GOVERNMENT OF THE REPUBLIC OF HONDURAS

MINISTRY OF NATURAL RESOURCES

CHOLUTECA RIVER BASIN AGRICULTURAL DEVELOPMENT PROJECT

UPDATING FEASIBILITY STUDY

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ANNEX A

GENERAL BACKGROUND

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GENERAL BACKGROUND

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A. GENERAL BACKGROUND

A.1 POPULATION AND EMPLOYMENT

A.1.1 Population

The Republic of Honduras has, within its territory of 112,088 km^2, a population of approximately 4.1 million in 1983. The population increased from 1.88 million in 1961 (census) to 2.66 million in 1974 (census), and to 3.69 million (estimated) in 1980. The growth rate of the population was estimated by the Directorate of Statistics and Census to be 3.4% per annum in 1980-84. (The Central Bank estimated the growth rate at 2.9% a year during this period.) It is estimated that the population of Honduras will reach 4.3 million in 1985 and 4.9 - 5.1 million in 1990. The density of population is around 39 persons per km^2 on a national average. (Refer to Table A-01)

The urban population has been growing at a higher rate in recent years. The urban population accounted for 31.5% in 1974 and was estimated to represent 38.2% in 1983. A notable concentration is observed in Central District (Tegucigalpa and Comayaguela) and other major cities. The urban population increased from 451,800 in 1981 to 509,000 in 1983 in Central District (growth rate of 6.1% per annum), from 279,200 to 323,500 in San Pedro Sula (7.6% per annum) and from 44,700 to 50,700 in Choluteca (6.5% per annum). Such a high rate of urban population increase is causing serious socio-economic problems in major cities. The development of social infrastructures, such as water supply, in the population concentrated centers will require much higher costs than the development of rural areas. Such problems will be aggravated unless appropriate measures are taken for a well balanced rural and regional development.

About 415,000 inhabitants, or approximately 10% of the total population of the country reside in the South Region, which comprises Choluteca Department and Valle Department. Density of population in

the South Region (72 persons per km^2) is the third highest among the 18 Departments, followed by Cortes and Francisco Marazán Departments. Choluteca Department has an estimated population of approximately 290,000 persons in 1983, of which around 78% live in rural areas. The Department's population is forecasted to reach 307,000 persons in 1985. (Refer to Table A-02) Although Choluteca Department encompasses sizable flat land in the coastal plain, the population density is higher in the hilly zone. Some emigration has occured from hilly areas to the northern regions of the country.

A.1.2 Employment

The economically active population (EAP) was 0.76 million in 1974 and 1.04 million in 1983, which correspond to around 29% and 26% of the total population of the country. Out of the total EAP, about 61% was involved in the agricultural sector in 1974. EAP in the agricultural sector decreased to 53% in 1983. (Refer to Table A-03) The National Development Plan 1982-86 forecasts that EAP available in this sector will reach 793,000 in 1986.

The unemployment rate has been relatively high. According to a sample survey made in October - November 1982, the unemployment rate was 15.2% in Tegucigalpa and 13.7% in San Pedro Sula. The National Development Plan in the agricultural sector also estimated that the underemployment rate in the sector was 34.9% in 1980-82 and it was expected to be 33.8% in 1986. It appears to be of vital significance that employment opportunities are created by developing agriculture in a more accelerated manner.

Such a situation of unemployment and underemployment has economic effects on the employment of unskilled labor for construction works. The opportunity cost of unskilled labor is much lower than the market wage rates. A study by the University of Boston in October 1983 estimated that the opportunity cost of unskilled labor was 0.566. The shadow wage rate of 0.5 for unskilled labor adopted by CONSUPLANE appears to be reasonable, and this rate will be applied in estimating the economic

cost of the project. On the other hand, qualified technicians are relatively limited in number, and it is assumed that wages paid are a better approximation of the economic cost of using labor.

Minimum wages are defined by the law in Honduras. The prevailing law has been effective since June 1981. The minimum wage is Lp. 4.6 per day for agricultural workers (less than 5 employees) and Lp. 5.3 per day for construction workers. According to the prevailing practices in construction works, social charges and other expenses are incurred at the rate of around 80% of the basic salary and wage.

A.2 ECONOMIC SITUATION

A.2.1 Gross Domestic Product

The gross domestic product (GDP) of Honduras amounted to Lp. 5,890 million at current market prices in 1983. The real growth rate calculated at 1966 constant prices was around 7.3% per annum on an average in 1975-80. However, GDP at constant prices showed negative growth since 1981. (Refer to Table A-04). The gross national product (GNP) per capita at current prices was Lp. 1,557 in 1983. (Refer to Table A-05)

The agricultural sector attained a growth rate higher than the total GDP growth in 1975-83. Even in 1980-83, the sector grew at the rate of 1.6% per annum. The sector contributed for 26.6% of total GDP in 1975 and 24.6% of GDP in 1983. (Refer to Table A-04) The National Development Plan envisages an annual growth rate of 6.3% in real value added during the plan period up to 1986.

GDP in the manufacturing, construction and transportation sector contributed for 28.3% of total GDP in 1983. However, the sector experienced a negative growth in 1980-83. Growth has not been attained in the third sector of the economy since 1980. Such a recession might have been caused by multiplex national and international economic situation.

A.2.2 Expenditure on GDP

GDP and imports of goods and services amounted to Lp. 7,700 million in 1983. Imports accounted for 23.6% of the total offer. On the other hand, private consumption and public consumption represented 56.4% and 11.0% of the total demand, respectively. Public investment has been gradually increased in recent years, while private investment decreased substantially since 1980. Investment accounted for 17.1% of the total demand in 1980 and 14.2% in 1983. (Refer to Table A-05)

The opportunity cost of capital investment has not been assessed in an authentic way. However, CONSUPLANE indicated that the opportunity

cost of capital in Honduras was at least 12%. Desirably, the investment will be planned to attain a return over 15%.

A.2.3 Balance of Payment

Trade balance of Honduras has remained unfavorable in recent years. However, since 1980 imports have decreased at a higher rate than exports, and the persistent effort of the government was fruitful in improving trade deficit. The deficit decreased from Lp. 634 million in 1980 to Lp. 336 million in 1983. (Refer to Table A-06)

Agricultural products have continued to be main commodities for exports. Banana and coffee accounted for about 53% of total commodity exports which amounted to Lp. 1,644 million in 1980 and Lp. 1,360 million in 1983. Together with sugar, cotton, tobacco, fruits, sesame, cacao, etc., crop products contributed for over 60% of total commodity exports in 1983. The export earning of agricultural products has been greatly affected by international prices. Other major commodity exports are shrimp and lobster (5%), frozen meat (4.6%), lumber (5.8%), silver, lead and zinc (8%), etc. (Refer to Table A-07)

Imports of commodities have substantially decreased in 1982-83, if compared with 1980 when commodity imports exceeded over Lp. 2 billion. Out of total commodity imports of approximately Lp. 1.5 billion in 1983, manufactured goods accounted for about 28%, chemical products for 21% machinery and vehicles for 17%. Imports of fuel and lubricants remained at around Lp. 340 million in 1980-83. Imports of food products was around Lp. 140 million in 1983. (Refer to Table A-08)

A.2.4 Foreign Exchange

Honduras has an official exchange rate (US$1 = Lp.2) applied to all foreign transactions. However, various type of taxes are applied on imports and exports, which affect commodity pricing. Quota for imports and

exports of some commodities are also prevailed. Under such circumstances, it is necessary to apply a shadow exchange rate in the economic evaluation of the project.

The rate of shadow exchange applicable in Honduras was studied by the University of Boston in October 1983. The study indicated that the social price of foreign exchange is Lp. 2.44 per Dollar in medium term and Lp. 2.97 per Dollar in short term. CONSUPLANE is applying the shadow exchange rate of Lp. 2.5 per Dollar in the economic appraisal of projects in Honduras. Since the rate applied by CONSUPLANE is found reasonable, the economic evaluation of this project will be made by applying such a shadow exchange rate to inputs to be required in foreign currency and outputs to be exported.

A.2.5 Taxes

There are a variety of taxes in Honduras. However, it has been an usual practice of the government to exempt import taxes, sales tax and consumer tax to be imposed on the construction of projects executed by the government and public institutions. Income tax, either corporate or personal, will not be exempted.

In case of imported farm inputs, farmers and cooperatives have to pay 5% tax under the recently promulgated regulations, in addition to 5% sales tax. Such taxes are to be counted in the financial evaluation of the farm budget. With respect to fuels, consumer tax is to be exempted for construction works, but it is imposed on purchase for farming operation. In view of such practices, the economic and financial costs of the project will be estimated in this study.

A.2.6 Price Index

Consumer prices have been inflated at the average annual rate of 9.2% in 1980-83, or 8.9% in 1982-83. On the other hand, wholesale prices in construction industry have increased at the annual rate of 6.9% in

1980-83, or 4.4% in 1981-83. In case of El Cajon hydroelectric project, the price escalation of construction costs incurred in local currency has been made at the average rate of 6.8% in 1980-83, or 5.2% in 1981-83. (Refer to Table A-09) In general, the rate of inflation has been lowered in recent years. In view of the recent trends, as well as the possibility of increasing minimum wages which has remained unchanged since June 1981, the rate of inflation is estimated, in a rather conservative manner, to be 6% per annum in estimating financial contingencies for the construction cost of this project.

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TABLES

Table A-01 AREA AND POPULATION BY DEPARTMENT

Department	Area (km2)	Population in 10³ 1974/1	1980/2	1985/3
Choluteca	4,211	193	264	307
Atlántida	4,251	148	214	262
Colón	8,875	78	114	138
Comayagua	5,196	137	191	226
Copán	3,203	152	201	227
Cortés	3,954	370	543	683
El Paraíso	7,218	141	189	218
Fco. Marazán	7,946	453	657	792
Gracias Dios	16,630	21	31	39
Intibucá	3,072	82	105	116
Isl. Bahía	261	13	17	20
La Paz	2,331	66	83	89
Lempira	4,290	128	164	182
Octepeque	1,680	51	62	65
Olancho	24,351	151	207	243
Sta. Bárbara	5,115	186	260	305
Valle	1,565	92	118	131
Yoro	7,939	195	271	328
TOTAL	112,088	2,657	3,691	4,372

Notes: /1: Population Census
/2: Estimated

Source: Anuario Estadístico 1982, DG de Estadistica y Censos

Table A-02 POPULATION ESTIMATED IN CHOLUTECA DEPARTMENT

Municipality	1975	1980	1985
Choluteca	58.0	72.7	90.2
Apacilagua	9.1	10.4	11.7
Concep. de Maria	18.9	21.7	24.2
Duyure	1.9	2.2	2.5
El Corpus	17.5	20.0	22.4
El Triunfo	18.8	22.2	25.8
Marcovia	19.1	21.9	24.4
Morolica	5.1	5.9	6.6
Namasigue	10.8	12.4	13.8
Orocuina	12.3	14.1	15.8
Pespire	21.0	24.0	26.8
S. Antonio Flores	4.4	5.1	5.7
San Isidro	3.8	4.3	4.8
San Jose	3.4	3.9	4.4
S. Marcos Colon	15.0	18.2	21.9
S. Aua Yusguare	4.5	5.3	5.9
TOTAL	223.6	264.3	306.9

Table A-03 ECONOMICALLY ACTIVE POPULATION

Activities	1974 (10³)	1974 (%)	1983 (10³)	1983 (%)
Agriculture, forestry, fishery	461	(60.5)	556.1	(53.3)
Mining	2	(0.3)	4.0	(0.4)
Manufacturing industry	84	(11.0)	138.4	(13.3)
Construction	24	(3.1)	45.3	(4.3)
Electricity, gas, water	2	(0.3)	3.8	(0.3)
Transport, communication	21	(2.8)	41.7	(4.0)
Commerce	59	(7.7)	100.8	(9.7)
Finance	109	(14.3)	9.5	(0.9)
Others			144.2	(13.8)
Total EAP	762	(100.0)	1,043.8	(100.0)
Total Population	2,657		4,092.2	
EAP/Total Pop. (%)	28.7		25.5	

Source: Honduras on Cifra, Central Bank
Anuario Estadístico, 1975, DG de Estadística y Censo

Table A-04 GROSS DOMESTIC PRODUCT BY SECTOR

	1975		1980		1983*	
	Lp.10⁶	(%)	Lp.10⁶	(%)	Lp.10⁶	(%)
At Current Price						
Agric. forest fish	597	(26.6)	1,263	(25.4)	1,450	(24.6)
Mining	52	(2.3)	96	(1.9)	114	(1.9)
Manuf. industry	316	(14.1)	681	(13.7)	808	(13.7)
Construction	108	(4.8)	267	(5.4)	320	(5.4)
Elect. gas, water	36	(1.6)	98	(2.0)	128	(2.2)
Transp. & commun.	157	(7.0)	332	(6.7)	412	(7.0)
Commerce	239	(10.7)	587	(11.8)	692	(11.8)
Finance	82	(3.8)	218	(4.4)	252	(4.3)
Housing	153	(6.8)	297	(5.9)	377	(6.4)
Public services	66	(2.9)	197	(4.0)	276	(4.7)
Others	216	(9.6)	396	(7.9)	476	(8.1)
GDP at factor cost	2,022	(90.2)	4,432	(89.1)	5,305	(90.1)
Net indirect taxes	219	(9.8)	544	(10.9)	586	(9.9)
GDP at market price	2,241	(100.0)	4,976	(100.0)	5,891	(100.0)
At 1966 Constant Price						
Agric. forest, fish	389	(26.7)	539	(26.1)	565	(27.7)
Mining	33	(2.3)	38	(1.9)	39	(1.9)
Manuf. industry	195	(13.4)	295	(14.3)	276	(13.5)
Construction	54	(3.7)	77	(3.7)	75	(3.7)
Elect. gas, water	23	(1.6)	34	(1.6)	36	(1.8)
Transp. & communic.	97	(6.7)	120	(5.8)	126	(6.2)
Commerce	153	(10.5)	236	(11.4)	220	(10.8)
Finance	50	(3.4)	74	(3.6)	68	(3.3)
Housing	111	(7.6)	143	(6.9)	141	(6.9)
Public services	45	(3.1)	86	(4.2)	93	(4.5)
Others	163	(11.2)	197	(9.6)	183	(8.9)
GDP at factor cost	1,313	(90.2)	1,839	(89.1)	1,822	(89.2)
Net indirect taxes	142	(9.8)	226	(10.9)	220	(10.8)
GDP at market price	1,455	(100.0)	2,065	(100.0)	2,042	(100.0)

Note: *Preliminary figures

Source: Cuenta Nacional de Honduras, Central Bank
Bolletin Estadístico, Central Bank

Table A-05 EXPENDITURE ON GROSS DOMESTIC PRODUCT

	1975		1980		1983*	
	Lp.10^6	(%)	Lp.10^6	(%)	Lp.10^6	(%)
At Current Price						
Private consumption	1,772	(56.6)	3,392	(46.9)	4,347	(56.4)
Public consumption	278	(8.9)	682	(9.4)	853	(11.0)
Investment	476	(15.2)	1,235	(17.1)	1,092	(14.2)
(Private)	(314)	(10.0)	(758)	(10.5)	(444)	(5.8)
(Public)	(162)	(5.2)	(477)	(6.6)	(648)	(8.4)
Change in stocks	-75	(-2.4)	68	(0.9)	-130	(-1.7)
Exports	680	(21.7)	1,860	(25.7)	1,547	(20.1)
Total Demand	3,131	(100.0)	7,237	(100.0)	7,709	(100.0)
Imports	890	(28.4)	2,261	(31.2)	1,818	(23.6)
GDP	2,241	(71.6)	4,976	(68.8)	5,891	(76.4)
Total Offer	3,131	(100.0)	7,237	(100.0)	7,709	(100.0)
Net factor income from abroad	-50		-275		-268	
GNP	2,191		4,701		5,623	
GNP per capita (Lp.)	757		1,416		1,557	
At 1966 Constant Price						
Private consumption	1,129	(58.1)	1,466	(50.5)	1,426	(54.9)
Public consumption	183	(9.5)	303	(10.4)	302	(11.6)
Investment	287	(14.8)	509	(17.5)	352	(13.6)
(Private)	(204)	(10.5)	(315)	(10.8)	(142)	(5.5)
(Public)	(83)	(4.3)	(194)	(6.7)	(210)	(8.1)
Change in stocks	-49	(-2.5)	28	(1.0)	-44	(-1.7)
Exports	390	(20.1)	598	(20.6)	562	(21.6)
Total Demand	1,940	(100.0)	2,904	(100.0)	2,598	(100.0)
Imports	485	(25.0)	839	(28.9)	556	(21.4)
GDP	1,455	(75.0)	2,065	(71.1)	2,042	(78.6)
Total Offer	1,940	(100.0)	2,904	(100.0)	2,598	(100.0)
Net factor income from abroad	-27		-106		-83	
GNP	1,428		1,959		1,959	
GNP per capita (Lp.)	493		590		542	

Note: *Preliminary figures

Source: Central Bank

Table A-06 BALANCE OF PAYMENT

(Unit: Lp.10^6)

	1978	1980	1981	1982	1983*
Exports	1,415.9	1,934.9	1,806.4	1,567.0	1,630.3
Imports	1,762.0	2,611.5	2,466.8	2,083.5	2,055.0
Trade Balance	-346.1	-676.7	-660.4	-516.5	-424.7
Transfers	34.6	43.0	55.0	60.0	89.0
C.A. Balance	-311.5	-633.6	-605.4	-456.5	-335.7
Capital Accounts					
Long term	324.1	541.2	428.4	329.0	310.1
Short term	6.9	21.9	27.3	-74.9	-10.2
Error & Omission	24.8	-37.0	4.9	17.4	-
BALANCE	44.3	-107.5	-144.8	-185.0	-35.8

Note: * Preliminary figures

Source: Boletin Estadístico, Central Bank

Table A-07 MAJOR EXPORTED COMMODITIES

(Unit: Lp.10^6)

	1978	1980	1981	1982	1983*
Banana	282.4	456.0	426.6	436.6	415.3
Coffee	422.0	408.2	345.7	306.2	302.4
Frozen meat	77.6	121.5	92.9	67.4	62.6
Shrimp & lobster	31.2	46.8	52.5	55.9	68.3
Sugar	11.0	58.7	93.1	44.5	55.7
Tobacco	2.8	27.4	26.7	21.5	22.0
Pine	13.5	15.6	14.2	17.6	n.a.
Cotton	31.1	26.9	24.9	13.0	9.4
Cigar	2.8	6.8	9.7	11.5	n.a.
Lumber	n.a.	72.4	86.3	89.3	79.3
Silver	21.9	63.5	31.5	18.6	49.5
Lead & zinc	45.3	39.8	41.3	32.4	58.5
Others	273.5	300.8	261.8	192.9	237.6
Total	1,215.1	1,644.2	1,507.2	1,307.4	1,360.6

Note: * Preliminary figure

Source: Cuentos Nacionales de Honduras, Central Bank
Boletin Estadístico, Central Bank

Table A-08 MAJOR IMPORTED COMMODITIES

(Unit: Lp.10^6)

	1980	1981	1982	1983
Food products	171.1	154.6	116.8	139.2
Beverage & tobacco	8.8	14.0	8.5	4.7
Crude materials other than foodstuff	22.2	19.7	14.1	18.7
Fuel and lubricants	342.3	326.4	340.1	341.6
Vegetable and animal oil and butter	23.3	22.7	10.8	8.2
Chemical products	308.6	332.2	256.3	314.6
Manufactured goods	423.8	412.0	307.6	351.0
Machinery and vehicles	600.9	496.2	273.6	257.4
Misc. manufactured goods	134.8	138.1	89.4	70.2
Misc. goods	2.8	4.1	6.6	5.9
Total	2,038.6	1,920.0	1,423.8	1,511.7

Table A-09 PRICE INDEX

Year	Consumer P. Index	Wholesale P. Index General	Wholesale P. Index Construction	El Cajon* P.Escalation
1978	100.0	100.0	100.0	
79				100.0
1980	132.4	125.6	126.8	114.0
81	144.8 (9.4)	136.4 (8.6)	142.1 (12.1)	125.3 (9.9)
82	158.4 (9.4)	150.2 (10.1)	146.8 (3.3)	131.5 (4.9)
83	172.5 (8.9)	161.9 (7.8)	154.9 (5.5)	138.8 (5.6)
84 (mid.)	n.a.	n.a.	n.a.	139.5

Note: * Price escalation applied for El Cajón project payment in local currency.

Source: Economía de Honduras, Central Bank
ENEE, El Cajón Project Office

ANNEX B

SECTORAL BACKGROUND

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SECTORAL BACKGROUND

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B. SECTORAL BACKGROUND

B.1 AGRICULTURE

B.1.1 Agricultural Land

Honduras is mainly dominated by mountainous topography, except for the northeastern part of the country. The flat lands are substantially limited, and they extend principally in the northern and southern coastal plains and along the valleys of major river systems. According to the study made by FAO, MRN and CONSUPLANE, the cultivable land is estimated at around 2.8 million ha, or approximately 25% of Honduran territory. Out of this cultivable land, about 1 million ha extend on the sloped highlands. Consequently, it appears to be of real importance to utilize, to the utmost extent, the lands apt to agricultural development.

According to the National Plan for Water Resources Development prepared by CONSUPLANE, the irrigable land in Honduras is estimated at around 0.4 million ha., or about 15% of the cultivable lands. The estimated irrigable lands account for approximately 20% of soils classified into soil type I and type II. On the other hand, the existing irrigation systems were limited to around 55,000 ha in 1982. (Refer to Table B-01)

In the South Region, which comprises Choluteca Department and Valle Department, there extend about 233,000 ha of arable lands, mainly in the coastal plains. The irrigable land in the region was estimated at around 57,000 ha, or approximately 15% of total irrigable land of the country.

The most popularly cultivated crop over the country is maize. It was cultivated in about 339,000 ha in 1981-82. As staple crops, beans and sorghum were cultivated in 76,500 ha and 58,400 ha, respectively. Cultivation of paddy was estimated at around 21,200 ha in 1981-82.

Cultivation of sugar cane covers about 52,000 ha, mainly in the Sula Valley and Choluteca river basin. Sugar cane has been mainly cultivated for 8 sugar mills. The acreage of cane cultivation for the sugar mills was estimated at around 33,300 ha in 1982-83, of which 21,000 ha were cultivated by farmers contracted by the sugar mills. Banana has been traditionally cultivated in the Sula Valley and northern plain, with an acreage of around 20,000 ha. Cultivation of coffee mainly extends on the sloped highlands over 120,000 ha. Land cultivated by cotton has decreased in recent years, while cultivation of sesame, fruits and horticulture has increased notably. (Refer to Table B-02)

B.1.2 Production

Maize, beans, sorghum and rice are the staple crops in Honduras. Production of maize was insufficient to meet the domestic demand up to the year 1980, and the country had to depend on imports. However, since 1981, maize production has exceeded 400,000 tons and attained quasi-self-sufficiency. Production of beans is approximately 50,000 tons, which is almost equivalent to the domestic consumption. Sorghum production has been relatively constant in the last decade, or slightly over 60,000 tons over the country. Production of rice increased in 1983, and it exceeded over domestic consumption for the first time in the last decade. (Refer to Table B-03 and B-04)

Production of the staple crops is geographically distributed, as shown on Table B-05. North Region accounted for, in 1982, 37% of the total maize production, 32% of beans and 65% of rice. On the other hand, South Region produced around 5% of the total production of maize and beans, with the implication that the demand in South Region had to be supplied from other regions. The reason for decrease in rice production in South Region is uncertain, but it would be partly attributable to the relatively high cost in pump irrigation. (Refer to Table B-05)

Productivity of grain cultivation still remains substantially low. Unit yield is estimated at around 1.2 ton per ha for maize, 0.6 ton per ha

for beans, and 1.7 ton per ha for rice. The productivity is substantially affected annually by weather conditions.

Production of sugar cane has increased since ACENSA and ACANSA started their operation in 1977 and AZUNOSA in 1978. Production to feed the 8 sugar mills in the country ranged from 2.4 to 2.6 million tons during the period from 1980-81 to 1982-83. The average yield of sugar cane was around 77 tons per ha in 1982-83. Production of crude sugar and white sugar reached 93,100 tons and 112,200 tons, respectively. A tax of Lp. 33.1 per ton of sugar is paid by the sugar mills. (Refer to Table B-06)

Production of cotton has decreased in line with reduction in the cropped area. Although the production reached 31,700 tons in 1977-78, it gradually decreased to 18,600 tons in 1981-82 and 8,200 tons in 1982-83. The production recovered in 1983-84 to reach 12,800 tons. A total of 151 producers, of which 19 were collective producers, form a cooperative which administers production, processing and export of cotton fiber and by-product. Productivity has been greatly affected by weather conditions. For instance, the yield per ha was 1.80 ton in 1982-83 and 2.84 tons in 1983-84. Export of cotton fiber was 3,430 tons in 1983-84. A tax is imposed on cotton fiber export at the rate of 1% of the FOB value. (Refer to Table B-07)

B.1.3 Settlement

Honduras has been promoting agrarian reform since the Agrarian Reform Law (Decreto-Ley No.170) was promulgated in January 1, 1975. The law has the objectives to redistribute land to landless or small-holding farmers to secure their participation in the socio-economic development of the country. Small-holding farmers are those who have land of less than 5 ha (Article 34). Under the Law, for instance, the land holding size is limited to 500 ha at maximum in the coastal plain of South Region. The Law stipulates that the holding size is limited to 100 ha in the state irrigation project area (Article 25).

Land exceeding such limitation, as well as land inefficiently utilized, is subject to expropriation. For instance, pasture land with less than 2 heads of cattles is deemed to be inefficiently utilized.

INA is acting as the executing agency for land reform, including land expropriation, redistribution, resettlement, cooperative activities, training, etc., and MRN, BANADESA and other institutions are cooperating for the promotion and stabilization of settlements. By September 1983, INA organized a total of 1,630 groups of settlement with 44,100 families in some 275,200 ha of land expropriated under the law. The land expropriated in 1982 was around 19,000 ha. (Refer to Table B-08)

In South Region, there are 247 groups of settlers, with 7,200 families benefited by the agrarian reform. The land acquired for settlers in the region is approximately 49,000 ha, of which about 16,200 ha are cultivated.

Settlers are usually organized into cooperatives or pre-cooperatives, and land tenure belongs to such organizations. Cooperatives or groups of settlers are obliged to repay for the land within 20 years. A minimum of 5 ha per family is distributed to settlers' groups.

B.1.4 Supporting Services

For the agricultural development, MRN, BANADESA, IHMA and other institutions are cooperating, in addition to INA. MRN is responsible for the technical aspects of agricultural development, including extension services, experiments and research, planning and study on development projects, seed multiplication, lease of agricultural machineries, training of farmers, etc. MRN has its regional offices, including an office in Choluteca with approximately 180 staffs. At the regional level, the Regional Agricultural Committee is organized to advise MRN Regional Director and to coordinate activities for the agricultural development of the region. The Committee is formed by representatives from CONSUPLANE, INA, BANADESA, IHMA, CODEFOR, ICAFE and 3 other institutions.

Services of MRN regional offices to farmers are usually extended through extension offices. For instance, the MRN Choluteca office has 16 extension officers and a total of 27 extension workers.

BANADESA is responsible for agricultural credits. Out of the total credits extended by BANADESA in 1983, about 60% or Lp. 133 million were extended for crop cultivation and 9% for livestock. Beneficiaries in crop cultivation reached around 62,400 individuals and cooperatives. (Refer to Table B-09) BANADESA's regional offices in South Region are located in Choluteca and Nacaome. Choluteca office provided around 3,800 credits in total amount of approximately Lp. 17 million in 1983. Agricultural credits are classified into 3 types, Prendaria, Hipotecaria and Fiduciaria. Prendaria is extended for farm inputs and other necessities for cultivation and livestock, as well as acquisition of farm machineries. Hipotecaria is destined for land acquisition, construction of irrigation canals, etc. The repayment conditions are different for the ordinary loan and Fidecomizo which is extended to the agrarian reform sector. In case of Fidecomizo, the annual interest is 13% and the repayment period is 12 months for farm inputs and 5 years at maximum for agricultural machineries. The ordinary loan has the annual interest rates of 15.58% (IBRD loan) and 19% (IDB loan). For the construction of irrigation canals and land acquisition, the repayment period is extended up to 12 years, with the maximum grace period of 4 years. Agricultural credits extended at present through BANADESA are found to be yet insufficient, quantitatively and qualitatively. To implement irrigation projects, it is desirable that credits are extended in more concessional terms and conditions and the amount of credits are increased to meet the farmers' requirements.

IHMA was organized in 1978 to be in charge of marketing of basic grains, with the principal objectives to stabilize market prices. Approximately 15% of the grain production are marketed through IHMA. Guaranteed prices for purchase of grains from farmers are annually fixed by IHMA, in the light of estimated production cost, demand and supply situation, incentives, etc. For instance, guaranteed prices are

Lp. 352 per ton for maize, Lp. 991 per ton for red beans and Lp. 485 per ton for paddy. (Refer to Table B-10) Slight adjustment is made in accordance with quality of products. For marketing, IHMA has storage facilities of around 80,000 tons in total over the country. (Capacity of private storage facilities is said to be around 35,000 tons in total) IHMA is also responsible for imports and exports of basic grains. For reference, the market prices in Honduras are relatively low for maize, beans and sorghum and relatively high for rice, if compared with prevailing market prices in other Central American Countries. (Refer to Table B-11)

B.1.5 Development Plans for Agriculture

Consumption of grain per capita shows some of the characteristics and trends in demand by regions and by income levels. Per capita consumption of maize and beans is higher in rural areas than urban areas. The consumption of maize and beans tends to gradually decrease in pace with the rise in income level. On the other hand, the per capita consumption of rice is higher in urban areas, and it is increasing when income level becomes higher. In the Atlantic coast region, for instance, the per capita consumption of rice was more than double of consumption in the South region, while consumption of maize in urban areas was less than half of consumption in the South region or national average. Apparently, the consumption of rice has a strong elasticity to per capita income. (Refer to Table B-12 and B-13)

If compared with the per capita grain consumption in other Central American countries, demand in Honduras still remains at a lower level though self-sufficiency in grain production is said to have been attained. For instance, the per capita consumption of rice in Nicaragua and Costa Rica is much higher, though consumption of maize tends to decrease in these countries. The tendency of rice consumption linked to per capita income is also observed in these countries.
(Refer to Table B-14)

The National Development Plan in the agricultural sector sets forth its objectives to increase production and productivity to meet the domestic demand and increase exports, and to improve and rationalize the

use of available human and natural resources. The Plan indicates a target for production to cover domestic demand and exports. For instance, production is planned to be increased by about 140,000 tons for maize and 26,000 tons for rice by 1986. Production of sesame, pineapple, tomato and melon is planned to be almost duplicated in the Plan period. A part of increased production in maize, beans and rice, as well as a major part of sesame and melon production, is destined for exports. (Refer to Table B-15 and B-16)

To attain the target production, the National Development Plan also sets forth a target area to be cultivated by each crop. The crop area is to be increased by around 42,000 ha for maize, 27,000 ha for beans and about 8,000 ha for rice by 1986. The area for cultivation of cotton is to be also increased to some extent. No increase in sugar cane and sorghum cultivation area is contemplated under the Plan. (Refer to Table B-17)

In the field of agrarian reform, the National Development Plan contemplates to resettle around 26,400 families in 163,200 ha to be expropriated in 1983-86.

The National Plan for Water Resources Development is also being promoted. Under the Plan, the implementation of irrigation systems in the Choluteca valley is taken up as one of the highest priority projects. Priority is also accorded to the consolidation of existing irrigation systems. Such schemes as the Ola irrigation and Buena Vista irrigation listed up in the National Plan will be incorporated into the Choluteca project if it is implemented.

The Water Resources Development Plan also contemplates to lay down a new water law. In Honduras, a water law was enacted in 1927, but water rights and water charges are practically ineffective at present. MRN is finalizing the text of the water law at the moment, and it is expected that the water law will be approved by the cabinet in the near future. The promulgation of the water law is considered to be essential for the implementation of irrigation systems, like the Choluteca project.

B.2 ELECTRIC POWER

B.2.1 Present Situation

Electric power in Honduras is supplied principally by ENEE, which is an autonomous institution. ENEE's policy is, in principle, subject to approval by its Board of Directors, composed of ministers for SECOPT, CONSUPLANE, MRN and Finance. Power supply by ENEE is divided into the central interconnected system and isolated system. The isolated system is sporadically located and fed by 18 small power plants, mainly of diesel type, with a total installed capacity of about 13 MW. Net energy generated by the isolated system was around 28 GWh, or 2.5% of total energy generated by ENEE in 1983.

The central interconnected system is fed by hydropower stations (131 MW) and thermal power stations (99 MW). The existing hydropower stations are Canaveral (28.5 MW), Rio Lindo (80 MW) and El Nispero (22.5 MW). The Canaveral and Rio Lindo stations are utilizing water regulated by the Yojoa Lake, while El Nispero station on the Paloja river is a run-of-river type power station. In 1983, the Canaveral station produced around 195 GWh and Rio Lindo station generated 572 GWh. El Nispero station, constructed in 1982, produced around 67 GWh in 1983, of which 47 GWh was generated in the rainy season from May to October and 20 GWh in the dry season. The annual firm energy of El Nispero station is designed at 40 GWh. The shortage of power generation by hydro stations is met by 4 diesel power stations (97 GWh in 1983) and 2 gas turbine power stations (25 GWh), as well as by purchase from Costa Rica through interconnection system (146 GWh). (Refer to Table B-18 to B-20 and Figure B-01)

Sold energy of the central interconnected system increased from 550 GWh in 1977 to 900 GWh in 1983, with the average annual growth rate of 9.6%. On the other hand, the peak demand increased from 96 MW in 1975 to 181 MW in 1983, at the rate of 8.2% per annum. The sectoral demand is about 30 - 31% in residential sector, 15% in commercial sector, 47 - 48% in industrial and bulk power consumption and 6 - 7% in government, municipal

and public lighting sector. Energy loss through transmission and distribution systems was around 18% in 1982-83. (Refer to Table B-21 and B-22)

Power sales revenue in the interconnected system averaged Lp. 0.160 per kWh in 1983. The sales revenue per kWh increased at the average annual rate of about 9% in 1980-83. (Refer to Table B-23) On the other hand, power cost was estimated at Lp. 0.0277 per kWh for operation and maintenance of generating plants, Lp. 0.0026 per kWh for transmission and Lp. 0.0067 per kWh for distribution systems. (Refer to Table B-24) Price of fuels has remained, since 1981, at Lp. 2.2366 per gallon for diesel and Lp. 1.294 per gallon for Bunker-C. (Refer to Table B-25)

B.2.2 Power Expansion Program

ENEE has drawn a demand forecast up to year 2010. According to the forecast, the peak demand will reach 344 MW in 1990, 426 MW in 1993 and around 670 MW in year 2000. The average annual growth rate of peak demand is estimated at 8.4% in the late 1980's and 6.9% in 1990's. The growth of demand is forecasted to decrease to 5.9% per annum in 2000 - 2010. The load factor is estimated at around 62%. (Refer to Table B-26)

ENEE expects that the demand up to year 1993 will be covered by the El Cajon hydroelectric project, which is scheduled to complete in 1985. The El Cajon power station has an installed capacity of 292 MW (4 units x 73 MW) and generates 986 GWh of firm energy or 1,243 GWh of average energy output. ENEE contemplates to retire all gas turbine and diesel stations by 1994, except for the Puerto Cortes diesel station. Consequently, it is expected that the capacity of power supply will turn to be critical in or around 1994.

Updating study on hydroelectric development programs is being finalized by ENEE. The study contemplates to select the schemes to be

implemented by year 2001. According to the draft final report prepared by ENEE, the most promising program is to install gas turbine stations (3 units x 25 MW) in 1993-94 and to complete the Remolino hydroelectric project (125 MW, located downstream of El Cajon) by 1995. Installation of additional 3 units of gas turbine stations (75 MW in total), a steam power station (75 MW) and a hydropower station (72 MW) is envisaged by year 2001. (Refer to Table B-27 and Figure B-02)

In view of the power situation in 1990's, ENEE has shown interest in developing hydropower generation by utilizing water to be stored for the Choluteca project. Even in case that the stored water is principally used for irrigation and power is mainly generated during the dry season, the power generation by the Choluteca project appears to be effective in supplementing the energy output in the dry season.

B.3 WATER SUPPLY AND WATERSHED MANAGEMENT

B.3.1 Water Supply

Water supply over the country is administered by SANAA. For the development of the Choluteca river basin, water supply for the Metropolitan area (Tegucigalpa - Comayaguera) and Choluteca city is mostly related, and the situation of water supply in these areas is briefly summarized hereunder.

1) Water Supply to Metropolitan Area:

Demand for water supply in the metropolitan area has been sharply increasing, in line with the rapid growth in population in the Central District. As noted in Annex A.1.1, urban population increased at the rate of 6.1% per annum in 1981-83. SANAA estimated that the urban population in the metropolitan area will reach 665,000 in 1990 and 1.1 million in year 2000. Demand for water supply is estimated at around 111,000 m^3/day in 1990 and 240,000 m^3/day in 2000. By improving the loss in water supply, the requirement for production of potable water is estimated to reach 149,000 m^3/day (about 1.72 m^3/sec or 54.4 million m^3/year) in 1990 and 300,000 m^3/day (about 3.47 m^3/sec or 109.5 million m^3/year) in 2000. (Refer to Table B-28)

SANAA has, at present, a capacity to produce 88,800 m^3/day (or 32.4 million m^3/year) of potable water for the metropolitan area, including the Los Laureles scheme completed in 1977 with a capacity of 52,800 m^3/day. To meet the forecasted demand up to year 2010, SANAA prepared a master plan for development of water supply to Tegucigalpa, D.C. in 1979-80. Under the master plan, 8 water supply schemes have been identified and recommended, including 4 dam-reservoir schemes, 2 water diversion from rivers and 2 groundwater exploration schemes. By year 2000, it is required to implement the Guacerique reservoir scheme, Concepcion reservoir scheme, Zinguizapa water diversion scheme and Rio Hondo - Amarateca groundwater scheme. (Refer to Table B-29 and Figure B-03)

The Guacerique reservoir scheme has been accorded priority and detailed design for the scheme has already been prepared. Although it was originally planned to be constructed by 1986, it has been recently modified to be implemented by 1991. The Guacerique scheme is designed to secure water of 88,200 m^3/day (1.02 m^3/s), by constructing a 64 m high fill-type dam on the Guacerique river, a tributary of the Choluteca river. The cost of treated water is estimated at Lp. 0.9/m^3 at 1982 prices. (Under the master plan in 1979-80, it was estimated at Lp. 0.45/m^3.) The construction cost of the scheme is estimated at around Lp. 260 million (updated). The second priority reservoir scheme, the Concepcion project, will cost much higher in water production. The project contemplates to produce 118,400 m^3/day (1.37 m^3/s) of water at the total project construction cost estimated to exceed well over Lp. 400 million, including construction of a 108.5 m high dam for water storage. (Refer to Table B-30)

Water cost of the Concepcion project, as well as the Tatumbla and Sabacuante reservoir schemes scheduled for completion in year 2002 - 2003, is substantially high. Although water supply from the San Fernando dam to be contemplated under the Choluteca agricultural development project has not been studied by SANAA, it appears worthwhile to make a preliminary study on the water pump-up from the San Fernando reservoir to Tegucigalpa. Under such an alternative plan, the location of intake of water will preferably be planned at the outlet of the tributary or Hombre river (catchment area of about 350 km^2) to avoid, as far as possible, intake of water contaminated in the Central District and carried down in the main-stream of Choluteca river.

2) Water Supply to Choluteca City:

The urban population in Choluteca has also been increasing sharply (at around 6% per annum in 1979-83). Potential demand of water supply is estimated at around 10,000 m3/day (or 3.7 million m^3/year) in 1983. At present, potable water is supplied by pumping-up from the Choluteca river, old water conduit from the watershed of Sampile river and 6 deep tubewells. Total capacity of water supply is estimated at 4,400 m^3/day (or 1.6 million m^3/year), or less than a half of the potential demand. (Refer to Table B-31)

In view of the water quality, availability and cost, it appears desirable to explore and utilize groundwater to satisfy the present and future requirement of water supply in Choluteca city. According to the groundwater study conducted in the Choluteca valley in 1979-80, additional exploitation of groundwater in the Choluteca plain was assessed to be feasible, though limited as it was. Since the additionally exploitable groundwater potential was estimated at around 4 - 6 million m^3/year, it is desirable that such a potential will not be used for irrigation, but utilized for municipal water supply in future. Further, it appears preferable that irrigation by groundwater in the Choluteca plain will be substituted by surface-water irrigation, in order to prevent further intrusion of salty water and to reserve groundwater for municipal and industrial water supply in the plain.

B.3.2 Watershed Management

Honduras is endowed with water, soil and forest. However, deterioration of such natural resources is rapidly worthening. For instance, it is said that around 80,000 ha of broad-leaved forest is annually destroyed, though the deterioration of coniferous forest is much smaller. It will affect water conservation, cause prolongation of drought, more severe floods, soil erosion and landslides, increase in sediment, etc.

The Choluteca river basin is not an exceptional case. Uncontrolled deforestation is in progress, and inappropriate farming practices, like shifting cultivation, are prevailing. Although CODEFOR is responsible for control and utilization of public and private forest over the country and some forestal protection projects were carried out in the Choluteca river basin, more determined efforts were required for integrated management of the basin. Under such circumstances, the Office of Natural Resources Management Project was organized by MRN in 1980. The Project first took up the watershed management in the Choluteca river basin, and is executing the program with a special fund allocated by the Government and donated by AID.

Under the project for watershed management in the Choluteca river basin, 5 sub-basin development programs have been selected and scheduled for execution in 1982-87. (Refer to Figure B-04) The programs incorporate soil and water conservation in agricultural land in the sloped area, management of pasture land in the sloped area, reforestation to recuperate watershed and to secure firewood for small farmers, and promotion of training and community development in watershed. For instance, in the upper-most sub-basin (about 606 km^2 located upstream of Tegucigalpa) where more than 30% of land is presently used for agricultural land, pasture land and populated centers, it is programmed to implement in 1984 reforestation and forest management over 45 km^2, as well as soil conservation and pasture management over 600 ha. (Refer to Table B-32 and B-33)

The promotion of watershed management is of vital significance for the development of water resources in the country. In relation to the Choluteca dam and irrigation project, the primary concern is given to management of the basin upstream of the proposed San Fernando dam. In this context, it is desirable that the programs contemplated for the upper-most sub-basin be extended to cover the rest of the catchment area at the San Fernando damsite.

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TABLES

Table B-01 CULTIVABLE AREA BY REGION

	Total Area (km^2)	Arable Land (10^3 ha)	Irrigable Land (10^3 ha)	Irrigated Land, 1982 (10^3 ha)
South (Choluteca)	6,583	232.6	57.0	7.7
North (Sula)	16,165	373.9	164.6	30.5
Central (Comayagua)	8,070	82.5	21.9	4.9
South Central (Teguc)	16,065	181.5	15.0	3.0
West (Copán)	10,139	82.7	4.5	0.0
South East (Olancho)	18,367	188.0	50.4	0.3
North East (Aguán)	15,610	396.7	51.5	8.0
East (Mosquitia)	21,089	1,262.1	35.1	-
Total	112,088	2,800.0	400.0	54.4

Source: National Plan for Water Resources, CONSUPLANE

Table B-02 HARVESTED AREA OF MAJOR CROPS IN HONDURAS

(Unit: 10^3 ha)

	1975-76	1977-78	1979-80	1981-82
Maize	330.5	430.9	352.0	339.0
Coffee	110.4	114.2	152.6	122.5
Bean (frijol)	73.5	76.7	59.8	76.5
Sorghum (Maicillo)	55.6	65.8	51.7	58.4
Sugar cane	28.2	27.5	23.6	52.2
Paddy	20.7	15.3	20.3	21.2
Banana	19.2	20.0	20.9	17.6
Cotton	4.6	17.7	12.7	8.0
Sesame	1.4	1.5	4.4	4.1
Pine	1.4	1.6	3.2	4.0
Tomato	2.1	2.7	1.6	3.5
Water melon	1.3	1.5	1.0	1.5
Melon	0.5	0.6	0.7	1.2

Source: Anuario Estadistico 1982, DG de Estadistica y Censos

Table B-03 PRODUCTION OF MAJOR CROPS IN HONDURAS

(Unit: 10^3 tons)

Year	Banana	Maize	Sorghum	Rice	Beans	Coffee	Cotton	Sugar
1975	787	343	61	22	48	51	15	1,558
1976	1,084	378	64	23	43	50	9	1,647
1977	1,221	381	61	19	43	48	20	1,955
1978	1,240	420	61	24	44	64	32	2,094
1979	1,450	362	62	27	44	75	21	2,557
1980	1,426	366	62	29	45	73	25	2,868
1981	1,323	410	59	32	51	73	21	2,882
1982	1,432	404	58	35	49	73	18	3,055
1983*	1,188	409	62	39	52	86	8	3,153

Note: * Preliminary figures

Source: Central Bank, July 1984

Table B-04 PRODUCTION AND CONSUMPTION OF GRAIN

(Unit: 10^3 tons)

Crop	Year	Production	Export	Import	Variation	Consumption
Maize	1975	343.4	-	43.0	27.2	359.2
	1976	378.2	17.5	0.7	-3.1	364.5
	1977	381.0	0.5	15.3	-27.7	423.5
	1978	420.4	-	39.8	5.6	454.6
	1979	362.4	0.4	7.5	-1.8	371.3
	1980	366.1	-	64.2	8.2	422.1
	1981	409.8	0.3	17.7	24.1	403.1
	1982	404.4	6.4	5.7	-4.4	408.1
	1983*	401.3	3.2	13.6	-7.9	419.6
Beans	1975	47.6	3.4	0.4	2.4	42.2
	1976	43.0	1.4	-	-1.4	43.0
	1977	43.2	2.3	0.2	-2.9	44.0
	1978	44.5	0.1	0.2	-0.6	45.2
	1979	44.0	-	0.3	-2.4	46.7
	1980	45.0	-	2.8	1.5	46.3
	1981	51.0	2.8	-	-	48.2
	1982	56.0	2.6	0.1	4.2	49.3
	1983*	46.5	3.0	-	-6.7	50.2
Rice	1975	22.1		10.4	6.7	25.8
	1976	22.8		1.3	-2.3	26.4
	1977	19.0		4.9	-4.7	28.6
	1978	24.3		4.4	-0.7	29.4
	1979	26.8		4.9	1.3	30.4
	1980	29.4		3.8	1.5	31.7
	1981	32.3		1.7	-2.0	36.0
	1982	34.5		2.8	0.5	36.8
	1983*	43.4		0.1	5.7	37.8

Note: * Preliminary figures

Source: Central Bank, July 1984

Table B-05 REGIONAL DISTRIBUTION OF GRAIN PRODUCTION

(Unit: %)

Crop	Region	1975	1980	1982
Maize	South	6.8	9.0	5.1
	West Central	6.4	9.1	6.3
	North	34.9	22.4	36.6
	Atlantic Coast	11.4	16.6	12.0
	North East	15.4	14.9	20.3
	East Central	7.9	11.9	12.9
	West	17.2	16.1	6.8
		(100.0)	(100.0)	(100.0)
Beans	South	6.0	4.3	5.5
	West Central	6.8	11.1	10.9
	North	24.5	14.5	31.6
	Atlantic Coast	6.6	11.7	6.4
	North East	14.1	18.0	18.6
	East Central	27.5	25.1	15.8
	West	14.5	15.3	11.2
		(100.0)	(100.0)	(100.0)
Rice	South	19.0	23.0	1.4
	West Central	4.4	11.2	11.6
	North	41.3	23.5	65.3
	Atlantic Coast	13.6	20.5	16.8
	North East	14.1	8.8	3.3
	East Central	2.3	1.1	1.4
	West	5.3	11.9	0.2
		(100.0)	(100.0)	(100.0)

Source: Central Bank

Table B-06 SUGAR CANE CULTIVATION BY SUGAR MILLS

Sugar Mill	Croped Area (ha)*			Harvested Cane (10^3 tons)	Sugar Production (10^3 tons)	
	Proper	Contracted	Total		Crude	White
ACHSA	1,408	1,646	3,054	247.6	-	21.5
ACENSA	2,350	4,233	6,583	454.3	17.4	20.2
ACANSA	158	2,380	2,538	120.8	-	12.0
CAHSA	4,589	6,542	11,131	904.2	72.1	5.8
ACHUMSA	1,970	538	2,508	124.9	-	9.3
AZUNOSA	1,212	2,741	3,953	311.5	3.6	18.7
AYSA	635	2,930	3,565	289.3	-	24.7
TOTAL	12,322	21,010	33,332	2,452.6	93.1	112.2

Note: * Harvest in 1982-83

Source: Association of Sugar Producers in Honduras

Table B-07 COTTON CULTIVATION IN HONDURAS

Year/ Department	Cultivated Area (ha)	Product. (ton)	Product. (t/ha)	Producers Price (Lp./t)	Export Price (Lp./t) Fiber	Export Price (Lp./t) Seed
1975-76	4,619	8,745	1.89	926	2,383	-
1976-77	10,287	19,838	1.93	1,125	2,954	-
1977-78	17,779	31,744	1.79	956	2,501	-
1978-79	11,998	21,160	1.76	1,061	2,930	-
1979-80	11,168	24,753	2.22	1,093	3,059	287
1980-81	8,578	21,181	2.47	1,255	3,622	294
1981-82	8,031	18,597	2.32	926	2,618	303
1982-83	4,393	8,185	1.86	998	2,752	303
Choluteca	860	1,552	1.80			
Valle	2,138	3,837	1.79			
Orancho	849	1,388	1.63			
Fco. Morazan	91	159	1.75			
El Paraiso	455	1,249	2.75			
1983-84	4,527	12,848	2.84	1,256	3,429	308
Choluteca	527	1,320	2.50			
Valle	1,924	5,553	2.89			
Orancho	1,059	2,860	2.70			
Fco. Morazan	646	1,896	2.93			
El Paraiso	371	1,219	3.29			

Table B-08 SMALL-FARMERS GROUP OF INA PROJECTS

Region/Project	No. of Groups	No. of Members (act.)	Land Acquired (ha)	Cultivated Land (ha)
South:				
Ola-Monjaras	25	381	2,781	2,491
San Bernardo	98	2,118	14,715	11,357
Consolidation	124	4,700	31,573	26,348
North:				
Guaymas	59	1,503	8,187	7,857
San Manuel	44	988	7,502	6,880
Tobacco	12	307	1,738	1,480
Consolidation	414	12,900	60,276	48,567
Central:				
Consolidation	153	3,305	24,866	17,614
West:				
Consolidation	207	6,491	15,805	13,223
North East:				
Consolidation	140	1,868	13,528	9,537
East Central:				
Jamastran	4	106	1,348	1,246
Consolidation	78	1,540	15,474	13,343
Talanga	42	1,234	5,380	3,914
Atlantic Coast:				
Masica	56	920	5,688	5,128
Puerto Arturo	25	369	2,336	2,162
Bajo Aguan	94	4,209	57,169	50,840
Consolidation	58	1,178	6,823	6,636
TOTAL	1,632	44,117	275,189	228,623

Source: Directory of Small Farmers Group, Sept. 1983, INA

Table B-09 CREDIT EXTENDED BY BANADESA

	Total in 1983		Choluteca Region	
	No. of Credit	Amount (Lp.10³)	No. of Credit	Amount (Lp.10³)
Crop:				
Maize	32,229	29,234	868	293
Sorghum	1,979	2,753	206	109
Rice	10,014	16,308	105	4,949
Beans	10,387	3,513	61	30
Coffee	3,252	27,190	168	627
Cotton	636	6,762	45	516
Sugar cane	948	32,088	749	3,132
Sesame	411	218	202	72
Tomato	160	167	-	-
Water melon	577	690	67	178
Melon	644	1,953	480	1,184
Other crops	1,197	11,867	17	684
Sub-Total	62,434	132,743	2,968	11,774
Forestry & fishery	13	1,863	-	-
Livestock, poultry	3,798	18,897	692	3,560
Industry, commerce	668	30,823	119	1,328
Refinance	881	36,423	15	285
Others	9	81	-	-
TOTAL	67,803	220,830	3,794	16,947

Source: Boletin Estadistico, BANADESA

Table B-10 MARKET PRICE OF GRAIN IN HONDURAS

(Unit: Lps./ton)

	1980-81	1981-82	1982-83	1983-84	1984-85
Maize					
Purchase by IMA (Min.)	308	352	352	352	352
Sold by IMA	401	430	418	448	-
Wholesale price	451	389	451	449	-
Beans (red)					
Purchase by IMA (Min.)	859	1,184	1,074	1,074	991
Sold by IMA	1,006	1,393	1,455	991	1,181
Wholesale price	1,457	1,004	897	1,140	-
Sorghum					
Purchase by IMA (Min.)	281	325	325	325	325
Sold by IMA	366	-	369	396	-
Wholesale price	413	373	441	425	-
Rice (ordinary)					
Purchase by IMA (Min.)	507	558	558	457	485
Sold by IMA	1,104	1,233	1,307	1,282	-
Wholesale price	1,181	1,309	1,235	1,124	-

Source: IHMA

Table B-11 MARKET PRICE OF GRAIN IN CENTRAL AMERICA*

(Unit: Lps./ton)

	Honduras	Guatemala	El Salvador	Nicaragua	Costa Rica
Maize (white)					
Wholesale price	356	383	634	441	520
Consumer price	397	573	772	838	573
Beans (red)					
Wholesale price	1,211	n.a.	1,248	1,542	1,451
Consumer price	1,323	1,235	1,499	2,095	1,588
Sorghum					
Wholesale price	334	n.a.	352	396	463
Consumer price	441	573	441	573	n.a.
Rice (second)					
Wholesale price	1,486	1,101	1,204	1,277	n.a.
Consumer price	1,654	1,279	1,345	1,521	1,235

Note: * Price in June 1984

Source: CONSUPLANE

Table B-12 CONSUMPTION OF GRAIN IN HONDURAS (1978-79)

(Unit: gram)

	Maize	Beans	Rice
Per Capita Consumption in Urban Area			
South region	182.0	39.9	32.5
West region	214.2	53.8	29.4
Atlantic coast	70.8	47.4	69.9
Mean	154.5	46.9	44.3
Per Capita Consumption in Rural Area			
South region	240.1	58.8	23.2
West region	307.2	74.5	10.5
Atlantic coast	176.8	60.3	59.5
Mean	234.0	63.7	32.4
Average per Capita Consumption			
South region	204.4	46.8	29.0
West region	246.4	59.9	22.9
Atlantic coast	111.3	52.3	66.0
Mean	184.9	52.8	40.0

Source: CONSUPLANE

Table B-13 CONSUMPTION OF GRAIN BY INCOME LEVEL

(Unit: gram/capita/day)

Income Level	Maize	Beans	Rice
Urban Area:			
0 - 100	288.5	60.6	13.4
100 - 300	237.8	59.0	29.1
300 - 500	194.1	48.9	38.5
500 - 1,000	185.4	46.9	42.5
Over 1,000	179.1	45.8	59.7
Total	213.2	52.8	35.8
Rural Area:			
0 - 100	277.9	69.8	18.6
100 - 300	244.7	57.7	35.9
300 - 500	179.6	47.8	46.1
500 - 1,000	178.7	43.8	44.4
Over 1,000	209.5	58.6	31.6
Total	227.8	58.4	34.1
Average:			
0 - 100	201.1	44.2	14.7
100 - 300	239.0	55.8	40.2
300 - 500	207.0	47.5	44.9
500 - 1,000	191.1	40.5	46.1
Over 1,000	164.7	30.8	45.4
Total	196.0	42.3	44.5

Source: Tratado General de Integracion Economica Centroamericana, Sept. 1983

Table B-14 CONSUMPTION OF GRAIN IN CENTRAL AMERICA

	Honduras	Guatemala	El Salvador	Nicaragua	Costa Rica
Estimated Population* in 1984 (10^3 prs)	4,232	7,847	5,423	2,663	2,453
GDP per Capita* in 1982 (1980 US$)	610	1,111	560	935	1,310
Maize:					
Estimated demand** (10^3 tons)	417.2	1,062.1	527.1	253.3	70.8
Estimated per capita consumption (kg/year)	98.6	135.4	97.2	95.1	28.9
Beans:					
Estimated demand** (10^3 tons)	41.9	119.0	43.4	58.4	23.4
Estimated per capita consumption (kg/year)	9.9	15.2	8.0	21.9	9.5
Rice:					
Estimated demand** (10^3 tons)	24.3	30.3	32.1	94.8	118.3
Estimated per capita consumption (kg/year)	5.7	3.9	5.9	35.6	48.2

Source: * Economic and Social Progress in Latin America, 1983, IDB
** Tratado Central de Integracion Economica Centroamericana, August 1984

Table B-15 PRODUCTION TARGET UNDER NATIONAL DEVELOPMENT PLAN

(Unit: 10^3 tons)

Crop	Production in 1980-82	Production* in 1982-83	Target for 1986	To be ** Increased
Banana	1,171	1,310	1,346	36
Maize	430	407	549	142
Sorghum	48	60	57	-
Rice	38	37	63	26
Beans	38	51	76	25
Coffee	70	80	75	-
Cotton	8	13	9	-
Sugar Cane	2,683	3,104	2,162	-
Sesame	0.7	-	1.2	0.5
Pineapple	151	-	373	222
Tomato	35	-	69	34
Water Melon	5.2	-	6.6	1.4
Melon	4.6	-	8.8	4.2

Note: * Average annual production in 1982-83, Ref. Table
** Production to be increased from 1982-83 (or 1980-82) to 1986.

Source: National Development Plan for Agricultural Sector, CONSUPLANE

Table B-16 TARGET FOR EXPORT OF AGRICULTURAL PRODUCTS

Product	Target Export (10^3 tons)	Production in 1980-82	Production to be increased
Banana	954.3	822.3	132
Maize	7.4	-	7.4
Rice	10.1	-	10.1
Beans	30.9	0.6	30.3
Coffee	68.3	59.6	8.7
Cotton	9.3	7.7	1.6
Sesame	1.2	0.6	0.6
Pineapple	34.2	26.8	7.4
Tomato	10.1	2.2	7.9
Melon	5.3	1.8	3.5

Source: National Development Plan for Agricultural Sector, CONSUPLANE

Table B-17 CULTIVATION TARGET UNDER NATIONAL DEVELOPMENT PLAN

Crop	Target Production (10^3 t)	Target Yield/ha	Target Area (10^3 ha)	Area in 1981-82	Area to be increased (10^3 ha)
Banana	1,346	68	19.8	17.6	2.2
Maize	549	1.44	381	339	42
Sorghum	57	0.96	60	76	-
Rice	63	2.16	29	21	8
Beans	76	0.73	104	77	27
Coffee	75	0.61	123	123	-
Cotton	9	0.89	11	8	3
Sugar Cane	2,162	48.25	45	52	-
Sesame	1.2	0.60	2	4	-
Pineapple	373	49	8	4	4
Tomato	69	14.60	4.7	3.5	1.2
Water Melon	6.6	4.13	1.6	1.5	0.1
Melon	8.8	6.77	1.3	1.2	0.1

Source: National Development Plan for Agricultural Sector, CONSUPLANE

Table B-18 INSTALLED CAPACITY OF ENEE SYSTEM

(Unit: MW)

	Type	1975	1980	1982	1983
Interconnected					
Hydro-plant:					
Canaveral	Hydro	28.5	28.5	28.5	28.5
Rio Lindo	"	40.0	80.0	80.0	80.0
El Nispero	"	-	-	22.5	22.5
Sub-Total		(68.5)	(108.5)	(131.0)	(131.0)
Thermal-plant:					
Santa Fe	Diesel	10.0	10.0	10.0	10.0
Puerto Cortes	"	-	30.0	30.0	30.0
La Ceiba	"	26.6	26.6	26.6	26.6
San Lorenzo	"	4.2	4.2	4.2	4.2
S.P. Sula	Gas	15.0	15.0	15.0	15.0
Miraflores	"	13.6	13.6	13.6	13.6
Sub-Total		(69.4)	(99.4)	(99.4)	(99.4)
Isolated System					
	Hydro	0.1	0.3	0.3	0.3
	Diesel	8.1	13.3	12.9	12.5
Sub-Total		(9.2)	(13.6)	(13.2)	(12.8)
Total	Hydro	68.6	108.8	131.3	131.3
	Diesel	48.9	84.1	83.7	83.3
	Gas	28.6	28.6	28.6	28.6
	Total	145.9	221.5	243.6	243.2

Source: ENEE
Anuario Estadistico, DG de Estadistica y Censos

Table B-19 NET ENERGY GENERATED BY ENEE

(Unit: GWh)

Year	Interconnected				Isolated System	Total
	Total	Hydro	Diesel	Gas		
1975	483.6				26.9	510.5
1976	547.3				12.9	560.2
1977	634.5	468.9	82.4	83.2	15.5	650.0
1978	699.0	646.6	22.2	30.2	21.2	720.2
1979	796.4	740.7	19.9	35.8	23.0	819.4
1980	873.5	782.1	38.1	53.3	25.7	899.2
1981	953.4	820.4	23.2	109.8	25.6	979.0
1982	1,010.0	846.0	46.5	117.5	27.1	1,037.1
1983	1,097.5	832.9	n.a.	n.a.	27.6	1,125.1

Source: ENEE
Anuario Estadistico

Table B-20 MONTHLY ENERGY GENERATED BY MAJOR PLANTS IN 1983

(Unit: GWh)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Hydro:												
Canaveral	18.8	17.5	19.9	18.8	20.6	17.6	16.4	16.8	12.5	11.7	11.3	13.1
Rio Lindo	47.5	49.6	56.1	53.1	57.1	51.9	48.2	51.4	40.3	39.5	36.3	40.9
Nispero	2.7	1.3	1.0	1.2	0.7	4.7	9.6	8.0	13.8	9.5	9.4	3.6
Diesel:												
Santa Fe	-	-	0.1	0.1	0.4	0.3	0.2	0.1	0.6	0.5	0.3	0.1
P. Cortes	5.4	5.8	6.7	6.4	6.7	4.9	4.6	2.0	4.1	5.3	4.3	5.2
L. Ceiba	5.7	6.2	6.1	0.5	-	0.6	0.8	0.5	3.0	4.1	2.7	3.2
S. Lorenzo	-	-	-	-	-	-	-	-	-	-	-	-
Gas:												
S.P. Sula	0.6	1.9	2.2	1.5	2.7	0.6	0.2	0.1	1.0	0.8	0.0	0.0
Mirafl.	1.8	2.0	1.5	2.3	2.4	0.2	0.1	0.3	0.7	1.1	0.0	0.0
Imported:	1.6	0.1	2.5	6.7	9.9	4.7	6.4	11.8	16.4	21.1	30.2	32.0

Source: ENEE

Table B-21 ENERGY GENERATED AND SOLD BY ENEE

Year	Net Energy Generated		Energy Sold		Energy Loss		
	Total	Inter-connected	Total	Inter-connected	Total	Inter-connected	(%)
1977	650.0	634.5	561.7	548.7	88.3	85.8	(13.5)
1978	720.2	699.0	584.1	567.8	136.1	131.2	(18.8)
1979	819.4	796.4	691.5	674.3	127.9	122.1	(15.3)
1980	899.2	873.5	768.5	749.8	130.7	123.7	(14.2)
1981	979.0	953.4	841.1	821.4	137.9	132.0	(13.8)
1982	1,037.1	1,010.0	855.5	834.5	181.6	175.5	(17.4)
1983	1,125.1	1,097.5	919.6	897.2	205.5	200.3	(18.3)

Source: ENEE

Table B-22 ENERGY SOLD BY SECTOR

(Unit: GWh)

	Residen-cial	Commer-cial	Indus-trial	Bulk Consum.	Gov. & Munic.	Public Light	Others
1975							
Total	103.2	64.4	47.4	193.5	15.4	11.5	0.9
(%)	(23.7)	(14.8)	(10.9)	(44.4)	(3.5)	(2.6)	(0.2)
1982							
Total	264.4	131.6	152.3	248.0	30.5	19.2	8.5
(%)	(30.9)	(15.4)	(17.8)	(29.0)	(3.6)	(2.2)	(1.0)
Interconn.	252.7	129.8	148.1	248.0	28.2	18.1	8.5
(%)	(30.3)	(15.6)	(17.8)	(29.8)	(3.4)	(2.2)	(1.0)
Isolated	11.7	1.8	4.2	-	2.3	1.1	-
(%)	(55.5)	(8.5)	(19.9)	-	(10.9)	(5.2)	-
1983							
Total	281.5	137.1	162.2	276.6	37.7	24.6	-
(%)	(30.6)	(14.9)	(17.6)	(30.1)	(4.1)	(2.7)	-

Source: ENEE

Table B-23 AVERAGE POWER SALES PRICE OF ENEE

	Total Sale		Interconnected		Isolated	
	Sold Energy (GWh)	Price (Lp./kWh)	Sold Energy (GWh)	Price (Lp./kWh)	Sold Energy (GWh)	Price (Lp./kWh)
1977	554.0	0.099	541.0	0.096	13.0	0.211
1978	596.3	0.102	580.0	0.099	16.3	0.198
1979	679.0	0.111	661.8	0.107	17.2	0.246
1980	759.0	0.129	740.3	0.125	18.7	0.313
1981	824.5	0.137	804.8	0.133	19.7	0.332
1982	850.4	0.148	829.3	0.143	21.0	0.348
1983	919.6	0.164	897.2	0.160	22.3	0.345
Residential	281.5	0.182				
Commercial	137.1	0.195				
Industrial	162.2	0.167				
Bulk cons.	276.6	0.136				
Gov. Mun.	37.7	0.168				
Public Light	24.6	0.074				

Source: ENEE

Table B-24 POWER COST IN 1983

(Unit: Lps./kWh)

	Direct Cost of Generation	Cost of Transmission	Cost of Distribution
Interconnected:	0.0277	0.0026	0.0067
Hydro:	0.0033		
Canaveral	0.0087		
Rio Lindo	0.0007		
Nispero	0.0099		
Thermal:	0.1834		
Santa Fe	0.3804		
P. Cortes	0.1172		
La Ceiba	0.1605		
San Lorenzo	0.5446		
S.P. Sula	0.2881		
Miraflores	0.3804		
Isolated System:	0.3405	-	0.0372

Source: ENEE

Table B-25 PRICE OF FUEL PURCHASED BY ENEE

(Unit: Lps./Galon)

	Diesel*	Bunker*
1977	0.9308	0.5940
1978	0.9813	0.6940
1979	1.3032	0.7440
1980	2.0191	0.9957
1981	2.2366	1.2940
1982	2.2366	1.2940
1983	2.2366	1.2940
1984	2.2366	1.2940

Source: ENEE

Table B-26 LOAD FORECAST BY ENEE

Year	Peak Load (MW)	Energy Demand (GWh)	Average Growth
1984	214	1,163	
1985	233	1,265	
1986	253	1,373	
1987	274	1,488	8.4%
1988	296	1,608	
1989	319	1,735	
1990	344	1,868	
1991	364	1,977	
1992	397	2,156	
1993	426	2,314	
1994	456	2,477	
1995	487	2,645	6.9%
1996	520	2,824	
1997	555	3,014	
1998	596	3,237	
1999	630	3,422	
2000	669	3,633	
2001	711	3,862	
2002	755	4,101	
2003	801	4,350	
2004	848	4,606	
2005	898	4,877	5.9%
2006	951	5,165	
2007	1,005	5,458	
2008	1,062	5,768	
2009	1,122	6,094	
2010	1,182	6,420	

Source: Updating of Inventory of Hydroelectric Potential in Honduras, ENEE

Table B-27 POWER INSTALLATION PROGRAM CONTEMPLATED BY ENEE*

Year	Type	Capacity	Energy Output	Scheme
1985	Hydro	73 MW x 4	986 GWh	El Cajón
1993	Gas	25 MW x 1		
1994	Gas	25 MW x 2		
1995	Hydro	125 MW		Remolino
1996	-	-		
1997	Gas	25 MW x 1		
1998	Gas	25 MW x 2		
1999	-	-		
2000	Steam	75 MW x 1		
2001	Hydro	72 MW	407 GWh	Naranjito

Note: Program studied and recommended by consultant (MAIN-SEI) in the "Updating of Inventory of Hydroelectric Potential in Honduras" (Draft) in June 1984

Table B-28 WATER DEMAND FOR PRODUCTION: METROPOLITAN AREA

	1980	1990	2000	2010
Estimated population (10^3 prs)	374.9	665.0	1,136.0	1,868.0
Coverage for supply (%)	63	75	85	91
Population to be served (10^3 prs)	236.2	499	965.6	1,700
Demand per capita (ℓ/day)	169	223	248	267
Demand for supply (10^3 m^3/day)	40.0	111.3	239.5	453.9
Loss in supply (%)	50	25	20	18
Demand for production (10^3 m^3/day)	80	149	300	550

Source: Plan Maestro para Tegucigalpa, Final Report, SANAA

Table B-29 WATER SUPPLY PROJECTS FOR METROPOLITAN AREA

Year	Scheme	Production (10^3m^3/day)	Total Production (10^3m^3/day)	Total Production (10^3m^3/year)	Demand for Production (10^3m^3/day)	Demand for Production (10^3m^3/year)
1977	Existing	36.0	36.0	13,140		
	Los Laureles	52.8	88.8	32,412		
1980					80.0	29,200
1985					107.7	39,310
1987	Rio Hondo/ Amarateca (groundwater)	25.0	113.8	41,537		
1990					149.0	54,400
1991	Guacerique	88.2	202.0	73,730		
1995					215.0	78,500
1995	Zinguizapa	20.1	222.1	81,067		
1996	Concepcion	118.4	340.5	124,280		
2000					300.0	109,500
2002	Tatumbla	21.4	361.9	132,100		
2003	Sabacuante	27.6	389.5	142,200		
2004	El Chile	16.3	405.8	148,100		
2005					416.0	151,900

Source: Plan Maestro para Tegucigalpa, and Updated program, SANAA

Table B-30 OUTLINE OF WATER SUPPLY MASTER PLAN

	(Unit)	Dam & Reservoir				Groundwater		Water Diversion	
		Guacerique	Concepcion	Sabacuante	Tatumbla	Rio Hondo	Amarateca	El Chile	Zinguizapa
Catchment area	(km^2)	189	141	80	65				
Dam height	(m)	64	108.5	74.5	71.5				
Regulated water	(m^3/s)	1.18	1.37	0.32	0.25	0.30	0.30	0.19	0.23
"	($10^6 m^3$/year)	32.21	43.20	10.09	7.82	9.46	9.46	5.96	7.35
Construction Cost*	($Lp.10^6$)								
Dam		117.3	353.0	63.2	98.4	-	-	-	-
Treatment plant		13.3	14.6	5.5	4.4	-	-	3.9	3.3
Waterway		6.7	18.0	6.3	5.6	20.6	19.0	80.3	75.6
Tubewell		-	-	-	-	14.0	7.1	-	-
Total:		137.3	385.6	75.0	108.4	34.6	26.1	84.2	78.9
Cost of Water*	($Lp./m^3$)								
Investment		0.37	0.89	0.74	1.39	0.38	0.28	1.41	1.07
Operation		0.08	0.08	0.08	0.08	0.16	0.16	0.16	0.08
Total:		0.45	0.97	0.82	1.47	0.54	0.44	1.57	1.15

Note: * Cost estimated in 1980

Source: Plan Maostro para Tagucigalpa, Final Report, SANAA

Table B-31 MUNICIPAL WATER SUPPLY IN CHOLUTECA

	1979*		1983**	
	m^3/day	$10^3 m^3$/year	m^3/day	$10^3 m^3$/year
Estimated Water Supply:				
Pump from Choluteca R.	1,384	505.2	2,420	883.3
Pipe from Sampile R.	863	315.0		
Groundwater	1,172	427.7	2,000	730.0
Total	3,419	1,247.9	4,420	1,613.3
Estimated Potential Demand:				
Urban population in Choluteca	(39,800)		(50,200)	
Assumed per capita consumption	(150 ℓ/day)		(200 ℓ/day)	
Potential demand	5,970	2,180	10,040	3,665

Source: * Estudio de Drenaje y Aguas Subterraneas, 1980, MRN
** Information provided by SANAA, Choluteca

Table B-32 PRESENT LAND USE IN WATERSHED*

(Unit: km^2)

Land Use	Guacerique	R. Grande	Sabacuante	Tatumbla	R. Chiquito	Total	(%)
Agriculture (Incl. populated centers)	30.1	40.9	36.8	15.0	6.8	129.6	(21.4)
Cultivated pasture	21.4	7.9	0.4	1.8	5.1	36.6	(6.0)
Pasture	4.0	10.3	1.6	1.3	3.8	21.0	(3.5)
Forest: pine	-	-	-	6.2	-	6.2	(1.0)
Forest: large leave	3.7	0.6	0.2	0.2	8.7	13.4	(2.2)
Forest: mixed	84.3	140.8	18.6	34.8	21.9	300.4	(49.6)
Bush land	42.0	19.5	22.2	2.1	12.9	98.7	(16.3)
Total	185.5	220.0	79.8	61.5	59.2	605.9	(100.0)

Note: Watershed in the uppermost part of Choluteca river, upstream of Tegucigalpa, D.C.

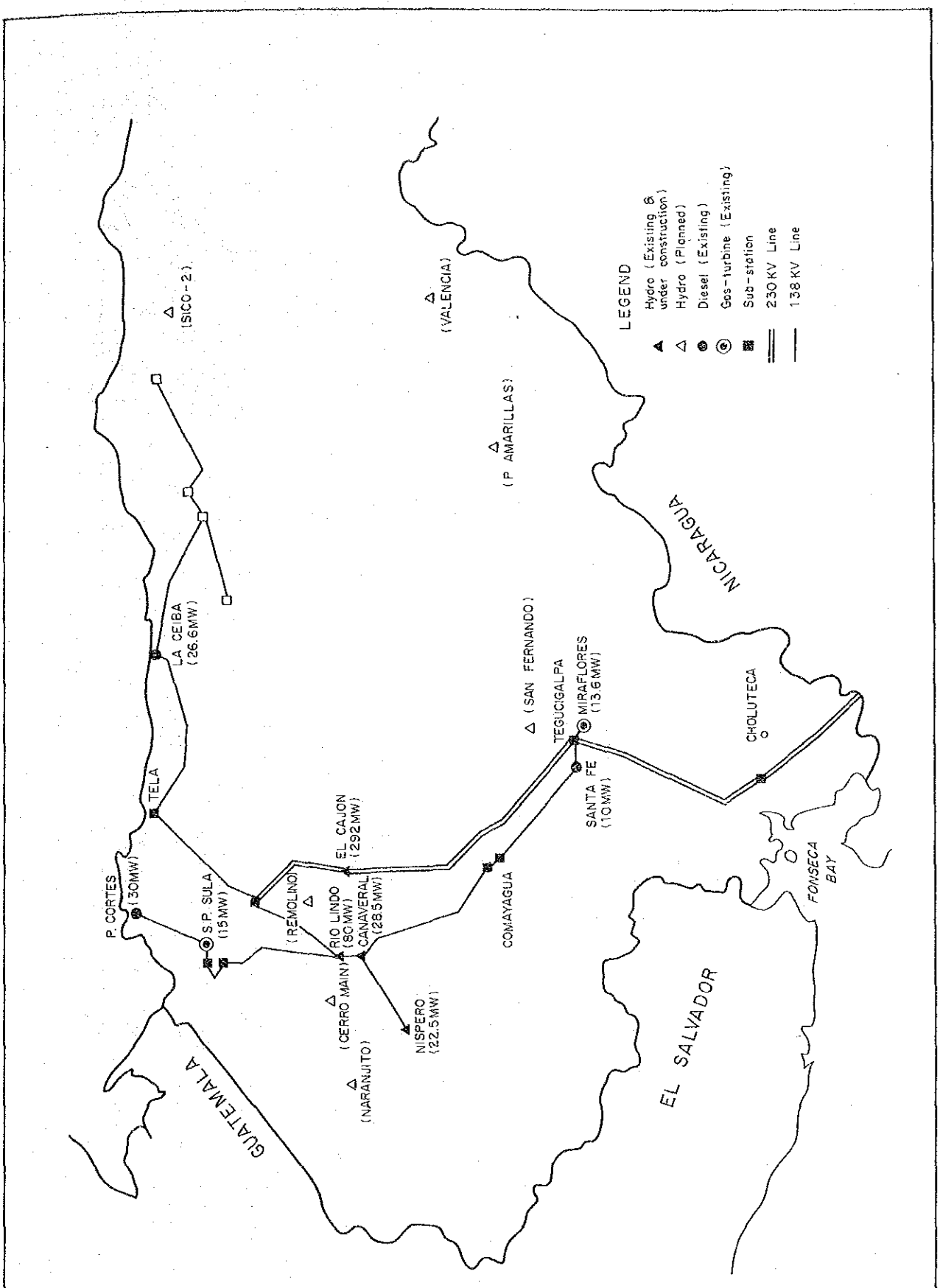
Source: Plan de Manejamiento de las Cuencas de los Rios Choluteca y Sampile-Guasaule, Proyecto Manejo de Recursos Naturales, MRN

Table B-33 WATERSHED MANAGEMENT PROGRAM FOR 1984

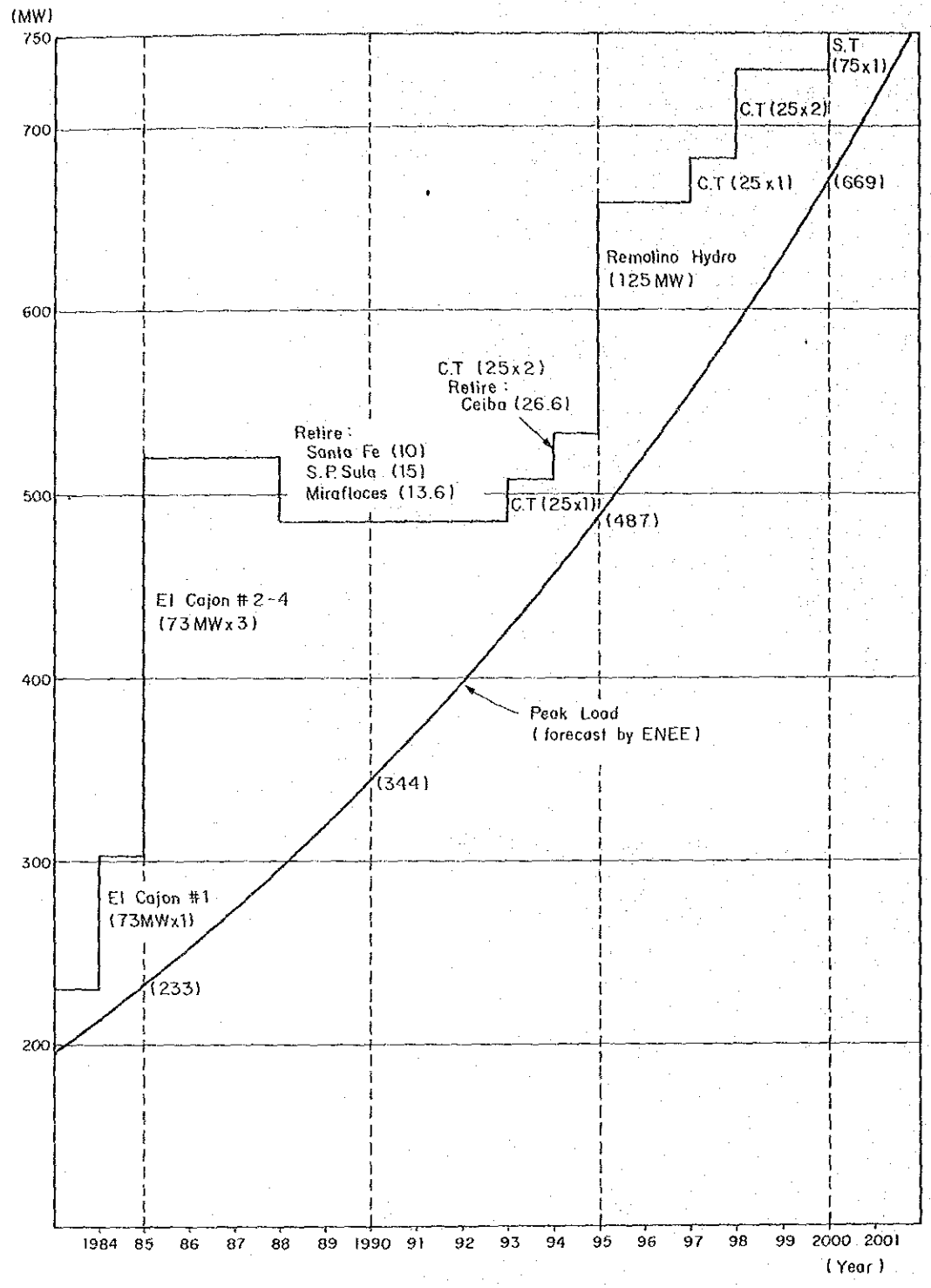
Program		Guacerique	R. Grande	Sabacuante	Tatumbla	R. Chiquito	Total
Reforestation:							
Planting	(ha)	8	6	-	20	25	59
Fruits tree	(km)	46	52.5	52.5	41	-	192
Forest Management:							
Protection	(ha)	1,700	55	640	800	385	3,580
Treatment	(ha)	20	55	214	170	250	709
Soil Conservation:							
Conservation work	(ha)	30	36	25	25	21	137
Basic grain	(ha)	7	10	126	56	30	229
Horticulture	(ha)	34	36	10	31	2	113
Pasture Management:							
Pasture land	(ha)	5	26	82	10	14	137
Fruits Land:	(ha)	6	-	3	7	7	23
Training:							
Cources	(Nos.)	23	20	10	11	20	84

Source: Proyecto Manejo de Recursos Naturales, MRN

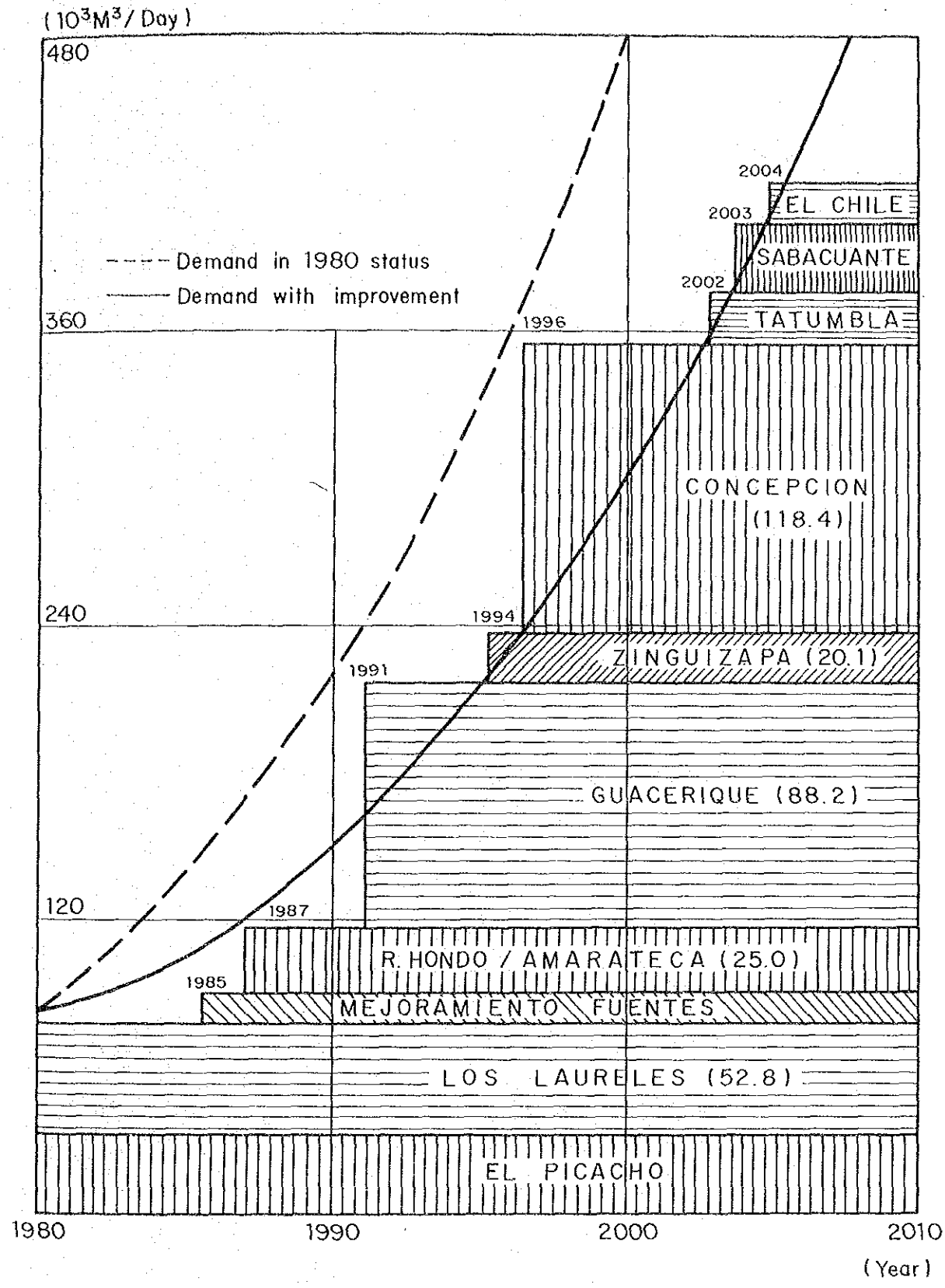
FIGURES



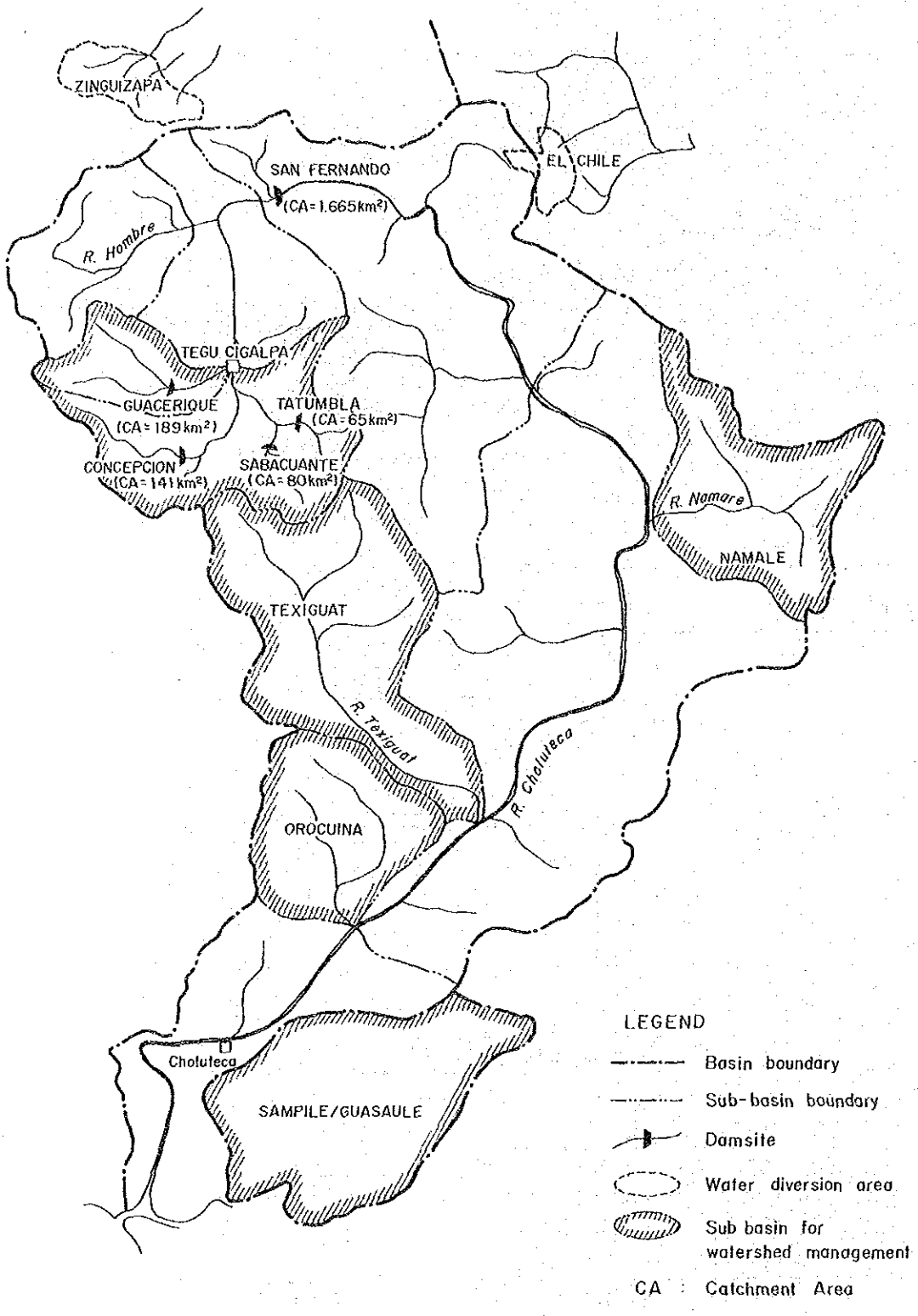
GOVERNMENT OF THE REPUBLIC OF HONDURAS MINISTRY OF NATURAL RESOURCES CHOLUTECA RIVER BASIN AGRICULTURAL DEVELOPMENT PROJECT JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. B-01	ELECTRIC POWER NETWORK



GOVERNMENT OF THE REPUBLIC OF HONDURAS MINISTRY OF NATURAL RESOURCES CHOLUTECA RIVER BASIN AGRICULTURAL DEVELOPMENT PROJECT JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. B-02	ELECTRIC POWER PROGRAM



GOVERNMENT OF THE REPUBLIC OF HONDURAS MINISTRY OF NATURAL RESOURCES CHOLUTECA RIVER BASIN AGRICULTURAL DEVELOPMENT PROJECT JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. B-03	MASTER PLAN CONTEMPLATED BY SANAA



GOVERNMENT OF THE REPUBLIC OF HONDURAS MINISTRY OF NATURAL RESOURCES CHOLUTECA RIVER BASIN AGRICULTURAL DEVELOPMENT PROJECT JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. B-04	LOCATION OF WATER SUPPLY AND WATERSHED MANAGEMENT PROGRAMS

ANNEX C

METEOROLOGY AND HYDROLOGY

ANNEX - C

METEOROLOGY AND HYDROLOGY

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C. METEOROLOGY AND HYDROLOGY

C.1 GENERAL

Located between the Atlantic ocean to the north and the Pacific ocean to the south, Honduras has a climate dominated by the tropical low pressure when the trade wind prevails and by the high pressure of Bermuda. Since the country is divided by the mountain ranges in the central part, the climate in the southern Pacific region is different from the northern Atlantic region, especially in the rainfall patterns. The southern region has a distinctly demarcated dry season and wet season. The dry season lasts from November to April when the Bermuda high pressure governs, while the rainy season lasts from May to October when the tropical low pressure prevails.

The Choluteca river drains a total area of approximately 7,580 km^2 in the southern part of the country. The river originates in the mountain ranges of 1,200-1,500 m above mean sea level, extending to the south of Tegucigalpa, and it runs northward until it crosses the Hernando Lopez bridge (Catchment area at Hernando Lopez is about 1,565 km^2). The Choluteca river turns to the east to reach San Juan de Flores valley, where the river turns its direction toward the southeast and then toward the southwest. After passing through Choluteca city, the river finally debouches into the Fonseca Bay. In its course, the river passes through areas of relatively different climate.

The meteorological and hydrological records available in the basin is listed up on Table C-01 and C-02, as well as on Figure C-01 to C-03. Most of the records are compiled by the Department of Climatology and Hydrology of MRN. Meteorological data at Choluteca and Tegucigalpa are compiled by the National Meteorological Services (SMN).