONTINUE AND EXPAND PILOT FAMILY PLANNING PROGRAM WHICH ESTABLISHED MOTHER CHILD HEALTH (MCH) PROGRAM UNDER AEGIS OF THE MINISTRY OF HEALTH (REVISED PROP 11/5/71). MCH OPERATED AS INDEPENDENT UNIT. CURRENT AIM IS TO STRENGTHEN FAMILY PLANNING DELIVERY SYSTEM - CONTINUING EXPANSION OF CLINICS (FROM 25-40) AND FULLY INTEGRATING MCH PROGRAM WITHIN MINISTRY OF HEALTH (MOH). DURING INTEGRATION PERIOD, EMPHASIS WILL BE PLACED ON INCORPORATING FAMILY PLANNING SERVICES IN ALL MOH CLINICS. COMPUTERIZED CLIENT RECORD SYSTEM WILL BE DEVELOPED. AID CONSIDERS POSTPARTUM FAMILY PLANNING SERVICES AS CRITICAL ELEMENT OF PROJECT. PAN AMERICAN HEALTH ORGANIZATION (PAHO) WILL BE ENCOURAGED TO ASSUME FINANCIAL AND TECHNICAL RESPONSIBILITIES OF CURRENT POST-PARTUM PROGRAMS AND TO COORDINATE ITS EFFORTS WITH MCH. AID WILL ASSIST BOTH MCH AND MOH TO DEVELOP STRONGER AND MORE COORDINATED EFFORTS IN MOTIVATING POPULACE TO USE FAMILY PLANNING SERVICES. PRINCIPAL EFFORT HAS COME FROM PRIVATE SECTOR, HONDURAN FAMILY PLANNING ASSOCIATION (HFPA). CLOSER COORDINATION BETWEEN HFPA AND MCH PROGRAM IS PLANNED. AID WILL ASSIST MCH TO CARRY OUT KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) STUDIES TO PROVIDE BASELINE DATA FOR MOTIVATION ACTIVITIES. SUBSEQUENT PROP REVISION (12/11/74) REDUCED NUMBER OF CLINICS TO 34. PRIORITY WILL BE GIVEN TO TRANSFER OF PROJECT ADMINISTRATION TO MOH. SEVERAL IN-COUNTRY TRAINING COURSES ARE PLANNED TO ASSIST IMPLEMENTATION OF FAMILY PLANNING SERVICES IN MOH HEALTH POSTS AND CENTERS.

PROJECT GOAL REDUCE POPULATION GROWTH IN HONDURAS
 PROJECT PURPOSE MOTIVATE FERTILE POPULATION TOWARD FAMILY PLANNING AND INCREASE USE OF FAMILY PLANNING SERVICES.
 PROJECT OUTPUTS 1. NAT'L FAMILY PLNGG SERVICE ESTABLISHED: A. EFFECTIVE NAT'L STAFF DEVELOPED. B. EFFECTIVE CLINICAL STAFF WITH SPECIALIZED KNOWLEDGE IN FAMILY PLNGG DEVELOPED TO OPERATE 40 CLINICS. C. SELECTED STAFF TRAINED IN FAMILY PLNGG MOTIVATION TECHNIQUES AND SKILLS. D. FACILITIES SECURED FOR HEADQTRS, CLINICAL, ADMINISTRATIVE AND SUPPORT SERVICES. E. FAMILY PLNGG SERVICES INTEGRATED WITHIN MINISTRY OF HEALTH. F. STATISTICAL SYSTEM DEVELOPED.

PROJECT INPUTS USAID: 1. PERSONNEL - 1 DIRECT HIRE MANAGER AND 238 LOCAL HIRE FOR STAFFING 40 CLINICS. 2. COMMODITIES - DRUGS, CONTRACEPTIVES, AUDIO-VISUAL MATERIAL, VEHICLES AND SPARE PARTS, LABORATORY AND MEDICAL EQUIPMENT. 3. TRAINING - DOCTORS, NURSES TRAINING IN GENERAL FAMILY PLANNING, SEX EDUC FOR MOTIVATORS AND NURSES, SPECIALIZED COURSES IN MOTHER CHILD HEALTH, STATISTICAL AND DATA PROCESSING AND CYTOLOGY. GOM: 1. SUPPORT STAFF. 2. COMMODITIES - SPECIALIZED DRUGS, CONTRACEPTIVES, OFFICE SUPPLIES, GASOLINE, SPARE PARTS, RENT AND UTILITIES.

Health Projects continued

PROJECT NUMBER 522013000
 OLD PROJECT NUMBER 52215580130
 PROJECT TITLE INTEGRATED RURAL HEALTH
 PROBLEM STATEMENT ORIGINAL FAMILY PLANNING PROGRAM WAS URBAN-ORIENTED VERTICAL ORGANIZATION ABLE TO ATTAIN ACCEPTOR RATE OF ONLY 8%. IN 1975, MINISTRY OF HEALTH DECIDED TO INTEGRATE FAMILY PLANNING PROGRAM INTO NATIONAL MATERNAL/CHILD HEALTH PROGRAM, COMMITTED TO PENETRATION OF RURAL AREAS WITH SYSTEM TO PROVIDE MATERNAL/CHILD HEALTH/FAMILY PLANNING AND OTHER BASIC HEALTH CARE.
 PROJECT STRATEGY LONG TERM, PUBLIC SECTOR APPROACH.
 PROJECT SUMMARY PROJECT TO REACH 70% IN RURAL AREAS & THOSE DISADVANTAGED BY INCOME & HEALTH BY PROVIDING MATERNAL/CHILD HEALTH & FAMILY PLANNING SERVICES AS PART OF BASIC COMMUNITY HEALTH CARE DELIVERY SYSTEM. 150 CLINICS ALREADY ESTABLISHED & GCH CONSTRUCTING 500 MORE DURING 5-YR LIFE OF PROJECT. AID BILATERAL FINANCING SUPPORTS MOH ESTABLISHMENT OF INSTITUTIONAL CAPABILITY FOR TRAINING PARAMEDICS TO PROVIDE BASIC HEALTH/FAMILY PLANNING SERVICES TO RURAL AREAS. INTL PLANNED PARENTHOOD TO ASSIST HONDURAN FAMILY PLANNING ASSN. ASSISTANCE ALSO PROVIDED THRU AID/W CENTRALLY FUNDED CONTRACTS & GRANTS/ASSN FOR VOLUNTARY STERILIZATION, JOHNS HOPKINS UNIV, DEVELOPMENT ASSOCIATES INC, PATHFINDER FUND, WORLD EDUCATION INC, PAHO & IDB.
 PROJECT GOAL REDUCED POPULATION PRESSURE ON DEVELOPMENT STRATEGIES AND PROGRAMS IN AND FOR HONDURAS.
 PROJECT PURPOSE DEVELOP AND UTILIZE HONDURAS INSTITUTIONAL PROGRAM OF FERTILITY CONTROL, AND MATERNAL/CHILD AND OTHER BASIC HEALTH SERVICES, PRIMARILY IN RURAL AREAS.
 PROJECT OUTPUTS 1. TRAINING CENTERS ESTABLISHED. 2. OBSERVATION TRAINING FOR MOH OFFICIALS. 3. INSTRUCTION STAFF TRAINED & ASSIGNED. 4. CURRICULA & TEACHING MATERIAL DEVELOPED & SUPPLIED. 5. NURSES, COMMUNITY HEALTH WORKERS, MIDWIVES, SUPERVISORS & DOCTORS SELECTED & TRAINED. 6. RURAL HEALTH CENTERS CONSTRUCTED, STAFFED & EQUIPPED WITH TRAINED STAFF & SUPPLIES INCLUDING CONTRACEPTIVES. 7. SYSTEM FOR COLLECTION OF BASELINE DATA & EVALUATION INFORMATION. 8. SYSTEM FOR EVALUATING RURAL HEALTH STAFF TRAINING.
 PROJECT INPUTS 1. AID/W. 2. BILATERAL, EQUIPMENT, CONSTRUCTION, LOCAL TRAINING, EVALUATION/ADVISORY. 3. AID/W. 4. CONTRACEPTIVES. 5. INTERMEDIARIES. 6. GOVERNMENT OF HONDURAS/MINISTRY OF HEALTH. 7. PERSONNEL. 8. CONSTRUCTION. 9. COMMODITIES. 10. PAN AMERICAN HEALTH ORGANIZATION. 11. ADVISORY SERVICES. 12. EQUIPMENT. 13. INTER-AMERICAN DEVELOPMENT BANK. 14. INTERNATIONAL PLANNED PARENTHOOD FEDERATION.

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Appendix VI Bibliography

1. General and Land Use
2. Physical Resources
3. Biological Resources and Conservation
4. Health and Urban Environment

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