

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

SRI LANKA TELECOM (SLT)

THE STUDY
ON
TELECOMMUNICATIONS NETWORKS
IN
THE DEMOCRATIC SOCIALIST REPUBLIC OF
SRI LANKA

FINAL REPORT

VOLUME-II
MASTER PLAN

MAY 1996

NIPPON TELECOMMUNICATIONS CONSULTING CO., LTD. (NTC)

JAPAN TELECOMMUNICATIONS ENGINEERING
AND CONSULTING SERVICE (JTEC)

TOKYO, JAPAN

SSS
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As of May 1995

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JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

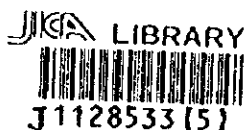
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PREFACE

In response to a request from the Government of the Democratic Socialist Republic of Sri Lanka, the Government of Japan decided to conduct a study on Telecommunications Networks in the Democratic Socialist Republic of Sri Lanka and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Sri Lanka a study team headed by Mr. Tatsumi AMANO, Nippon Telecommunications Consulting Co., Ltd., three times between March 1995 and May 1996.

The team held discussions with the officials concerned of the Government of Sri Lanka, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

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

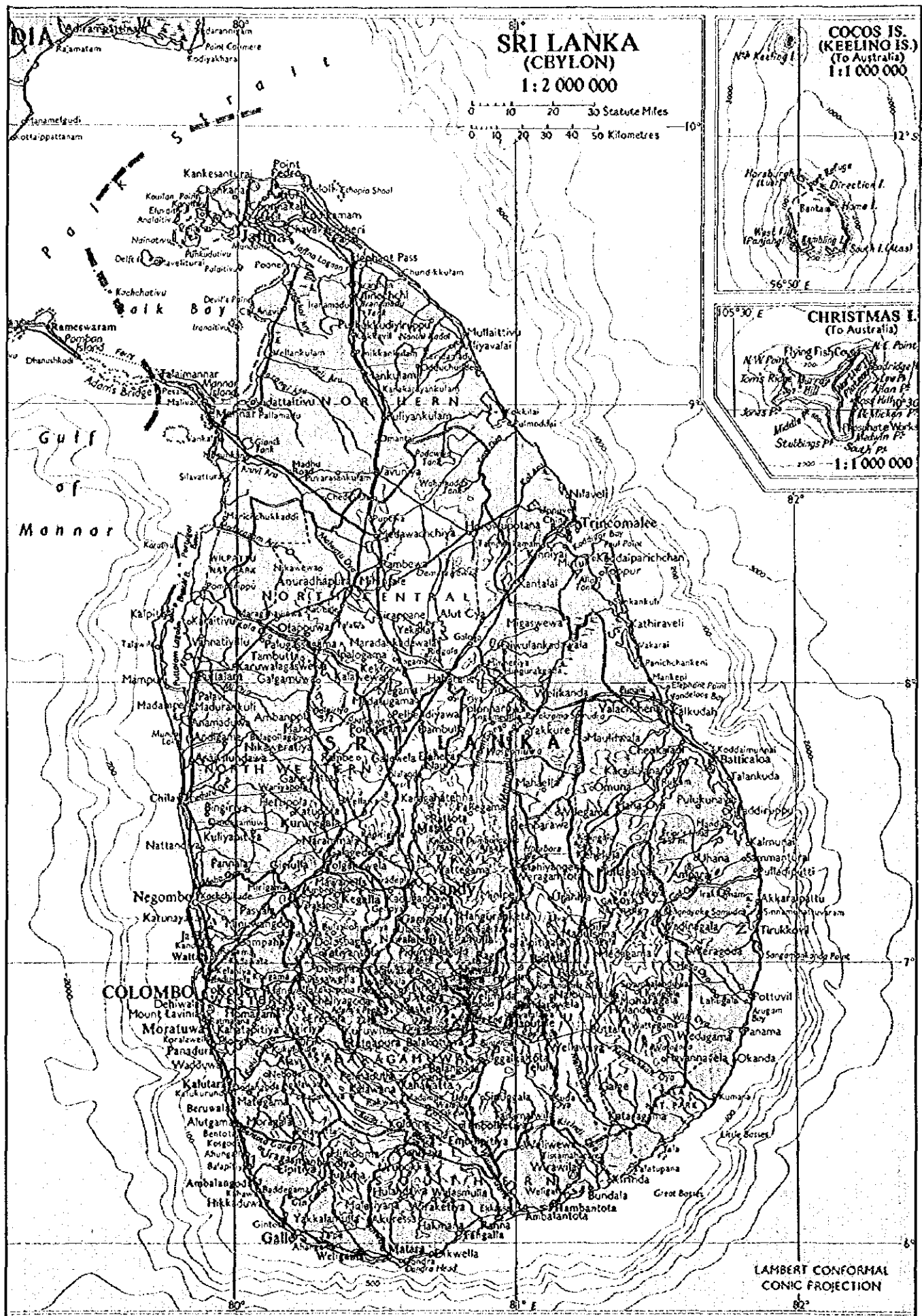
May 1996



Kimio Fujita
President

Japan International Cooperation Agency

THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA



May 1996

Mr. Kimio Fujita
President
Japan International Cooperation Agency

Dear Mr. Fujita:

Letter of Transmittal

It is our great pleasure to submit to you the Study Report on Telecommunications Networks in the Democratic Socialist Republic of Sri Lanka.

This report has been prepared by Nippon Telecommunications Consulting Co., Ltd. (NTC) and Japan Telecommunications Engineering and Consulting Service (JTEC), based on a contract with JICA. The study team conducted the works from March 1995 to May 1996.

The study aims at formulating the master plan for telecommunications networks development up to the year 2015 and feasibility study for priority projects which will be implemented by the year 2000, in the Democratic Socialist Republic of Sri Lanka.

Objective areas of the study covered the whole country for the master plan and several target areas for the feasibility study. Through field surveys and analyses of data / information collected, the master plan has been drawn up covering mainly development targets and strategies, network development plan, facilities plan, implementation plan, operation / maintenance / human resource plans as well as cost estimate and project evaluation. The feasibility study has been made for three priority projects identified as a result of the master plan study.

We wish to take this opportunity to express our deep gratitude to the officials concerned of the Japan International Cooperation Agency and other authorities concerned of the Government of Japan. We wish to offer our sincere appreciation to the officials concerned of Ministry of Posts and Telecommunications, Sri Lanka Telecom and other authorities concerned of the Government of Sri Lanka for their unlimited cooperation and assistance extended to the study team in connection with the execution of their duties.

Finally, we earnestly hope that this report will contribute to future telecommunications development in the Democratic Socialist Republic of Sri Lanka.

Very truly yours,

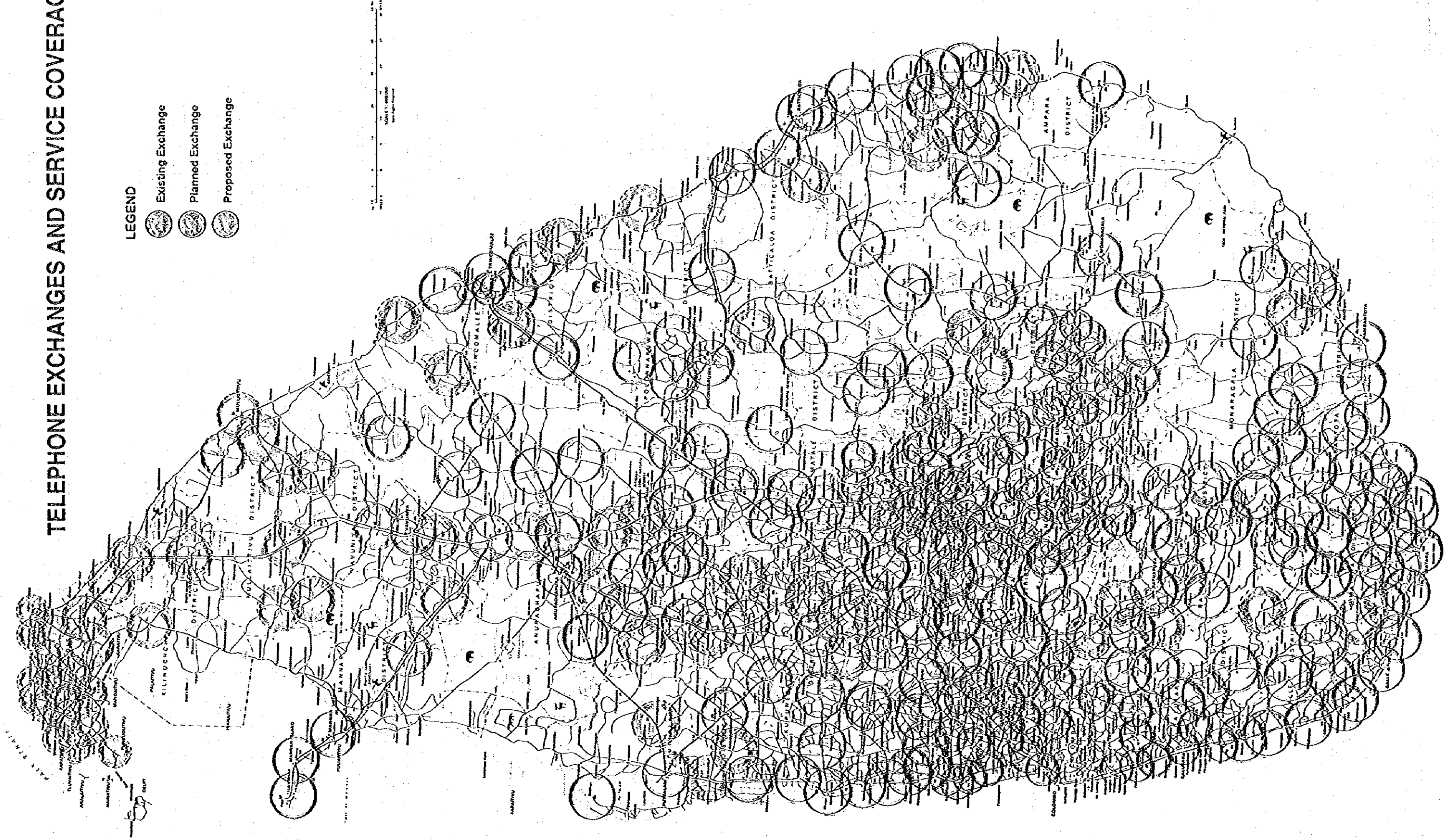


Tatsumi Amano
Team Leader
Study on Telecommunications Networks
in the Democratic Socialist Republic
of Sri Lanka

TELEPHONE EXCHANGES AND SERVICE COVERAGE

LEGEND

- Existing Exchange
- Planned Exchange
- Proposed Exchange



Scale bar: 10 Kilometers
10 Miles

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ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
AMPS	Advanced Mobile Phone Services
ATM	Asynchronous Transfer Mode
B-ISDN	Broadband ISDN
BOO	Build, Own and Operate
BOT	Build, Operation and Transfer
BTT	Turnover Tax
CC	Country Code
CCB	Coin and Collection Box Telephone
CCS	Common Channel Signalling System
CLR	Circuit Loudness Rating
CSPDN	Circuit Switched Public Data Network
DANIDA	Danish International Development Agency
DEL	Direct Exchange Line
DF/R	Draft Final Report
DGT	Director General of Telecommunications
DN	Destination Network
DNC	Destination Network Code
DP	Distribution Point
DRMASS	Digital Radio Multiple Access Subscriber System
DUP	Data User Part
EDCF	Economic Development Co-operation Fund, Korea
EIRR	Economic Internal Rate of Return
ERC	Economic Restructure Credit
ERC II	Economic Restructure Credit II
F/R	Final Report
F/S	Feasibility Study
FDM	Frequency Division Modulation
FIRR	Financial Internal Rate of Return
FIRROE	Financial Internal Rate of Return on Equity
FIRROI	Financial Internal Rate of Return on Investment
FISU	Fill-in Signal Unit
FM	Frequency Modulation
FOTS	Fibre Optic Transmission System
GCTNIP	Greater Colombo Telecommunications Network Improvement Project
GDP	Gross Domestic Product
GMDSS	Global Maritime Distress and Safety System
GOSL	Government of Sri Lanka
GRDP	Gross Regional Domestic Product
GSM	Global System for Mobile Communication
HF	High Frequency
IC/R	Inception Report
IDA	International Development Bank
IDD	International Direct Dialling
IDN	Integrated Digital Network

IN	Intelligent Network
INMARSAT	International Maritime Satellite Organisation
INTELSAT	International Satellite Organisation
ISC	International Switching Centre
ISDN	Integrated Services Digital Network
ISPC	International Signalling Point Code
ISUP	ISDN User Part
IT/R	Interim Report
ITU	International Telecommunications Union
JICA	Japan International Co-operation Agency
LAN	Local Area Network
LE	Local Exchange
LR	Loudness Rating
LSSU	Link Status Signal Unit
M/P	Master Plan
MF	Medium Frequency
MIS	Management Information System
MSU	Message Signal Unit
MTP	Message Transfer Part
N-ISDN	Narrowband ISDN
NPV	Net Present Value
NSB	National Saving Bank
NSC	National Switching Centre
NSN	National Significant Number
O&M	Operation and Maintenance
ODA	Official Development Assistance
OECF	Overseas Economic Cooperation Fund, Japan
OLR	Overall Loudness Rating
PAD	Packet Assembly / Disassembly
PCM	Pulse Code Modulation
PDCA	Plan, Do, Check and Action
PDH	Presiochronous Digital Hierarchy
PIP	Public Investment Programme
POTS	Plain Ordinary Telephone Service
PSPDN	Packet Switched Public Data Network
PSTN	Public Switched Telephone Network
QC	Quality Control
RLR	Receiving Loudness Rating
RSU	Remote Switching Unit
RTE	Regional Telecommunications Engineer
SCCP	Signalling Connection Control Part
SCP	Signal Control Point
SCPC	Single Channel Per Carrier
SDH	Synchronous Digital Hierarchy
SEA-ME-WE3	International Submarine Cable (via South East Asia - Middle East - Western Europe)
SLR	Sending Loudness Rating

SLT	Sri Lanka Telecom
SLTA	Sri Lanka Telecommunications Authority
SLTD	Sri Lanka Telecommunications Department
SN	Subscriber Number
SRS	Subscriber Radio System
SSC	Secondary Switching Centre
STD	Subscriber Trunk Dialling
TACS	Total Access Communications System
TC	Trunk Code
TCAP	Transaction Control Application Protocol
TDM	Tandem Switch
TMN	Telecommunications Management Network
TQC	Total Quality Control
TSC	Tertiary Switching Centre
TUP	Telephone User Part
UHF	Ultra High Frequency
UPT	Universal Personal Communications
VHF	Very High Frequency
WB	World Bank

List of SLT's Telephone Exchange Codes (Alphabetical Order)

Exchange Name	Code
Ambanpola	ABP
Anuradhapura (OLD)	AD
Adampan	ADP
Ambalangoda	AG
Akuessa	AK
Alawwa	ALW
Angoda	AN
Anamaduwa	ANA
Angunukolapelassa	ANK
Agarapatana	AP
Ampitikanda	APK
Ampara	APR
Ambantota	AQ
Akkaraipattu	AR
Aralaganvila	ARG
Akurana	ARN
Attanakadawala	ATK
Ankumbura	AU
Achchuveli	AV
Awissawella	AW
Aranayaka	AY
Ayagama	AYG
Bogawantalawa	BA
Bambarabotuwa	BBT
Batticaloa	BC
Batticaloa 5ESS	BC1
Badulla	BD
Bandaragama	BDG
Badalgama	BDL
Baddegama	BE
Balangoda	BG
Bengamuwa	BGM
Bibile	BI
Badakubura	BK
Bakamuna	BKM
Beliatta	BL
Boralanda	BLD
Bulathsinhala	BLS
Bingiriya	BN
Beruwala	BR
Beralapanatara	BRP
Baduraliya	BRY
Boralesgamuwa	BS
Bentota	BT
Battuluoya	BTL
Bulatkohupitiya	BU
Bandarawela	BW
Bullala	BZ
China Bay	CB

Exchange Name	Code
Central Camp	CC
Cheddikulam	CDD
Cheddipalayam	CDP
Craig Head	CHD
Chunnakam	CK
Central North E-10	CN
Chavakachcheri	CV
Chilawathura	CVT
Chilaw	CW
Central City E-10B	CY
Dambulla	DB
Diyabeduma	DBD
Dodangoda	DD
Diddeniya	DDN
Dolosbage	DG
Dehialta Kandiya	DHK
Deraniyagala	DI
Digana	DIN
Dunagaha	DJ
Dankotuwa	DK
Deniyaya	DN
Peradeniya	DN
Deift	DQ
Dodanduwa	DU
Dikwella	DW
Thimbolketiya	EH
Embilipitiya	EMB
Elpitiya	EP
Eppawala	EPA
Erukkalampiddi	ERK
Eravur	EV
Galthinna	GAN
Giribawa	GB
Galle CONT.	GC
Ganemulla	GE
Galagedara	GG
Galgamuwa	GGM
Galaha	GH
G.Ihala Korale	GIK
Galkiriyagama	GKY
Galle SSC	GL
Galenbindunawewa	GLE
Galnewa	GLN
Galewela	GLW
Galigamuwa	GM
Gomarankadawala	GMK
Galamunnai	GMW
Geliya	GO
Gampola	GP

Exchange Name	Code
Gampaha	GQ
Gampaha 1	GQ1
Gampaha 2	GQ2
Girandurukotte	GRK
Ginigathena	GT
Giriulla	GU
Hakmana	HA
Hambantota	HB
Habarana	HBR
Hokandara	HC
Habaraduwa	HD
Handessa	HDS
Haliela	HE
Hungama	HGB
Hingurana	HGR
Havelock TOWN	HK
Hikkaduwa	HKD
Hadummulla	HM
Hingurakgoda	HN
Homagama	HO
Haputale	HP
Hiripitiya	HPT
Horana	HR
Horowpathana	HRP
Halton	HT
Halgrn oya	HY
Hettipola	HZ
Ingiriya	IG
Inginiyagala	IGG
Iakachi	IK
Imaduwa	IM
Iralaperiyakulam	IPK
Jaffna	JA
Jaela	JL
Kadugannawa	KA
Kataragama	KAG
Kaleliya	KAL
Kalpitiya	KAP
Kayts	KB
Kebitigollawa	KBT
Kochchikade	KC
Kuchchaweli	KCH
Kochchikade (RS)	KCR
Kostanda	KD
Koltegoduwa	KDE
Kodikamam	KDK
Kaduwela	KDL
Kandaketiya	KDT
Kadawala	KDW

List of SLT's Telephone Exchange Codes (Alphabetical Order)

Exchange Name	Code
Kotadeniyawa	KDY
Kegalle	KE
Kiriella	KEL
Kurunegala	KG
Kahatagasdigiya	KGD
Kelaniya	KI
Kiliveddi	KID
Kamburupitiya	KJ
Kalmune	KL
Kolonna	KLN
Kuliyapitiya	KLY
Kotmale	KM
Kirimetiya	KMT
Kankasanture	KN
Kantale	KNT
Kinniya	KNY
Kilinochchi	KO
Kosgoda	KOD
Kotiyakumbura	KOK
Kosgama	KOM
Kotapola	KOP
Katupota	KP
Kollupitiya	KPT
Kopay	KPY
Karainagar	KRG
Kalugastota	KS
Kalutera	KT
Kathankudi	KTK
Kalana	KTN
Kalunayake	KTY
Kitulgala	KV
Karaveddy	KVD
Kehelwatta	KHW
Kuruwita	KW
Karawitagara	KWA
Kekirawa	KWA
Karuwalagaswewa	KWG
Kirindiwela	KWL
Kalawana	KWN
Kotte	KX
Kandy (A)	KYA
Kandy (B)	KYB
Kandy (C)	KYC
Karadiyanaru	KYN
Kandy TSC	KYT
Lunugamwehera	LGW
Laggala Pallegama	LPG
Lunuwila	LU
Malwana	MAL

Exchange Name	Code
Mannar	MB
Mahakumbukkadawala	MBD
Marawila	MC
Madu Church	MCH
Maradana	MD
Medagama	MDG
Madurankuliya	MDK
Mundel	MDL
Madu Road	MDR
Mardankadawala	MDW
Maskeliya	ME
Moratuwa	MF
Maltegododa	MG
Magandena	MGD
Megahatenna	MGE
Negampaha	MGP
Malara	MH
Maharagama	MHG
Mirigama	MI
Middeniya	MIA
Monaragala	MJ
Makandura	MKD
Mankulam (Jaffna SSC)	MKL
Mankulam (Vavuniya SSC)	MKL
Murunkan	MKN
Mulliyawalai	MLI
Madulsima	MM
Mamaduwa	MMD
Medamahenuwara	MMN
Madolkele	MN
Mewanella	MNA
Manampitiya	MNP
Maha Oya	MO
Mulativu	MP
Maspota	MPT
Maho	MQ
Matugama	MR
Medirigiriya	MRG
Morawewa	MRW
Melsiripura	MSP
Manmunai South West	MSW
Matale	MT
Mihintale	MTE
Muthiyawela	MTH
Maltakkuliya	MTK
Muruthalawa	MTW
Maturata	MU
Muttur	MUT
Mt. Lavinia	MV

Exchange Name	Code
Mt. Lavinia CSE	MV(R)
Minuwangoda	MWG
Medawachchiya	MWI
Morawaka	MWK
Mawarala	MWR
Mawathagama	MWT
Madampe	MX
Manipay	MY
Mahiyanganaya	MYN
Nivitigala	NA
Neboda	NB
Narammala	NC
Negombo (CONT.)	NEC
Nochchiyagama	NCH
Nugegoda	ND
Nikadalupotha	NDP
Negombo	NE
Norton Bridge	NE
Nagoda	NF
Negombo (NX 61)	NG
Nintavur	NIT
Nikaweratiya	NK
Naula	NL
Nelululam	NLL
Nilaweli	NLV
Neluwa	NLW
Namunukula	NM
Nanatan	NN
Nedunkeni	NQ
Neriyakulam	NRK
Nawalapitiya	NT
Nainativu	NTV
Nuwera eliya	NW
Odduchuddan	ODU
Omantai	OM
Oluvil	OV
Pallai	PA
Pitabeddara	PBD
Padiyathalawa	PDT
Padaviya	PDY
Pelmadulla	PE
Panadura	PH
Passara	PJ
Padukka	PK
Punakari	PKR
Pannala	PL
Pallewela	PLA
Pallekele	PLK
Pelatiyawa	PLT

List of SLT's Telephone Exchange Codes (Alphabetical Order)

Exchange Name	Code
Palavi	PLV
Pulmodai	PME
Pooneryn	PN
Pinapana	PNP
Pallepola	POL
Pointpedro	PQ
Polonnaruwa	PR
Polpithigama	PRG
Porativu	PRT
Pesale	PSL
Padawi Sripura	PSP
Pasyala	PSY
Pandattarippu	PT
Pulasthigama	PTG
Potuhera	PTH
Puthukudiyirippu	PTK
Pilimathalawa	PTL
Potuvil	PTV
Punkunduthivu	PUN
Pussellawa	PV
Polgahawela	PW
Pawalikulam	PWK
Puttalam	PX
Pundaluoya	PY
Piliyandala	PYL
Rangala	RA
Ramboda	RB
Rambewa	RBW
Ruwanwella	RC
Rajakadalawa	RD
Raddolugama	RDG
Ragama	RG
Ridigama	RGM
Rambukkana	RK
Rikillagaskada	RKL
Ratmalana	RM
Rukmalgama	RMG
Ratnapura	RN
Ranpokunagama	RPK
Rakwana	RW
Ralfota	RX
Ridimaliyadda	RY
Siyambalanduwa	SBD
Siyabaladuwa	SD
Sevanagala	SEV
Sigiriya	SG
Sithankermi	SKR
Sandalankawa	SL
Sammanthurai	SMT

Exchange Name	Code
Seruwawila	SW
Sooriyawewa	SYW
Ehaliyagoda	TBL
Tabuttigama	TBT
Trincomalee	TC
Tangalle	TG
Thalpota	THP
Telijjawila	TJ
Talawakele	TK
Tirrukkovil	TKV
Talawa	TL
Tillicoultry	TLC
Talaimannar	TM
Thunukkai	TNK
Tanamalwila	TNL
Toppur	TP
Thissamaharamaya	TR
Tirappane	TRP
Talatuoya	TT
Thawalama	TWL
Tampalakamam	TZ
Urubokka	UB
Udubeddawa	UBD
Undugoda	UD
Udappuwa	UDP
Udatuttiripitiya	UDT
Uhana	UHN
Ulukkulama	UKL
Uyilankulama	UKM
Udugama	UM
Urapola	UO
Udupussellawa	UP
Upcol	UPC
Uva Paranagama	UPR
Ukuwela	UW
Veyangoda	VG
Valachchena	VH
Velanai	VI
Vaddukodde	VK
Vidattaltivu	VKM
Vakarai	VKR
Velvetituru	VL
Veliveriya	VR
Vavuniya	VU
Wellawaya	WA
Watagoda	WB
Wedduwa	WD
Watawala	WF
Wilgamuwa	WG

Exchange Name	Code
Wattigama	WH
Wellampitiya	WI
Weligama	WJ
Warakapola	WK
Welikanda	WLK
Weligepola	WLP
Welimada	WM
Wariyapola	WP
Wattafa	WT
Watumulla	WTM
Wanathawilluwa	WTW
Walasmulla	WU
Weeraketiya	WY
Anuradhapura	XA
Galle TSC	XG
Havelock TDM	XH
Yakkalamulla	YKM
Yatiana	YMH
Central 5ESS	YS
Yatakalanpattuwa	YTP
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CHAPTER 1

INTRODUCTION

CHAPTER 1

INTRODUCTION

1. General

This Report covers a telecommunications master plan up to the year 2015 and a feasibility study for priority projects which will be implemented by the year 2000, for the Study on Telecommunications Networks in the Democratic Socialist Republic of Sri Lanka.

The report consists of :

- Volume-I Summary
- Volume-II Master Plan
- Volume-III Feasibility Study for the Priority Projects
- Volume-IV Supporting for Master Plan
- Volume-V Data Book

The study has been carried out in accordance with the work plan and schedule of the study which were discussed and agreed upon between Sri Lanka Telecom, hereinafter referred to as SLT and Japan International Co-operation Agency, hereinafter referred to as JICA. The study work has been done both in Sri Lanka and in Japan. The major items of the study are referred to in the following :

The First Study in Sri Lanka (27 March - 25 June 1995)

- a) Explanation and discussion of the Inception Report;
- b) Collection of data / information and analyses;
- c) Field survey in sample areas;
- d) Study on long-term development targets;
- e) Explanation and discussion of Progress Report;
- f) Technology transfer through field survey and preparation of development framework.

The First Study in Japan (26 June - 26 September 1995)

- a) Demand forecast;
- b) Preparation of telecommunications network plan;

- c) Preparation of telecommunications network facility plan;
- d) Preparation of operation and maintenance plan;
- e) Preparation of human resource development plan;
- f) Preparation of institution, organisation and management plan;
- g) Financial analyses for SLT;
- h) Preparation of radio frequency management plan;
- i) Preparation of project implementation plan;
- j) Selection of priority project(s);
- k) Evaluation of master plan;
- l) Conclusion and recommendations;
- m) Technology transfer through training in Japan for a SLT counterpart.

The Second Study in Sri Lanka (18 October - 14 December 1995)

- a) Explanation and discussion of the Interim Report;
- b) Decision of objective priority projects for feasibility study;
- c) Collection of data and information regarding the priority projects from a view of both technical and socio-economic points;
- d) Field survey for the objective priority projects;
- e) Preparation of scope of work for the objective priority projects;
- f) Explanation and discussion of scope of work for the objective priority projects;
- g) Technology transfer through field survey and project basic design.

The Second Study in Japan (15 December 1995 - 14 February 1996)

- a) Socio-economic analysis for the objective area;
- b) Technical study and preparation of project basic design;
- c) Project cost estimate;
- d) Preparation of project implementation plan;
- e) Project evaluation;
- f) Preparation of draft final report consisting of master plan and feasibility study.

2. Background of the Study

To realise higher economic growth and equitable distribution of social benefits, the Government of Sri Lanka has been strongly emphasising the needs for adequate, efficient and reliable infrastructures in the national development policy. Telecommunications development is placed as a highest priority in the development policy for industrial

development, higher productivity of agriculture and enhancing efficiency in the service sector.

In 1988, the Government of Sri Lanka set up the short-term telecommunications development target aiming at the total provision of 500,000 telephone lines including the existing lines by the end of year 1995 based on the master plan formed under the support of Asian Development Bank.

In line with the master plan, SLT has been proceeding various projects for improvement to increase a telephone penetration ratio as a major telecommunications development index and to extend a network coverage to villages. Up to the present, the Government of Japan has been supporting telecommunications development in Sri Lanka in the form of the development study support for whole country and fund aids for the Greater Colombo Telecommunications Network Improvement Project for Phase I and II.

However, due to unstable social condition, shortage of the budget and delay in design work, some difficulties will be expected on achievement of the development targets. At present, approximately 180,000 telephone lines in whole country are supplied. In spite of an development effort, 187,000 of applicants are still on the waiting lists. In order to clear this situation, a master plan with a long-term view and adequate development strategies is required, while the present master plan is of short-term and already outdated.

Considering the above condition, the Government of Sri Lanka requested the Government of Japan to revise and update the master plan to incorporate the latest changes in policy and environment and to extend a development target year to the year 2015 as follows :

- a) Review of the existing master plan;
- b) Formulation of a long-term development plan covering whole Sri Lanka up to the year 2015;
- c) Feasibility study for the priority projects implemented between the year 1996 and the year 2000.

In response to the request, the Government of Japan dispatched JICA Preparatory Study Team to discuss regarding this study programme and the Scope of Work of the Study was agreed upon between SLT and JICA on 20th December 1994.

3. Objectives and Scope of the Study

3.1 Objectives of the Study

The objectives of this study are as follows :

a) **Phase-I Study**

To formulate a long-term plan for the development of telecommunications networks in the Democratic Socialist Republic of Sri Lanka up to the year 2015.

b) **Phase-II Study**

To conduct a feasibility study for the priority project(s) identified in consequence of the Phase-I Study.

3.2 Scope of the Study

For the objectives of the study mentioned above, the study is carried out covering the following items and sub-items :

[Phase-I Study]

3.2.1 Basic Study

(1) Collection and Review of Data / Information

- a) Social and economic conditions and statistics;
- b) National development plans;
- c) Previous studies on telecommunications;
- d) Present status of telecommunications services;
- e) Development plans and on-going projects for telecommunications services;
- f) Existing laws, regulations and technical standards related to telecommunications services;
- g) Present situations of operation and management of telecommunications services;
- h) Present situations of telecommunications facilities and networks;
- i) Other data / information related to the study.

(2) Field Survey

- a) Social and economic conditions;
- b) Existing telecommunications facilities and services;
- c) Other surveys related to the study.

(3) Analysis and Evaluation

- a) Demand and traffic forecasts;
- b) Trend of new technologies and new telecommunications services;
- c) Planning framework (target year, planning area, service level).

3.2.2 Formulation of the Telecommunications Networks Development Plan

- a) Telecommunications networks plan;
- b) Facilities plan;
- c) Operation and maintenance plan;
- d) Institution, organisation and management plan;
- e) Human resource development plan;
- f) Project evaluation;
- g) Implementation plan;
- h) Identification of the priority project(s).

[Phase-II Study]

3.2.3 Feasibility Study on the Priority Projects

(1) Confirmation of the Planning Framework

- a) Target year;
- b) Planning area;
- c) Service level;
- d) System components.

(2) Facility Improvement and Expansion Plan

- a) Transmission system;

- b) Switching system;
 - c) Outside plant;
 - d) Cable networks.
- (3) **Operation and Maintenance Plan**
- (4) **Institution, Organisation and Management Plan**
- (5) **Cost Estimation**
- (6) **Project Evaluation**
- a) Financial analysis;
 - b) Social and economic analysis.
- (7) **Project Implementation Programme**

4. Approach to the Study

4.1 Basic Concept on This Study

This study consists of Phase-I Study and Phase-II Study. The Phase-I Study aims to formulate a short-term development plan, a medium-term development plan and a long-term development plan for telecommunications networks in the whole Sri Lanka, up to the respective target years 2000, 2005 and 2015. The Phase-II Study aims to conduct a feasibility study for the priority project(s) identified through the Phase-I Study. Through the entire study, the study team reviews and studies in detail background of the problems being encountered by SLT and reflects the results on a new master plan and feasibility study.

(1) Objectives of the Study

The objectives of the study are subdivided into the following items :

- a) Forecast of telecommunications demands up to the year 2015;
- b) Formulation of a master plan in consideration of the existing facilities, on-going and planned projects, and trend of new telecommunications technology;

- c) Formation of projects being composed of objective area, applicable system and project scale;
- d) Selection of priority project(s) from a view of urgency of demand fulfilment, area priority on socio-economy, imbalance of service supply and financial evaluation;
- e) Feasibility study of the priority project(s);
- f) Technology transfer to the counterparts through the study.

(2) Consistency with National Development Plan

Role of telecommunications development in the national development plan is recognised. In addition, the national policy for the telecommunications sector is reflected to the master plan.

(3) Development Framework

In consideration of efficient management and effective investment by SLT and other operators, an adequate development framework is formulated with emphasising especially :

- a) Improvement / expansion of the existing network;
- b) Digitalisation of the existing network and system;
- c) Improvement of service quality;
- d) Introduction of new technology and system for new service provision;
- e) Expansion of rural telecommunications network.

(4) Consistency with On-Going and Planned Projects

The present master plan was prepared in 1990 by supporting of ADB. However, demand increase after the preparation of the master plan was quite rapid and exceeded the forecasted level in the plan. In consequence, on-going projects have been carried out based on the temporarily adjusted demand. The study is carried out taking such a situation into account. In addition, ITU is preparing a master plan for SLTA (Sri Lanka Telecommunications Authority) of the Ministry of Posts and Telecommunications. In the ITU master plan, the numbering plan for telephone service is closely related with this Study and is to be co-ordinated with each other.

(5) Network and Facilities Plan

Network and facilities plan is formulated paying attention to the following points :

- a) Digitalisation of network and system;
- b) Introduction of SDH system and CCS No. 7 system for various new services;
- c) Improvement of traffic congestion in backbone network for both national and international calls;
- d) Utilisation of RSU (Remote Switching Unit) at remote areas;
- e) Utilisation of radio subscriber system in rural areas;
- f) Enhancement of mobile telecommunications services.

(6) Telecommunications Development in Rural Areas

Rural telecommunications development is one of most important issues in Sri Lanka. Sample rural areas are selected for rural telecommunications study. In consequence of the sample study, most suitable telecommunications system is proposed.

(7) Institutional Issue for Telecommunications Sector

Recently institutional reform of telecommunications entities including privatisation is an international trend. Such a movement seems to exist also in Sri Lanka. The study covers not only the institutional issue but also organisational and operational issues of SLT. As a result of the study, institution, organisation and management plan is proposed.

(8) Human Resources Development

Digitalisation of telecommunications facilities is to be progressed in whole Sri Lanka by being replaced with old analogue facilities aiming at improvement of service quality and efficient operation and maintenance. In order to meet such a situation, human resource development of operation and maintenance staff as well as technical management staff who have knowledge of digital technologies is indispensable issue. Based on the analyses of present situation and future conditions expected, a human resource development plan including manpower forecast is proposed.

4.2 Specific Approach to the Study Work

The specific approach in this master plan study other than items described in the subsection 4.1 "Basic Concept on Master Plan Study" is as follows :

(1) Forecast Methods

Nation-wide telephone subscriber demand is forecasted in a macroscopic model based on correlation between GDP per Capita and demand density, which is recommended as an ITU model. The nation-wide demand forecasted by the model is distributed to each district by using district demand share which is calculated from district demand model in correlation between district demand density and regional GDP per Capita.

Traffic distribution forecast is made with gravity model which is recommended as an ITU model. Both demand and traffic forecast models are used as standard models for various planning and are more effective for technology transfer and easier for future maintenance and modification of the master plan.

(2) Data Analysis

For analysis and processing of the data collected, forecasting and network planning, personal computers are utilised mainly for the following work items :

- a) Demand forecast;
- b) Traffic forecast;
- c) Estimate of the number of trunk circuits;
- d) Estimate of transmission link capacity.

(3) Technology Transfer to Counterparts

Technology transfer from the study team to counterparts is one of important items during the study period in Sri Lanka. On-the-job training and joint work with counterparts are the most effective way for smooth technology transfer not only on the master plan study consisting mainly of data collection / analyses, establishment of development targets, strategy making, network planning, facility planning, operation and maintenance plan, manpower planning and evaluation, but also on the feasibility study. Items of technology transferred cover not only technical issues but also economic and financial issues. A special training

programme was carried out during the first study in Japan. JICA invited one (1) counterpart for one (1) month from 19th September and 15th October 1995.

5. Work Schedule

5.1 Overall Time Schedule of the Study

The study period is from the end of March 1995 up to the middle of April 1996. The time schedule of this Study by study stage is shown in the following Table 1-5-1 :

Table 1-5-1 Work Schedule of the Study

Study Stages	1995					1996
	First Study in Sri Lanka	3M				
First Study In Japan		3M				
Second Study in Sri Lanka			2M			
Second Study in Japan				2M		
Discussion of Draft Final Report					2W	
Preparation of Final Report						1.5M
Submission of Reports	IC/R	P/R	IT/R	D/F	F/R	
IC/R: Inception Report	M: Months					
P/R: Progress Report	W: Weeks					
IT/R: Interim Report						
DF/R: Draft Final Report						
F/R: Final Report						

5.2 Progress in the First Study in Sri Lanka

During the first study in Sri Lanka from 27th March to 24th June 1995, the study team carried out the following work together with counterparts :

- a) Discussion of Inception Report submitted from the team;
- b) Collection of data / information (socio-economy, national development policy, telecommunications);
- c) Analyses of data / information collected;

- d) Field survey (socio-economy, demand distribution and facilities);
 - Field survey by two technical teams : 24 - 29 April 1995;
 - Field survey by one socio-economy team : 24 - 29 April, 2 - 6 May 1995
- e) Macroscopic demand forecast;
- f) Study of long-term development strategies;
- g) Preparation of Progress Report;
- h) Technology transfer through field survey and preparation of development framework.

5.3 Progress in the First Study in Japan

During the first study in Japan from 26th June to 26th September 1995, the study team prepared a draft master plan based on the results of the first study in Sri Lanka. The draft master plan consists mainly of the following :

- a) Socio-economic analyses;
- b) Demand forecasts;
- c) Telecommunications development plan;
- d) Operation and management plan;
- e) Project formation and selection of priority project(s);
- f) Evaluation of master plan;
- g) Technology transfer through training in Japan for a SLT counterpart for one month.

The details of the master plan are referred to in the later respective Chapters of this report.

5.4 Progress in the Second Study in Sri Lanka

During the second study in Sri Lanka from 18th October to 14th December 1995, the study team carried out the following work together with counterparts :

- a) Explanation and discussion of Interim Report submitted from the study team;
- b) Selection of priority projects for feasibility study;
- c) Presentation and discussion on Joint Work-Shop with JICA team and telecommunications sector in Sri Lanka, chaired by Secretary of MPT, on 8th Nov. 1995;
- d) Collection of data and information for feasibility study;

- e) Field survey for priority projects selected for the feasibility study;
- f) Preparation of a report consisting of basic conditions of feasibility study and outlines of project scope;
- g) Explanation and discussion of basic conditions of feasibility study and outlines of project scope.

5.5 Progress in the Second Study in Japan

During the second study in Japan from 15th December 1995 to 13th February 1996, the study team prepared a draft final report consisting of a master plan and feasibility study for three (3) priority projects. The study team carried out the following work :

- a) Modification of the master plan submitted as Interim Report;
- b) Project basic design and cost estimate for the priority projects selected for feasibility study;
- c) Evaluation of objective priority projects for feasibility study;
- d) Preparation of a draft final report consisting of a master plan study and feasibility study.

5.6 Progress in the Third Study in Sri Lanka

During the third study in Sri Lanka from 14th to 26th February 1996, the study team carried out explanation and discussion of a draft final report with SLT key personnels, counterparts and other officials from organisations concerned. Contents of the draft final report has been basically accepted.

5.7 Progress in the Third Study in Japan

During the third study in Japan from 15th April 1996 to 29th April 1996, the study team prepared a final report consisting of a master plan and feasibility study for three (3) priority projects based on the results of explanation and discussion on the draft final report.

CHAPTER 2

SOCIO-ECONOMY OF SRI LANKA



CHAPTER 2

SOCIO-ECONOMY OF SRI LANKA

1. Geographical Conditions

1.1 Topography

Sri Lanka lies off the southern tip of India, some say like a tear drop, between latitudes 6° and 10° north and longitude 80° and 82° east. It is separated from India by the Palk Strait, 32 km wide at its narrowest. Sri Lanka has a maximum length of 432 km and a maximum width of 224 km. The land area of the island is 65,610 square km, including coastal islands. The northern region of the country consists of a plain. The centre of the country is dominated by hills and mountains which rise to over 2,000 metres. The highest peak, Piduratalagala, near the hill station of Nuwara Eliya. In some parts of the south of the island the hills extend almost to the coast.

Sri Lanka has five topographical regions; **Central Highlands** comprise a central massif bounded by a southern mountain wall and on the north by the valley of the Mahaweli Ganga. The massif consists of a central backbone of high plains and peaks, the highest being 2,524 metres above sea level, the Hatton plateau, Uva basin and the Dumbara and Bulutota massifs. **South-West** is the "wet zone", with a characteristic topography of elongated parallel ridges with networks of streams. **Northern Lowlands** include the Jaffna peninsula and the islands, characterised by dry, flat landscape. **Coastal Fringe** consists of a series of lagoons, marshes, sand bars, spits, peninsulas and dunes.

1.2 Climate

Sri Lanka has a tropical climate with distinct dry and wet seasons. The island's climate is determined by the position of the central mountains and the Southwest and Northeast monsoons. The southwestern monsoon which occurs between May and September, bring rain to the Southwest of central massif, but the clouds then hit the high central mountains and exhaust themselves. The wet zone covers roughly an area from Negombo on the west coast to Tangalle on the south coast and inland to the central highlands. The rest of the country is known as the dry zone and relies for its rain on the Northeast monsoon, which blows from October to February.

Mean annual temperature in lowland areas is 27°C, with a mean daily range of 6°C, in the coastal areas. Inland, especially in the wet zone, the humidity level generally varies from 70% to 90%. The dry zone is less humid, and during the Southwest monsoon a hot and withering wind can blow over the northern plain by day.

1.3 Modern Irrigation Scheme

The tropical greenery of the island owes much to the rivers, most of which flow from the central highlands and many of which have been harnessed for modern irrigation schemes. The longest is the Mahaweli Ganga which flows for 303 kilometres from its source near Adam's Peak, through Kandy, to the Indian Ocean at Koddidiyar Bay, near Trincomalee. Sri Lanka is also dotted with thousands of irrigation tanks, from small ponds to great reservoirs, which feed the paddy fields and are stocked with fish. Anuradapura district and North of the island alone recorded over 11,200 tanks.

2. Demographic Trend

In 1972 Ceylon became a republic and its name was changed to Sri Lanka. In 1987, nine provincial councils were established by the 13 th amendment to the constitution with power and functions. The nine province are divided into 25 districts and 206 Divisions to handle government services at local level. These changes are in the process of implementations.

2.1 Population

According to the results of the 1981 population census, Sri Lanka's population stood at 14,988,000 and an average household size of 4.9. It was officially estimated at 17.7 million in 1994 with a growth rate of 1.39% per annum between 1981 and 1994. About 70% of the people live in the island's wet zone (south western area), which accounts for about three-quarters of the cultivated land and most of the country's industry. Around 20% of the total population was living in urban. Table 2-1-1 shows the population by province in 1994, estimated by JICA study team.

Table 2-1-1 Population (1994) and Land area by province

Province	Population (000)	Land Area (Sq.km)
Western	4,640.7	9,781
Southern	2,226.2	8,316
Central	2,310.6	9,158
Northern	1,974.5	5,490
Sabaragamuwa	1,351.2	7,431
Uva	1,112.6	4,869
North - West	1,469.1	8,292
North - Central	1,675.1	3,603
Eastern	1,005.3	5,398
Sri-Lanka	17,765	62,337

Source : Dept. of Census & Statistics

Table 2-1-2 Population by district

District name	POP by district	District name	POP by district
Western		Sabaragamuwa	
Colombo	2,007,703	Ratnapura	918,684
Gampaha	1,695,728	Kegalle	756,437
Kalutara	937,183	Uva	
Southern		Badulla	748,027
Galle	953,815	Monaragala	364,599
Matara	754,044	North West	
Hambantota	518,366	Kurunegala	1,375,591
Central		Puttlam	598,932
Kandy	1,218,865	North Central	
Matale	421,629	Anuradhapura	675,125
Nuwara Eliya	670,128	Polonnaruwa	330,228
Northern		Eastern	
Jaffna	978,251	Trincomalee	352,533
Mullaitivu	103,153	Batticaloa	461,353
Mannar	112,221	Ampara	537,301
Vavunia	129,224		
Kilinochchi	146,228	TOTAL	17,765,348

Source : Dept. of Census & Statistics

2.2 Social Indicators

Demographic parameters of Sri Lanka are summarised in followings.

<u>Fiscal Year</u>	:	<u>January - December</u>
Unemployment Rate (as a % of Labour Force)	:	13.8%
Inflation (% change of Colombo Consumer's Price Index)	:	11.7%
Life Expectancy (by 1981 Census)	:	71 Yrs
Literacy Rate (Aged 5 years & above, 1986/87)	:	88.6%
Crude Birth Rate (per '000)	:	20.1
Crude Death Rate (per '000)	:	5.6
Infant mortality (per '000)	:	25.0
Languages	:	Sinhala, Tamil, English
Time	:	5.5 hours ahead of GMT

2.3 General Socio Economic Trend

Findings through socio-economic field survey are summarised as follows. Sri Lanka shall be divided into four major commercial zones, namely, Colombo and its outskirts, northern area, eastern area and southern area. Jaffna is the centre of the northern area, and Trincomalee in the east and Galle in the south are central cities, respectively. A tangible trends of the development is that the economic zone of Colombo and its outskirts, which has been the centre and the core of the Sri Lanka's economic zone, is extending to the directions shown in the Figure 2-3-1. The crops produced under the guideline of the Mahaweli Development Project, are distributed and consumed in the area. The ports functioning at present are, Colombo, Galle, Trincomalee and Jaffna. In this context further improvement of the above port facilities is projected to facilitate economic activities in the more extended zone.

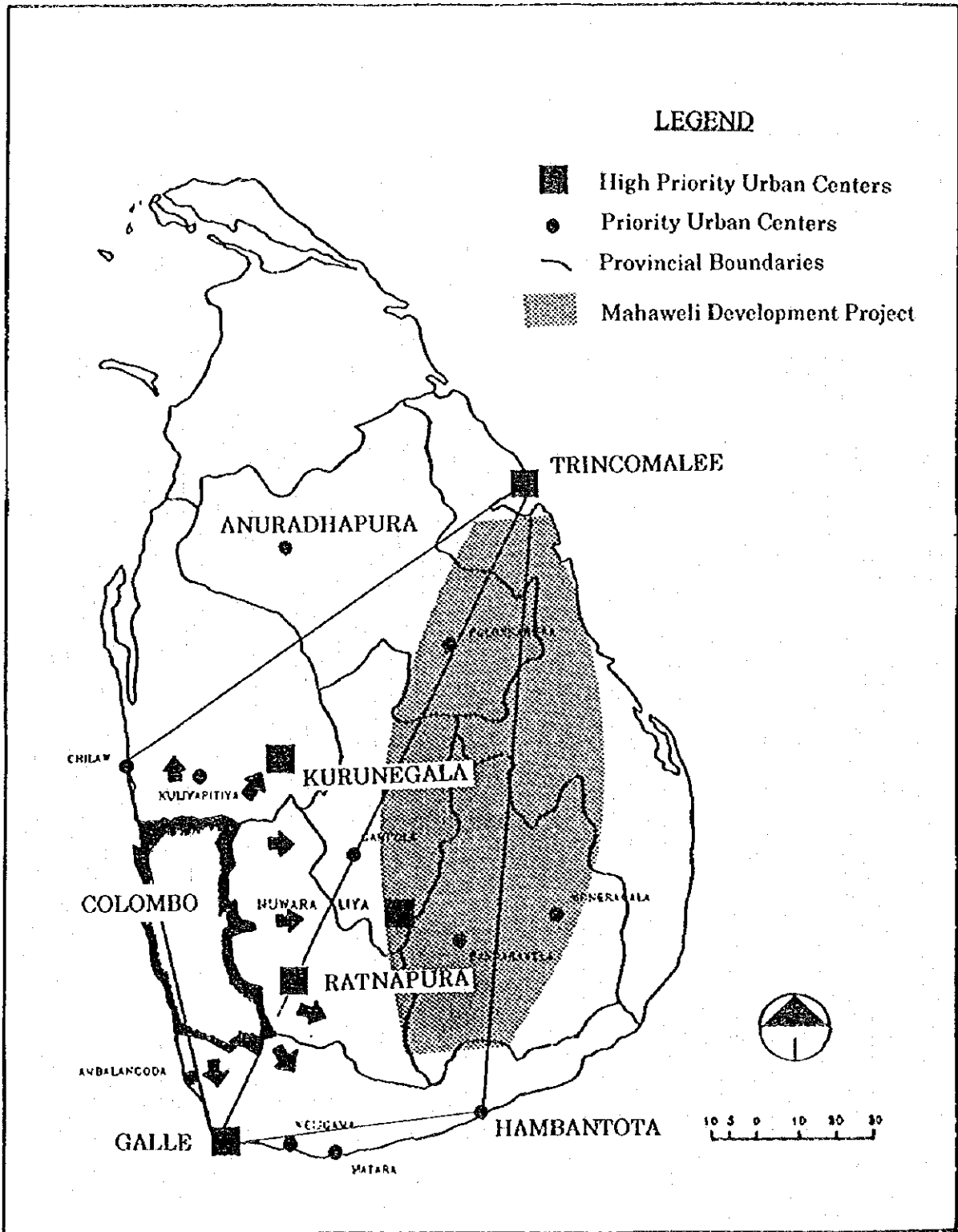


Figure 2-3-1 Economic Trend of Sri Lanka

Meanwhile, Mihintale is cited as an area where rapid economical growth is expected once peace is recovered. In Mihintale an attraction program to construct industrial compound, which was drafted by the former government and put under the control of BOI, is being suspended while construction of all the infrastructure including railway, electricity, water supply, telecommunication is ready to be implemented. However, the project has not been proceeded by the new government and left intact. This should be an example of frustration caused by the political environment and the Civil disturbances. Kurumegala, an important city in terms of traffic convenience, located around 100 km south of Anuradapura, links Sri Lanka's four major cities Jaffna and Anuradapura in the north, Trincomalee in the east, Colombo in the west and Kandy in the south. The area is also expected rapid progress, should the peace negotiation be successful.

The target area of the Mahaweli Development Project (a vast farming area extending from Trincomalee to Kandy, and Anuradhapura and its outskirts) has been developed into a vast paddy field thanks to the successful irrigation scheme. In the core cities of the region, economic activities are brisk but since the people there live basically on farming, telephone facility is not an urgent need for each household. Therefore, installation of public pay phone shall be most appropriate in this region.

The coastal area, extending Southeast from Colombo, is prosperous as a tourist resort making contribution to acquisition of foreign currency but the infrastructure is still in poor condition. Among others, Galle and Matara have potentiality in economical growth and yet unable to show its latent ability. In order to improve present state, Southern Province Development Program (Matara-Panatula) has been launched.

The major objectives of the program are :

- a) Electrification of railways;
- b) Construction of another highway between Colombo and Matara;
- c) Industrialisation of Weligama and its outskirts;
- d) Free trade zone in Koggala;
- e) Expansion and improvement of Galle port;
- f) others.

The program is keenly expected to bring along a rapid progress in the southern area.

2.4 North & Eastern Region

In the past, priority level for North East rehabilitation programme is listed below.

- a) Agriculture & Fishing
- b) Irrigation
- c) Power & Energy
- d) Social welfare
- e) Telecommunications

It is to be noted that the priority for direct benefit projects are topping in the list. However in the recent years the telecommunication sector had gained priority mainly to support the administration of the rehabilitation areas.

Tendency of migration from these areas had shown down. The social facilities are functioning with limited number of staff. Some of the problems faced to carry out the rehabilitation programme are listed below ;

- a) Security;
- b) Obtain financial support;
- c) Retaining the trained staff.

3. General Trend of Privatisation in Sri Lanka

In a narrow sense, privatisation means to reduce the role of the public sector and to expand the ownership role of the private sector by transferring the assets of public enterprises to private hands. In a wide sense, it means the consignment of part of government's business activities to the private sector. In addition, privatisation is a way to improve the efficiency of the public sector, to activate the private sector, and to reduce the financial burden on the public.

After the late 1980s, privatisation was the focus of structural adjustment programme led by the World Bank. This shift in focus is attributable to world-wide changes in economic policy. Aiming at smaller government, new conservatives in industrialised countries gave priority to privatisation throughout the 1980s. Privatisation provided some notable benefits, including reduction of the public financial burden.

Privatisation can take many forms, for example, the selling of government stock to the private sector. Auctions, the stock market, and preferred stock distributions to employees are some of the ways to sell the stock. Another method is to sell government's fixed property to the private sector. Further methods include leasing of government property to the private sector and consigning management rights to the private sector while leaving ownership in the hands of the public sector.

The policy of the World Bank regarding privatisation is as follows: first, divide the public sector into competitive sectors and non-competitive sectors, or public utility corporations; second, privatise the former immediately, and privatise the latter in a step-by-step process by introducing appropriate regulations. In developing countries which have insufficient regulatory capability and few market mechanisms, only management should be privatised at first. Then as the next step, regulations should be introduced to cope with changing market conditions.

Sri Lanka is one example of the countries that received Economic Restructuring Credit (ERC) under the World Bank/IMF structural adjustment policy, and then introduced its own privatisation program, called "Peoplisation". Peoplisation focuses on the following sectors:

- a) Agriculture, which is Sri Lanka's major industry;
- b) Bus transport, which is a public utility;
- c) The manufacturing industry, which is under a former nationalisation policy.

The following are the privatisation procedures implemented in Sri Lanka. First, the Department of Commercialisation at the Ministry of Finance undertakes preliminary procedures such as evaluating the value of assets. Then a small committee which consists of related authorities, the Ministry of Textiles and Industry, and the Department of Commercialisation decide on matters regarding restructuring, such as the schedule for privatisation, the method to be used, its effects on labour, how to deal with bad debts, etc. After the Cabinet approval of the committee's findings, the procedure for selling stocks is implemented by the Department of Commercialisation.

By the privatisation in the late 1980s', national corporations were transferred to government-owned corporations which were run on a commercial basis. After separated from the public sector, these corporations gradually began to take restructuring steps, such as layoffs of workers. Stocks were then sold gradually. However, since 1990, the time lag has

been rapidly decreasing; an increasing number of national enterprises have been changing from closed corporations to public corporations with selling their stock at the same time. Basically, 60% of each lot is sold at auction, 30% is sold through the stock market, and the final 10% is usually distributed to employees according to their seniority and position. This 10% transfer to employees is designed to make workers feel like they are participating in the selling of national assets.

Regarding layoffs, the guidelines issued by the Department of Commercialisation at the Ministry of Finance state that the number of employees be cut to a level at which privatised corporations can operate profitably. Basically, compulsory resignation is not approved of, rather voluntary resignation by mutual agreement is recommended. If the employee and employer cannot agree on compensation, the criteria suggested by the government are applied. Moreover, the Department of Commercialisation has a plan to write off part of its bad debts so that privatisation can be effected easily.

After 1989, any national corporations that could be privatised immediately were privatised. After that, twenty public industries were privatised with the support of the World Bank. A total of thirty-two national manufacturing corporations had been privatised by September 1993. Many privatised companies need funds to invest in their fixed property. However, since the long-term money market is undeveloped, long-term fund procurement is difficult. Therefore, it is necessary to restructure the financial environment, for example, by expanding the schemes for long-term fund supply through financial institutions.

Funds for the national plantation are still being borrowed under a government guarantee. In the privatisation of the national bus line, the operation costs resulting from preprivatisation measures are becoming increasingly large due to the costs associated with layoffs and the payment of related compensation. On the other hand, privatisation generated very little income through the sale of government stock, and the privatisation of the national bus line increased short-term financial burden instead.

ERC II (Economic Restructure Credit II), which is scheduled to follow ERC, will focus on the privatisation of relatively small corporations and it will not be easy to generate income by selling stocks. Moreover, the huge costs incurred by the restructuring required by privatisation will be a burden on national finances. Therefore, it seems impossible that ERC II will implement privatisation as gradually as ERC did. It is then necessary to plan a realistic implementation schedule only after considering Sri Lanka's current situation.

4. Economic Activities

4.1 Gross Domestic Product (GDP)

GDP (million)	:	SRs 453,092 (1993)	US\$ 9,246.7
GDP Growth Rate	:	4.47% during 1987 - 1993	
Per Capita GDP	:	SRs 25,751	US\$ 526
Note : US\$ 1.00 = SRs 49.0 (1993), Population : 17,595,000 (1993)			

GDP gives as useful index to be applied to a structural pattern of production in economy besides helping to measure the rate of growth. It is available both at current and constant prices which estimate a measure of the real change. The productive system of Sri Lanka in the Last decade can be seen from Table 2-4-1.

GDP real growth rate has averaged 4.47% since 1987. The major economy is still largely agricultural with about 25% of GDP generated by this sector and about 39% of the employed population is belonging this. However, Sri Lanka economy had 4.3% real growth in 1992, despite a severe drought which caused a small fall in agricultural output. Manufactures are expected to be the most dynamic export sector, but traditional exports will regain an upward trend based on improved agricultural performance. The beneficial impact of economic reforms, along with growing foreign investment, enabled the rest of the economy, notably manufacturing, largely to offset poor agricultural performance. In this mean, Agriculture's importance has been declining slowly but steadily.

In its " New Economic Policy " released on September 13 in 1994, the new Sri Lanka administration announced that it would firmly pursue the policies of economic liberalisation and structural adjustment initiated by the previous administration. On the other hand, however, the new administration reportedly indicated its intention to make adjustments in some of the policies proposed by the previous governments, including its plans to consolidate protection of labourers, increase wages for workers at export-processing areas, and privatise national enterprises (Parastatal Reform). Under these circumstances, the future direction of SLT which currently operates as a parastatal, has yet to be determined.

Basically, the new administration emphasises social welfare and relief for the poverty.

The list of its new economic policy is indicated below.

- a) Increase real economic growth up to 8% by the year 2000
- b) Decrease the budget deficit to 3-4% of GDP

c) Control the inflation rate

With regard to public investment, the main objective is to construct and maintain the infrastructure required to assist private-sector growth. Due to the magnitude of the funds necessary to accomplish this, however, plans call for private capital to be introduced as well. Major investment targets are road, power-generation, communication and port facilities.

Table 2-4-1 Productive System of Sri Lanka

Unit: SRs million

At Constant (1982) Factor Cost Prices								
Sector	1982	1987	1988	1989	1990	1991	1992	1993
1. Agriculture, Fishing	24,964	27,409	27,984	27,666	30,011	30,570	30,090	31,554
2 Mining	2,238	3,112	3,392	3,576	3,901	3,511	3,300	3,693
3. Manufacturing	13,601	18,748	19,622	20,488	22,427	23,949	26,059	28,806
4. Construction	7,959	8,338	8,463	8,514	8,761	9,033	9,765	10,400
5. Electricity	1,089	1,418	1,499	1,526	1,681	1,800	1,897	2,125
6. Transport	10,666	13,538	13,619	13,883	14,410	15,534	16,606	17,287
7. Wholesale	19,694	24,496	25,164	25,588	26,497	28,556	30,074	32,584
8. Banking	3,715	5,490	5,819	6,168	6,556	6,831	7,241	8,023
9. Ownership of Dwelling	3,250	3,550	3,603	3,650	3,705	3,761	3,795	3,841
10. Public Administration	2,899	5,435	5,462	6,140	6,355	6,304	6,449	6,642
11. Service	4,604	4,358	4,423	4,530	4,940	5,355	5,714	5,828
12. GDP	94,679	115,922	119,050	121,729	129,244	135,204	140,990	150,783
13. Growth Rate			2.69%	2.25%	6.17%	4.61%	4.28%	6.94%

4.2 Gross Regional Domestic Product (GRDP)

The GRDP by province has been announced by dept. of National Planning. These figures are summarised in Table 2-4-2 and Table 2-4-3.

Table 2-4-2 GRDP by province

Unit : SRs million

Province	GRDP by province	Province	GRDP by province
Western	176,984	Uva	17,227
Southern	32,842	North West	37,397
Central	39,378	North Central	15,407
Northern	15,006	Eastern	25,500
Sabaragamuwa	27,259	All Province	386,999

Source : At 1992 factor cost

Table 2-4-3 GRDP per capita by province

Unit : SRs

Province	GRDP /capita by province	Province	GRDP / capita by province
Western	38,143	Uva	15,491
Southern	14,753	North West	25,457
Central	17,049	North Central	9,198
Northern	7,601	Eastern	25,373
Sabaragamuwa	20,176	All Province	21,784

Source : At 1992 factor cost

Although the GRDP by district had not been announced by Sri Lanka Government , GRDP by district is estimated in this study based on several statistical data. These data taken by Dept. of Census and statistics include data on the distribution of labour force in each industrial sector by district. GRDP by district is summarised in Table 2-4-4.

The Economic potentiality of Northern and Eastern region is quite different from other regions, due to the damage by Civil disturbances. Difficult negotiations with the Tigers continued throughout the first half of 1990 but fighting broke out again in June, 1990 and has continued. In the Eastern Province the army was able to gain the control of the towns relatively quickly. In the Northern Province, the Tigers control the city of Jaffna and most of the Jaffna peninsula. Many of residents of Jaffna have left the peninsula and the people stay behind are enduring hardship. The telecommunications development plan in Northern region should be drafted in consideration of technology varying according to the level of urgency, socio-economic development and expected demand.

Table 2-4-4 GRDP by district

Unit : USD million

District name	GRDP by district	District name	GRDP by district
Western		Sabaragamuwa	
Colombo	1,726	Ratnapura	313
Gampaha	1,387	Kegalle	279
Kalutara	734	Uva	
Southern		Badulla	266
Galle	317	Monaragala	109
Matara	254	North West	
Hambantota	144	Kurunegala	578
Central		Puttlam	235
Kandy	484	North Central	
Matale	162	Anuradhapura	239
Nuwara Eliya	210	Polonnaruwa	96
Northern		Eastern	
Jaffna	216	Trincomalee	158
Mullaitivu	23	Batticaloa	186
Mannar	33	Ampara	211
Vavunia	30		
Kilinochchi	24		

4.3 Currency

The value of the Sri Lanka Rupee has fluctuated since 1978 but the overall trend has been down wards, reflecting the persistent current-account deficit and relatively high inflation rates. Historical exchange fluctuations are shown in Table 2-4-5.

Table 2-4-5 Exchange Rate

Unit : USD

Year	Exchange rate	Year	Exchange rate
1988	33.0	1991	42.6
1989	40.0	1992	46.0
1990	40.2	1993	49.6

Source : Central Bank

5. Future Socio-Economic Trends

5.1 Population Growth Rate

Looking at past population growth rates, Sri Lanka indicated growth of 1.4% in its population between 1981 - 1991. By 1994, the total population had reached about 17.7 million. The population projection announced by Sri Lanka Government is indicated in Table 2-5-1.

Table 2-5-1 Future Population

Unit : 1000

Year	Population	Year	Population
1994	17,765	1999	18,648
1995	17,937	2000	18,830
1996	18,111	2005	19,780
1997	18,288	2010	20,690
1998	18,467	2015	21,524

5.2 Economic Growth rate

1982 - 1993 showed average economic growth of 4.47%. Economic growth rate of 1994 - 1999 shown in Table 2-5-2 has been projected by Dept. of National Planning.

Future economic growth rate up to 2015 has never been published by the Sri Lanka Government, therefore, Economic projection is made by the study team through discussion with staff of Dept. of National Planning, and industries could be achieved given that adequate foreign investment continue and privatisation in industries would be made steadily in line with the government policy. Future Economic growth rate are shown in Table 2-5-2.

As noted, Sri Lanka's medium-term prospects critically depend upon developments in two fronts : Status of the civil disturbances and policy progress.

Table 2-5-2 Future Economic Growth

Year	Growth Rate	Mil US\$	Year	Growth Rate	Mil US\$
1994	5.50%	9,494	1999	7.70%	13,277
1995	6.00%	10,063	2000	8.00%	14,339
1996	6.50%	10,717	2005	7.00%	20,882
1997	7.00%	11,469	2010	5.00%	28,212
1998	7.50%	12,331	2015	5.00%	36,014

Source: National Planning (1994 - 1999)

JICA Study team (2000 - 2015)

5.3 Economic Environment in 1995

The consumer price index for the Colombo area, released by the Central Bank in March 1995, indicates an average annual increase of 5.5%. This, however, represents a downturn (- 0.9%) compared to the same month in previous year, making the first decrease in almost a decade since October 1985 (with the price increase ratio for 1994 at 11.2%).

The abatement of double-digit inflation may be ascribed to a) decreasing prices of daily necessities such as wheat bread, kerosene oil, etc. because of government subsidies, b) favourable agricultural production thanks to the Northeast monsoons. However, because the government cannot afford to continue providing price subsidies and budget allocation is estimated at 10 billion rupees, most of local economists anticipate that price must be raised to keep the budget deficit at its target of 7.5% of GDP.

The average prime rate in April 1995 at commercial banks stands at 17.4% (a decrease of 0.9% compared to the same period in the previous year). The interest rate for a one-year time deposit at NSB (National Saving Bank) is 14% (a decrease of 2% over the same period in the previous year). Under these circumstances, it is difficult not to assume substantial inflation.

CHAPTER 3

NATIONAL DEVELOPMENT AND TELECOMMUNICATIONS

CHAPTER 3

NATIONAL DEVELOPMENT AND TELECOMMUNICATIONS

1. National Development

1.1 Infrastructure Development

Until 1977, Sri Lanka had been a welfare-oriented controlled economy. This has completely changed: a free economic policy based on a market economy has been introduced to expand employment, raise the standard of living, and improve the long-term international balance of payments. Economic development is now the focus of attention. As a result, the Government has implemented an economic expansion policy by promoting free trade zones, development of the regions along the MAHAWELI River (an irrigation project), development of the area surrounding Colombo, regionalization of industries, etc.

Over the past five years, under a new industrialisation policy established in 1989, the Government of Sri Lanka (GOSL) has focused its economic activities on the development of export-oriented industries capable of obtaining foreign currency. The policy has three pillars:

- a) To cultivate the private sector into the driving force of economic growth;
- b) To reduce the role of public sector while making it work more effectively;
- c) To distribute wealth fairly among the people.

GOSL has since fortified its efforts to create an improved investment environment through parastatal reform of nationalised firms and relaxation of regulations on foreign currencies. Industry is thus far concentrated only around Colombo, and does not make effective use of outlying land and labour resources, making it essential for industrial activity to proliferate across the nation and for as many stable but small-scale firms to be established as possible. Once implemented, the above policy will eliminate the concentration of population around Colombo, and upgrade the current social and economic infrastructure within urban centres.

In 1992, GOSL published a report on the Urban Development Project, specifying five high-priority towns and eleven priority towns. Urban centres were surveyed as to infrastructure, and prioritised using following criteria for current performance and needs.

- (1) **Demographic**
Population Growth Rate
- (2) **Economic**
Employment in Manufacturing and Construction
Unemployment
- (3) **Financial**
Self Generated Revenue
Collection Efficiency
- (4) **Infrastructure**
Solid Waste Collection Efficiency
Roads and Drainage Maintenance Efficiency
Tarred Roads / Capita
Built Up Drains / Tarred Roads
- (5) **Government Plans**
Urban Development Authority Plan

Figure 3-1-1 shows the distribution of priority urban centres where future growth is strongly expected. As is clear in the figure, such urban centres are scattered all over Sri Lanka. Rapid economic growth requires the support of ever expanding infrastructure facilities ; roads, water, power and telecommunications. In particular, as agricultural development increases the commercial agriculture products, it gives rise to widespread trade in agricultural products, seeding, fertilisers, fuels and services will expand. To support efficient expansion, rapid, highly reliable long distance communications will become necessary. No one can deny the importance of establishing a well-organised telecommunication network to improve communications between separate centres and to further increase economic effects.

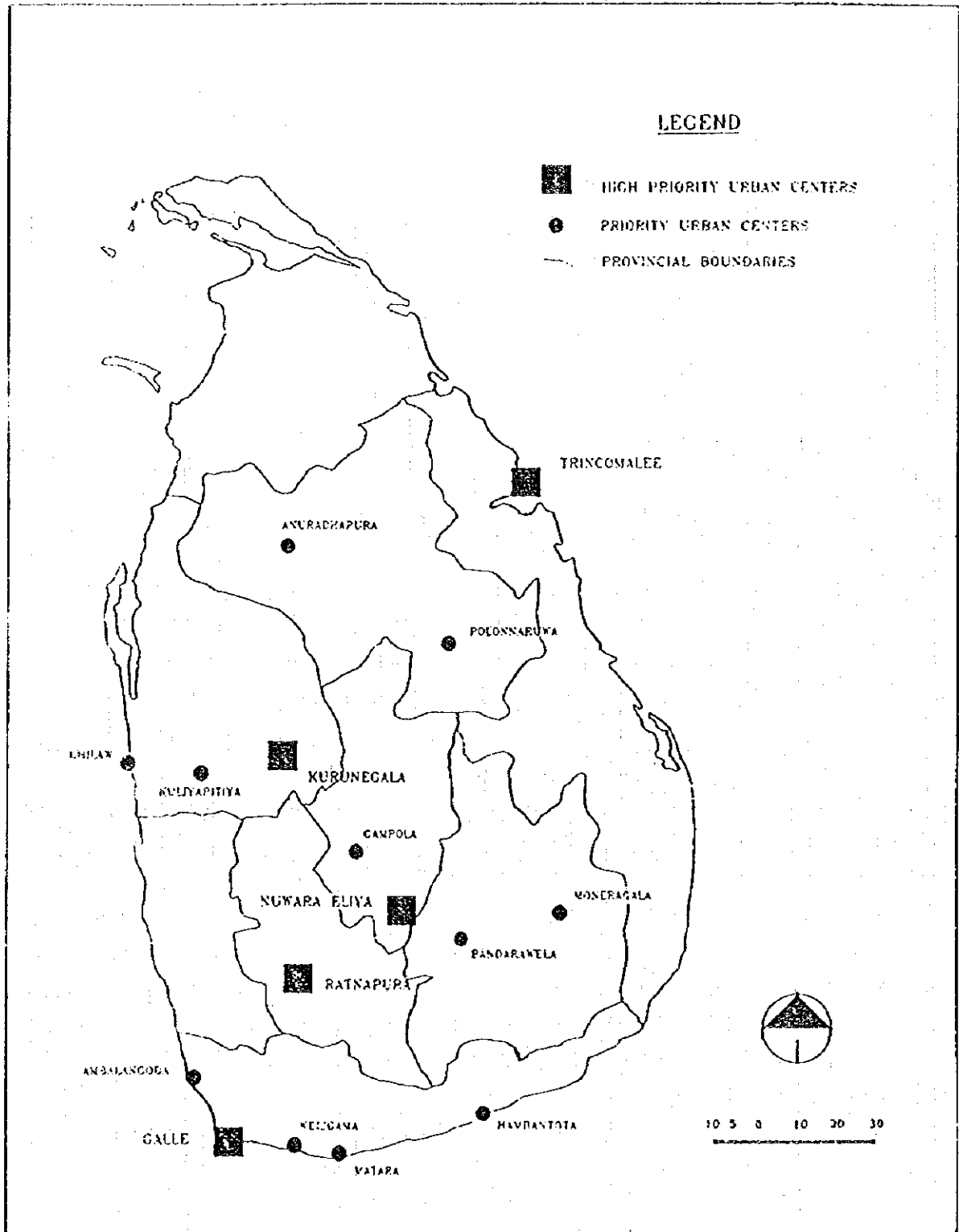


Figure 3-1-1 Distribution Map of Priority Urban Centres

2. Telecommunications Development Plan and On-Going Projects

Aiming at nation-wide telecommunications services, improvement of service quality, demand fulfilment and improvement of operational efficiency, the Telecommunications Department launched the five year development programme which was included in the public investment programme 1990 - 1994 of Ministry of Policy Planning and Implementation.

The five year development programme was based on a master plan finalised in 1990 by consultants engaged by the Asian Development Bank. According to the master plan, the estimated demand for DEL by 1995 was 376,000. Although it was not possible to secure funds to reach this figure by 1995, funding was obtained to reach around 70% by 1995 for increasing the number of DEL. Along with the increase of DEL, it is also necessary to upgrade the entire trunk transmission system to facilitate connectivity between the exchanges without congestion. It is also further necessary to increase the international system, when the number of telephone subscribers is increased.

For this purpose, a total aid package taking into account all the above requirements was prepared which culminated in the Second Telecommunications Development Project supported by Asian Development Bank, World Bank, OECF Japan, Finland and Supplier's Credit. All the development schemes yielded optimum results on the quality of service aspect. In fact, every project helps to replace old and outdated equipment. The results have been remarkable. In consequence, the number of new applicants for telephone service is rapidly increasing.

As of December 1994, however, the total number of DEL has reached to only approximately 180,000 (65% in Colombo) due to delay of mainly design work, contractual procedures and various management, while the number of waiters are still 186,000 which are more than that of DEL. The number of DEL per 100 inhabitants is 1.0 and is still low compared with the other countries. The following Table 3-2-1 shows telephone density and GDP/Capita in several countries.

**Table 3-2-1 Telephone Density and GDP/Capita
in Neighbouring Countries in 1992**

Countries	Telephone Density per 100 inhabitants	GDP / Capita (US\$)
Sri Lanka	0.78	504
Bangladesh	0.22	208
China	0.99	435
India	0.77	243
Indonesia	0.81	686
Japan	46.31	29,486
Korea Rep.	36.30	6,777
Malaysia	11.25	3,095
Pakistan	1.04	351
Philippines	1.03	816
Thailand	3.09	1,902

Source: World Development Report 1994

ITU Statistical Yearbook 1994

The programme which shall be finished by the end of 1994 is expected to be completed by the year 1997. By the completion of the on-going projects as shown in Tables 3-2-2 and 3-2-3, the number of DEL will reach to approximately 500,000. According to the demand forecast in this study, the expressed demands are estimated as 680,000 in 2000, 980,000 in 2005 and 1,670,000 in 2015. To cope with the large number of waiters and expressed demand estimated, Third Telecommunications Development is to be promptly finalised and implemented.

In addition, the civil disturbances have seriously affected the telecommunications system and services in the Northern and Eastern Provinces over the last 10 years. The worst affected are Jaffna and Trincomalee where the main telephone exchanges were destroyed. It is estimated that approximately 14,000 subscribers are affected. In consequence, most of telecommunications facilities are not functioned, while only one telephone line is barely operative between Colombo and Jaffna.

In December 1987, when the Rehabilitation Programme of this country was discussed at the Sri Lanka Aid Group Meeting in Paris, the Danish delegation pledged support to reconstruct and rehabilitate the telecommunications system. As a result, a Danish Consultant

was engaged in 1988 through the Danish International Development Agency (DANIDA) to report on the requirements to restore the telecommunications services in the North and East and to meet the accumulated demand up to 1995. When the peace has come in the troubled areas, the reconstruction and rehabilitation is to be urgently and quickly implemented. Aiming at the implementation, preparatory work and planning co-ordinating with the relevant plans are to be maintained.

Considering the above conspicuous changes in policies and environment on telecommunications development, it is requested to update the existing master plan meeting such changes and expanding the development target year up to 2015.

Table 3-2-2 List of On-Going Projects by Foreign and Private Funds

No.	Name of Projects	Finance
1	International Telecommunications Network Facilities Project	ADB
2	Second Telecommunications Project (Trunk Transmission Network)	ADB
3	Technical Assistance for Trunk Transmission	ADB
4	Technical Assistance for International Network Facilities	ADB
5	Revenue & Operation Support System (ROSS)	ADB
6	Matara Telecommunication Development Project	Finland
7	Consultancy for Matara Project	Finland
8	Second Telecommunication Project (Exchanges)	IDA/WB
9	Exchange Rehabilitation	IDA/WB
10	Technical Assistance for Second Telecommunication Project (Exchanges)	IDA/WB
11	Greater Colombo Telecommunication Network Improvement Project II Package I (Greater Colombo Area)	OECE
12	Greater Colombo Telecommunication Network Improvement Project II Package I (Gampaha & Katunayaka Area)	OECE
13	OECE III Regional Telecommunication Development Project	OECE
14	150K Suppliers Credit Project	Private
15	Improvement of Telecommunication Facilities in Horana Area	EDCF
16	Improvement of Telecommunication Facilities in Sigiria Area	EDCF

Source: Sri Lanka Telecom

Note: ADB: Asian Development Bank

IDA: International Development Association

WB: World Bank

OECE: Overseas Economic Co-operation Fund, Japan

EDCF: Economic Development Co-operation Fund, Korea

Table 3-2-3 List of On-Going Projects by SLT's Own Fund

No.	Name of Projects
1	Local Transmission Links (spur link) for WB Exchange Project
2	Outside Plant Development in 9 Regional Stations
3	Subscriber Line Connections in Regions
4	Multi-Access Radio Systems
5	Single Channel Radio Systems
6	Crash Programme for Cable Augmentation and Subscriber Line Connection
7	Colombo - Katunayake Radio Transmission Link Expansion
8	Investment in TAT (Transatlantic) No. 12/13 Cable
9	Investment in Columbus II Cables
10	Investment in MT (Malaysia - Thailand) Cable
11	Intelsat Satellite Capacity Expansion
12	Colombo PCM Expansion 2
13	Colombo PCM Expansion 3
14	SESS Gateway Expansion No.2

Source: Sri Lanka Telecom

3. Problems in Telecommunications Development and Future Development Trends

There are several factors involved in the failure to fulfil current demand;

- a) Inability to raise sufficient amount of funds
- b) Deficiency in drawing up an appropriate project
- c) Inability to implement the project
- d) Unsatisfactory efficiency of investment implementation procedure including international tendering

The first or largest factor is this ; the current SLT system acts as an obstacle to the necessary amount of funds being available at a stipulated timing and on an appropriate scale. To put it differently, Telecom's funding requirements can no longer be met through public sources, and the delay in upgrading the Telecom. infrastructure has become more prominent in comparison with economic growth. In order to fill the gap between Telecom. infrastructure supply and demand, another factor liable to become a bottleneck of the economic growth, Infrastructure development projects scheme in association with Private Sector Participation (e.g., commercialisation, BOT, etc) have now emerged as worthy of a close examination.

3.1 Inability to raise sufficient amount of funds

In 1991, GOSL announced a new policy on foreign currencies, deregulated foreign investment, simplified related procedure, and established a system for inviting private investment. Public investment programmes, too, have been simultaneously modified in accordance with the above changes in the economic environment.

A total of 283,019 million rupees have been incorporated into the investment plan for the period between 1995 and 1999. By sector, agriculture accounts for 11.5% of this amount, industries 3.0%, social infrastructure 29.4%, economic infrastructure 38.4%, and others 17.75, with the investment emphasis on improving infrastructure. From the above figures, Study team can safely surmise that GOSL is well aware of the importance of investment into essential areas such as irrigation, roads, electricity, communication, and human resources.

How then do they view the Telecom sector?

Investment into the Post & Telecom sector seems set to gradually decrease from 1995 to 1999 as shown in Table 3-3-1.

Table 3-3-1 Investment into the Post & Teleco Sector (1995-1999)

Year	1995	1996	1997	1998	1999
P.I.P (Rs million)	4,069	1,850	850	253	294

This tendency clarifies GOSL's judgement that it can no longer shoulder the entire expenditure for future refurbishing of the infrastructure; rather, the private sector should participate in the development process. Although the government is aware that the Post & Telecom sector is part of public infrastructure, the allotment of public investment thereto has been declining, since the sector is profitable overall. This reveals the government's stance that investments into the Telecommunication sector be accommodated by sources other than public funds.

3.2 Concept of Cross subsidies

While telecommunications is potentially a very profitable business area, it has basically been positioned as part of the social infrastructure. In addition, as a monopolistic public enterprise in the telecommunications sector of Sri Lanka, SLT is destined to provide telecommunications services for the entire country, including areas where it is quite difficult to make a profit. Without any guarantee in sight for securing sufficient charges in the future, however, SLT will certainly find it extremely difficult to universally satisfy demand in telephone services throughout the country given the limited financial resources.

It will therefore be necessary to introduce external rescues or private inward investments abroad. Wherever the necessary funds are obtained, it will be necessary at the very least, to secure sufficient profits for repayment. To this end, the concept of cross subsidies, in which the returns from high-profitable projects support low return projects, must be strongly promoted. In more concrete terms, it is necessary to study through Master Plan the possibility of diverting profits from the Colombo metropolitan area to regional areas, and to achieve universal expansion of the network.

Currently planned projects call for an increase primarily in the number of residential subscribers. Because the majority of subscribers will spend only about USD 100 annually, appropriate measures must be taken to deal with this situation.

When private inward investment abroad is introduced into the telecommunications sector in the current situation where projects for residential subscribers are expected to increase, investments in low return projects are likely to be neglected. Balancing and restricting measures should therefore be explored.

3.3 Northern and Eastern regions

Current telecommunications services in the northern and eastern region of the country are much worse than those in other regions because of the civil disbursement, which has intensified since 1990. In particular, the infrastructure in the northern region has been almost annihilated. As for the telecommunications services, only one line remains operative, and that is the line that connects Colombo and Jaffna. Because telecommunication services are almost non-existent, residents in the northern region use the post as an alternative means of communication. Although this must be rectified as soon as possible, nothing can be done until the civil disbursement ends.

It is expected that when peace negotiations are successfully concluded, international organisations will offer reconstruction and rehabilitation projects, which will most certainly include reconstruction of telecommunications services. A presidential task force has already begun research in the northern region, and is now compiling a report on the telecommunications facilities which are most urgently needed. It will probably take two to three years to complete the target projects proposed by the report; nevertheless, these first few years are the very phase in which close communication is most crucially required by reconstruction and rehabilitation projects. SLT has to take responsibility for securing these communication means, and must therefore prepare the necessary counter measures. However, because it is pressed for time, it must introduce some temporary solutions. The Subscriber Radio System (SRS) system seems to be appropriate for this purpose in terms of the requirements in time and space. This point will be further investigated in this study.

CHAPTER 4

PRESENT TELECOMMUNICATIONS SERVICES

CHAPTER 4

PRESENT TELECOMMUNICATIONS SERVICES

1. Present Status of Telecommunications Administration

The Sri Lanka Telecommunication Department (SLTD) came into being in 1980 after the bifurcation from the integrated Post and Telecommunication Department which operated the telecommunications in the country since Oriental Telephone Company was taken over by the colonial government in 1st January 1896. Despite being run as a government department, SLTD has come a long way from the days of manual telephony to digital network facilities.

In accordance with the Telecommunications Act No. 25 of 1991, Sri Lanka Telecom Corporation (SLT) was licensed for the operations of basic telecommunications services and took over the operations of both domestic and international telecommunications services from the SLTD, on 1st September 1991.

The act also provided Sri Lanka Telecommunications Authority (SLTA) as the Regulatory Authority under a Director General of Telecommunications (DGT) within the Ministry of Posts and Telecommunications. SLTA mainly controls tariff system and inter-connection charge, licensing of operators, radio frequency allocation, national numbering, consumer protection, enforcement of relevant laws and licensing conditions, in accordance with the 1991 Act.

In consequence of the restructuring, SLT took over all assets, liabilities and personnel of SLTD except the frequency management section which came under the purview of DGT. Over 5,000 personnel from SLTD retired under the Act and joined SLT. Other personnel who opted to continue as public servants belong to SLTD which only controls those personnel.

The transformation from SLTD to SLT was smooth and successful and SLT started functioning under the new organisation in 1st September 1991. At present, SLT is a fully government owned but otherwise autonomous enterprise headed by a Chairman and a board of directors appointed by the Government and is licensed for the operations of not only basic

services consisting of plain ordinary telephone service (POTS), telex and telegram services but also other non-basic services including public payphone service.

In addition, various private companies are licensed for providing various telecommunications services i.e. mainly mobile telephone, paging, data communication and public payphones which are defined as the value added services.

The present organisation of telecommunications sector among Governmental organisations and private companies is shown in the Figure 4-1-1.

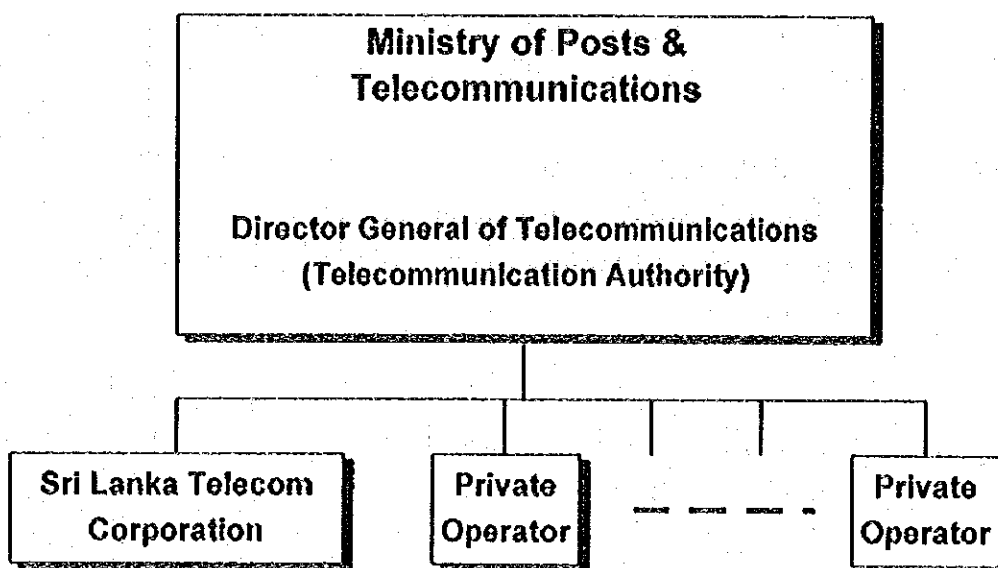


Figure 4-1-1 Present Organisation of Telecommunications Sector in Sri Lanka

2. Present Status of Telecommunications Services and Operators

2.1 General

By the enforcement of Telecommunications Act No. 25 of 1991, operations of telecommunications services were opened to the private sector excluding for basic services consisting of local, long distance and international POTS, and telex and telegram services. Under the Act, participation of private investors to non-basic services, especially to mobile

telephone service has been promoted to meet the rapidly increasing demand. In consequence, the number of private companies licensed has grown dramatically and it has reached to 18 private companies in total as of May 1995.

2.2 Telecommunications Services Operated by SLT

2.2.1 General

Sri Lanka Telecom (SLT) has been monopolistically providing nation-wide basic telecommunications services and the other services including value added services since 1991 consisting of :

- a) Plain ordinary telephone service (domestic and international);
- b) Telex service (domestic and international);
- c) Telegram service (domestic and international);
- d) Leased circuits;
- e) Public payphone service;
- f) Cellular mobile service (BOT basis);
- g) Packet switched service (joint venture between SLT and Indian Saga);
- h) Radio maritime services including INMARSAT services.

Note: a) to c): basic telecommunications services;
e) to g): value added services.

2.2.2 Plain Ordinary Telephone Service (POTS)

The provision of nation-wide plain ordinary telephone service to fulfil the waiting demand is current core activity for SLT and has been rapidly accelerated during the recent years. The number of Direct Exchange Lines (DEL) in whole country is approximately 180,000 as of the end of 1994 and brings 1.0 DEL per 100 inhabitants which is slightly lower than an international level in relation between teledensity and GDP/Capita. However, 186,000 registered waiters which is more than 180,000 of the existing number of subscribers are not supplied yet and have been still stably increasing. From a quantitative view, to fulfil the waiting demand is the most important target. In addition, improvement of low service quality, i.e. call completion rate, fault rate and fault clear rate is also indispensable from views of corporate finance and customer satisfaction.

From a view of accessibility to the plain ordinary telephone service, all the districts and divisional secretariats except certain areas of North and East Regions have been covered by the telephone network and are accessible to the telephones. However, 68% of the total DEL are provided in Colombo SSC area. At present, the enhancement of telephone accessibility has been made up to all villages and villagers and is targeted to complete by 1998.

SLT is also providing public payphones in a nation-wide basis. Since the start of the public payphone service, SLT has been operating coin and collection box telephones (CCB) directly, and also on a caretaker basis, entrusted to certain recognised public and private institutions. In 1992, card phones with IDD facilities were introduced for the first time in Sri Lanka by SLT. The historical data regarding plain ordinary telephone service during 1985 - 1994 are referred to in the following Table 4-2-1. Figures 4-2-1 and 4-2-2 show the number of direct exchange lines (DEL) during 1990 - 1994 and DEL share by SSC area as of December 1994, respectively.

Table 4-2-1 Plain Ordinary Telephone Service by SLT (1985 - 1994)

Categories	Year					
	1985	1990	1991	1992	1993	1994
No. of DEL	87,690	121,390	125,830	135,500	157,770	180,720
DEL/100pop	0.55	0.71	0.73	0.78	0.90	1.01
No. of Payphones	N.A	N.A	439	447	673	747

Source: data in 1985-1992: ITU Statistical Yearbook issued in 1994, data 1993: DGT, data 1994: SLT.

N.A: data not available.

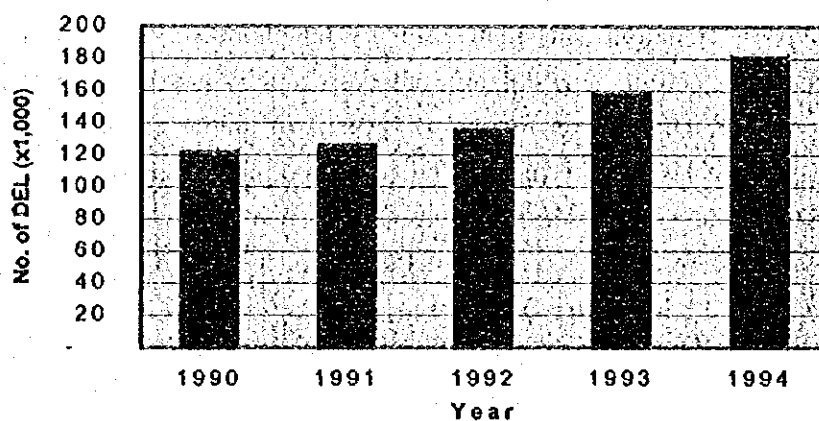


Figure 4-2-1 The Number of DEL (1990 - 1994)

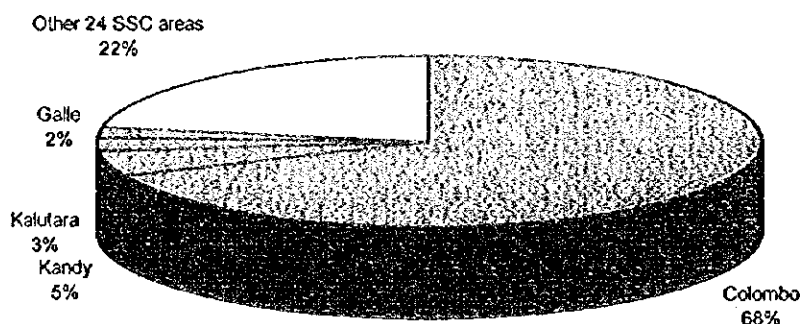


Figure 4-2-2 DEL Shares by SSC Area

2.2.3 Cellular Mobile Service

In 1992, SLT entered into a BOT agreement with AOTC of Australia to operate a Cellular Mobile Service to be transferred to SLT after a period of 7 years. The service has been started as "Mobitel" with AMPS in April 1993. As of April 1995, the service covers 11 cities i.e. Colombo, Chilaw, Kuliyaipitiya, Gampaha, Kalutara, Galle, Matara, Kurunegala, Kandy, Ratnapura, Anuradhapura. The total number of subscribers has reached to approximately 10,000.

2.2.4 Telex Service

Telex service in terms of subscriber base has been showing a marginal increase since 1990, while international outgoing telex traffic had been declining in the recent years. The traffic decline is consistent with the globally observed trend where telex usage is declining due to inroads made by facsimile and value added services.

In consequence of the above changes in communication needs, the number of telex subscribers have been reduced to 1,560 from 1,966 of that in 1993. It is expected that this trend will continue up to the future. The past trend in the number of telex subscribers during 1990 - 1994 is shown in the Table 4-2-2.

Table 4-2-2 The Number of Telex Subscribers during 1985 - 1994

Category	Year					
	1985	1990	1991	1992	1993	1994
No. of Telex Subscribers	1,190	1,664	1,739	1,789	1,966	1,560

Source: data 1985-1992: ITU Statistical Yearbook issued in 1994, data 1993-1994: SLT

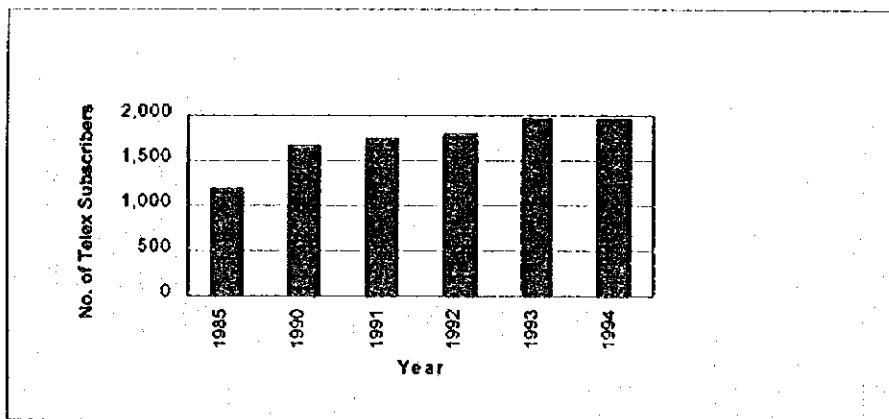


Figure 4-2-3 The Number of Telex Subscribers during 1985 - 1994

2.2.5 Packet Switched Service

SLT launched Packet Switched Service in May 1993. This service enables SLT's Data Pac subscribers to utilise the switch in Bombay via an X. 75 link directly connecting the Node in Colombo with the switch in Bombay. The node provides access to and from all important data networks throughout the world.

2.2.6 Maritime Communication Service

The coastal maritime radio communication service is provided for ships off the coast of Sri Lanka to contact subscribers over HF, MF, or VHF radio. There are two coastal stations i.e. Colombo and Galle. INMARSAT services are also available through foreign coastal stations.

2.2.7 Leased Circuit

The leased circuit is provided both voice circuits and data circuits consisting of 4.8 / 9.6 / 19.2 / 64kbps and 2Mbps for domestic service. For international service, voice circuits and telegraph circuits are available.

2.3 Telecommunications Services Operated by Private Companies

In Sri Lanka, the number of private companies to provide various telecommunications services are rapidly increasing, especially under the Telecommunications Act 1991. As of May 1995, 18 private companies are providing their services. The number of private companies by the service category is shown in the Table 4-2-3.

Table 4-2-3 The Number of Private Companies by Service Category

Service Categories	No. of Private Companies
Cellular mobile telephone	4
Paging service	5
Stored & forward fax service	2
Data transmission	3
Mobile radio trunking	1
Payphone	3

Source: Sri Lanka Telecommunications Authority (as of June 1995)

The details of private companies indicating type of service, name of operator, the number of subscribers, year licensed and year of operation are shown in the Table 4-2-4. In addition, telecommunications indexes in Sri Lanka during the period from 1985 to 1994 are also referred to in the Table 4-2-5.

Table 4-2-4 Private Operators of Telecommunications Services

Type of Service	Name of Operator	No. of Subscribers	Licence given	Year of Operation
Cellular	Lanka Celltel	18,000	1988	1989
	Call Link	7,800	1992	1993
	Mobitel	12,462	1993	1993
	MTN Networks	1,500	1993	1995
Paging	Fentons	764	1989	1990
	Bell Communications	525	1989	1990
	Equipment Trades	770	1981	1982
	Infocom Lanka	4,209	1992	1993
	Intercity Paging	2,000	1989	1990
Stored & Forward Fax	Lanka Communications	N.A.	1991	1993
	Electroteks	N.A.	1991	1993
Data Transmission	Data Net	700	1991	1993
	Electroteks	800	1987	1991
	Lanka Internet	200	1994	1995
Mobile Radio Trunking	Dynacom Engineering	200	1993	1993
Payphones	Lanka Pay Phones	702	NA	1992
	Metrocard	245	NA	1994
	The PayPhone Company	NA	1994	1995

Source: Sri Lanka Telecommunications Authority (as of June 1995)

N.A.: Data are not available.

Table 4-2-5 Telecommunications Indexes in Sri Lanka (1985 - 1994)

No.	Indexes	Units	Year					
			1985	1990	1991	1992	1993	1994
1	Telephone Stations (sets)	10x3	116.75	166.00	172.00	190.00	224.00	275.00
2	Main Telephone Lines	10x3	87.69	121.39	125.83	135.50	157.77	180.72
3	Main Lines in Colombo	10x3	NA	NA	84.88	93.26	104.82	122.28
4	Public Payphones (SLT)	10x3	NA	NA	0.439	0.447	0.673	0.747
5	Exchange Lines to PBX	10x3	NA	2.24	2.30	3.00	NA	NA
6	Telephone Lines of Digital SW	%	NA	NA	NA	95.00	97.00	98.00
7	Telephone Lines for DID	%	70.00	60.00	70.00	70.00	NA	NA
8	Residential Telephone Lines	%	33.00	30.00	31.00	39.00	45.00	45.00
9	Telephone Lines in Urban Areas	%	NA	NA	NA	66.00	67.00	68.00
10	Local Telephone Exchanges	-	NA	NA	NA	242	NA	NA
11	Capacity of Local Exchanges	10x3	135.03	158.52	159.667	180.000	207.227	237.466
12	Exchange Fill (Item 2 / Item 11)	%	64.9	76.6	78.8	75.3	76.1	76.1
13	Trunk Telephone Circuits	10x3	NA	6.14	12.36	NA	NA	NA
14	International Telephone Circuits	10x3	NA	0.36	0.370	0.481	0.630	0.984
15	Waiting List for Telephone Lines	10x3	49.20	47.87	66.574	96.207	124.066	186.245
16	National Telephone Traffic (Calls)	10x6	660.00	NA	2,167.60	2,469.00	NA	NA
17	International Outgoing Traffic (Calls)	10x6	NA	NA	4.837	6.388	7.763	NA
18	Automatic International OG Traffic	%	74.18	85.00	93.00	95.00	97.00	97.00
19	National Paid Telegram (Messages)	10x3	NA	NA	1,078.00	2,483.00	NA	NA
20	International OG Telegrams (Messages)	10x3	141.65	91.10	NA	94.90	84.80	NA
21	Bureaufax Stations	10x3	NA	NA	400	NA	NA	NA
22	Telex Subscriber Lines	10x3	1.190	1.664	1.739	1.789	1.966	1.560
23	National Telex Traffic (Munites)	10x3	NA	5,329.80	5,576.00	5,825.00	NA	NA
24	International Outgoing Telex Traffic (Min.)	10x3	4,487.71	4,472.12	4,298.00	4,231.00	3,276.66	NA
25	Data Equipment for Data Network	10x3	NA	NA	0.091	0.120	NA	NA
26	Subscribers to Cellular Mobile Systems	10x3	NA	1.010	1.973	4.000	13.000	32.500
27	Subscribers to Radio-Paging Systems	10x3	NA	NA	1.962	2.650	NA	NA
28	Telephone Stations per 100 Inhabitants	-	0.74	0.98	1.00	1.09	1.27	1.55
29	Telephone Main Lines per 100 Inhabitants	-	0.55	0.71	0.73	0.78	0.90	1.01
30	Number of Staff (SLT)	10x3	NA	NA	7.141	7.572	7.466	7.516
31	Number of Staff per 1,000 DEL (SLT)	-	NA	NA	57	56	47	42
32	Number of Inhabitants	10x3	15,840.00	16,990.00	17,240.00	17,405.00	17,622.00	17,765.30

Source: data 1985-1992: ITU Statistical Yearbook issued in 1994, data 1993: DGT, data 1994: SLT
 Item 6: Including proposed capacity expansion

tel-indr.xls