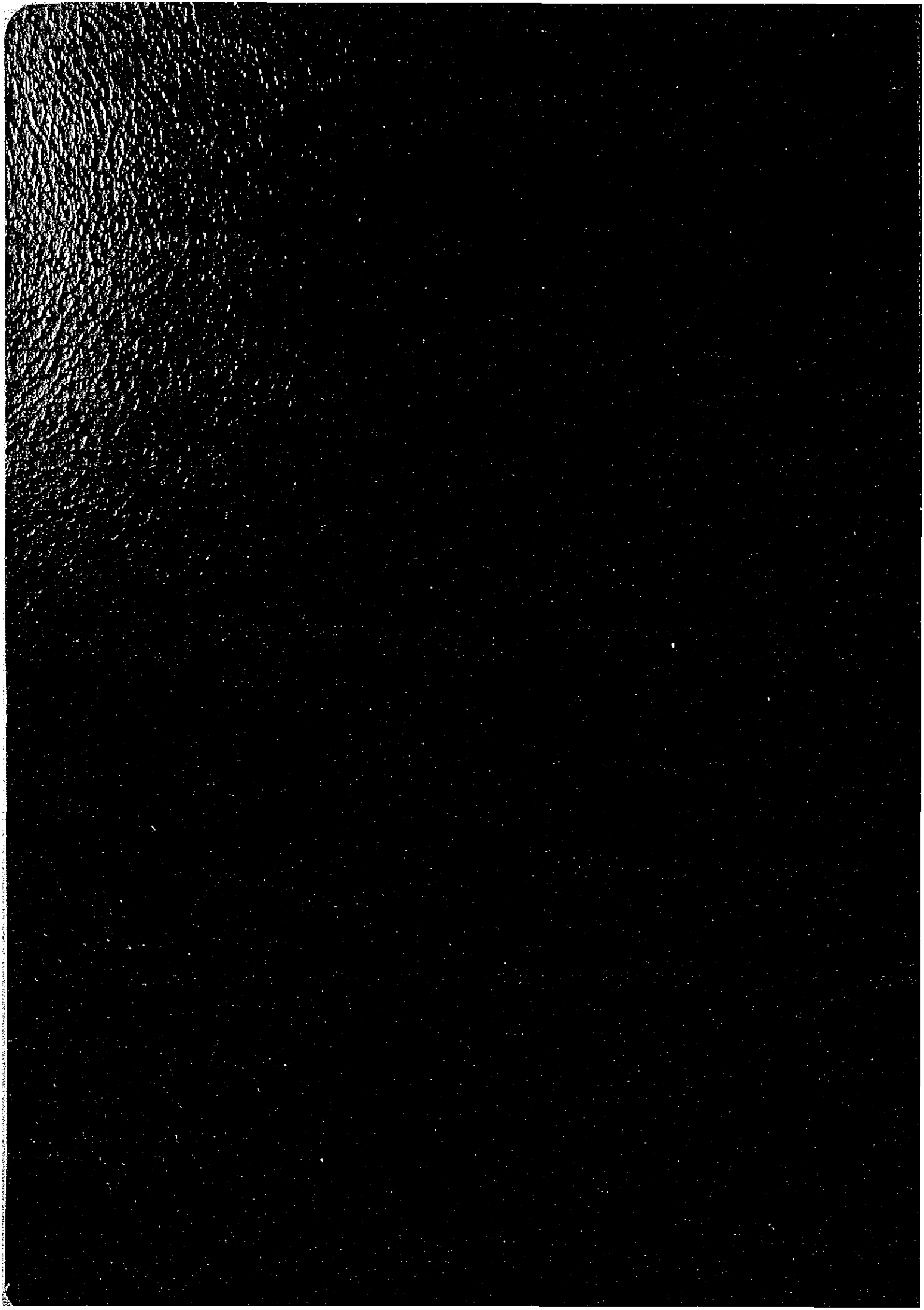
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

MASTER PLAN FOR THE DOMESTIC TELECOMMUNICATION NETWORK

VOLUME 1

JAPAN INTERNATIONAL COOPERATION AGENCY



THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

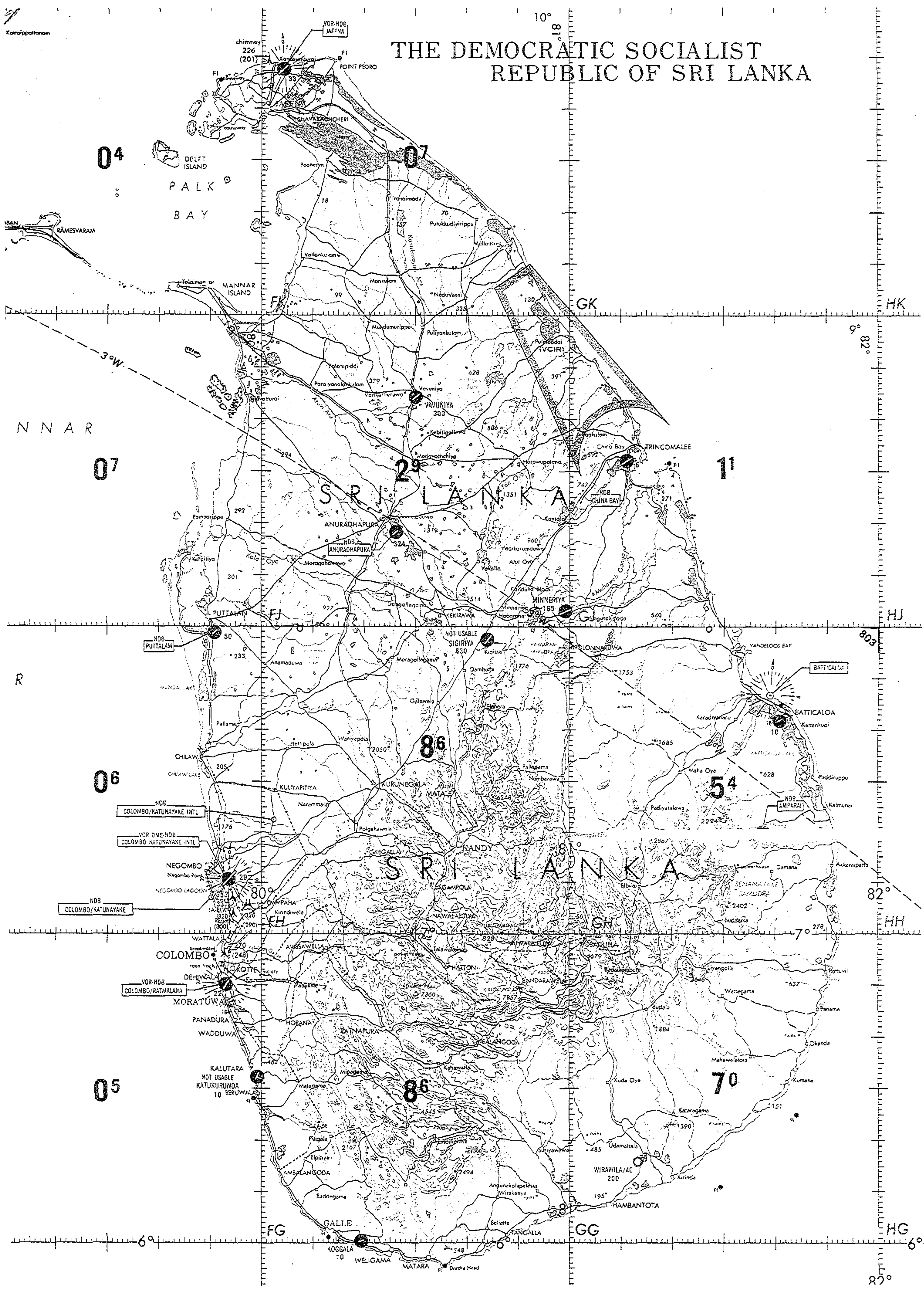
MASTER PLAN FOR THE DOMESTIC TELECOMMUNICATIONS NETWORK

— VOLUME I —

OCTOBER, 1985

JAPAN INTERNATIONAL COOPERATION AGENCY

THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA



PREFACE

It is with great pleasure that I present this report entitled Master Plan Study Report on the Domestic Telecommunications Network Project in the Democratic Socialist Republic of Sri Lanka to the Government of the Democratic Socialist Republic of Sri Lanka.

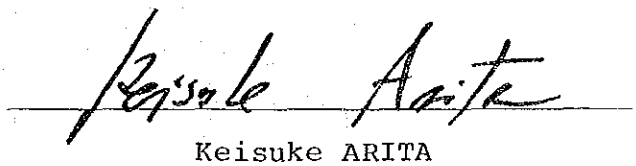
This report embodies the results of the study which was carried out from December 1984 to October 1985 by a team organized by the Japan International Cooperation Agency in response of the Democratic Socialist Republic of Sri Lanka to the Government of Japan.

The study team, headed by Mr. Akio Mizukoshi, Special Technical Advisor, International Cooperation Division, Communication Policy Bureau, Ministry of Posts and Telecommunications, had a series of discussions on the Project with the officials concerned of the Government of Sri Lanka, conducted a wide scope of survey and has now formulated the present report.

I hope that this report will be useful as a basic reference for the development of the Project.

I wish to express my deep appreciation to the officials concerned of the Government of the Democratic Socialist Republic of Sri Lanka for their close cooperation extended to the study team.

October 1985

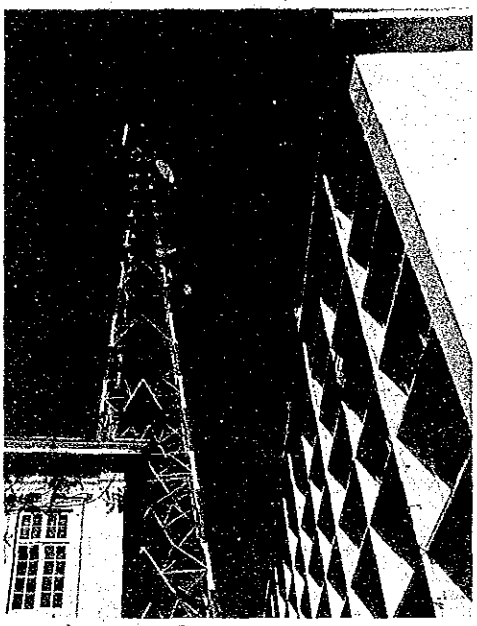


Keisuke ARITA
President
Japan International Cooperation Agency

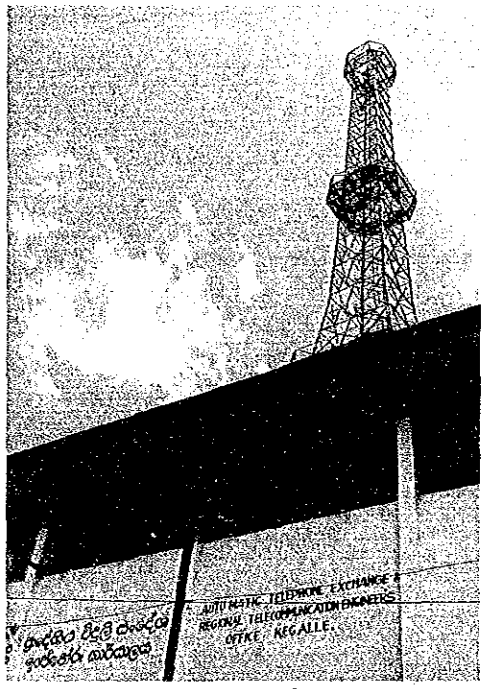
Discussion with
Permanent Secretary

Discussion with
SLTD Director

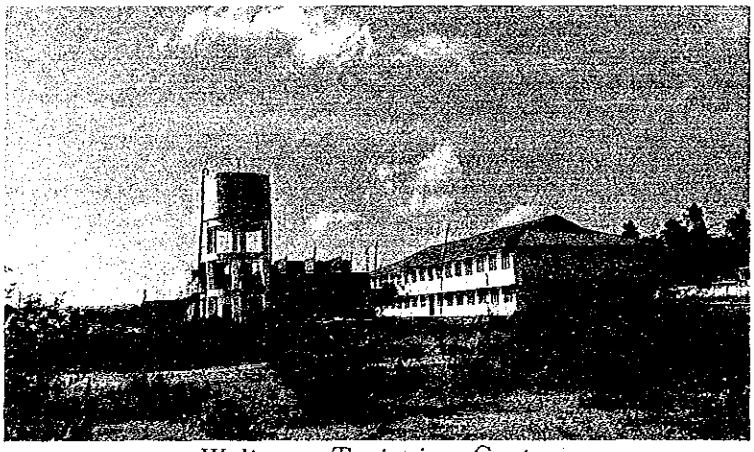
Discussion with
SLTD Key Persons



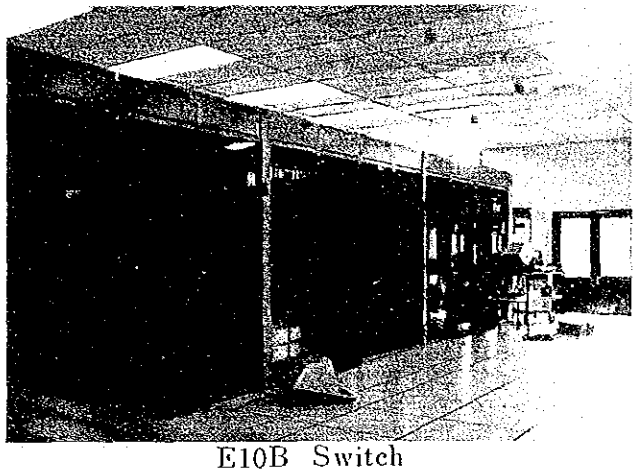
Antenna Tower of
Colombo Contral Exchange



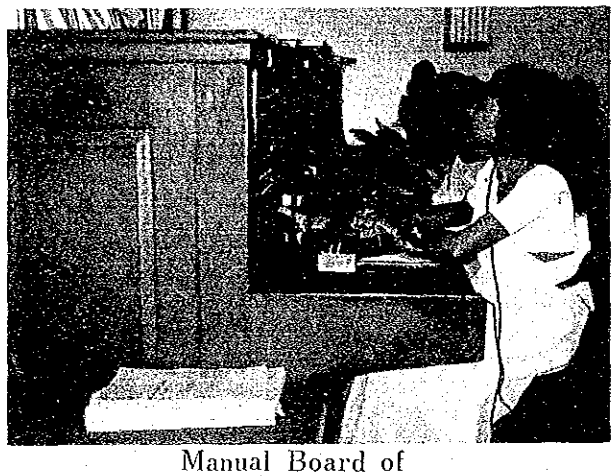
Kegalle Exchange



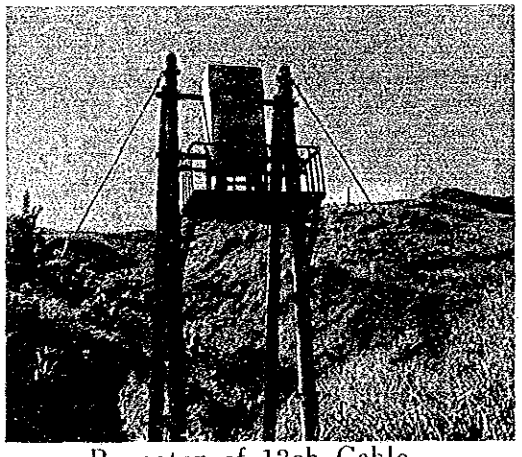
Welisara Trainning Centre



E10B Switch



Manual Board of
Kegalle Exchange



Repeater of 12ch Cable
Carrier System

CONTENTS

VOLUME I Master Plan for the Domestic Telecommunications Network in the Democratic Socialist Republic of Sri Lanka

Page

CHAPTER 8 ECONOMIC/FINANCIAL ANALYSIS

LIST OF TABLES

LIST OF FIGURES

EXCHANGE NAME AND CODE LIST

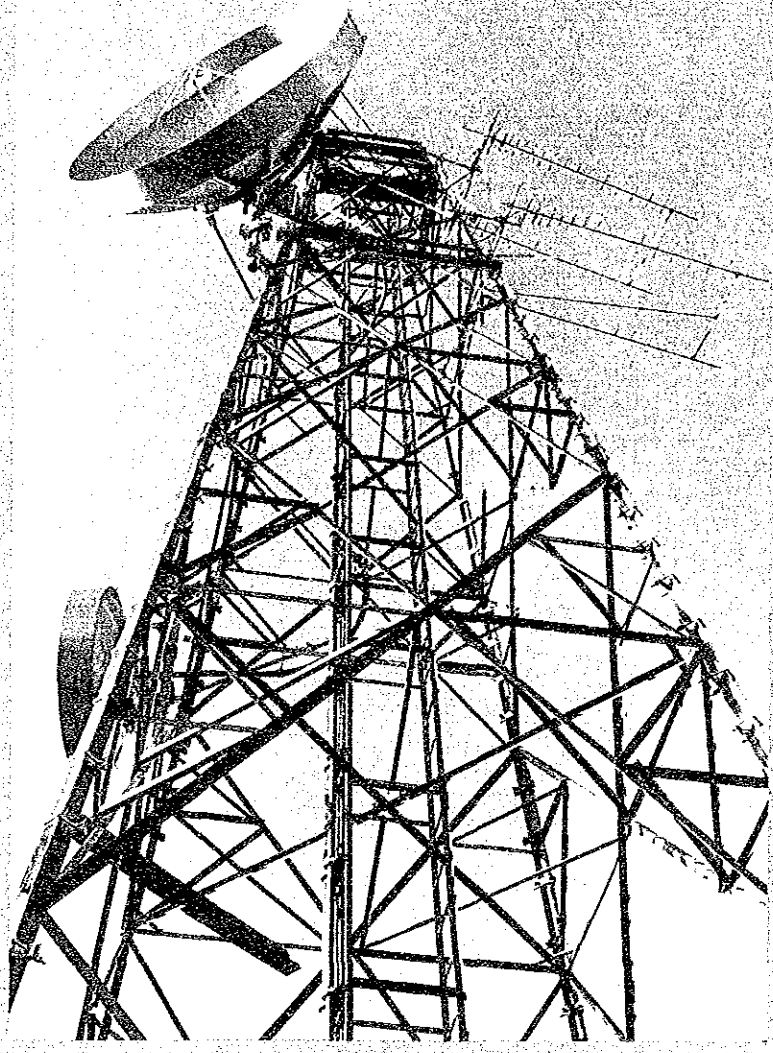
1.	ANURADAPURA	ANR
2.	AMPARA	AMR
3.	AVISSAWELLA	AVS
4.	BADULLA	BDL
5.	BATTICALOA	BTC
6.	BANDARAWELA	BNR
7.	COLOMBO	CNT
8.	CHILLAW	CHW
9.	GALLE	GLE
10.	GAMPAHA	GMH
11.	HAMBANTOTA	HMB
12.	HATTON	HTN
13.	JAFFNA	JFN
14.	KALMUNAI	KLM
15.	KANDY	KND
16.	KURUNEGALA	KRG
17.	KALUTARA	KLT
18.	KEGALLE	KGL
19.	MANNAR	MNR
20.	MATALE	MTL
21.	MATARA	MTR
22.	NAWALAPITIYA	NWL
23.	NEGOMBO	NGM
24.	NUWARA-ELIYA	NWR
25.	POLONNARUWA	PLN
26.	PANADURA	PND
27.	RATNAPURA	RTN
28.	TRINCOMALEE	TRN
29.	VAVUNIYA	VNY

Abbreviations for each exchange name are shown in Volume II "Exchange Name and Code List".

LIST OF ABBREVIATIONS

CADS	Colombo Area Development Scheme
CAMA	Centralized Automatic Message Accounting
ESS	Electronic Switching System
FTZ	Free Trade Zone
GDP	Gross Domestic Product
IDA	International Development Association
IPZ	Investment Promotion Zone
ISC	International Switching Center
LAMA	Local Automatic Message Accounting
LE	Local Exchange
MC	Maintenance Center
OCADS	Outer Colombo Area Development Scheme
OTS	Overseas Telecommunications System
Rs	Rupees
RSU	Remote Switching Unit (Digital)
SEAMEE	Submarine Cable Project between Sri Lanka and Indonesia
SLTD	Sri Lanka Telecommunications Department
SPC	Stored Program Control
SSC	Secondary Switching Center
SXS	Step-by-Step Switching Equipment
TD	Time Division type (Digital) Equipment
TSC	Tertiary Switching Center
WCY	World Communications Year (Project)
XB	Cross-bar Switching Equipment
XB-SE	Semi-electronic XB Switching Equipment
16-QAM	16 level Quadruple Amplitude Modulation

SUMMARY



Antenna Tower
of Primrose Hill

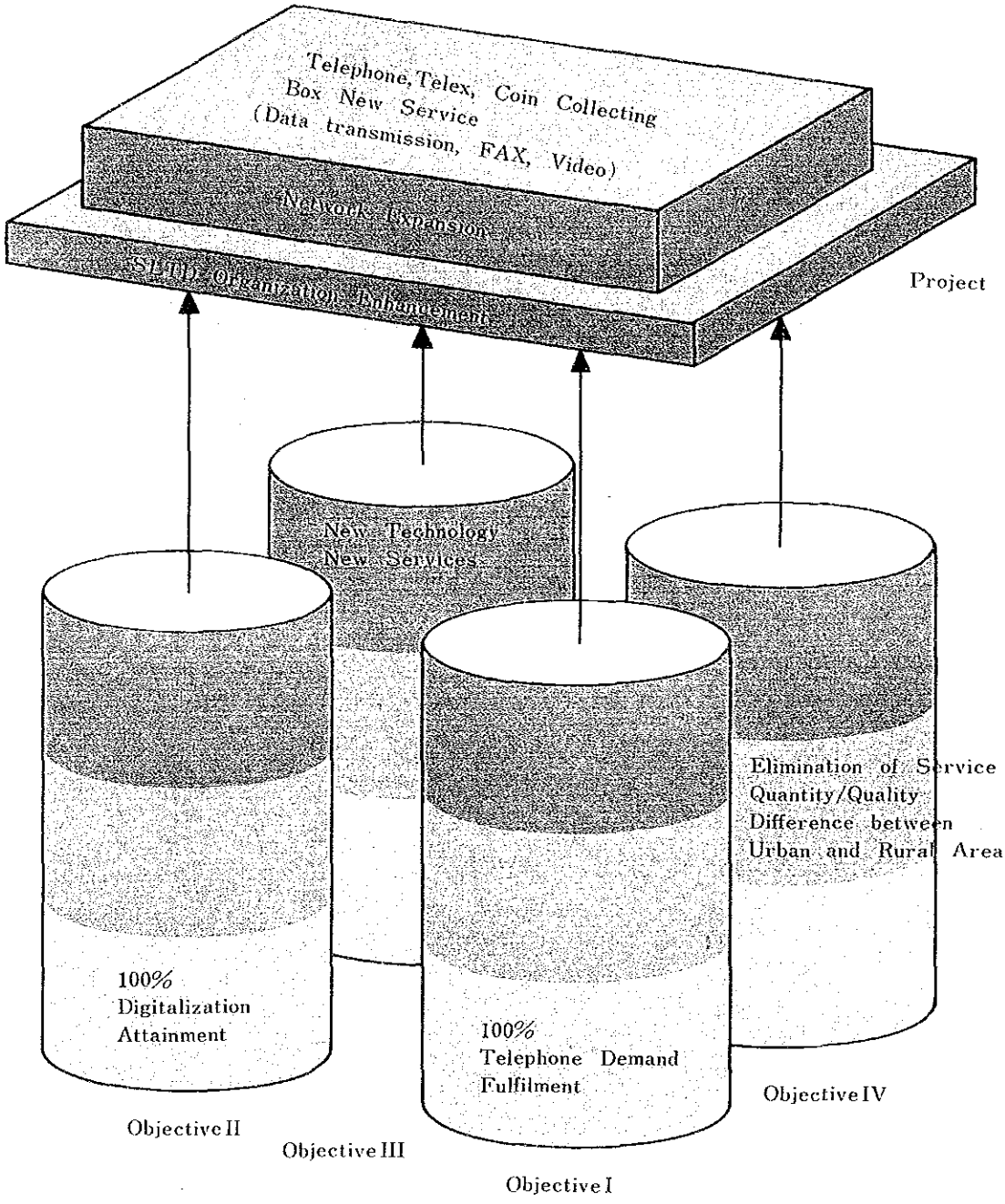
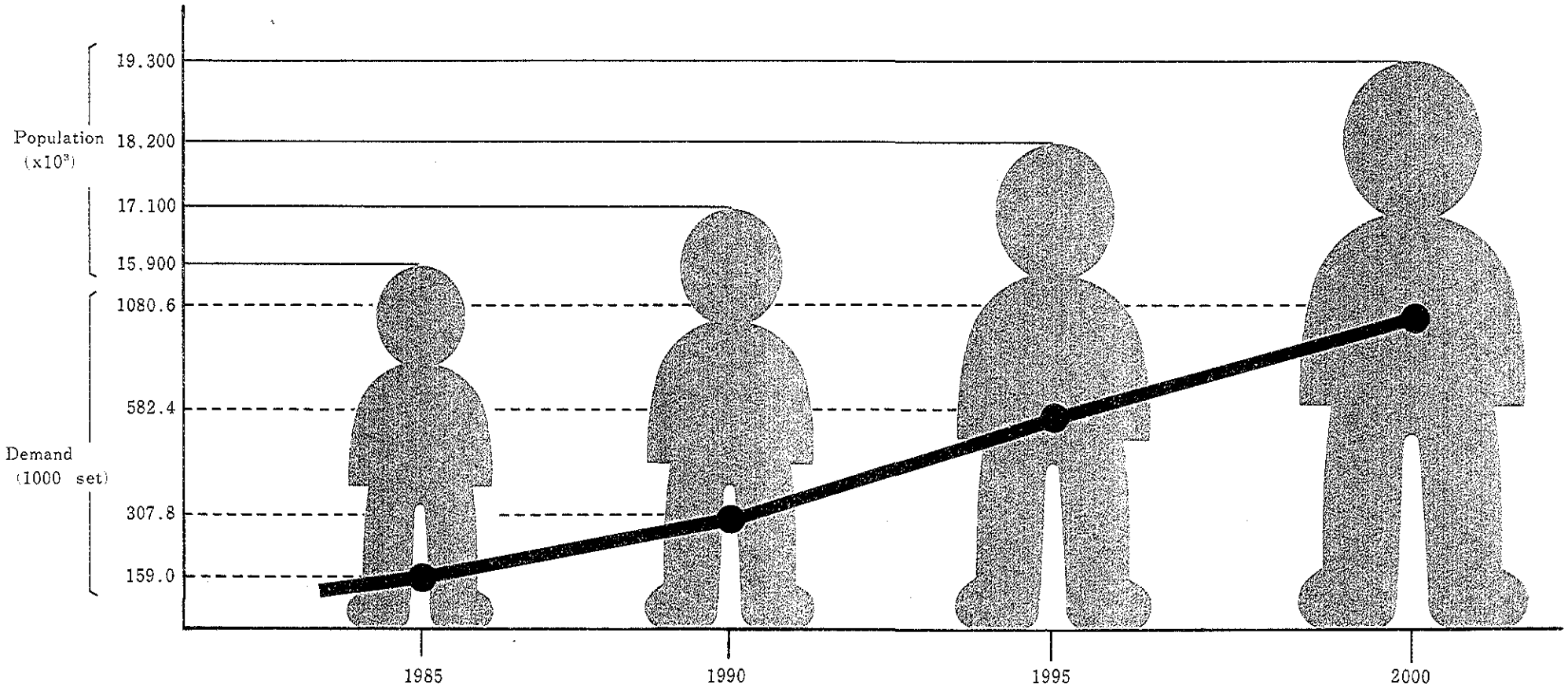
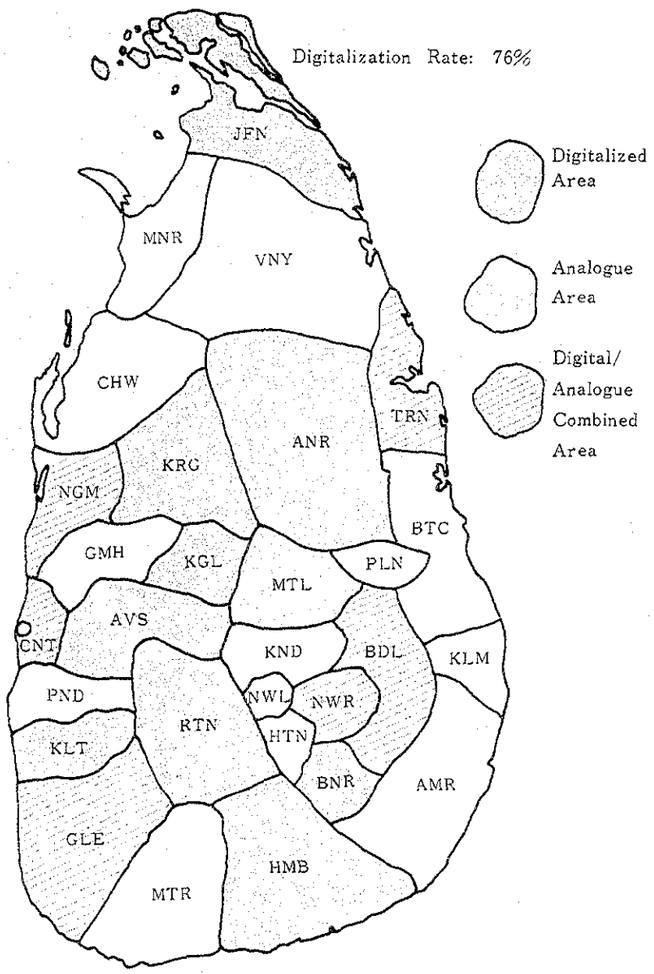


Fig. 1−1 Sri Lanka Telecommunications Odjectives in the Year 2000

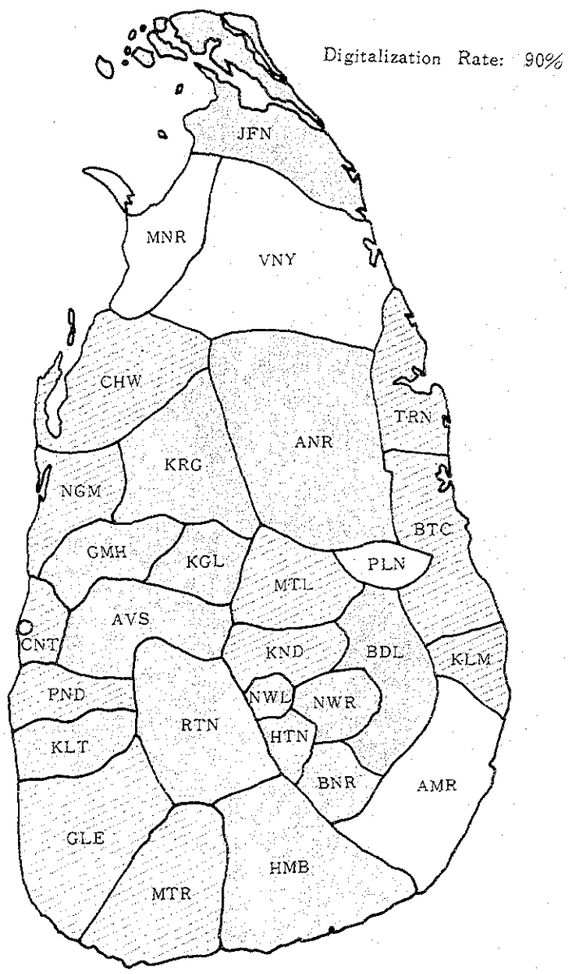


	1985	1990	1995	2000
Nation wide Demand Density (100 persons)	1.0	1.8	3.2	5.6
Number of Telephone Set (1000 set)	119.3	261.7	553.2	1.080.6
Demand Fulfilment	75%	85%	95%	100%

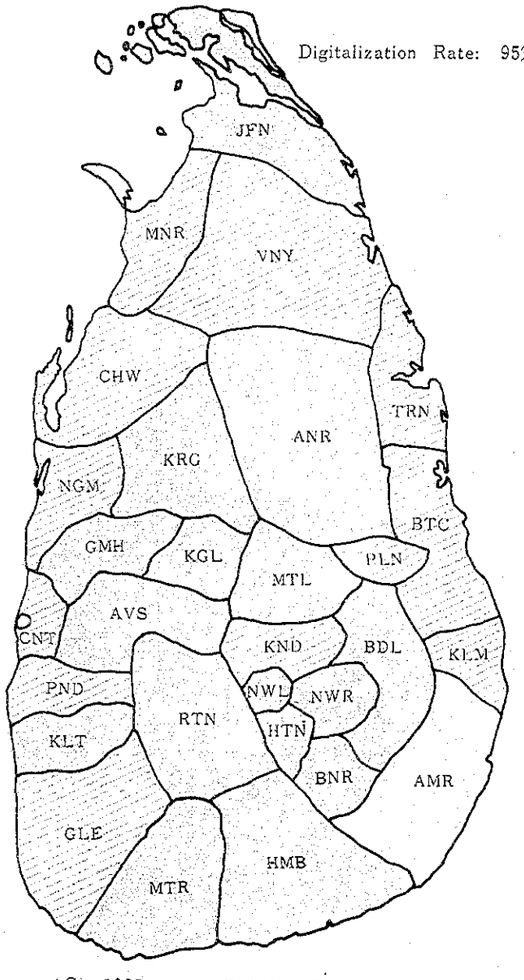
Fig. 1−2 (Objective-I) Demand Forecast and Telephone Demand Fulfilment



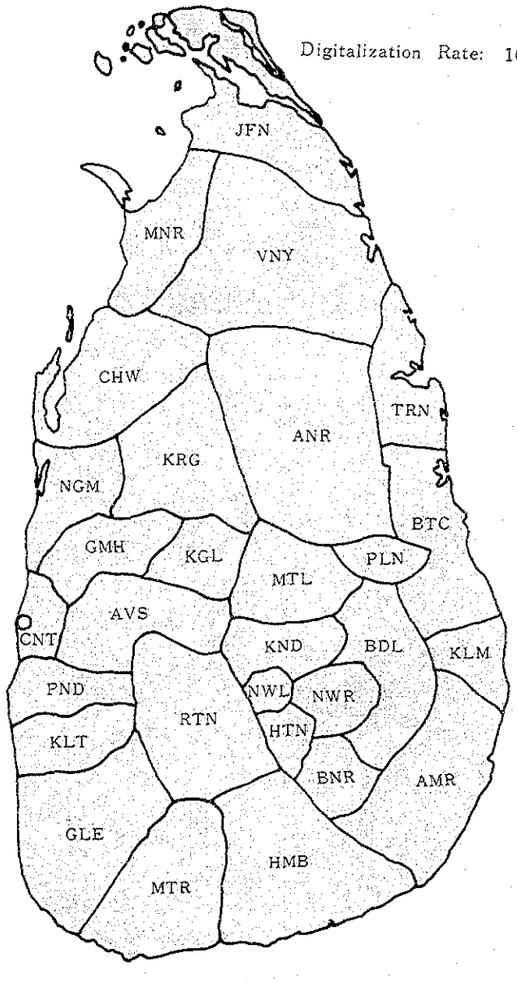
(A) 1985 year



(B) 1990 year (PHASE I)



(C) 1995 year (PHASE II)



(D) 2000 year (PHASE III)

Fig. 1—3 (Objective-II in the year 2000) Change of Digitalization Rate

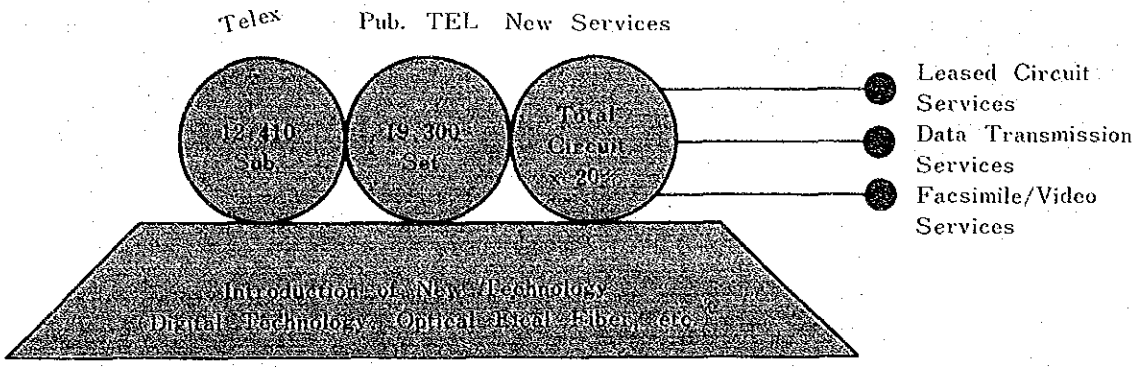


Fig. 1—4 (Objective-III) Introduction of New Technology and New Services

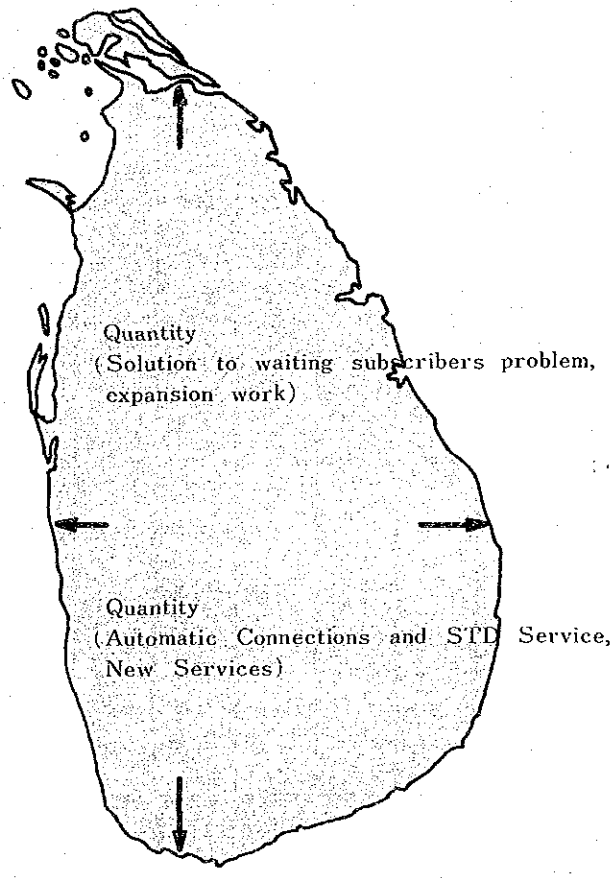


Fig. 1—5 (Objective-IV) Elimination of Service Quantity/Quality Difference Between Urban and Rural Area

Table 1 (1/3) Summary of Network Expansion Plan (SSC Area)

TSC		SSC AREA	CATEGORY	UNIT	PHASE-I					PHASE-II	PHASE-III
CODE	NO.				1986	1987	1988	1989	1990	1995	2000
ANR	1	Anuradapura	SWITCHING	L.U.			1,544			2,812	5,176
			TRANSMISSION	2Mb			13			17	31
			LOCAL CABLE	Pair						2,400	6,300
	2	Mannar	SWITCHING	L.U.				800		2,816	479
			TRANSMISSION	2Mb					15	8	12
			LOCAL CABLE	Pair	1,100			1,100	2,800		1,500
	3	Jaffna	SWITCHING	L.U.				8,590		13,360	23,980
			TRANSMISSION	2Mb				19		27	58
			LOCAL CABLE	Pair	9,700			400		15,000	30,400
	4	Vavuniya	SWITCHING	L.U.		1,550				1,332	4,336
			TRANSMISSION	2Mb		15				9	19
			LOCAL CABLE	Pair		1,400				1,400	2,300
	5	Trincomalee	SWITCHING	L.U.			144		700	2,020	3,684
			TRANSMISSION	2Mb					9	8	16
			LOCAL CABLE	Pair					800	1,900	3,700
	6	Polonnaruwa	SWITCHING	L.U.						988	1,972
			TRANSMISSION	2Mb						18	15
			LOCAL CABLE	Pair						800	1,700
KND	1	Kandy	SWITCHING	L.U.		552	7,000	1,824	3,433	16,720	37,516
			TRANSMISSION	2Mb		1	12	7	3	20	28
			LOCAL CABLE	Pair	200	200	16,900	1,000	400	18,500	56,800
	2	Matale	SWITCHING	L.U.					1,876	2,668	5,080
			TRANSMISSION	2Mb					4	7	12
			LOCAL CABLE	Pair	100				2,100	3,500	6,100
	3	Batticaloa	SWITCHING	L.U.			3,700			2,300	5,836
			TRANSMISSION	2Mb			11			7	11
			LOCAL CABLE	Pair			2,400			2,900	5,900
	4	Kalmunai	SWITCHING	L.U.				1,500		2,050	3,800
			TRANSMISSION	2Mb				9		5	5
			LOCAL CABLE	Pair				2,400		1,000	5,300
	5	Ampara	SWITCHING	L.U.				600			2,700
			TRANSMISSION	2Mb						12	6
			LOCAL CABLE	Pair						1,100	1,600
	6	Badulla	SWITCHING	L.U.				1,432		2,700	4,960
			TRANSMISSION	2Mb				14		14	23
			LOCAL CABLE	Pair	600			1,700		3,300	5,300
	7	Bandarawela	SWITCHING	L.U.				988		2,020	3,788
			TRANSMISSION	2Mb				6		5	13
			LACAL CABLE	Pair	500			1,200		2,500	5,200

Table 1 (2/3) Summary of Network Expansion Plan (SSC Area)

TSC CODE	TSC NO.	SSC AREA	CATEGORY	UNIT	PHASE-I 1986	PHASE-I 1987	PHASE-I 1988	PHASE-I 1989	PHASE-I 1990	PHASE-II 1995	PHASE-III 2000
KND	8	Nuwara Eliya	SWITCHING	L.U.					1,528	3,288	4,640
			TRANSMISSION	2Mb					6	11	14
			LOCAL CABLE	Pair	700				100	2,900	8,000
	9	Hatton	SWITCHING	L.U.	2,308					1,724	3,540
			TRANSMISSION	2Mb	15					6	12
			LOCAL CABLE	Pair	2,300					2,300	4,500
	10	Nawalapitiya	SWITCHING	L.U.		1,376				700	1,200
			TRANSMISSION	2Mb		11					
			LOCAL CABLE	Pair		1,300				900	1,600
CNT	1	Colombo	SWITCHING	L.U.	54,250	23,800	27,350	9,900	16,300	178,800	323,200
			TRANSMISSION	2Mb	394					683	1,260
			LOCAL CABLE	Pair	13,900	19,400	26,800	7,600	17,500	250,400	398,500
	2	Chillaw	SWITCHING	L.U.		2,672				240	2,320
			TRANSMISSION	2Mb		14			9	9	16
			LOCAL CABLE	Pair		1,500				700	1,900
	3	Kurunegala	SWITCHING	L.U.					2,864	4,900	8,436
			TRANSMISSION	2Mb					6	13	37
			LOCAL CABLE	Pair					2,700	5,000	10,800
	4	Kegalle	SWITCHING	L.U.				192		2,544	3,140
			TRANSMISSION	2Mb						12	14
			LOCAL CABLE	Pair						800	3,600
	5	Gampaha	SWITCHING	L.U.	4,038					3,056	5,864
			TRANSMISSION	2Mb	6					8	13
			LOCAL CABLE	Pair	3,700					3,900	7,500
	6	Avissawella	SWITCHING	L.U.				1,528		960	3,312
			TRANSMISSION	2Mb				2			20
			LOCAL CABLE	Pair	400			1,500		1,200	4,500
	7	Kalutara	SWITCHING	L.U.				3,888		3,960	7,496
			TRANSMISSION	2Mb				8		9	14
			LOCAL CABLE	Pair				3,900		4,200	9,100
	8	Panadura	SWITCHING	L.U.		3,720				2,624	6,900
			TRANSMISSION	2Mb		8				5	8
			LOCAL CABLE	Pair		2,800				3,500	7,800
	9	Negombo	SWITCHING	L.U.				6,520		10,276	18,544
			TRANSMISSION	2Mb				13		17	23
			LOCAL CABLE	Pair				8,400		12,000	20,000

Table 1 (3/3) Summary of Network Expansion Plan (SSC Area)

TSC		SSC AREA	CATEGORY	UNIT	PHASE-I					PHASE-II	PHASE-III
CODE	NO.				1986	1987	1988	1989	1990	1995	2000
GLE	1	Galle	SWITCHING TRANSMISSION LOCAL CABLE	L.U. 2Mb Pair				6,124 21 7,600	192	6,364 24 8,300	12,244 48 18,300
	2	Ratnapura	SWITCHING TRANSMISSION LOCAL CABLE	L.U. 2Mb Pair			2,460 8 2,200			3,776 14 4,100	6,724 28 8,600
	3	Hambantota	SWITCHING TRANSMISSION LOCAL CABLE	L.U. 2Mb Pair						750 23 100	2,586 18 3,300
	4	Matara	SWITCHING TRANSMISSION LOCAL CABLE	L.U. 2Mb Pair	4,400 32 4,100					3,645 16 5,100	7,420 33 8,100

Table 2 Project Implementation Schedule

|---| Preparation ——— Execution

Project Phase	Phase I					Phase II		Phase III		Project Cost (Million Rs)
Project Name	1986	1987	1988	1989	1990	From 1991	To 1995	From 1996	To 2000	
G. Colombo Telecom. Network Improvement (Phase II)			---		———					762
EOTD Project	———									124
OCADS-III Category-I Category-II	|---|		———	———					1,039
Demand Fulfilment Project		|---|	———	———	———				2,822
(Phase II) Demand Fulfilment Project						———	———			8,373
(Phase III) Demand Fulfilment Project								———	———	14,810

With reference to the Democratic Socialist Republic of Sri Lanka national telecommunications network improvement plan, study conclusions are summarized hereunder.

1. PURPOSE AND OUTLINE OF PLAN

1.1 Purpose of Plan

The purpose of this plan is to fulfill rapidly growing telecommunications demand in all parts of Sri Lanka and to upgrade maintenance service. For this purpose, a long term telecommunications plan up to the year 2000 has been formulated, and, concerning implementation methodology and economic feasibility, in-depth studies have been carried out.

1.2 Sri Lanka Telecommunications Objectives in the Year 2000

Refer to Figure 1.

In regard to the long term Sri Lanka telecommunications plan, technical objectives in the year 2000 are fourfold.

Objective I: 100% Telephone Demand Fulfillment
(Refer to Figure 2.)

To install the same number of telephones as the estimated national telephone demand as of the year 2000 totaling 10,806,000, and, by this means, attain 100% telephone demand fulfillment.

Objective II: 100% Digitalization Attainment
(Refer to Figure 3.)

To elevate telecommunications system digitalization rate, which at present stands at 76%, to 100% in the year 2000, although subscriber's cable network (telephone sets to switching equipment) will remain on analog basis as before.

Objective III: Introduction of New Technology and New Services (Refer to Figure 4.)

To introduce new services including data communication and facsimile communication, besides expanding the conventional services, such as TELEX and public pay telephone services. Also, to initiate leased circuit service in response to requests from business enterprises.

Objective IV: Elimination of Service Quantity/Quality Difference between Urban and Rural Areas
(Refer to Figure 5.)

To plan telecommunications facilities expansion work equally for both urban and rural areas, without prejudice for urban area where investment effect is high, and, by this means, eliminate inequality between urban and rural areas not only in service quantity (as in solution to waiting subscribers problem) but also in service quality (as in realization of automatic connections and STD service).

To attain those objectives, several projects by years will be implemented. At the same time, the operation and management systems of SLTD as responsible entity for telecommunications services will have to be reorganized substantially so that SLTD can have as much capability as required for essential project implementation.

2. DRAFT BASIC PLAN

2.1 Demand Forecast

Demand forecast results for subscriber telephone, public telephone and TELEX services, as well as new services, in Sri Lanka are as under.

(1) Telephone Demand Forecast

	1985	1990	1995	2000
National demand density (%)	1.0	1.8	3.2	5.6
National total of demand	159,000	307,800	582,400	1,080,000

(2) TELEX Demand Forecast

	1984	1985	1990	1995	2000
National total of demand	1,100	1,642	4,768	9,344	12,410

(3) Public Pay Telephone Demand Forecast

	1985	1990	1995	2000
No. of public pay telephones	1,590	5,130	10,920	19,300
Additional installations	1,540	3,540	5,790	8,380

(4) Spare Circuits for New Services

	1985	1990	1995	2000
No. of spare circuits (%)	10	12	15	20

2.2 Traffic Forecast and Calculation of Circuits Required

Traffic forecast is by the following methods:

(1) To divide originating calling rate/subscriber into two patterns, one for Greater Colombo Area and the other for other areas.

(2) To calculate toll call volume, dividing toll calling rate into the above two area patterns.

(3) To determine route by route traffic increment in accordance with subscriber increase, thereby calculating future traffic estimate.

From the forecasted traffic for each route, the number of circuits required in each forecast year is calculated.

2.3 Basic Network Plan

Basic plan indispensable for telecommunication network planning is so formulated that it benefits both the period wherein analog and digital systems coexist and the period wherein digital system is being firmly established. The basic plan consists of

(1) National numbering plan

(2) Charging plan

(3) Network plan

(4) Transmission plan

(5) Signalling plan

(6) Digital network synchronization plan

2.4 Installation Standards

Study items include additional equipment installation philosophy for network construction at minimum cost, method of equipment selection, system design period, and maintenance/operation plan.

(1) Demand Fulfillment Plan

	1986	1990	1995	2000
Overall objective fulfillment rate	72	81	90	95
Installation objective fulfillment rate	75	85	95	100

Additional telephone installations based on the above installation objective fulfillment rate follow:

	1983	1986	1990	1996	2000
No. of telephones installed	73,425	119,340	261,670	553,210	1,080,750
Additional installations	-	45,910	142,330	291,540	527,360

(2) System Selection Standards and Design Period

1) System selection standards

a) Digital switching equipment and remote switching equipment

b) Subscriber carrier equipment

c) Transmission/ratio system selection

2) Design/Installation Period Study for each technology division

3) Optimum Operating Scale Study for each exchange office

4) Equipment Replacement/Transfer Plan

5) Maintenance/Operation Plan

6) Auxiliary Facilities Standards

2.5 Network Expansion Plan

For the purpose of forecasted demand fulfillment according to the fulfillment plan, network expansion plan in consideration of existing facilities is determined for each technology division (switching, transmission/radio, outside plant). Network expansion plan is summarized in Table 1.1.

2.6 Economic/Financial Analysis

(1) Long term telecommunications investment plan is established by four steps. That is:

Step I: Scale of overall telecommunications plan analysis

Step II: Optimum telecommunications investment scale analysis

Step III: Break-even point study

Step IV: Operation/management plan study

(2) 100% demand fulfillment in the year 2000 by additional installation of 961,230 telephones requires cost as detailed below.

(in million Rupees)

	Equipment Investment Cost	Maintenance Cost	Operation/ Management Cost	Total
1986	811	-	_	811
1987	1,023	46	101	1,170
1988	986	103	128	1,217
1989	1,024	155	164	1,343
1990	890	209	213	1,312
1991-1995	8,373	2,196	3,275	13,844
1996-2000	14,810	4,930	8,787	28,527

(3) The investment is of big scale totaling about 279,000,000 Rupees, i.e., annual average of 950,000 Rupees in Phase I, 167,000,000 Rupees in Phase II and 29,600,000 Rupees in Phase III. Whether this big scale investment is reasonable from national viewpoint or not is taken up for study. Comparison between all costs and all benefits (installation fee, annual rental, call charge and consumer's surplus) during 1986-2000 (15 years) yield period and 1987-2020 management period shows that IERR (internal economic rate of return) as investment feasibility indicator is of the following standards:

(in percent)

	20%	10%	0%	-10%	-20%
Decrease of benefits	11.75	14.58	17.33	20.05	22.75
Increase of cost	13.76	15.40	17.33	19.68	22.60

In all cases, IERR exceeds opportunity cost of capital by upwards of 10%. This fact stands witness to the reasonableness of this scale of investment in the light of national interests.

(4) However, for 30 exchanges in the country, exchange by exchange IERRs vary broadly from 3% to 23%. Exchanges, where existing facilities plus completion of on-going projects still make further investment necessary and where investment feasibility is at high level, are the undermentioned 14.

	Exchange	IERR
1.	Colombo	22.67%
2.	Kandy	21.05
3.	Jaffna	20.89
4.	Kegolle	19.30
5.	Gampaha	16.95
6.	Hambantota	16.15
7.	Badulla	15.54
8.	Ratnapura	15.16
9.	Kurunegala	14.93
10.	Panadura	14.69
11.	Avissawella	13.85
12.	Bandarawella	13.36
13.	Galle	13.34
14.	Anuradapura	12.65

(5) For exchanges where IERR is low, investment period is delayed whereas for exchanges with high IERR, investment period is advanced. By this means, optimum investment plan is formulated. Optimum investment breakdown by years follows:

(in million Rupees)

	Basic Plan Investment	Proposed Optimum Investment	Balance
1986	811	599	-212
1987	1,023	1,167	+144
1988	986	1,110	+124
1989	1,024	1,070	+46
1990	890	890	0
1991-1995	8,373	8,365	-8
1996-2000	14,805	14,629	-176

(6) Study is made concerning investment feasibility in case where the proposed optimum investment is executed a) by SLTD as independent business entity and b) by private enterprise on commercial basis.

a) is the case where SLTD procures investment fund subject to 3% interest per annum and delivers 10% of operating profit to national treasury. In this case, IFRR (internal financial rate of return) is somewhere around 10%.

b) is the case where private enterprise concerned uses its own fund and pays business tax corresponding to 7% of gross revenue. In this case, IFRR is 9.94%.

Real interest rate less price rise rate is about 6.5%. Therefore, in both cases, a) and b), 3-4% operating profit can be expected so that operation breaks even.

(7) At present, out of the government's public investment, about 3%, or 700-800 million Rupees, are distributed to telecommunications sector. Therefore, additional distribution of the amount set aside for telecommunications sector in the optimum investment plan is difficult. This means that for acquisition of additional investment fund, change in one form or another in the present telecommunications service management by SLTD becomes necessary.

To that end, two alternatives are available. One is to establish new self-supporting business entity (public corporation) to take charge of telecommunications service management. The other is to transfer telecommunications service management to private enterprise. Whichever the choice, the management can be on paying basis and part of operating profit payment to national treasury is possible. Earlier the commencement of necessary preparations which ought to be multilateral and which may take several years to complete, the better.

2.7 Project Impementation Plan

Based on all-round technical study findings and economic/financial analysis results, recommendation is made for implementation of several project units. Order of priority for implementation is attached.

The whole project implementation period is 15 years from 1986 to 2000. These 15 years are divided into three 5-year phases. Phase I is for 1986 - 1990. Phase II is for 1991 - 1995. Phase III is for 1996 - 2000. For Phase I, project units having special importance as short term plans are recommended. Work contents are identified below. Implementation time schedule is in Table 2.

2.7.1 (Priority 1) Greater Colombo Area Telecommunications Improvement Project-II

Greater Colombo Area consists of 24 exchange areas. On-going in the area are CADS-III Plan for switching equipment expansion mainly with E-10 switching equipment, and improvement/expansion of junction lines and of subscriber's line networks of seven exchanges in central district, the latter by loan from Japan. Subscriber's line networks of the remaining 17 exchanges are not yet improved.

Areas served by those 17 exchanges are being developed as residential quarters and as light industry zone also. Hence the growing need for telephone network improvement/expansion.

Project concerned is to install 52,500 pairs of new subscriber's cables in all 17 exchange areas in addition to the existing 13,275 pairs.

- o Estimated project cost: 762 million Rupees
- o Work period: Installation to commence in 1987 and to be completed in 1989

2.7.2 (Priority 2) SLTD Organization Improvement Project

SLTD as responsible entity for execution of demand fulfillment plan envisaged in this long term plan and for subsequent service management must have its organization improved, aimed at work capability and efficiency enhancement. For this purpose, the undermentioned items are recommended for execution. Budget estimated at 124 million Rupees in required.

A. New Employment

For Phase I, employment of average 570 worker per year, including 450 engineers, is necessary.

B. Work Mechanization

Maintenance and operation service mechanization must be promoted whereby to enhance work performance efficiency.

C. Work Procedure Standardization

SLTD services including maintenance, operation, planning and financial affair must be standardized whereby to promote work performance accuracy.

D. Computerized Business Management

Handy type electronic computers must be introduced whereby to facilitate analytical, statistical and financial/accounting business management and to enhance work performance efficiency.

E. Staff Employee Training

Level of training must be elevated and curricula upgraded to improve staff employees' capability more positively than heretofore.

F. Improvement/Expansion of Exchange Buildings and Ancillary Facilities

2.7.3 (Priority 3) OCADS-III - Category I and Category II

OCADS-III Category I is for rural towns/villages where switching facilities are fully installed as in Greater Colombo Area but subscriber's line networks are deficient or incomplete so that existing facilities do not operate as effectively as they ought. Category I objective towns/villages are Kalutara, Galle, Negombo, Avissawella and Matale.

Rural towns/villages named above constitute area group where investment feasibility is assessed to be reasonable by economic/financial evaluation. Therefore, investment in those towns/villages should be executed preferentially and, as far as possible, along with Category II in order to enhance investment effect.

OCADS-III Category II is for rural towns/villages where telecommunications network remains without improvement for a considerably long period. In those towns/villages, aging of facilities and their lack of capacity call for urgent improvement project not only for switching system but for line network and transmission network also. Category II objective towns/villages are Chillaw, Gampaha, Nawalapitiya, Hatton, Panadura and Matara.

o Estimated project cost:

Category I	307	million Rupees
Category II	732	"
Total	1,039	"

o Work period: Work to commence in 1988 and to be completed in 1989

2.7.4 (Priority 4) National Demand Fulfillment Project

This project is to carry out facilities expansion in each city/town/village in accordance with demand fulfillment plan envisaged in this long term plan.

o Estimated project cost: 2,822 million Rupees

o Work period: Work to commence in 1988 and to be completed in 1990

2.7.5 (Priority 5) Public Telephone Expansion Project

This project is to be executed in parallel with the foregoing paragraphs 2.7.1 through 2.7.4 projects.

2.7.6 (Priority 6) TELEX Network Expansion Project

This project also is to be executed in parallel with the foregoing paragraphs 2.7.1 through 2.7.4 projects.

2.8 Other Recommendation

For the undermentioned service items, recommendation is made for establishing separate companies from SLTD. This proposal constitutes an integral part of SLTD organization reform. Proposed new companies are to operate as private enterprises specializing in their respective service lines, aimed at service performance at top efficiency.

(1) Local production of telephone sets and accessories

(2) Local field works

1) Drop wire work at subscriber premisses

2) Fraftmanship and papyrography service

CHAPTER 1 INTRODUCTION

Kandy

CHAPTER 1 INTRODUCTION

1. BACKGROUND AND OBJECTIVE

1.1 Background of Study

The national economy of Sri Lanka is growing rapidly since 1977, supported by the liberalization policy of the Government now in power. Average annual growth rate of Gross Domestic Product (GDP) has improved from 2.9% during 1971-77 to 6.2% during 1978-82.

With this rapid growth of national economy, telephone demand is also growing, recording 9.1% increase in the average among cities during 1980-83. Nevertheless, the telephone diffusion rate remains low, being 0.47 telephones/100 inhabitants (as of the end of 1983; main telephones only) on the national basis. Even in City of Colombo, the capital, the diffusion rate is not more than 3.6 telephones/100 residents. This low diffusion rate is mainly due to the equipment shortage and the time-worn existing facilities.

The Government of Sri Lanka is carrying out since 1977 the "Public Investment Five-Year Plan" which is annually corrected in the light of actual attainment. The on-going five-year plan covers 1984-88, wherein the improvement of infrastructure such as telecommunications constitutes one of keynote policy plans. Special importance is attached to effective development investment for power supply, transport and telecommunications. These are three essentials for industrial foundation whereon to build mining and manufacturing industry oriented stable national economy. Up to the present, Sri Lanka economy has been supported almost exclusively

by the export of tea, rubber and coconuts, the big three agricultural products, which occupies 70% majority in the country's total export record.

For the purpose of telecommunications network improvement and expansion, the Sri Lanka Telecommunications Department (hereafter referred to as SLTD) is now proceeding ahead with a five-year plan. This five-year plan, however, is not based on a organized long-term plan. Therefore, from the viewpoint of successful working program formulation by SLTD from now on, the most important and urgent requirement is to prepare the long-term basic plan (hereafter referred to as Master Plan).

Under the foregoing circumstances, the Government of Sri Lanka requested the Government of Japan in February 1984 to provide technical assistance relating to the "Master Plan for Domestic Telecommunications Network in Sri Lanka." The request was for formulation of national numbering, charging, network, transmission, routing and signalling plans covering the whole of Sri Lanka and for feasibility study concerning subscriber's cable network installation in seven cities. However, for the feasibility study, time is considered to be not ripe yet in view of the project now in progress or being planned so that Master Plan formulation only is to be taken up, this time, as immediate necessity. Advance agreement of the Government of Sri Lanka to this arrangement could be obtained.

1.2 Dispatch of Preliminary Study Team

Based on the decision of the Government of Japan, the Japan International Cooperation Agency (hereinafter referred to as JICA) dispatched a preliminary study team to Sri Lanka on August 28, 1984. The preliminary study team negotiated with the Government of Sri Lanka concerning procedural requirements for main study to follow, including the scope of study, as well as the subjects to be taken up and the study period. Mutual agreement on Scope of Work for main study resulted on September 6, 1984.

The Scope of Work provides that the main study will be carried out as described below.

(1) The whole country of Sri Lanka be taken up for study, and, based on study results, the Master Plan for the domestic Telecommunications Network in the Democratic Socialist Republic of Sri Lanka be formulated, using the year 2000 as the goal year. Study Report be completed by October 1985.

(2) Study items be as under.

1) Basic Data Forecasts

A. Gross national telephone demand forecasts as of 1986, 1990 and 2000

B. Macroscopic telephone demand forecasts by telephone exchanges as of 1986, 1990 and 2000

C. Originating traffic estimates by telephone exchanges as of 1986, 1990 and 2000

D. Inter-exchange traffic flow estimates as of 1986, 1990 and 2000

2) Basic Network Plan

A. Objectives to be attained in the year 2000

B. New numbering plan

C. Charging plan

D. Network improvement plan including optimum switching network for the purpose of transfer to full digital network

E. Outgoing routing plan

F. Transmission plan with digitalization considered

G. Applicable technical standards in the course of digitalization

H. Signalling system

3) Implementation Plan and Work Execution Schedule

4) Implementation Cost Estimate

5) Manpower Plan

6) Recommendations and Financial and Economic Evaluations

Based on the Scope of Work prepared by the preliminary study team, JICA dispatched the main study team to Colombo for 75 days from December 6, 1984 through February 18, 1985.

1.3 Main Study Team Activities

(1) Study Objective and Outline

1) Study Objective

Study objective is to plan national telecommunications network of Sri Lanka as it should be in the year 2000. Telecommunications network ought as an important infrastructure to uphold national economy performance and social activities predicted for that year. For this purpose, investigation is made for the condition of existing facilities and for facilities expansion projects now in progress or under contemplation.

For basic planning philosophy, consultation is made with SLTD to have such philosophy mutually agreed upon.

2) Study Outline

A. Investigation of facilities status quo and on-going and approved projects

Data were collected from plant records, as well as project records including as-build drawings and implementation schedules, in the possession of SLTD. Areas where network development behaviors present typical examples were selected and field surveys were carried out in those areas.

B. Basic data forecast

Based on the result of discussion with SLTD and related organizations, demand forecast and traffic forecast for the whole country were made. Findings were used for calculation of the number of circuits required. In view of the importance of numerical data thus obtained as basic data, confirmation in writing was made with SLTD concerning those numerical data.

C. Basic network plan

Basic network plan also holds importance as basic data so that confirmation in writing was made with SLTD. Network plan consists of

i) Numbering plan
ii) Charging plan
iii) Outgoing routing plan
iv) Signalling system
v) Transmission plan
vi) Digital network synchronization plan

3) Study Team Composition and Study Itinerary

A. Study team composition

The main study team was composed as in Table 1-1.

B. Study itinerary

The study team carried out field survey for a period of 75 days from December 6, 1984, through February 18, 1985. Field survey itinerary is in Table 1-2.

1.4 Report Making Procedures

Master Plan Study was made, based on Scope of Work agreed upon between the preliminary study team and SLTD.

Study report was made by the following procedures:

At the stage of interim report, basic requirements for project planning, such as demand forecast, traffic forecast and fundamental network design, were determined pursuant to approval by Sri Lanka authorities. Subsequently, after concrete network expansion planning, cost estimate, benefit appraisal, overall evaluation, and Phase I (1986 - 1990) Project planning, final report was completed. Final report approval by Sri Lanka authorities is ready granted.

Minutes concerning Scope of Work for study is attached hereto as references.

Table 1-1 Member of Main Study Team (1/2)

Position/Assignment	Name	Place of Employment
Team Leader	Akio MIZUKOSHI	Investigator, International Cooperation Section, Communication Policy Bureau, Ministry of Posts and Telecommunications
Specialist	Osamu MAKINO	International cooperation specialist, Japan International Cooperation Agency
Coordinator	Minoru TATEMATSU	Councillor, Social Development Cooperation Department, Japan International Cooperation Agency
Coordinator	Ryutaro TOTSUKA	Social Development Cooperation Department, Japan International Cooperation Agency
Survey Leader	Ryuhsi SUENAGA	Senior Engineer, International Operation Division, The Nippon Telecommunications Consulting Co., Ltd.
Digital Network	Michio MATSUMOTO	Special staff member, The Nippon Telecommunications Consulting Co., Ltd.

Table 1-1 Member of Main Study Team (2/2)

Position/Assignment	Name	Place of Employment
New Technology	Nobuyasu KITAMURA	Special staff member, The Nippon Telecommunications Consulting Co., Ltd.
Cable Network	Takaaki IIDA	Senior Engineer International Operation Division, The Nippon Telecommunications Consulting Co., Ltd.
Transmission	Satoru KUSHIDA	Ditto
Switching	Akira IWAMI	Engineer, Communication Engineering Division, The Nippon Telecommunications Consulting Co., Ltd.
Radio	Tadahiko MIURA	Ditto
Economic Evaluation	Masamitsu TORIYAMA	Economist, International Development Center

Table 1-2 Field Survey Itinerary (1/7)

Date	Technical Group	Economist	Team Leader, Coordinators
1984:			
Dec. 6 (Thu)	Leaves Narita; arrives at Colombo		
7 (Fri)	Consultations with SLTD and JICA		
8 (Sat)	Consultations inside study team		
9 (Sun)	Schematic survey of Colombo City		
10 (Mon)	Consultations with SLTD and JICA		Leave Narita; arrive at Colombo
11 (Tue)	Courtesy visits to JICA and Japanese Embassy		Same as Technical Group
12 (Wed)	Courtesy visit to SLTD; explanation of inception report		"
13 (Thu)	Data collection (demand forecast)		"
14 (Fri)	Data analysis and study (")		Field survey of Kandy
15 (Sat)	" (")		Same as Technical Group
16 (Sun)	Consultations inside study team		"
17 (Mon)	Consultations with SLTD (demand forecast)		"

Table 1-2 Field Survey Itinerary (2/7)

Date	Technical Group	Economist	Team Leader, Coordinators
Dec. 18 (Tue)	Data collection and analysis (demand forecast)		Same as Technical Group
19 (Wed)	"		Leave Colombo; arrive at Bangkok
20 (Thu)	"		Leave Bangkok; arrive at Narita
21 (Fri)	Ditto and report making (demand forecast)		
22 (Sat)	Ditto and report making (traffic forecast)		
23 (Sun)	Data assortment; consultations inside study team		
24 (Mon)	Data collection and analysis (traffic forecast)		
25 (Tue)	"		
26 (Wed)	"		
27 (Thu)	"		
28 (Fri)	"		

Table 1-2 Field Survey Itinerary (3/7)

Date	Technical Group	Economist	Team Leader, Coordinators
Dec. 29 (Sat)	Data collection and analysis (traffic forecast)		
30 (Sun)	Data assortment; consultations inside study team		
31 (Mon)	"		
1985: Jan. 1 (Tue)	Consultations inside study team		
2 (Wed)	Data collection and analysis (fundamental plan)		
3 (Thu)	"		
4 (Fri)	"		
5 (Sat)	"	Leaves Narita; arrives at Colombo	
6 (Sun)	Consultations inside study team	Same as Technical Group	
7 (Mon)	Consultations with SLTD (demand forecast, traffic forecast)	"	

Table 1-2 Field Survey Itinerary (4/7)

Date	Technical Group	Economist	Team Leader, Coordinators
Jan. 8 (Tue)	Data collection and analysis (fundamental plan)	Data collection	
9 (Wed)	"	"	
10 (Thu)	"	"	
11 (Fri)	"	"	
12 (Sat)	Consultations inside study team	Same as Technical Group	
13 (Sun)	Data assortment	"	
14 (Mon)	"	"	
15 (Tue)	Data collection and analysis (fundamental plan)	Data collection	
16 (Wed)	"	"	
17 (Thu)	"	"	
18 (Fri)	Field survey (Colombo - Tilac)	Same as Technical Group	
19 (Sat)	Data collection, analysis, report making	Data collection	

Table 1-2 Field Survey Itinerary (5/7)

Date	Technical Group	Economist	Team Leader, Coordinators
Jan. 20 (Sun)	Consultations inside study team	Same as Technical Group	
21 (Mon)	Data collection and analysis (fundamental plan)	"	
22 (Tue)	Field survey (Colombo - Kandy)	Data collection	
23 (Wed)	Field survey (Kandy - Nuwara-Eliya)	"	
24 (Thu)	Field survey (Nuwara-Eliya - Colombo)	"	
25 (Fri)	Data collection and analysis (next project)	"	
26 (Sat)	Data collection and analsysis (next project)	"	
27 (Sun)	Consultations inside study team; data assortment	Same as Technical Group	
28 (Mon)	Field survey (Colombo - Matara - Colombo)	"	

Table 1-2 Field Survey Itinerary (6/7)

Date	Technical Group	Economist	Team Leader, Coordinators
Jan. 29 (Tue)	Data collection and analysis (next project)	Data collection	
30 (Wed)	Consultations with SLTD (fundamental plan, traffic forecast)	Same as Technical Group	
31 (Thu)	Consultations inside study team	"	
Feb. 1 (Fri)	Data collection and analysis (next project)	Data collection	
2 (Sat)	Data collection and analysis (next project)	"	
3 (Sun)	Data assortment	"	
4 (Mon)	Data collection and analysis (next project)	"	
5 (Tue)	Data collection and analysis (next project)	"	
6 (Wed)	Data collection and analysis (next project)	"	
7 (Thu)	Progress report making	Same as Technical Group	

Table 1-2 Field Survey Itinerary (7/7)

Date	Technical Group	Economist	Team Leader, Coordinators
Feb. 8 (Fri)	Progress report making	Same as Technical Group	
9 (Sat)	"	"	
10 (Sun)	"	"	
11 (Mon)	Consultations with SLTD	"	Leave Narita; arrive at Colombo
12 (Tue)	Courtesy visits to JICA and Japanese Embassy	"	Same as Technical Group
13 (Wed)	Data assortment	"	Same as Technical Group
14 (Thu)	Consultations with SLTD (progress report presentation)	"	"
15 (Fri)	(Japanese Embassy Sponsored press conference on technical assistance)	"	"
16 (Sat)	Office closing	"	"
17 (Sun)	Preparations for return to Japan; leaves Colombo	"	"
18 (Mon)	Arrives at Narita	"	" (Team Leader to Indonesia)