VII. IMPLEMENTATION PLAN AND COST ESTIMATE

VII. IMPLEMENTATION PLAN AND COST ESTIMATE

7-1 Implementation Plan

7-1-1 Project Formation

The rural telecommunications network plan formulated, this time, extends over the whole national territories of Nepal. Considering the required amount of work and size of financial investment, as well as the necessary period for training and education of maintenance and operation personnel, implementation of the whole plan on crash program basis is not realistic. Thus, the whole plan is divided into four phases, to be implemented phase after phase.

The four work phases are determined, based on NTC's basic policy to introduce a telecommunications network at S. Doti, an important foothold in the far-western development region, as early as possible and in accordance with the order of precedence given by NTC to each objective site in the current plan. Furthermore, with a view to work period curtailment by means of construction work to begin immediately after the delivery of materials at each site, it is so arranged that, at the sites in a fixed area, the implementation work will be in progress at the same time as far as possible. By this arrangement, the implementation work, at all the objective sites is to be divided into four groups. The site grouping according to work Phases I through IV is in Table 7-1-1.

In compliance with the aforementioned basic policy of NTC, the implementation work at S. Doti is included in Phase I. Before the telephone exchange is constructed by NTC at Dangadhi, S. Doti is to be a public call office temporarily with Nepalgunj as its parent exchange. And the telephone exchange introduction at S. Doti is to be in the period of telephone exchange construction at Dangadhi.

(Although this period still remains undecided, the current plan has the telephone exchange construction at Dangadhi scheduled in Phase III.)

In connection with the transmission route formation between Nepalgunj and S. Doti, the implementation work at three public call office sites, i.e., Tikapur, Bhajani and Dandeldhura, is also to be included in Phase I. Like S. Doti, the three public call offices are to belong to Nepalgunj temporarily. By the same reason, Dangadhi is to have the radio repeater station constructed in Phase I.

The number of public call offices, independent exchanges and radio repeater stations to be constructed in each work phase, based on the foregoing project formation, is as under.

	Phase I	Phase II	Phase III	Phase IV
Public call office	*14	12	21	17
Independent exchange	-	2	1	-
Radio repeater station	**10	9	16	21

Note: * includes S. Doti.
** include Dangadhi and Kalaiya.

7-1-2 Implementation Time Schedule

The time schedule of project implementation appears in Table 7-1-2.

Preconditions to the above time schedule are as under.

(1) In all four work phases, equipment and materials are to be supplied by the same contractor. Therefore, the contractor selection by competitive bidding is to be made for Phase I work only. Phase II through Phase IV work is to be by negotiated contracts.

(2) Construction work in Phase I through Phase III is to be carried out by contractor on turn key basis. Construction work in Phase IV is to be carried out by NTC at its own responsibility.

Table 7-1-1 Site Assignment Plan by Phase

Phase	Area	Site
1st.	(01)	Bidur, Bhading
	(04)	S. Madi, Ramechhap, Charikot
	(05)	Simra, Gaur, Bhimphedi, Kalaiya (Repeater Station)
	(08)	Rajapur, Gularia
	(09)	Bhajani, Tikapur, Dandeldhura, S. Doti (PCO)
2nd.	(06)	Beni, Baglung, Kusma, Syangja, Damauli, Bandipur, Gorkha, Besishar
	(07)	Gulmi Tamghas, Shandhikharkha, Parasi, Tribeni
	(08)	Tulsipur (Exchange), Ghorahi (Exchange)
3rd.	(01)	Dhunche, Nagarkot, Chautara, Panchkhal
	(02)	Jhapa, Aitabare, Ilam, Terhathum, Bhojpur, Chainpur, Phidim
	(03)	Gaighat, Diktel, Okhaldhnga
	(08)	Salyana, Pyuthan, Dailekh
	(09)	S. Doti (Exchange), Darchula, Baitadi, Mangalsen, Martadi
4th.	(01)	Zink M. Town, Helambu
	(02)	Khandbari, Taplejung
	(03)	Salleri, Namche Bazar, Rumjatar
	(06)	Chame, Jomsom
	(08)	Libanggaon, Kalikot, Jumla, Jajarkot, Musikot
	(09)	Gadhawa, Koilabas, Chinpur

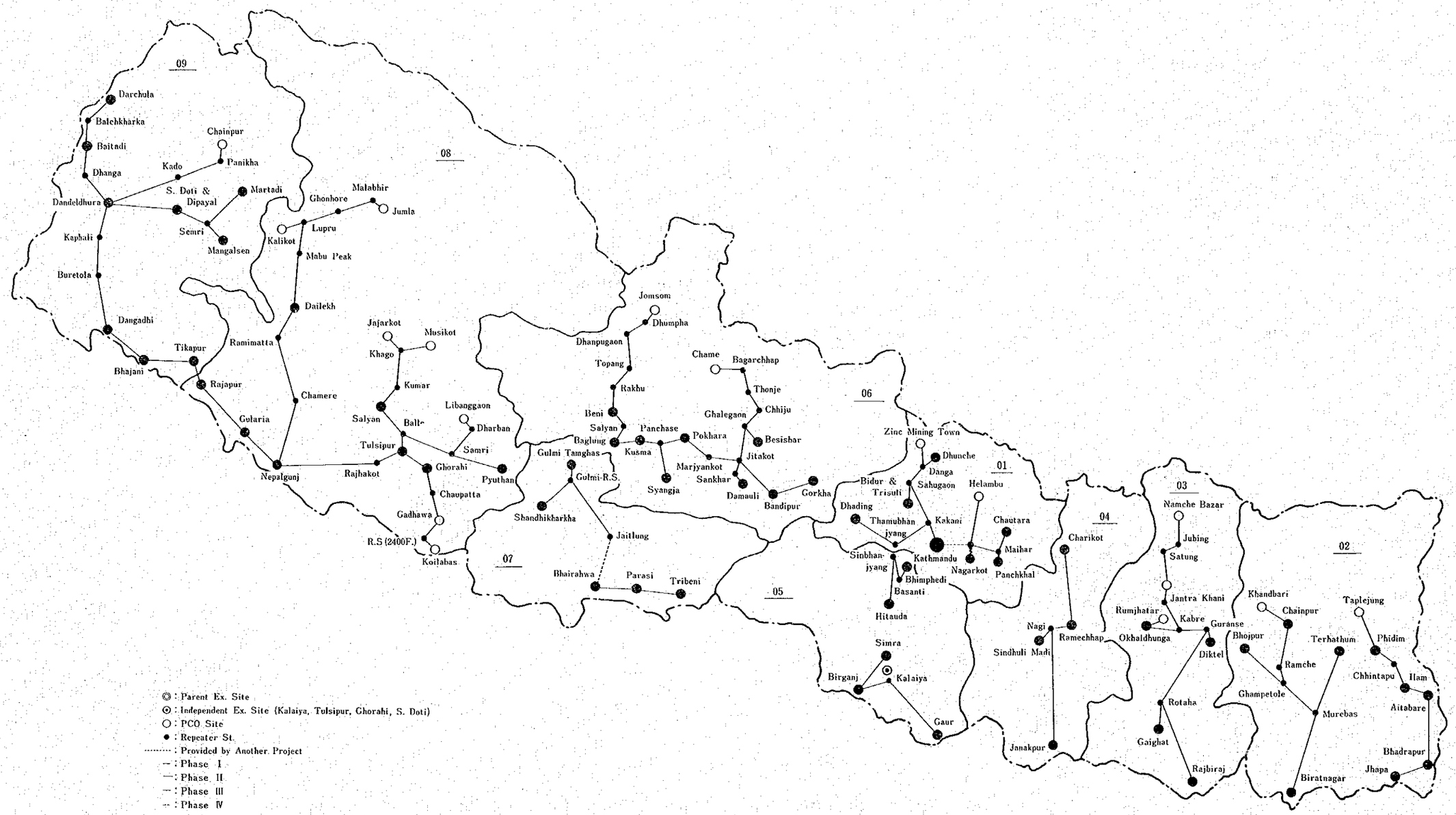
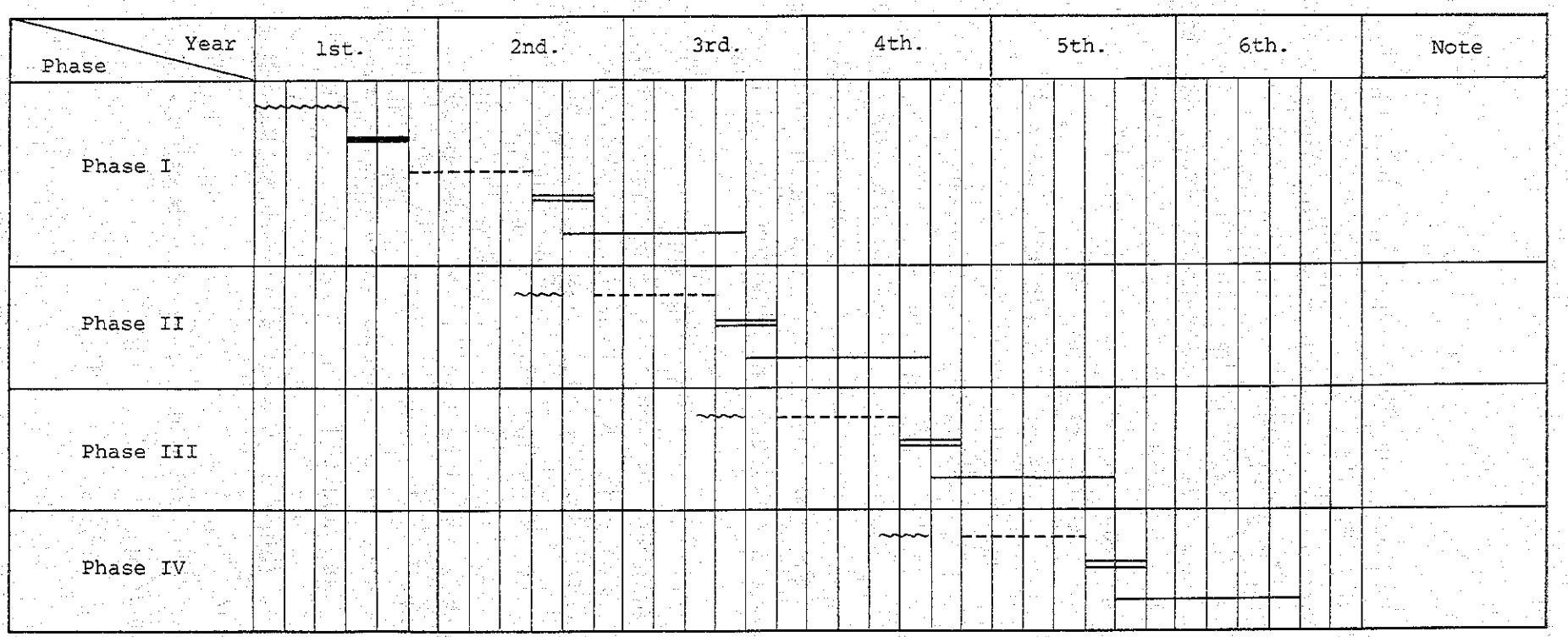


Figure 7-1-1 Site Assignment Plan by Phase(Reference to Table 7-1-1)

Table 7-1-2 Project Implementation Schedule



〰〰 : System Design & Preparation of Specifications
▬▬ : Selection of Contractor
----- : Manufacturing, Site Preparation
═══ : Overseas & Inland Transportation
—— : Installation & Testing

7-2 Cost Estimate

Phase by phase project cost estimates are in Table 7-2-1.

Preconditions to the above project cost estimates are as under.

(1) Construction work in Phase I through Phase III is to be carried out by contractor on turn key basis according to detail design and specifications (tender specifications for Phase I and technical specifications for Phases II and III) made by consultant. Construction work in phase IV is to be carried out by NTC at its own responsibility.

(2) Equipment and materials cost is to be estimated by CIF Kathmandu. I & F are to be estimated on the assumption that transportation from Japan to Calcutta is by sea and from Calcutta to Kathmandu by land.

(3) Local currency portion covering inland transportation cost for equipment and materials and wages of locally employed laborers is to be figured in the Japanese yen equivalent. In this case, the rate of exchange to apply is to be Rs 1 = ¥17.

(4) Cost of spares is to be figured in the amount covering three years stock. Cost of maintenance work vehicles is also to be figured according to the arrangement as under.

a) Parent exchanges (9 excluding Kathmandu and Hitauda):

One truck and one four-wheel drive car per exchange

b) Independent exchanges (3 excluding Kalaiya):

One truck per exchange

c) Kathmandu:

One truck and two four-wheel drive cars

(5) For parent exchange buildings, power supply facilities and antenna towers (excluding Dangadhi), either the existing ones or those to be prepared by NTC separately from the current plan are to be utilized.

(6) Acquisition of independent exchange sites and public call office sites, as well as ground levelling and access truck as necessary, are to be constructed by NTC at its own expense.

(7) All costs are to be estimated at price level as of 1983.

Table 7-2-1 Project Cost Estimates

(Unit: Million Yen)

Item \ Phase	I	II	III	IV
A. Transmission Facility	581	453	688	629
- Radio Equipment	298	260	418	418
- Multiplex Equipment	93	72	112	69
- Antenna & Feeder	95	62	92	76
- Antenna Tower	95	59	66	66
B. Switching Facility	-	164	90	-
C. Outside Plant	77	129	147	70
- Cable & Accessories	15	32	39	9
- Pole & Guy, etc.	62	97	108	61
D. Power Plant	391	400	617	572
- Solar Battery System	319	330	599	551
- Engine Generator System	72	70	18	21
E. Terminal Apparatus	15	14	16	2
- Facsimile Sets	13	7	10	32
- Telephone Sets	2	7	6	2
F. Equipment Shelters	150	130	169	177
G. Test Equipment & Spare Parts, etc.	209	197	246	209
H. Maintenance Vehicles	50	23	27	8
Sub-total	1,473	1,510	2,000	1,667
I. Inland Transportation & Installation Cost	712	646	776	173
J. Consultancy Services	191	139	153	-
Total	2,376	2,295	2,929	1,840

VIII. ECONOMIC EVALUATION

VIII. ECONOMIC EVALUATION

8-1 Financial Analysis

This chapter is for formulation of fund operation plan to govern the project implementation finance of NTC, the responsible party for implementation of the earlier prepared Rural Telecommunications Network Improvement and Expansion Plan of Nepal, and for study of financial internal rate of return that can be expected from the project implementation. The financial internal rate of return is to be calculated by the internal rate of return method.

The financial analysis, this time, applies to 15 years after the sixth project year when the initial capital investment will be completed.

The local to foreign currency, and vice versa, conversion rate is Rs 1 = ¥17 as stated in Chapter VII.

Social and economic data and information to be used in the survey and analysis will be selected from the following sources:

(1) Economic Survey 1982 (by Ministry of Finance)

(2) Tariffs

  1) Telex

  2) Telegraph

  3) Telephone

  4) Domestic trunk telephone

  5) Installation (by NTC)

(3) Economic Report 1979/80, 1980/81 (by Rastra Bank)

(4) Second Highway Project (by World Bank)

(5) IDA Assisted Project (by World Bank)

(6) Balance Sheet 1976 - 81 (by NTC)

Profit Loss Table 1976 - 81 (by NTC)

(7) Telephone Directory 1977 (by NTC)

(8) Pre-Feasibility Study Report 1982 (by JICA)

8-1-1 Expenditure

The expenditure required for construction, as well as maintenance and operation, of the system to be realized by the project consists of two major categories.

They are:

(1) Capital investment expense

(2) Operating expense

1. Capital Investment Expense

Capital investment expense is composed of the following items:

1) Site Land Acquisition Expense

This expense is necessary for site land acquisition, land formation and related work. The amount required during four years since the beginning of project implementation is as under.

Initial year	Rs 412,000
Second year	Rs 471,000
Third year	Rs 706,000
Fourth year	Rs 588,000

2) Materials/Equipment Purchase and Installation Expenses during Initial Period

These expenses are of purchase, transportation and installation of materials/equipment required during the initial period of project implementation. The necessary amount for six years since the beginning of project implementation is as under.

	Purchase & Work Expenses	NTC's Direct Managed Work Expense
Initial year	¥295,000,000	-
Second year	¥1,622,000,000	-
Third year	¥2,307,000,000	-
Fourth year	¥2,605,000,000	-
Fifth year	¥1,990,000,000	Rs 3,080,000
Sixth year	¥138,000,000	Rs 12,321,000

The assumption is that part of work expense, i.e., work expense in Phase IV, is to be borne by NTC.

For project cost details, refer to Chapter VII.

3) Consultant Employment Expense

This expense is of employing consultant who, on behalf of NTC, will make detail design, prepare tender specifications, and carry out overall work progress supervision in the initial period of project implementation. The amount required during five years since the beginning of project implementation is as under.

Initial year	¥96,000,000
Second year	¥79,000,000
Third year	¥141,000,000
Fourth year	¥98,000,000
Fifth year	¥69,000,000

4) Additional Installation Expense

This expense is of additional installation to meet demand growth during system operation after the completion of construction work. The amount required from the year of project through (the sixth year since the beginning of project implementation) until the 15th year of service.

Sixth year	Rs 2,824,000
Seventh year	Rs 2,647,000
Eighth year	Rs 7,412,000
Ninth year	Rs 6,353,000
10th year	Rs 7,412,000
11th year	Rs 6,353,000
12th year	Rs 7,412,000
13th year	Rs 6,353,000
14th year	Rs 4,588,000
15th year	Rs 3,706,000

5) Equipment Renewal Expense

A certain years after all kinds of equipment installed have come into service, they reach the limits of their service life so that they must be renewed.

(Facsimile terminals, for instance, have their service life terminate an average of 5-6 years after the installation. Hence the need for their renewal every 5-6 years).

This expense payment begins in the year when the equipment installed by Phase I work are committed to service (i.e., the fourth year after the installation). The annual amount of payment is as under.

Fourth year	Rs 4,353,000
Fifth year	Rs 8,765,000
Sixth year	Rs 14,647,000
Seventh year and each succeeding year	Rs 19,588,000

2. Operating Expense

Operating expense is composed of the following items:

1) Maintenance and Operation Expense

This expense is of maintenance and operation of the system to be constructed and put into service by the current project. It mainly consists of maintenance and operation personnel cost, engine generator fuel cost, power cost at commercial mains using exchanges, spare parts and components cost, maintenance test equipment purchase and upkeep cost, and maintenance work vehicle upkeep cost.

2) Administrative Expense

This expense mainly consists of personnel cost and administrative cost for management and operation of the system constructed by the current project.

Operating expense (the aggregate of maintenance and operation expense and administrative expense) is required in the amount mentioned below, beginning the third year of project implementation when the system under construction comes into service in part and covering the whole service period of the system.

Third year	Rs 647,000
Fourth year	RS 1,882,000
Fifth year	Rs 3,353,000
Sixth year	Rs 4,941,000
Seventh year and each succeeding year	Rs 5,647,000

Table 8-1 presents the aggregate of capital investment expense and operating expense by years.

8-1-2 Revenue

Revenue to accrue from the current project implementation is to be calculated, based on NTC's tariff system and demand forecast result described in Chapter IV. Main component categories of the revenue are

(1) Equipment installation charges imposed on subscribers

(2) Equipment rental charges imposed on subscribers

(3) Telephone call charges

1. Tariff System

As of the time the project implementation has been completed and the system constructed comes into service, NTC's tariff system is assumed to be as under.

1) Telephone Installation Charge

Rs 700 per subscriber's circuit.

2) Telephone Rental Charge

Rs 100 per subscriber (including free calls up to 50 local calls per month).

3) Telephone Subscriber's Deposit

Rs 1,500 per subscriber.
(However, in this financial analysis, this subscriber's deposit is not taken into account because the terms of repayment are not distinct and the degree of contribution to the service revenue is negligible.)

4) Local Call Rate

Rs 0.7 per call.

5) Toll Call Rate

Divided into six categories according to distances.

6) International Call Rate

Fixed rates by destinations for the first three minutes subject to additional charge one every minute call duration beyond the first three minutes.

7) Domestic Telegram Rate

Divided into two categories according to distances.

For further details, refer to Table 8-2.

2. Project Revenue

Operating revenue of the system to be constructed by the current project can be estimated from the aforementioned tariff system and the demand forecast performance described in Chapter IV. The operating revenue estimate is given in Table 8-3.

Initial capital investment will be continued until the sixth year of project implementation. It is so arranged, however, that, beginning the third year of project implementation, the system will come into operation in part. By the 15th year of service, the system will be operating to full capacity so that the service revenue in the 16th year and after will remain uniform.

8-1-3 Financial Analysis

Funding operations based on expenses and benefits clarified in the preceding two Paragraphs, 8-1-1 and 8-1-2, arrive at cash inflow as shown in Table 8-4, cash outflow as in Table 8-5 and net cash flow as in Table 8-6.

Expenses and benefits used in the financial analysis are based on the above funding operations. The financial internal rate of return (FIRR) of the current project obtained from those expenses and benefits turns out to be 0.46%.

Therefore, from the financial viewpoint, the current project cannot be determined as being feasible.

Nevertheless, the current project implementation will bring about a great deal of social and economic benefits in the way of national development of the Kingdom of Nepal. In-depth study of those social and economic benefits will be made in the next paragraph.

Insofar as the result of financial analysis is as stated above, economic analysis and sensitivity analysis are not worthwhile to make. Therefore, both these analyses are omitted.

Table 8-1 Investment and Operation/Maintenance Cost

Unit: Million Yen

Period (Year)	Investment	Operation and Maintenance Cost	Total
1	398	-	398
2	1,709	-	1,709
3	2,460	11	2,471
4	2,787	32	2,819
5	2,260	57	2,317
6	644	84	728
7	378	96	474
8	459	96	555
9	441	96	537
10	459	96	555
11	441	96	537
12	459	96	555
13	441	96	537
14	411	96	507
15	396	96	492
16	333	96	429
17	333	96	429
18	333	96	429
19	333	96	429
20	333	96	429
21	333	96	429

Table 8-2 (1/2) Principal Tariffs

1. Local Telephone Service

Rental (includes 50 free calls)	NRs/month	100
Call charge	NRs/call	0.7
Deposit (refundable)	NRs/main line	1,500
Installation	NRs/main line	700

2. Long Distance Telephone Service

A minimum of three minutes is charged per call. Each minute is charged:

Class	Distance km	NRs/minute
I	-25	0.9
II	26-50	1.8
III	51-100	3.6
IV	101-200	5.4
V	201-400	6.8
VI	401-800	9.0

For three minute calls between public call offices over the HF radio network, the charge is NRs 7.0.

3. International Telephone Service

Charge per three minute call to:

	NTC Share NRs	Total Tariff NRs
India - Zone 7	9.0	31
India - Zone 2	9.0	23
Japan	55.0	176
U.K.	55.0	176
U.S.A.	65.0	200

Table 8-2 (2/2) Principal Tariffs

4. Domescic Telegraph Service by Facsimile System

	NRs
Less than 100 km (per sheet)	4.0
Not less than 100 km (per sheet)	6.0

5. International Telegraph Service by Facsimile System

India, Pakistan	(8 words minimum)	4.24
Japan	(7 words minimum)	54.6
U.K.	(7 words minimum)	68.3
U.S.A.	(7 words minimum)	38.2

Each additional word is charged the proportional part of the minimum charge, except for India and Pakistan in which case the additional charge is NRs 0.5/word.

6. Telex Service

Rental, NRs/year	15,000
Deposit (refundable) NRs	3,500
Connection charge NRs	1,500
India per three minute NRs	23
Hong Kong per three minute NRs	180

Table 8-3 Operating Revenue

Unit: Million Yen

Period (Year)	Operating Revenue
1	-
2	-
3	26
4	153
5	343
6	488
7	563
8	658
9	770
10	883
11	995
12	1,107
13	1,239
14	1,328
15	1,396
16	1,396
17	1,396
18	1,396
19	1,396
20	1,396
21	1,396

Table 8-4 Cash Inflow

Unit: Million Yen

Period (Year)	Operating Revenue	Foreign Loan	Total Cash Inflow
1	-	-	-
2	-	-	-
3	26	-	26
4	153	-	153
5	343	-	343
6	488	-	488
7	563	-	563
8	658	-	658
9	770	-	770
10	883	-	883
11	995	-	995
12	1,107	-	1,107
13	1,239	-	1,239
14	1,328	-	1,328
15	1,396	-	1,396
16	1,396	-	1,396
17	1,396	-	1,396
18	1,396	-	1,396
19	1,396	-	1,396
20	1,396	-	1,396
21	1,396	-	1,396

Table 8-5 Cash Outflow

Unit: Million Yen

Period (Year)	Investment	Operating Expenses	Total Cash Outflow
1	398	-	398
2	1,709	-	1,709
3	2,460	11	2,471
4	2,787	32	2,819
5	2,260	57	2,317
6	644	84	728
7	378	96	474
8	459	96	555
9	441	96	537
10	459	96	555
11	441	96	537
12	459	96	555
13	441	96	537
14	411	96	507
15	396	96	492
16	333	96	429
17	333	96	429
18	333	96	429
19	333	96	429
20	333	96	429
21	333	96	429

Table 8-6 Net Cash Flow

Unit: Million Yen

Period (Year)	Net Cash Flow
1	-398
2	-1,709
3	-2,445
4	-2,666
5	-1,974
6	-240
7	89
8	103
9	233
10	328
11	458
12	552
13	702
14	821
15	904
16	967
17	967
18	967
19	967
20	967
21	967

8-2 Economic Benefits of Rural Communication

Following is the concrete analysis of economic effect to arise from the improvement and expansion of rural communication facilities in Nepal.

8-2-1 Convenience of Communication

Not a few information that must have a great value in the developed countries cannot be utilized in many cases in the developing countries. Otherwise, such information often becomes worthless even if it is to be utilized in the latter group of countries.

Communication generally is one instrumentality to increase the utilization possibility of such information.

The commonly recognized convenience of communication is assumed to be as under, when analyzed from economic and social viewpoints.

(1) Economically, the convenience of communication is found in the cutback of information cost in business activities, the inventory curtailment by pertinent information exchange, the planned production feasibility by effective use of demand and supply information, and the increase of revenue by the increase of production.

To business organizations, the ease of information transmission means the expansion of distribution and economic spheres.

When the preparedness of business organizations to utilize information is complete, the effect of information utilization takes shape as the combined effect from both the production system and market structure.

When the distribution channel becomes rationalized, contingencies at the time of distribution, such as expenses for remedying the road wear and tear and the resultant traffic accidents, can be reduced.

For Nepal, tourism assumes special importance.

The role of information in promoting national revenue from tourism is important a great deal. As a matter of fact, the number of foreign tourists that visit Nepal is by far more elastically reflected in the amount of investment in telecommunications services than in any other national activities.

(2) Socially, communication makes possible the integrated management and operation of the police system indispensable for the maintenance of law and order in the country, as well as the national defense organizations. For instance, communication contributes to the effective personnel alignment, the thorough personnel guidance, and the prompt delivery of business instructions and response thereto at high efficiency.

Same is the case with the promotion of administrative system rationalization also. By means of communication, political decision making by the central government permeates to all parts of the country, raising the efficiency of national administration and vitalizing the administrative functions.

8-2-2 Telephone Shortage and Decentralization Policy

The deficiency of inter-regional information exchange proves to be the bottleneck to social and economic development of Nepal.

Telephony is a vital means of information exchange.

However, in Nepal, the annual telephone density per population of 100 remains to be extremely limited as shown below. The absolute quantity of telephones is deficient.

	Subscriber Lines per Population of 100
1977/78	0.06
1978/79	0.07
1979/80	0.07
1980/81	0.08
1981/82	0.08

Annual investment in telecommunications services is as under.

	Telecommunications Investment
1976/77	Rs 8,430,000
1977/78	9,230,000
1978/79	14,022,000
1979/80	36,249,000
1980/81	9,331,000

Up to the present, the most part of investment in telecommunications services in Nepal has been concentrated in industrial development centers.

The utilization of telecommunications media, mainly telephones, is to the greatest extent among the industrial production division (ratio to total: 20%). Utilizations for political and social purposes and for liaison during emergency follow.

Users in the divisions not directly related to production activities occupy the majority of 80%. These users comprise regional government and public offices and public utilities including hospitals and police stations, and private residents.

Resident telephone users are mostly intellectuals. They are in the leading positions among local residents so that they exchange social and economic information through telephones.

Thus, in the future, telecommunications media including telephones will become more and more developed for distribution of important information among the whole nation of Nepal.

8-2-3 Importance of Rural Development

Nepal consists of three regions that geographically and socially extend from east to west. The three regions are:

1) The southern industrial center called Terai that borders on India.

2) The geographical middle of Nepal, called Pahad, where agriculture thrives.

3) The mountainous highlands adjoining the Himalayas. The whole region is undeveloped except a few tourist areas.

Human interflow among the three regions is seldom seen. Reasons are the shortage of transportation media and the difference in climate, natural features, culture and industry.

Should the situation continue as it is, the production capability per capita in Pahad region lags farther and farther behind the high productivity in Terai region. In the communication division, for instance, Terai region already maintains the main network extending from east to west whereas in Pahad region the network is far from being complete except among very few cities.

From the viewpoint of correcting the lack of human interflow and the widening production gap among the three regions, there is much to expect from providing more people in extensive Pahad region with a means of information exchange. This goes a long way toward further development of the whole country also.

The objective of the current project is to establish local networks branching from the existing main network, extending such branch networks to almost the whole of Pahad region and part of Terai region and realizing the necessary minimum communication networks covering those areas. This is considered to be indispensable for the development of social infrastructure in rural areas represented by Pahad region.

Short wave circuit cannot fully perform the function of information distribution. The most part of rural regions except part of urban areas are without STD service network. Presently, each zone comprises an average of five districts, and each district makes communication with other districts by means of short wave circuits.

To the public call office in each district the brought telegraphic message applications. Usually, those telegraphic messages are transmitted by short wave circuits to public call offices in other districts. And, for the reply from the addressee to each transmitted message to reach the sender, nearly one week is necessary. Information exchange, which is instantaneous when by telephone, takes nearly a week when by short wave system. This does not serve the purpose of information exchange in a real sense.

In each rural center of Nepal is established the primary switching center so that, basically, automatic switching and connection of inter-zone calls are intended by use of microwave transmission circuits.

8-2-4 Communication System to Compensate for Road Development Difficulty

The amount of investment in road construction in Nepal is as under.

For gravel road construction	Rs 1,000,000/km
For paved road construction	Rs 10,000,000/km
Average	Rs 5,000,000/km

For the areas where road development is necessary to stimulate economic activities or for the areas where the approach to industrial center is difficult, the road development costs quoted above are too much. Presently, in the areas where road construction is impracticable, the ropeway system is established for transportation of materials across mountain ridges, as in Hitauda-Kathmandu section. The ropeway system operation, however, is not in the desirable state.

The communication system can provide instantaneous information exchange media at a much lower cost than the ropeway system. The communication system makes it possible to acquaint people in charge of materials transportation with actual needs at different places precisely. The result is the transportation feasibility for larger quantities of materials by the prearranged number of transporting operations.

Thus the communication system is of vital importance for improving the operating efficiency of national economy of Nepal that remains at a low level due to the incomplete road network.

8-2-5 Economic Effect of Rural Communication Development

In the rural regions of Nepal, almost all inhabitants are engaged in agriculture either as self-sustaining independent farmers or as tenant farmers. The most part of farming villages are without roads for access to nearby urban areas. Many farming areas are isolated, denied the benefits of modern culture.

Sindhuli Madi area is one of those farming areas. Following is an analysis of economic effect that can be expected in the event the communication facilities are installed in that area.

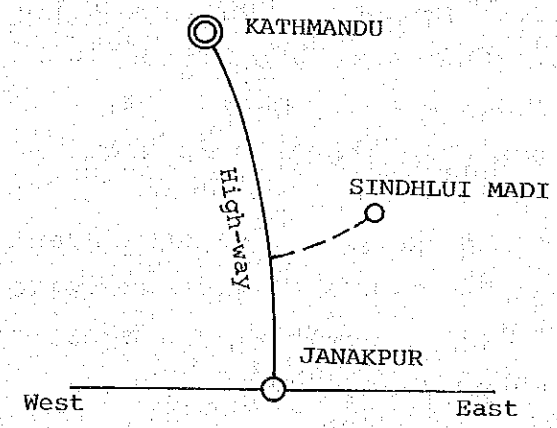
In Sindhuli Madi area, 10 villages including the district headquarters are scattered. As of the present, no communication facilities exist between nine villages in Sindhuli and Sindhuli center. The exchange of messages between Sindhuli, on one hand, and Kathmandu and Janakpur, on the other, is via short wave circuits. The existing exchange of messages arrangement is as under.

Sindhuli - Kathmandu	Twice/day	30 minutes,	each time
Sindhuli - Janakpur	Once/day	"	"

The exchange of messages with telegraph offices in Kathmandu and Janakpur is during the above time limits only.

Sindhuli is not directly connected by road either to Janakpur or to Kathmandu. The only road to Janakpur or Kathmandu is the highway in Terai region. For access road construction from Sindhuli to the highway, no fund is available yet.

The dotted line section in the illustration below, i.e., the section from Sindhuli to the highway, is several tens of km long.



In this section, a truck carrying men and materials plies once a day, crossing rivers and jolting along in the wilderness, and spending full one day for the return trip. Cattle or men themselves carrying materials are seen trekking the way from time to time.

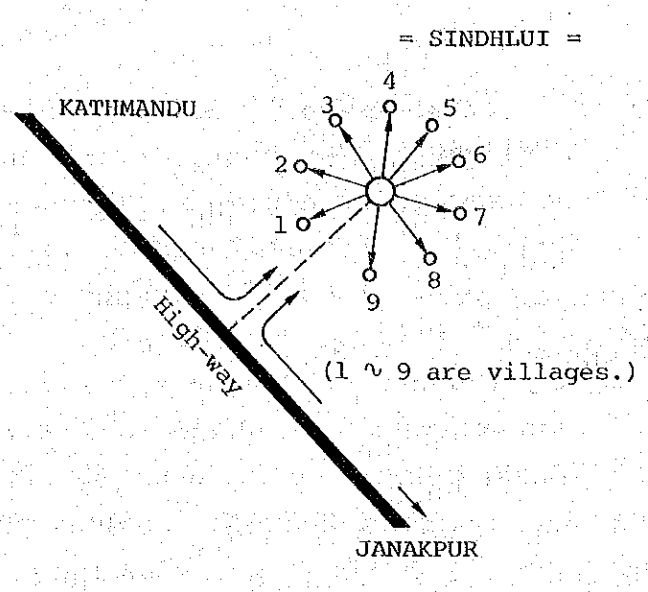
The quantity of materials that can be transported by this means is naturally limited.

At Sindhuli, a bazar is held, usually once a week, with materials transported from Janakpur and other towns. On this occasion, people from nine villages in Sindhuli gather at Sindhuli center to purchase materials. Sometimes, carriers called porters purchase materials at the bazar and carry those materials to the villages and sell them. By reasons of demand and supply relationship that arises at the bazar plus the socially required liaison, upwards of 50 porters proceed almost everyday from Sindhuli center to the nine scattered villages.

Suppose that STD system communication network exists in Sindhuli Madi. That is to say, if it becomes possible to respond promptly and pertinently to the needs for bazars and the life related social requirements, the now necessary porter labor and such labor cost can be saved.

Telecommunications can thus perform a full role as economic property.

The general trend is that the opportunity cost of labor of those local inhabitants is directed to agricultural activities in their respective villages. Needs for agricultural products between kathmandu/Janakpur and Sindhuli and inside Sindhuli area also can be correctly identified when analyzed using communication as a medium.



Transportation route where goods and materials are conveyed to the center of Sindhuli village.

In each village, the planned agricultural production adjusted to the actual needs can be carried out, and this leads to the production surplus at each farming household. Such production surplus is taken by each farming household to the bazar for marketing.

This fact indicates that the porters who visit villages from Sindhuli center as vendors or as messengers can carry products from those villages on their way back. In this manner, consumption economy pulls up momentum acceleratedly.

Instantaneous exchange of information via communication system contributes directly and indirectly to the elevation of productivity at farming villages.

Human capital surplus, such as porter labor which has become unnecessary after the installation of communication facilities, can be utilized for road development.

Basically, road construction should be carried out at the cost of villagers who are to utilize the road. This is according to the principle of beneficiary's cost sharing.

However, there are limits to the procurement of necessary labor from remote areas. First, the paucity of transportation media makes the transportation of procured labor difficult. Second, seasonal restrictions apply to labor availability. Third, the difference is climate and natural features makes the labor settlement infeasible.

In Nepal, the labor force that can be mobilized for implementation of such project as road construction in rural areas is substantially deficient.

From the long range viewpoint, however, the interest among rural inhabitants in road network development is bound to increase as market economy becomes established with people's market perception also improved.

IX. OVERALL PROJECT EVALUATION AND PROPOSAL

IX. Overall Project Evaluation and Proposal

9-1 Overall Evaluation

By the project implementation based on the rural telecommunications network improvement plan which, in turn, is based on the feasibility study findings, the stable and reliable communication system will be established, interconnecting administrative centers and other places of similar importance in the whole Kingdom of Nepal. And, to main subscribers in rural areas, such as administrative offices, police stations, banks and medical institutions, no-delay toll call service will be provided on round-the-clock basis. To the general public, 12 hours/day working no-delay toll public telephone service and telegram message service will become available.

These services will be an epoch-making new services to the inhabitants of rural areas of Nepal where no communication media exists at all or the sole available media is the unstable H.F. radio system for limited hours (time sharing) telegram service.

Thus, for the promotion of integral rural development to which His Majesty's Government of Nepal attaches utmost importance, there is much to expect from the current project.

However, as far as concerns the quantitative evaluation in terms of direct economic benefits to NTC, the current project cannot exactly be defined as being profitable. This is because the current project is planned as the most effective means of and as the prime requisite for responding to the requirement relating to the modern state formation, or, more precisely, the requirement for

organizations, as well as their management, for development of industry and economy, and for improvement of public welfare.

The project motivated by national interests and political considerations, though extremely important from the national viewpoint, is generally not fit for direct cost to benefit evaluation. For this kind of project, its indirect effect, of which the quantitative perception and evaluation are difficult, must be duly considered.

The indirect effect of the current project was already described in the preceding chapter. Essentially, such indirect effect itself constitutes the role to be performed by telecommunications, and the effect and benefit that derive from such role belong for the most part to the party that utilizes the service offered. The ratio of direct benefit to the project management entity (in the present case, NTC) is limited.

For example, when the communication system is established in rural areas as the result of project implementation, this time, the effective arrangement of police officers for the purpose of maintaining the public security and of defense officers to keep national defense integral becomes possible. Such effective personnel arrangement leads to personnel cost curtailment and also to wasteful facilities cutback. There is much to expect from the ecomony of spending that results.

Such holds true in the administrative system rationalization and the cost performance improvement. In tax collection and financial expenditure management, higher efficiency can be expected.