

- The facilities between the outlets of the newly established exchanges and the subscriber terminal boxes are involved.
 - The existing facilities are not involved.
- b) Construction costs are estimated, based on the broad design.
 - c) Construction costs do not include the expenses involved in the removal and/or transfer of existing facilities.
 - d) Construction costs are calculated at the exchange rate of US\$1 = 5.4 Lempira.
 - e) Construction costs take into account the HONDUTEL standards and include the testing equipment for maintenance, measuring equipment, and spare parts expected to be required for one year.
 - f) Investments are estimated separately in local currency and foreign currency.
 - g) The price of imported goods is the CIF(cost insurance and freight) price.
 - h) Contingencies are estimated at 10 percent of the construction costs.

Table 10.3-1 shows the break down in local currency and foreign currency.

Table 10.3-1 Distinction between Local and Foreign Currency in Paying Major Facilities

Items	Construction costs			
	Material expenses		Labour expenses	
	Foreign currency	Local currency	Foreign currency	Local currency
Facilities				
Switching facilities	○		○	
Transmission facilities	○		○	○
Outside plant facilities	○	○	○	○
Power facilities	○	○	○	○
Buildings		○		○
Access roads		○		○
Sites		○		○

Note: Training costs are appropriated in both foreign currency and local currency.

2) Main work items

Table 10.3-2 shows the main work items for the Plan.

Table 10.3-2 Main Work Items

Main work items		Unit	Quantity		
			Phase-I	Phase-II	Total
Digital exchange		Number of exchanges	12	6	18
		Number of lines	2,920	1,980	4,900
Transmission	Optical fiber cable transmission	Section	12	6	18
	DMAS	System	7	6	13
Inter-exchange lines		Core × kilometers	1,944	784	2,728
Subscriber lines		Pair × kilometers	15,670	14,850	30,520
Power facilities		Set	150	97	247
Buildings		Number of buildings	40	17	57
Access roads		Number of roads	20	13	33
Sites		Number of sites	72	36	108

Note: The newly established exchanges are all container type.

3) Investment cost

The investment cost is shown in Table 10.3-3. Since the total number of rural subscribers to be accommodated by this Plan is 12,090, the cost per line is around 3,880 US dollars if it is calculated in relation to the cost of the systems and equipment, or the Item 1, in the Table.

Table 10.3-3 Investment Cost

Unit: Foreign currency in ('000) US dollars; Local currency in ('000) Lempiras.

Description	Phase-I		Phase-II		Total	
	Foreign	Local	Foreign	Local	Foreign	Local
1. Systems and equipment						
1.1 Exchanges	1,574	0	1,038	0	2,612	0
1.2 Transmission systems	13,288	5,229	9,679	3,647	22,967	8,876
1.3 Outside plant of transmission system	5,532	4,473	2,232	1,800	7,764	6,273
1.4 Outside plant of local network	2,197	5,035	1,661	3,404	3,858	8,439
1.5 Power equipment	3,192	760	1,950	482	5,142	1,242
1.6 Sub-total (1.1 to 1.5)	25,783	15,497	16,560	9,333	42,343	24,830
2. Others						
2.1 Buildings	0	2,000	0	850	0	2,850
2.2 Roads	0	20,000	0	13,000	0	33,000
2.3 Sites	0	472	0	269	0	741
2.4 Common	92	0	62	0	154	0
2.5 Consultancy	2,500	194	2,052	194	4,552	388
2.6 Training	579	991	45	618	624	1,609
2.7 Sub-total (2.1 to 2.6)	3,171	23,657	2,159	14,931	5,330	38,588
3. Total (1 + 2)	28,954	39,154	18,719	24,264	47,673	63,418
4. Contingency	2,895	3,915	1,872	2,426	4,767	6,342
5. Grand total	31,849	43,069	20,591	26,690	52,440	69,760
6. For reference (in '000 US dollars)		39,825		25,534		65,359

CHAPTER 11 PROJECT EVALUATION

CHAPTER 11 PROJECT EVALUATION

This chapter evaluates the Project financially and economically.

11.1 Financial Analysis

Financial analysis of the Project is based on a cost-benefit analysis using the internal rate of return. The processes are as follows:

- 1) Make the underlying assumptions
- 2) Estimate the revenue of the Project
- 3) Estimate the expenditure of the Project
- 4) Make the cash-flow table
- 5) Calculate the FIRR (Financial Internal Rate of Return)

11.1.1 Underlying assumptions

- 1) The Project life is assumed to be 20 years. This takes the life of the equipment into consideration.
- 2) The salvage value of the equipment having a longer service life than the Project duration is entered as a negative cost at the end of the Project. The salvage value of the equipment after the end of its service life is assumed to be nil.
- 3) Inflation of the initial investment cost is not taken into account because the initial investment cost is determined by the contract. After the initial investment, the escalation of the operating and maintenance costs is taken into consideration because the wage of HONDUTEL personnel will be raised in accordance with the inflation rate. However, the operating and maintenance costs per main line will remain at the same level until the year 2002 by streamlining the operation and maintenance activities. Therefore, in this analysis, it is assumed that the operating and maintenance costs increase 2 % every year after the year 2003.

- 4) The exchange rate applied to this analysis is 5.4 lempiras per US dollar.
- 5) Telephone revenue per main line in the future is assumed to be the same as the current revenue.

11.2 Estimate of the Project Revenue

The Project revenues consist of telephone installation fees, basic monthly charges, and toll call charges.

11.2.1 Number of new subscribers

The estimated number of new subscribers in the subject areas is shown in Table 11.2-1.

Table 11.2-1 Number of New Subscribers

Year	New Subscribers	Cumulative
1995	1,765	1,765
1996	1,876	3,641
1997	870	4,511
1998	1,540	6,051
1999	1,714	7,765
2000	2,072	9,837
2001	1,061	10,898
2002	1,192	12,090

The result of the field survey showed the following breakdown by category of potential subscribers.

Table 11.2-2 Category Share of Potential Subscribers

Category	Share (%)
Residential	45 %
Commercial	25 %
Official	23 %
Public telephone	7 %

11.2.2 Estimate of revenue

Telephone installation fees and basic monthly charges are assumed to be the same as the current ones applied to rural areas.

1) Installation fee

Residential Lps. 100

Commercial Lps. 250

Official Lps. 200

2) Basic monthly charge (including the local charges for 150 pulses)

Residential Lps. 10

Commercial Lps. 20

Official Lps. 10

3) Estimate of revenue

According to the statistics of HONDUTEL, the average annual charges for telephone use are as follows:

Residential Lps. 1582

Commercial Lps. 4272

Official Lps. 3526

Data for public telephones are not available. According to the statistics of ITU, the average charge for public telephones is one and a half times that of the commercial user. So 6408 lempiras are assumed in this analysis.

By considering that twenty-five percent of the total telephone calls are local calls as mentioned in Section 5.3.2 of Chapter 5 and the local call charge of rural areas is half that of urban areas, the average annual charges per subscriber are estimated as follows:

Residential	Lps. 1384
Commercial	Lps. 3738
Official	Lps. 3085
Public telephone	Lps. 5607

11.3 Estimate of the Project Cost

In general, the Project costs consist of investment costs (which include construction and procurement costs, consulting fees, etc.), operating and maintenance costs, working capital, and taxes.

11.3.1 Investment costs

The same as mentioned in Section 10.3 in Chapter 10.

11.3.2 Operating and maintenance costs

Operating and maintenance costs consist of operating and maintenance expenses, administrative expenses, and business expenses.

- 1) The actual operating and maintenance expenditure situation

Table 11.3.2-1 shows the change of operating and maintenance expenditure from 1988 to 1990.

Table 11.3.2-1 Operating and Maintenance Expenditure (Unit: Lps.)

Year	1988	1989	1990
Operating and maintenance expenses	39,043,508	45,620,427	53,337,741
a) personnel	35,862,213	40,277,813	45,729,376
b) others	3,181,295	5,342,614	7,608,365
Administrative expenses	26,133,219	32,025,005	38,056,731
a) personnel	20,824,014	24,354,715	28,667,945
b) others	5,309,205	7,670,290	9,388,786
Business expenses	9,045,611	2,944,867	2,776,464
a) personnel	1,887,697	2,828,493	2,629,806
b) others	7,157,914	116,374	146,658

Source: 'Estados Financieros 1988-1990', HONDUTEL

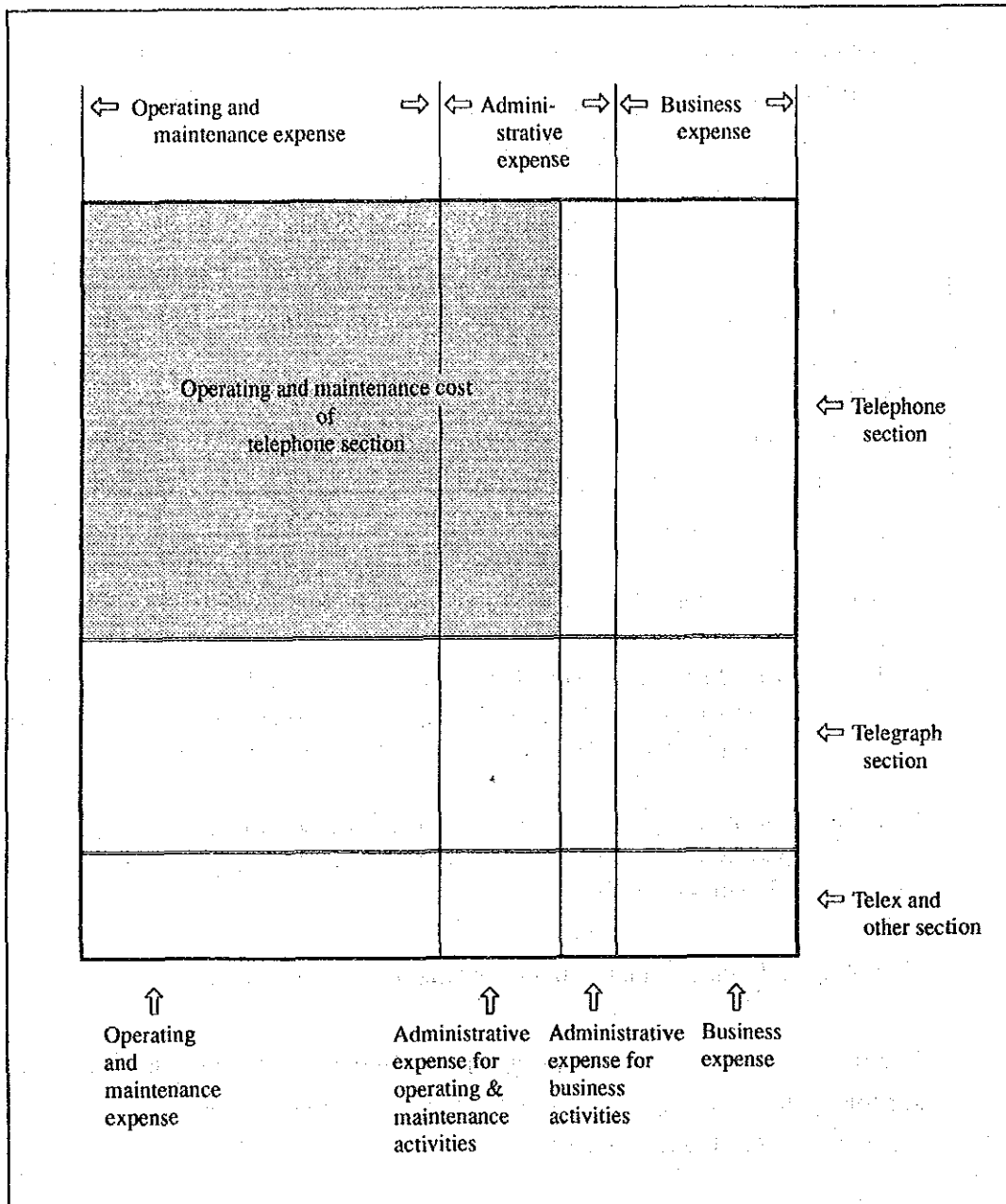
Note 1: Expenditure in Table 11.3.2-1 includes not only the expenses of the telephone section but also the expenses of other sections such as the telegraph section, the telex section, and other sections.

Note 2: Administrative expenses consist of the administrative expenses of operation and maintenance activities and the administrative expenses of business activities.

2) Operating and maintenance expenses of the telephone section

Figure 11.3.2-1 shows the operating and maintenance expenditure of all the sections. The operating and maintenance costs of the telephone section are estimated by the following procedure.

Figure 11.3.2-1 Component of Operating and Maintenance Expenditure



STEP-1 Operating and maintenance expenses of the telephone section

The operating and maintenance expenses of the telephone section are calculated as shown below:

$$\begin{array}{l} \text{Operating and} \\ \text{maintenance expenses} \\ \text{of} \\ \text{the telephone section} \end{array} = \begin{array}{l} \text{Operating and} \\ \text{maintenance expenses} \\ \text{of} \\ \text{total sections} \end{array} \times \frac{\begin{array}{l} \text{Number of employees} \\ \text{in the telephone section} \end{array}}{\begin{array}{l} \text{Number of employees} \\ \text{in total sections} \end{array}}$$

The allocation of employees of HONDUTEL is shown in Table 11.3.2-2.

Table 11.3.2-2 Allocation of Employees of HONDUTEL

Year	1988	1989	1990
Total employees	4,188	4,293	4,349
Telephone section	2,632	2,700	2,735
Telegraph section	1,099	1,125	1,139
Telex section	457	468	475
Allocation of employees			
Telephone section	63 %	63 %	63 %
Telegraph section	26 %	26 %	26 %
Telex section	11 %	11 %	11 %

Source: 'DIAGNOSTICO EMPRESARIAL 1990', HONDUTEL

STEP-2 Administrative expenses for operation and maintenance activities of the telephone section

From the data of Table 11.3.2-1, first calculate the personnel expenses ratio which is defined by the following equation.

$$\begin{array}{c}
 \text{Personnel expenses} \\
 \text{ratio}
 \end{array}
 = \frac{\text{Personnel expenses of operation and maintenance activities}}{\text{Personnel expenses of operation and maintenance activities} + \text{Personnel expenses of business activities}}$$

The result of the above calculation is shown in Table 11.3.2-3.

Table 11.3.2-3 Personnel Expenses Ratio

Year	1988	1989	1990
Personnel expenses ratio	0.95	0.93	0.94

Next, by multiplying the above ratio with the total administrative expenses, the administrative expenses for the operation and maintenance activities is obtained.

Finally, multiply this administrative expenses for operation and maintenance activities by the ratio of employees in the telephone section to the total sections, and the product is the administrative expenses for operation and maintenance activities of the telephone section.

$$\begin{array}{c}
 \text{Administrative} \\
 \text{expenses for} \\
 \text{operation and} \\
 \text{maintenance} \\
 \text{activities of the} \\
 \text{telephone section}
 \end{array}
 = \begin{array}{c}
 \text{Personnel} \\
 \text{expenses} \\
 \text{ratio}
 \end{array}
 \times \begin{array}{c}
 \text{Administrative} \\
 \text{expenses of} \\
 \text{total sections}
 \end{array}
 \times \frac{\begin{array}{c}
 \text{Number of} \\
 \text{employees in the} \\
 \text{telephone section}
 \end{array}}{\begin{array}{c}
 \text{Number of} \\
 \text{employees in} \\
 \text{total sections}
 \end{array}}$$

STEP-3 Operating and maintenance costs of the telephone section

Operating and maintenance costs are obtained by adding the results of STEP-1 and STEP-2.

Operating and maintenance costs of the telephone section = Operating and maintenance expenses of the telephone section + Administrative expenses for operation and maintenance activities of the telephone section

The results of the calculation and the operating and maintenance costs per main line are shown in the following table.

Table 11.3.2-4 Operating and Maintenance Costs of the Telephone Section

Year	1988	1989	1990
Operating and maintenance costs of the telephone section (Lps.)	40,238,141	47,585,022	56,259,851
Number of main lines	66,476	78,689	88,038
Operating and maintenance cost per main line (Lps.)	605	605	639

3) Operating and maintenance cost until the year 2002

Annual operating and maintenance cost per main line until the year 2002 is assumed to be 640 lempiras because of the following reasons.

The employees of the telephone section increased from 2,303 in 1986 to 2,735 in 1990. During the period, the number of main lines increased from 50,126 to 88,038. Therefore, the number of main lines per employee also increased from 21.76 to 32.19. However, these figures are still low compared with the data from other countries.

Personnel expenses occupy about 80 % of operating and maintenance expenses. Personnel expenses may increase every year in order to compensate for the decrease in real wages caused by inflation. However, operating and maintenance cost per main line can be kept to be 640 lempiras by increasing the number of main lines per employee. Therefore, operating and maintenance cost per main line until the year 2002 is estimated to be 640 lempiras in this analysis.

After 2003, as new subscribers can not be accepted because of the limitation in capacity, the number of main lines per employee will not increase. So, a raise in salary causes a rise in the operating and maintenance costs. However, even in this case, it will be possible to keep a lower increase in the rate of operating and maintenance costs than that of salary by streamlining the operation and maintenance activities. Therefore, the increase rate of the operating and maintenance costs is assumed to be 2 % after 2003 in this analysis. Furthermore, other increase rates are studied in the sensitivity analysis.

11.3.3 Working capital

Working capital can be recovered within a short time through business activities. It includes current deposits as cash on hand, and accounts receivable as funds necessary until call charges are collected. Although working capital is counted as an annual expense, it should be recovered during the last year of the project life.

In this analysis, working capital is estimated by the following equation.

$$K_i = E_i - E_{i+1}$$

where

K_i = working capital of the year of i

E_i = operating and maintenance cost of the year of i

11.3.4 Tax

Since HONDUTEL is a state-owned enterprise, HONDUTEL does not pay taxes.

11.4 Result of Financial Analysis

11.4.1 Financial internal rate of return (FIRR)

The objective of the financial analysis is to evaluate the financial viability of the Project. This study applies the criteria of internal rate of return to evaluate the profitability of the Project. The financial internal rate of return (FIRR) is the discount rate that makes

the total present value of annual expenditure equal to the total present value of annual revenue.

Table 11.4.1-1 is a revenue and expenditure statement summarizing the operating revenue, operating expenditure and capital costs of the Project over its total life-span. The Project has an internal rate of return of 2.25 %.

The reasons why the FIRR is so low are as follows:

- 1) As the subject areas are rural areas, the population and the telephone demand are not large compared with the urban areas.
- 2) As villages are thinly scattered, it is difficult to install equipment effectively. Therefore the installation cost per subscriber is high compared with that of the urban areas.
- 3) The average income of the inhabitants in the rural areas is not high, so much revenue from those areas can not be expected.

The FIRR of 2.25 % is lower than the market rate of return (MRR) of Honduras. The MRR of Honduras is estimated to be 17 % because the interest rate of the long-term bond of Honduras is 17 %. Therefore, implementing all the projects by internal funding from HONDUTEL is not so profitable.

Table 11.4.1-1 Cash Flow Table for the Calculation of FIRR

(Unit: thousand lempiras)

Year	Subscriber (New)	Subscriber (Cumulative)	Installation fee	Telephone charge	Total revenue [A]	Investment (Foreign) (Currency)	Investment (Local) (Currency)	Operating and Maintenance cost	Working capital	Total expense [B]	Net inflow [A] - [B]
1993	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	34,397	8,614	0	0	43,011	-43,011
1995	1,765	1,765	271	4,694	4,965	85,992	21,535	1,130	1,130	109,786	-104,821
1996	1,876	3,641	288	9,683	9,971	51,595	12,921	2,330	1,201	68,047	-58,076
1997	870	4,511	134	11,997	12,131	22,238	5,338	2,887	557	31,020	-18,890
1998	1,540	6,051	236	16,093	16,329	55,596	13,345	3,873	986	73,799	-57,470
1999	1,714	7,765	263	20,651	20,914	33,357	8,007	4,970	1,097	47,431	-26,517
2000	2,072	9,837	318	26,162	26,480	0	0	6,296	1,326	7,622	18,858
2001	1,061	10,898	163	28,983	29,146	0	0	6,975	679	7,654	21,492
2002	1,192	12,090	183	32,153	32,336	0	0	7,738	763	8,500	23,836
2003	0	12,090	0	32,153	32,153	0	0	7,892	155	8,047	24,106
2004	0	12,090	0	32,153	32,153	0	0	8,050	158	8,208	23,945
2005	0	12,090	0	32,153	32,153	0	0	8,211	161	8,372	23,781
2006	0	12,090	0	32,153	32,153	0	0	8,375	164	8,540	23,614
2007	0	12,090	0	32,153	32,153	0	0	8,543	168	8,710	23,443
2008	0	12,090	0	32,153	32,153	0	0	8,714	171	8,885	23,269
2009	0	12,090	0	32,153	32,153	0	0	8,888	174	9,062	23,091
2010	0	12,090	0	32,153	32,153	0	0	9,066	178	9,244	22,910
2011	0	12,090	0	32,153	32,153	0	0	9,247	181	9,428	22,725
2012	0	12,090	0	32,153	32,153	0	0	9,432	185	9,617	22,536
2013	0	12,090	0	32,153	32,153	0	0	9,621	189	9,809	22,344
2014	0	12,090	0	32,153	32,153	0	0	9,813	192	10,006	22,148
2015	0	12,090	0	32,153	32,153	0	0	10,009	196	10,206	21,948
2016	0	12,090	0	32,153	32,153	-7,667	0	10,210	-10,009	-7,467	39,620

IRR = 2.25%

11.4.2 Sensitivity analysis

In order to see the effect of the variation of the conditions surrounding the Project, a sensitivity analysis was done by changing the value of the parameters. The following factors were selected as the parameters in the sensitivity analysis.

1) Contingency

Ten percent of the total investment costs are considered as a contingency. For the sensitivity analysis, the following two cases were studied:

- Case where no contingency is needed,
- Case where contingency is doubled.

2) Exchange rate

The change in the exchange rate effects the costs of the foreign currency portion. The following two cases were studied:

- Case where US\$1 equals Lps. 4.9,
- Case where US\$1 equals Lps. 6.0.

3) Telephone revenues

The FIRR was calculated under the assumption that the telephone revenues per main line in the future were the same as the current ones. Here, the following two cases were studied:

- Case where the telephone revenues increase 2 % every year.
- Case where the telephone revenues increase 4 % every year.

4) Operating and maintenance costs

In order to compensate for the decrease of real wages by inflation, a wage raise will be done. In this case, the total operating and maintenance expenses will increase. However, if the number of main lines per employee increases, the operating and maintenance costs per main line can remain at the same level until the year 2002. However, since the number of main lines per employee will not increase after 2003

because of the capacity limitation, a wage raise will cause an increase in the operating and maintenance costs.

The FIRR was calculated under the assumption that the operating and maintenance costs would increase 2 % every year after 2003. Furthermore, the following two cases were studied:

- Case where the operating and maintenance costs increase 4 % every year after 2003.
- Case where the operating and maintenance costs increase 6 % every year after 2003.

The results of the sensitivity analysis are shown in Table 11.4.2-1.

Table 11.4.2-1 Results of Sensitivity Analysis (FIRR)

	FIRR		
	Phase-I	Phase-II	Whole project
Basic case	1.75 %	3.83 %	2.25 %
1) Contingency			
- where no contingency is needed	2.64 %	4.85 %	3.21 %
- where contingency is doubled	0.96%	2.93 %	1.41 %
2) Exchange rate			
- Lps. 4.9 per US\$1	2.47 %	4.66 %	3.02 %
- Lps. 6.0 per US\$1	0.97 %	2.94 %	1.43 %
3) Telephone revenues			
- where increase rate is 4 %	6.93 %	9.21 %	7.33 %
- where increase rate is 2 %	4.42 %	6.60 %	4.85 %
4) Operating and maintenance costs			
- where increase rate is 4 %	1.34 %	3.18 %	1.82 %
- where increase rate is 6 %	0.82 %	2.30 %	1.26 %

11.5 Economic Evaluation

In this section, the benefits and costs are evaluated from an economic point of view. So far most of the explanations concerning the economic benefits derived from the use of

telephones have been qualitative because of the difficulty of obtaining a quantitative analysis of the benefits of telephone use. A universal method for quantitative analysis concerning the benefits of telephone use has not been established.

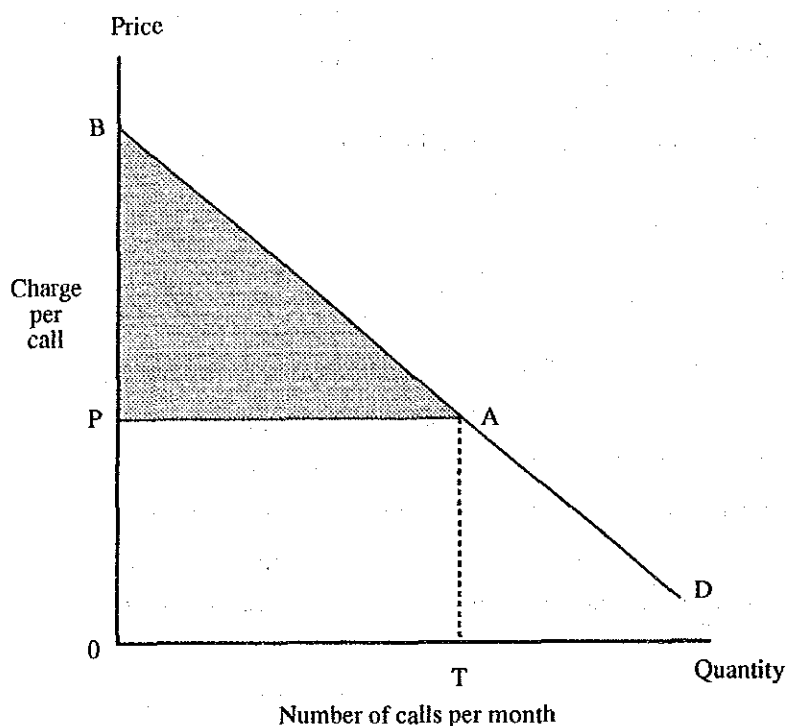
In this section, economic benefits are quantified and the economic internal rate of return (EIRR) is calculated by the following method.

11.5.1 Economic benefit

In this study, economic benefits are defined as the benefits which belong to the telephone users. The benefit which belongs to the telephone users is the benefit value minus the call charges that the users pay. In other words, economic benefit is the difference between the maximum willingness to pay of the users and the actual payment for the telephone use. This difference is called the "Consumers' surplus" in the field of economics. The following is an explanation of the "Consumer's surplus".

Consider the demand curve D in Figure 11.5.1-1. Points on it show the prices that consumers would be willing to pay for various quantities. A market price is established at OP. Once determined, all buyers pay this uniform price. But in fact it is the price that only the marginal buyer was willing to pay. Other (intramarginal) purchasers, more eager for the product, would have been willing to pay higher prices, as indicated by points on the demand curve above A. (Less eager buyers, whose preferences lead to points below A on the demand curve, do not purchase the product.) Yet despite this differential eagerness, they all pay the same price. The difference between what consumers would have been willing to pay and the market price that they actually pay is known as consumers' surplus. In the diagram it is measured by the area of the triangle PAB.

Figure 11.5.1-1 Consumers' Surplus



11.5.2 Method of evaluation

The idea of a consumers' surplus is convenient to explain the benefits to the users. In order to quantify the benefits, the benefits have to be grasped concretely. However, it is impossible to measure all of the benefits. Therefore, in general, the consumers' surplus is calculated from the demand function which shows the relationship between the price and the demand.

In this evaluation, based on the questionnaires, the demand function derived from the following steps is used in order to calculate the consumers' surplus.

STEP-1 Data collection

The following data were collected during the field survey.

- 1) Call charges per telephone call
- 2) Number of calls made per month
- 3) Annual income tax per worker

STEP-2 Derivation of the demand function

- 1) The demand function was derived by multiple regression analysis based on the data collected in the field survey.
- 2) The following equation is assumed as the model equation.

$$\text{Log}(T) = a + b_1 \text{Log}(X_1) + b_2 \text{Log}(X_2) + \dots + b_n \text{Log}(X_n)$$

where

T = the amount of calls (explained valuable)

a = constant

X_1 = explaining valuable of T

b_1 = coefficient of X_1

in this analysis,

T = monthly average of the the number of calls made per user

X_1 = average call charges per call
(hereinafter referred to as 'P')

X_2 = annual income tax per worker in the originating area
(hereinafter referred to as 'Y')

Note: It was not possible to get the information on the annual income per worker in the rural areas. So the average annual income tax per worker in the area was taken as the explaining valuable concerning the income of telephone users.

Since annual income taxes were only obtained by Department, the average values of T and P by Department are used for the multiple regression analysis.

STEP-3 Estimate of the consumers' surplus

Based on the demand function derived above, the consumers' surplus was calculated.

11.5.3 Derivation of the demand function and consumers' surplus

1) Demand function

The data shown in Table 11.5.3-1 were used for the multiple regression to derive the demand function. These figures were obtained by taking the average of the collected data in the field survey.

Table 11.5.3-1 Collected Data by each Department

Department	Calls/month (Frequency)	Charge/call (Lps.)	Charge/month (Lps.)
Atlántida	15.2	13.7	208.2
Colón	16.0	9.1	145.6
Comayagua	28.3	5.8	164.1
Copán	5.2	17.5	91.0
Choluteca	15.0	6.8	102.0
El Paraíso	17.6	6.1	107.4
Francisco Morazán	40.0	2.3	92.0
Intibucá	6.0	9.8	58.8
Lempira	6.0	20.0	120.0
Ocotepeque	4.5	12.0	54.0
Olancho	17.5	6.0	105.0
Santa Bárbara	4.5	16.6	74.7
Total	175.8	125.7	1,322.8

Average annual income taxes per worker are shown in Table 11.5.3-2. These figures were calculated based on the data presented by the Ministry of Finance of Honduras.

Table 11.5.3-2 Average Annual Income Tax per Worker (1990)

Department	Average annual income tax per worker (Lps.)
Atlántida	102.0
Colón	8.6
Comayagua	38.9
Copán	22.9
Choluteca	22.0
El Paraíso	15.2
Francisco Morazán	232.8
Intibucá	1.2
Lempira	1.0
Ocotepeque	3.7
Olancho	291.0
Santa Bárbara	3.3

Note: Calculated based on the data presented by the Ministry of Finance of Honduras.

From the result of the multiple regression analysis using the data shown in Table 11.5.3-1 and 11.5.3-2, the following equation was derived.

$$\text{Log}(T) = 3.814 - 0.767 \text{Log}(P) + 0.123 \text{Log}(Y)$$

(11.70)*** (3.789)*** (1.824)*

$$R^2 = 0.834$$

Figures in () are T-value.

'***' indicates a significance level of 0.5 %.

'**' indicates a significance level of 5 %.

where

T = Average number of monthly calls per user

P = Average charges per call

Y = Average annual income tax per worker in the originating areas

R^2 = Coefficient of determination

This equation shows the following.

- a) A one percent increase in call charges causes 0.767 percent decrease in the number of monthly calls.
- b) A one percent increase in the annual income tax per worker causes 0.123 percent increase in the number of monthly calls.

2) Consumers' surplus

The following equations are derived from the above equation.

$$\text{Log}(P) = 3.814/0.767 - (1/0.767) \text{Log}(T) + (0.123/0.767) \text{Log}(Y)$$

or

$$P = \exp(3.814/0.767) * T^{-1/0.767} * Y^{0.123/0.767} \dots\dots\dots (1)$$

By substituting the average value of T and Y of each department for T and Y of the above equation, the demand curves for each department are obtained. Furthermore, by calculating the amount of the triangle area between the demand curve and the horizontal line which is drawn at the level of the actual payment for the charge of telephone use, the consumers' surplus can be calculated.

Table 11.5.3-3 shows the benefits which belong to the consumers calculated by the above method.

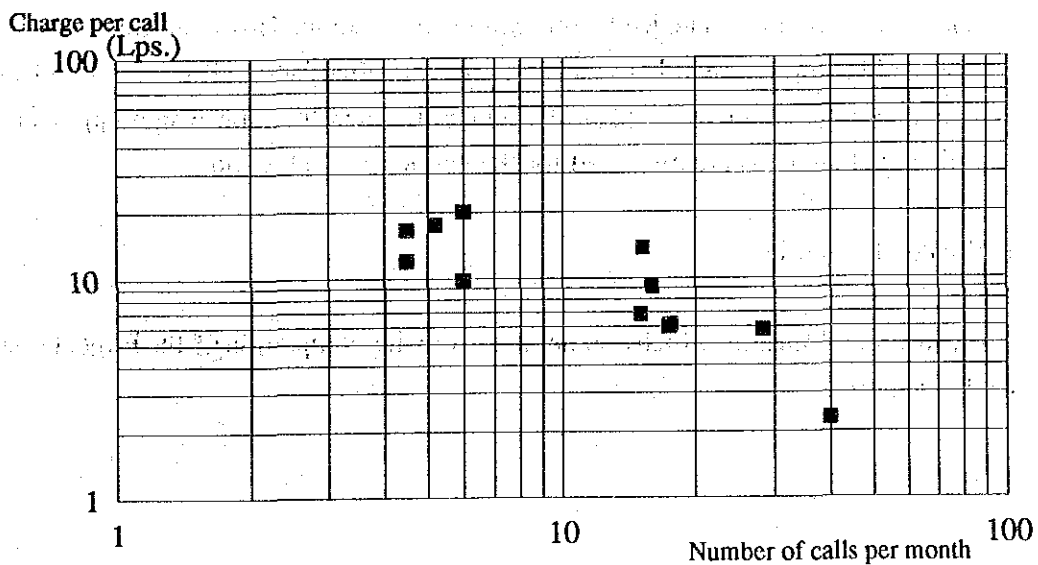
Table 11.5.3-3 Benefits to Consumers of each Department

Department	Benefits to Consumers (Lps.)
Atlántida	618.9
Colón	423.9
Comayagua	692.1
Copán	313.9
Choluteca	480.8
El Paraíso	482.2
Francisco Morazán	1,106.8
Intibucá	209.0
Lempira	203.0
Ocotepeque	217.1
Olancho	774.2
Santa Bárbara	213.2
Total	5,734.9

From Tables 11.5.3-1 and 11.5.3-3, the amount of benefits which belongs to the consumers can be estimated at 4.34 times as large as the call charge. (5,734.9 divided by 1,322.8 is 4.34.) Therefore, the consumers' surplus is 3.34 times as large as the call charge because 4.34 minus 1 is equal to 3.34.

Figure 11.5.3-1 shows the relationship between the charge per call and the number of calls per month.

Figure 11.5.3-1 Relationship between Charge/Call and Number of Calls/Month



11.6 Economic Internal Rate of Return (EIRR)

The economic internal rate of return (EIRR) is calculated using the following procedure.

- 1) Make underlying assumptions.
- 2) Estimate the benefits to the users.
- 3) Estimate the costs of the Project.
- 4) Make of the cash-flow table.
- 5) Calculate the EIRR (Economic Internal Rate of Return).

11.6.1 Underlying assumptions

The underlying assumptions are the same as that for the financial analysis.

Shadow price adjustment is not applied to this evaluation because of the following reasons.

- 1) Exchange rate

In Honduras, the floating exchange rate system has been introduced. So, this rate can be considered as the effective exchange rate.

- 2) Wage level

Under the circumstance that the unemployment ratio is very high, the wages of workers sometimes exceed the marginal productivity of labor. In this case, shadow price adjustment is needed for economic evaluation. However, this adjustment should be applied mainly to the wages of unskilled labor. The labor in telecommunications sector seems to be skilled labor. Therefore, the wages applied to the financial analysis are also used for the economic evaluation.

11.6.2 Estimate of benefits

The consumers' surplus which is generated from the completion of the Project is taken as the benefit.

Using the equation (1) derived in Section 11.5.3, the consumers' surplus was calculated to be 3.34 times as large as the call charges. (Total benefits to the users are 4.34 times as large as the call charges, so the surplus is 3.34 times as large as the call charges.)

11.6.3 Estimate of costs

The costs of the Project are the same as that for the financial analysis.

11.6.4 Cash flow table

Table 11.6.4-1 shows the cash flow table for the EIRR.

11.6.5 Result of the EIRR calculation

The result of the calculation shows that the EIRR is 30.2 %. This means that the Project will bring a large economic benefit to the Honduran communities.

Table 11.6.4-1 Cash Flow Table for the Calculation of EIRR

(Unit: thousand lempiras)

Year	Subscriber (New)	Subscriber (Cumulative)	Benefit [A]	Investment cost	Operating and Maintenance cost	Working capital	Total cost [B]	Net benefit [A] - [B]
1993	0	0	0	0	0	0	0	0
1994	0	0	0	43,011	0	0	43,011	-43,011
1995	1,765	1,765	20,372	107,527	1,130	1,130	109,786	-89,414
1996	1,876	3,641	42,025	64,516	2,330	1,201	68,047	-26,022
1997	870	4,511	52,067	27,576	2,887	557	31,020	21,047
1998	1,540	6,051	69,842	68,941	3,873	986	73,799	-3,957
1999	1,714	7,765	89,626	41,364	4,970	1,097	47,431	42,195
2000	2,072	9,837	113,541	0	6,296	1,326	7,622	105,920
2001	1,061	10,898	125,788	0	6,975	679	7,654	11,8134
2002	1,192	12,090	139,546	0	7,738	763	8,500	131,046
2003	0	12,090	139,546	0	7,892	155	8,047	131,499
2004	0	12,090	139,546	0	8,050	158	8,208	131,338
2005	0	12,090	139,546	0	8,211	161	8,372	131,174
2006	0	12,090	139,546	0	8,375	164	8,540	131,006
2007	0	12,090	139,546	0	8,543	168	8,710	130,836
2008	0	12,090	139,546	0	8,714	171	8,885	130,661
2009	0	12,090	139,546	0	8,888	174	9,062	130,484
2010	0	12,090	139,546	0	9,066	178	9,244	130,302
2011	0	12,090	139,546	0	9,247	181	9,428	130,118
2012	0	12,090	139,546	0	9,432	185	9,617	129,929
2013	0	12,090	139,546	0	9,621	189	9,809	129,737
2014	0	12,090	139,546	0	9,813	192	10,006	129,541
2015	0	12,090	139,546	0	10,009	196	10,206	129,340
2016	0	12,090	139,546	-7,667	10,210	-10,009	-7,467	147,013

IRR = 30.2%

11.7 Suggestions in Project Implementation

As described in the financial analysis in Section 11.4, the internal rate of return in case of implementing the whole project entirely by internal funding from HONDUTEL will be slightly positive. It means that the operating and maintenance cost in each year after putting the Project into service can be paid for by the income, resulting in sound business management.

From the economic view point, the benefit of the Project brought to the rural communities in Honduras will be great. Therefore, it is very meaningful for Honduras to implement the Project.

Some suggestions in implementing the Project will now be described.

1) Fund management

a) Implementation entirely by internal funding from HONDUTEL

The internal rate of return in case of implementing this Project entirely by internal funding from HONDUTEL is 2.25 %. Although this figure shows a profit for HONDUTEL, the rate is very low and the investment can not be regarded as favorable for HONDUTEL.

b) Financing by loans

Even when the Project is divided into Phase-I and Phase-II, implementing each phase of the Project by internal funding from HONDUTEL will be difficult. One conceivable solution is to borrow funds from local and foreign financial organizations. As the internal rate of return of the Project itself is 2.25 %, soft loans with a grace period will be necessary instead of hard loans. When assuming implementation of Phase-I and II of the Project using soft loans at an interest rate of 2.7 % for the foreign currency portion (US\$31.85 million for Phase-I and US\$20.59 million for Phase-II) and a repayment period of 30 years (including a 10 year grace period), the internal rate of return on equity is 6.57 %. (This figure includes the advance repayment of the capital which is discounted by the market rate of interest of Honduras at the end of the Project.)

c) Financing by governmental subsidy

Implementing this Project entirely by internal funding from HONDUTEL is a heavy burden in view of the large amount of funds required. Raising the funds by soft loans is desirable if realized smoothly but may require a long time. It is therefore necessary to implement this Project by raising the fund using gratuitous governmental subsidy.

If it is difficult to obtain a large amount of funds at a time, therefore it is necessary to study the method as shown below in implementing this Project.

i) Dividing the Project

Divide Phase-I and II further into small segments and implement in the order of priority according to the obtained funds. One example of this division is to divide the Project into 13 segments with the DMAS base stations as the core as described in the Facilities Plan in Chapter 8. In this case, the scale of each project segment is about US\$5.03 million on average.

ii) Packaging the Project

Regional development plans are generally implemented with the provision of socioeconomic infrastructure to satisfy basic human needs (BHN) in rural areas. This has as its objective the elimination of territorial differences. Since in underdeveloped areas, little effect can be expected without lateral coordination among different types of small scale projects, they are most generally packaged.

Therefore, it is suggested to discuss with related governmental agencies to incorporate the implementation of telecommunications facilities in a package for execution as a part of a regional development plan.

iii) Making the beneficiary bear the installation cost

Installation work in the rural areas will be more expensive than in the urban areas. (3 to 4 times according to the CCITT data) It is therefore conceivable to set the telephone installation fee in rural areas higher than in urban areas on the basis of the benefit theory. Since the money will still be insufficient, it is suggested to negotiate for subsidies from local and central governments.

2) Other methods for implementation

a) Combination with urban telephone network projects

In general, telecommunication services in rural areas only are not so profitable. It is therefore suggested to form projects by combining the rural telecommunication project with the urban telephone project which is more profitable because the higher demand for telephone service will increase the profitability. To be more definite, it will be one solution in forming a highly profitable project through combination with the telephone facility expansion project of the 13 base station cities as described in the Facilities Plan (Chapter 8).

b) Raising the telephone tariff

At present, telephone service is provided only in the urban areas. In promoting future nationwide development, it is necessary to expand the telephone service in the whole country. In introducing the telephone service in the rural areas, the cost for installation and maintenance there will be higher than that in the urban areas. To cover the cost differential, it will be necessary to raise the telephone tariff to get the required funds.

Implementation of telephone service in rural areas will not only be convenient for inhabitants in those areas but also enable urban inhabitants to communicate with them. This means improvement in the service compared with the previous state. This will justify raising the tariff to make users bear the cost required for such a service improvement.

In conclusion, implementing the whole project by funding from only one source will be difficult in view of the investment amount and the necessity of investment on other projects, such as urban projects, by HONDUTEL. Out of the suggestions proposed above: project implementation by governmental subsidy and other funding sources is recommended. To be more precise, it is desirable to divide the Project into phases I and II and try to get subsidies from the government for the funds required for each phase. A desirable result may be obtained if 54% (US\$17.3 million) of the required amount in foreign currencies can be obtained as a governmental subsidy for Phase-I and about 36% (US\$7.4 million) for Phase-II. If such funds are assumed to be obtained, 8% or more can be expected as the internal rate of return of the Project and

investment by internal funding will be financially possible. Even in this case, since the investment scale is large, it is desirable to additionally obtain low interest long-term loans from local and foreign financial organizations.

If the amount of subsidy expected to be obtained is not great, it is suggested that the Project be divided into 13 segments as described in the Facilities Plan in Chapter 8. They should be implemented in the order of priority or in combination with the urban project.

CHAPTER 12 OVERALL EVALUATION AND SUGGESTIONS

CHAPTER 12 OVERALL EVALUATION AND SUGGESTIONS

12.1 Evaluation of Social Benefit Expected from the Introduction of a Telephone Service

The economic benefit to be brought about by the Project was measured in Chapter 11. However, the value of a telephone service is not limited to the volume of traffic, but the transmitted information is also an important factor. Everyone admits the effect of the transmitted information to society, but quantitative evaluation of the effect is very difficult because telecommunication is a part of infrastructure and its impact is mostly indirect. Therefore, the following examines the indirect benefit according to the following aspects:

- (1) Agriculture
- (2) Non-agricultural sector
- (3) Administrative services
- (4) Living conditions
- (5) Differential in standard of living

1) Agriculture

Agriculture (including forestry and stock-farming) is naturally the major industry in the rural areas. Development of rural areas as the sources of food supply is very important for the whole country. Agriculture in rural areas, however, presently remains at the traditional self-supporting level. Products are rarely shipped to remote markets. Transformation from self-supporting agriculture to market-economy type agriculture is desirable for Honduras.

For this purpose, however, generation of surplus agricultural products is necessary in rural areas. To generate surplus agricultural products, introduction of new and improved farming technologies for modernization of agriculture will be needed in addition to implementation of irrigation and the use of fertilizers. Introduction of new fertilizers and HYV (high-yield varieties) is an example.

Farmers having only traditional agricultural knowledge are likely to respond conservatively to these introductions. Introduction of new technologies without

correct knowledge will lead to a poor result instead of increasing the yield. It is important to increase the opportunities of getting correct knowledge and information to farmers while spreading new technologies. Implementation of telecommunication networks in rural areas will enable farming instructors and farmers to obtain appropriate information, resulting in the strengthening of the productivity in the farming areas. It will also be possible to minimize the damages caused by calamities by providing information on blight and noxious insects and unusual changes of weather.

When surplus agricultural products are generated in this way, it is possible to obtain income by shipping them to markets. Implementation of the telecommunications facilities will lead to an enlargement of the sales routes and acquisitions of more favorable markets as well as switching to more favorable products.

According to the information obtained by the survey team, there is almost no information interchange between farming villages as a source of production and cities as a place of consumption at present. This results in no incentives for selection of favorable markets and products on the side of the producers.

2) Non-agricultural sector

Along with the development of agriculture in rural areas, transportation of goods between farming villages and cities will frequently call for implementation of a physical distribution mechanism. This will make the telecommunications system indispensable for communication with the collecting areas and destinations. Also with the increase in physical distribution, implementation of banking organizations for settlement of transactions will naturally be required. Telecommunication for correct information transfer and efficient management of banking organizations will be indispensable. In a situation involving the movement of goods and money, the role of telecommunication is very important.

3) Administrative services

Administration in rural areas is mostly supported by the subsidy from the central government. Because of insufficient finance, the numbers of local government officials, facilities for health and medical care, and educational facilities are not sufficient. Efficient management of rural administration is required to make up for

the insufficiency. Introduction of telecommunications in such a situation will lead to improvement of the administrative job efficiency. Frequent communication between local administrative organizations and the central government as a result of the improved telecommunications network will activate information interchange. This will increase the opportunities of rural inhabitants to get the information, leading to a qualitative improvement of administrative services.

Of the various administrative services, health and hygiene services are most closely related to the inhabitants in rural areas. During the field survey, a cholera epidemic broke out in some rural areas and warning posters were seen in many places. Warnings may be possible through mass media such as TV, radio, newspapers and magazines but these are one-way communication media.

Introduction of the telecommunications service will enable remote areas to be informed of the outbreak and spreading of diseases. Furthermore, communication between the Ministry of Welfare and doctors at local hospitals and public health centers will become possible in addition to giving instructions to individual patients who cannot come to hospitals or health centers.

4) Living conditions

In Honduras, paved roads account for 12.7% of all roads. About 55% of the unpaved roads allow traffic throughout the year and the remaining 45% are not passable in the rainy season. Mountainous terrain accounts for 65% of Honduras. Most rural communities are located in the folds of the hills and mountains. Most of the access roads to such communities are unpaved and require tremendous effort for traveling on foot or horses because of the terrain.

For some roads, one hour is required to travel several kilometers by car. Furthermore, such roads cross rivers here and there allowing passage in the dry season but not when it rains. Many villages, therefore, become isolated in the rainy season.

For such villages, telecommunications services will play an important role in preventing the inhabitants from being isolated.

It is not rare in rural areas that some family members work away from home. Telecommunications services will be helpful for communication between family

members.

5) Differential in the standard of living

In Honduras, there is a great difference in the standard of living between rural areas and urban areas. For example, the infant mortality in rural areas is twice that in urban areas. The illiteracy rate is 42.4% in rural areas, which is above the 32% average for the whole country. (Source: "Strategy for 1990-1994 integral development") There is also a great difference in the amount of individual income tax collected by Departments.

The GNP per capita of farmers is about half the national average which is far less compared to other industries. Since agriculture is the main industry in the rural areas of Honduras, there is a great differential in the standard of living between rural areas and urban areas. Elimination of this differential is an important task for the government.

It has been known empirically that there is a correlation between telecommunication service and economic development. Implementation of telecommunications will accelerate development of rural areas.

12.2 Overall Evaluation

As the economy in Honduras depends on primary products, development of primary industries is of vital importance for the nation. In rural areas, however, social infrastructure such as education, medical care, water, and electricity have not been implemented. Telecommunications services are concentrated only in cities whose population is over 20,000. The differential in the standard of living is great. The government, therefore, is actively promoting the development of rural areas.

When the Project is implemented, automatic telephone service will be provided in 223 communities, each with a population below 20,000, in 16 of the 18 Departments in the country. It will facilitate information interchange with most areas in the country and with foreign countries. It has so far been clarified that the influence on HONDUTEL and on the society, economy and culture in Honduras will extend over a very wide range. In other words, the Project not only contributes to the development of the economy and industries in Honduras but also bring about very large development effects such as

convenience to inhabitants and improvement of administrative services. During the field survey, many Departmental governors, district headmen and regional inhabitants strongly requested early telephone installation. Since the implementation of the Project is very meaningful for Honduras, the government of Honduras and HONDUTEL should give a higher priority to the investment and implementation of the Project than in the past.

Rural areas are targeted to be covered by this Project. Unlike urban areas, the population is small and scattered making efficient construction of telecommunication facilities very difficult. As described in the financial analysis section, it is possible to maintain and manage the facilities within the range of income after the end of construction, but not much profit can be expected. In the analysis from the aspect of the economic benefit, the effect is great and a certain degree of profit can be confirmed. It is, therefore, necessary to ensure long-term low-interest loans or subsidies from the central government as funds for construction. In other words, it is necessary to implement the Project in combination with development projects in other fields or to adopt the benefit theory in bearing of the construction cost. Another method is to implement the Project in combination with the urban telephone network project. It is also necessary to divide the Project into multiple segments as the required amount of funds is too large for execution as one project.

This project is to provide 223 rural areas with automatic telephone service. For this purpose, construction of office buildings, switching units, transmission equipment, radio equipment, power cabling and subscriber lines should be done without delay. It is necessary to make communication among related parties closer and to obtain cooperation and assistance from regional administrative organizations etc. The system for executing the construction takes these situations into consideration. Since the Project adopts the radio system for establishing the rural telecommunications network, aerial expansion of the telecommunications facilities is possible without much increase in the number of necessary maintenance personnel. Implementation by division into two phases in view of the work scale will eliminate possible problems when proceeding with the construction and training of maintenance personnel.

As described above, the Project has sufficient socioeconomic merits for the regional communities. Since the merits are sufficient and smooth work is possible, early implementation of the Project is desirable.

12.3 Suggestions

The Project will not only provide economic merits for rural communities but also contribute much to activation of their economy in rural areas by bringing about a strong impact in a wide range to society and administrative services. Providing the telephone service in areas where telephone service has not been available will contribute to improving the convenience to regional inhabitants. The necessity of the Project having diversified development effects is very high. Since this survey has revealed the effects and feasibility of the Project, the following suggestions are proposed.

12.3.1 Determining the priority of development

The necessity and effects of the Project have been confirmed as economic merits to the whole society and will have a strong impact on the activation of the economy in rural areas. It is therefore suggested that the government of Honduras and HONDUTEL should take necessary actions for giving higher priority to the investment and implementation of the Project than before.

12.3.2 Establishing the system for construction work

The Project is to provide automatic telephone service in 223 rural areas in the country. It is therefore important to execute the various work for office building construction, switching, transmission and radio equipment installation, and telephone terminal installation. Any problem arising in the course of such construction work should be solved quickly and appropriately through good coordination among related parties. For execution of the heavy construction work load, parallel operation of many kinds of work is required, calling for tremendous man-hours. In executing such work, cooperation and support from regional administrative organizations are necessary. For smooth execution of the Project, it is suggested that HONDUTEL ensure the necessary operation in view of these circumstances and establish a system for execution of the construction work. This should be provided with the follow-up function for the work in progress and the coordinating function for problems that may occur in the process of execution.

12.3.3 Division into phases

The Project covers 223 rural areas distributed throughout the country. Implementing the Project as a single step project will be difficult financially in view of the large amount of investment necessary and relatively low profitability. Implementation matching the

national development plan is necessary. Division into two phases after considering the training of employees and the system for construction work execution is proposed. The financial internal rate of return of Phase-I is greater than that of Phase-II. It is suggested to give priority to Phase-I because of the need to implement the Project in coordination with the national development plan. If it is necessary to further divide them according to the scale of the construction funds, a division into 13 segments is proposed.

12.3.4 Training of maintenance personnel

For the smooth execution of operation and maintenance of the new telecommunications facilities, it is necessary to train the required number of maintenance personnel at the same time as the construction work. The present training center of HONDUTEL is insufficient in its equipment and trainers for training on new technologies. It is suggested, therefore, that training of trainers and key engineers should be carried out in the plants of the contractor and general engineers should be trained by participation in the construction work, in Honduras.

12.3.5 Raising the funds for construction

After complete implementation of the Project, it is possible to maintain and manage the facilities within the range of income from the provided service. The significance of implementing the Project in Honduras is great. Therefore, the following suggestions concerning the raising of funds for construction are proposed:

- (1) Implementing the Project entirely by internal funding from HONDUTEL is not favorable for HONDUTEL when considering the low profitability. Use of low-interest long-term loans from local and foreign sources should be studied.
- (2) Implementing the Project entirely by internal funding from HONDUTEL is a heavy burden when considering the large amount of investment necessary. Getting gratuitous subsidies from the government should be studied.
- (3) Regional development projects in the national development plan are packaged with other kinds of projects to obtain the necessary effect through lateral coordination. Implement of the Project in combination with other projects in the form of a package should be studied.

- (4) The construction cost for telecommunications facilities in rural areas is much higher in comparison with that in urban areas. Setting a higher installation fee in rural areas should be studied according to the benefit theory.
- (5) Since a project for rural areas only is not sufficiently profitable, combination with a profitable urban project should be studied.
- (6) Expansion of telecommunication service to rural areas requiring a higher cost for construction, operation and maintenance than urban areas will be necessary in the future. Raising the telephone tariff to cover the expenses should be studied.
- (7) If the planned funds can be raised, the Project will be implemented in two phases. If sufficient construction funds cannot be obtained, the Project should be divided into 13 segments for implementation in order of priority either individually or in combination, according to the scale of the available funds.

Bibliography

1. HONDURAS EN CIFRAS 1979-1984, Central Bank of Honduras
2. HONDURAS EN CIFRAS 1983-1985, Central Bank of Honduras
3. HONDURAS EN CIFRAS 1986-1988, Central Bank of Honduras
4. HONDURAS EN CIFRAS 1987-1989, Central Bank of Honduras
5. HONDURAS EN CIFRAS 1988-1990, Central Bank of Honduras
6. INDICADORES ECONOMICOS DE CORTO PLAZO 1989-1991, Central Bank of Honduras
7. CENSO NACIONAL DE POBLACION Y VIVIENDA 1988, Ministry of Planning
8. PROGRAMA CONSOLIDADO DE INVERSIONES PUBLICAS 1992, Ministry of Planning
9. PLANES DE DESARROLLO DE CORTO, MEDIANO Y LARGO PLAZO, SECOPT
10. MANUAL DE MATERIALES DIDACTICOS PARA LA ENSEÑANZA DE LA GEOGRAFIA A NIVEL MEDIO, SECOPT
11. MEMORIA ANUAL 1991, SECOPT
12. MEMORIA 1990, COMTELCA
13. MEMORIA 1987, HONDUTEL
14. MEMORIA 1988, HONDUTEL
15. MEMORIA 1990, HONDUTEL
16. PLAN OPERATIVO - PRESUPUESTO 1991, HONDUTEL
17. PLAN OPERATIVO - PRESUPUESTO EJERCICIO FISCAL 1992, HONDUTEL
18. ESTADOS FINANCIEROS 1985-1990, HONDUTEL
19. PLAN DE EXPANSION 1990-1994 TOMO I, HONDUTEL
20. PLAN DE EXPANSION 1990-1994 TOMO II, HONDUTEL
21. PLAN DE EXPANSION 1992-1996, HONDUTEL
22. TABLA NACIONAL DE FRECUENCIAS, HONDUTEL
23. INFORME SECCION DE "PLANTA EXTERNA" MANTENIMIENTO C.S. MES DE FEBRERO 1991, HONDUTEL
24. INFORME SECCION DE "PLANTA EXTERNA" MANTENIMIENTO C.S. MES DE JUNIO 1991, HONDUTEL
25. INFORME SECCION DE "PLANTA EXTERNA" MANTENIMIENTO C.S. MES DE JULIO 1991, HONDUTEL
26. INFORME SECCION DE "PLANTA EXTERNA" MANTENIMIENTO C.S. MES DE AGOSTO 1991, HONDUTEL
27. INFORME ANUAL "1990" SECCION PLANTA EXTERNA DEPARTAMENTO MANTENIMIENTO C.S., HONDUTEL

28. SISTEMA DE INFORMACION GERENCIAL INDICES DE DESEMPEÑO, HONDUTEL
29. DIAGNOSTICO EMPRESARIAL 1990, HONDUTEL
30. DIAGNOSTICO EMPRESARIAL AREA DE PRODUCCION/EXPLORACION, HONDUTEL
31. MANUAL DE FUNCIONES, HONDUTEL
32. INFORME DE RESULTADOS 1990, HONDUTEL
33. Yearbook of Common Carrier Telecommunication Statistics (18th edition), ITU
34. REPORTS OF THE CCIR, 1990 ANNEX TO VOLUME IX - PART 1, CCIR
35. General Network Planning - GAS 3, CCITT
36. Choice of Telephone Switching Systems - GAS 6, CCITT

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