JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

UGANDA POSTS AND TELECOMMUNICATIONS CORPORATION
MINISTRY OF WORKS, TRANSPORT AND COMMUNICATIONS
THE REPUBLIC OF UGANDA

MASTER PLAN STUDY FOR TELECOMMUNICATIONS NETWORK IN THE REPUBLIC OF UGANDA

FINAL REPORT

— Vol. 1 —

(Main Body)

November 1994

NIPPON TELECOMMUNICATIONS CONSULTING CO., LTD.

Tokyo, Japan

All prices and costs used in this report are those prevailing in December 1993, excepting the case otherwise stated. They are also assumed to be constant during the whole project period.
Exchange Rate: US$1 = Ugandan Shillings 1,190 (December 1993)

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PREFACE

In response to a request from the Government of the Republic of Uganda, the Government of Japan decided to conduct a Master Plan Study for Telecommunications Network in the Republic of Uganda and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Uganda a study team headed by Mr. Junichi KUROBE, Executive Chief Engineer, NIPPON TELECOMMUNICATIONS CONSULTING CO., LTD., three times between October 1993 and September 1994.

The team held discussions with the officials concerned of the Government of Uganda, 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 Uganda for their close cooperation extended to the team.

November 1994

Kimio Fujita

President

Japan International Cooperation Agency

November 1994

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 Master Plan Study for Telecommunications Network in the Republic of Uganda.

This report has been prepared by Nippon Telecommunications Consulting Co., Ltd., based on a contract with JICA. The study team consisting of 10 members conducted the works from September 1993 to November 1994.

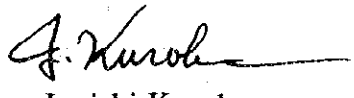
The study aims to formulate the Master Plan for Telecommunications Network Development (1994 to 2010) in the Republic of Uganda.

Study objective areas covered the whole country. Through field surveys and analysis of survey results, the master plan has been drawn up, including formation of development targets, network and system plans, operation/maintenance plans, and implementation plans, as well as cost estimates and project evaluation.

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 Works, Transport and Communications, Uganda Posts and Telecommunications Cooperation and other authorities concerned of the Government of Uganda for their unlimited cooperation and assistance extended to the study team in connection with the execution of their duties.

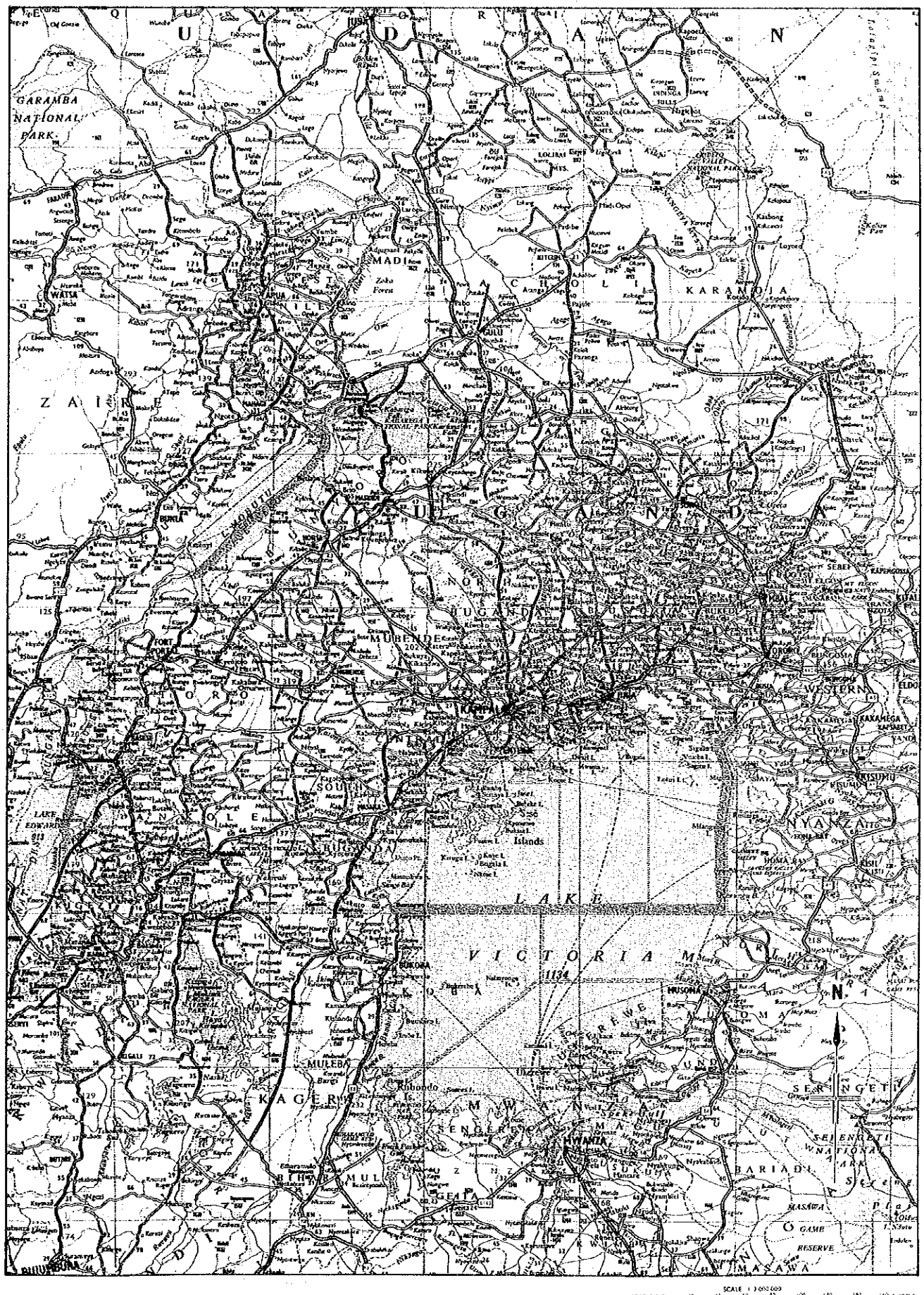
Before closing, we earnestly hope that this report will be effectively used for further development of telecommunications in the Republic of Uganda.

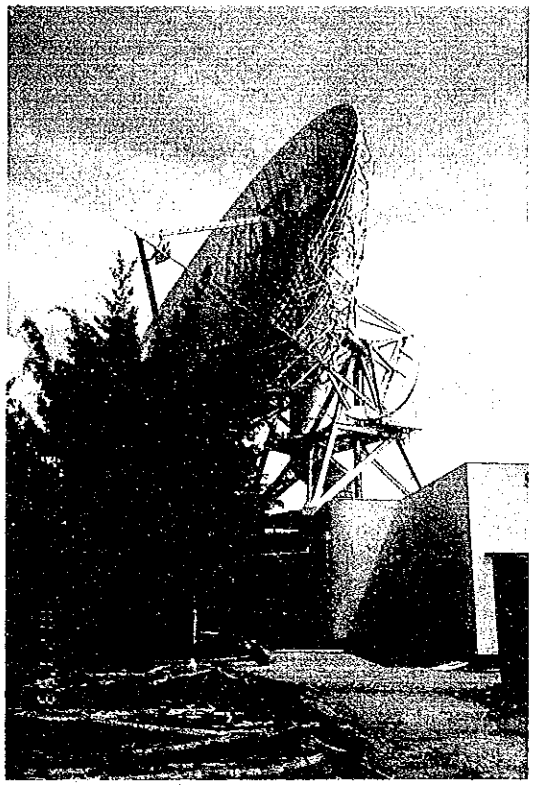
Very truly yours,



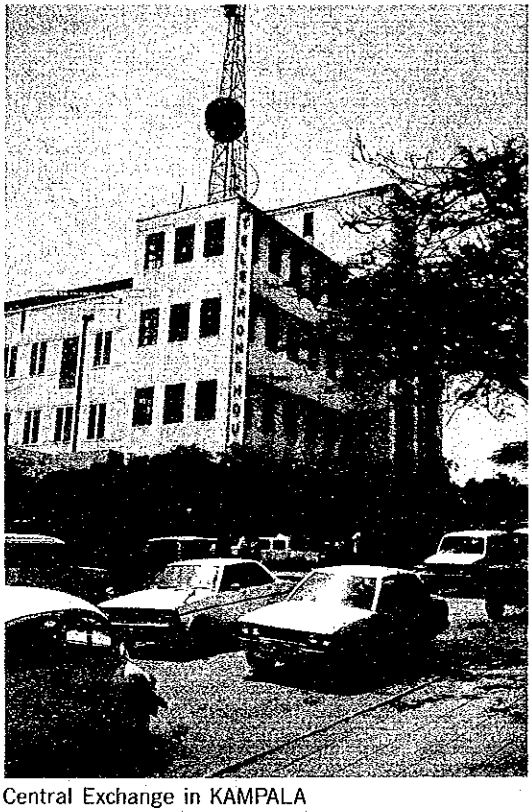
Junichi Kurobe
Team Leader
Master Plan Study for
Telecommunications Network
in the Republic of Uganda

The Republic of Uganda

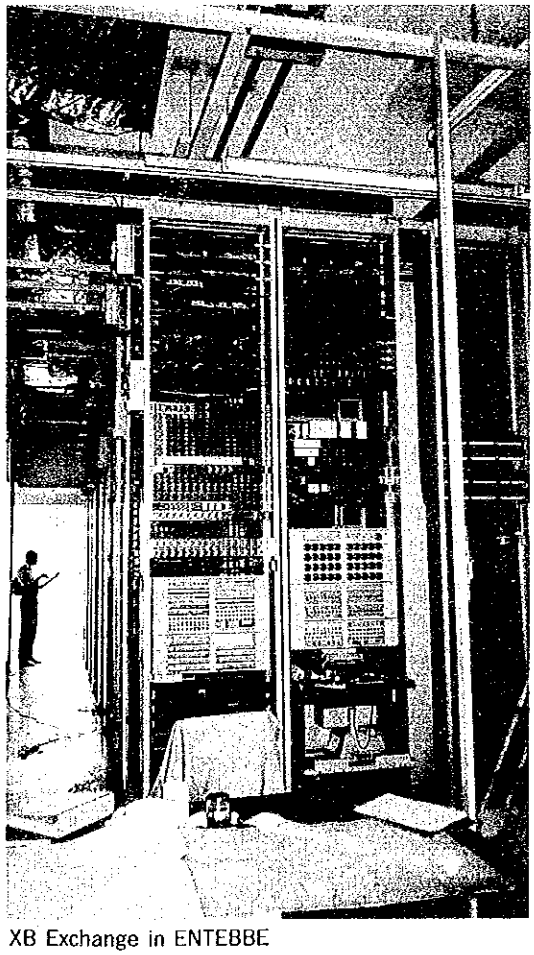




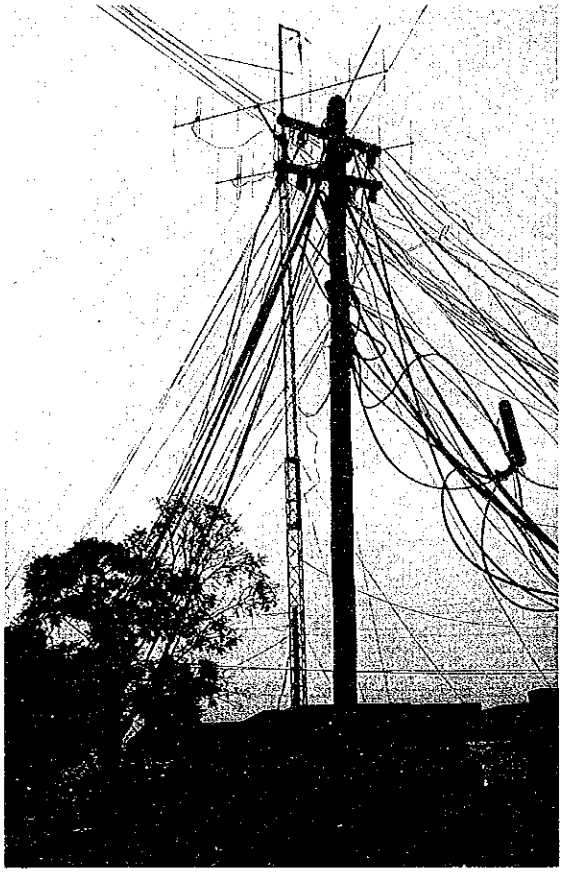
MPOMA Earth Station



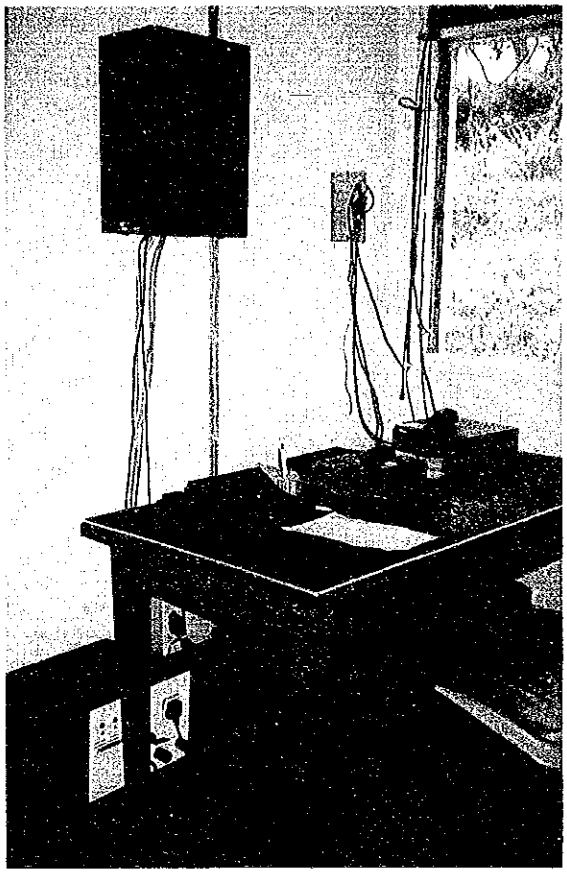
Central Exchange in KAMPALA



XB Exchange in ENTEBBE



Radio Tower and Pole in KAGADI



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ABBREVIATION

ADF	:	African Development Fund
AOR	:	Atlantic Ocean Region
ASC	:	Area Switching Center
CCIR	:	The International Radio Consultative Committee
CCITT	:	The International Telegraph and Telephone Consultative Committee
CCT	:	Circuit
CMS	:	Centralizing Monitoring System
CSPDN	:	Circuit Switched Public Data Network
DELs	:	Direct Exchange Lines
DF/R	:	Draft Final Report
DMARS	:	Digital Multiple Access Radio System
DP	:	Distribution Point
DP	:	Dial Pulse
EAPTC	:	East Africa Posts and Telecommunications Corporation
EC	:	European Community
EO	:	End Office
ERP	:	Economic Recovery Programme 87/88-90/91
FDM	:	Frequency Division Multiplex
FIRR	:	Financial Internal Rate of Return
FOTS	:	Fiber Optic Transmission System
GDP	:	Gross Domestic Product
GPO	:	General Post Office
GRDP	:	Gross Regional Domestic Product
GSC	:	Group Switching Center
I/R	:	Interim Report
IC/R	:	Inception Report
IDA	:	International Development Association
IDD	:	International Direct Dialling
IDN	:	Integrated Digital Network
IDR	:	Intermediate Data Rates
IMF	:	International Monetary Fund
INTELSAT	:	International Telecommunications Satellite Organization
IOR	:	Indian Ocean Region (INTELSAT)
ISD	:	International Subscriber Dialling

ISDN	:	Integrated Services Digital Network
ITE	:	International Transit Exchange
ITU	:	International Telecommunication Union
ITU-R	:	(ITU-RS) ITU Radio Communication Sector
ITU-T	:	(ITU-TS) ITU Telecommunication Standardization Sector
JICA	:	Japan International Cooperation Agency
KBO	:	Kagera Basin Organization
LU	:	Line Unit
MCA	:	Multiple Channel Access
MDF	:	Main Distribution Frame
MEPD	:	Department of Ministry of Finance and Economic
MF	:	Multi Frequency
MSU	:	Main Switching Unit
MUX	:	Multiplexer
MWTC	:	The Ministry of Works, Transport and Communications
NFRB	:	National Frequency Registration Board
NGO's	:	Non-Government Organizations
NPA	:	Numbering Plan Area
NSC	:	National Switching Center
NTT	:	Nippon Telegraph and Telephone Corporation
NURP	:	Northern Uganda Reconstruction Program
ODA	:	Official Development Assistance
OECD	:	Organization for Economic Cooperation and Development
P/R	:	Progress Report
PANA	:	Pan African News Agency
PANAFTEL	:	Pan African Telecommunications
PCM	:	Pulse Code Modulation
PCOs	:	Public Call Offices
PSPDN	:	Packet Switched Public Data Network
PSTN	:	Public Switched Telephone Network
RASCOM	:	Regional Africa Satellite Communication System
RDP	:	Rehabilitation and Development Plan
RSU	:	Remote Switching Unit
RTM	:	Regional Telecom. Manager
SCR	:	Successful Call Rate
SDH	:	Synchronous Digital Hierarchy
STD	:	Subscriber Trunk Dialling

STM	:	Synchronous Transport Module
TASS	:	Telegraph Automatic Switching System
TDM	:	Time Division Multiplex
TESI	:	Telecom Eirean Service International
TQC	:	Total Quality Control
TSU	:	Transit Switching Unit
UNDP	:	United Nations Development Programme
UPTC	:	Uganda Posts and Telecommunications Corporation
USH	:	Uganda Shilling
WFP	:	World Food Program

CHAPTER 1

INTRODUCTION

CHAPTER 1 INTRODUCTION

1.1 Background of The Study

To recover and rehabilitate the telecommunications facilities damaged by the civil wars from 1971 to 1979, the Uganda Posts and Telecommunications Corporation (UPTC) has prepared the master plan titled as "Telecommunication Development Plan (1985-2000)" with assistance of ITU in 1985. At present, this plan cannot be "satisfactory" due to recent change of economic and technical environments.

In Uganda, the transportation means are not adequate to connect many towns and villages which are spread in a wide area. The development of telecommunications network is, therefore, essentially required to support the national development in other sectors.

In view of the above, the Ministry of Works, Transport and Communications (MWTC) and UPTC intended to have the "revised" **Master Plan for Telecommunications Network** applicable to the current situation, in order to realize the effective and optimum rehabilitation/development of telecommunications in Uganda.

Based on this background, the Government of Uganda requested in April 1992 to the Government of Japan to assist for preparation of the revised master plan. In response to this request, the Japan International Cooperation Agency (JICA) despatched the preparatory study team in March 1993. The Scope of Work of this technical assistance program was agreed upon between MWTC and JICA.

1.2 Objectives and Scope of The Study

1.2.1 Objectives of The Study

The objectives of this master plan study are as follows:

a) To prepare the master plan for development of the telecommunications network up to year 2010 covering the whole territory of Uganda,

b) To transfer technology to UPTC counterpart personnel concerning telecommunications network planning through the study.

1.2.2 Scope of The Study

The following items be covered in this study:

a) Collection and review of data/information
- National development plans
- Socio-economic conditions and statistics
- Previous studies on telecommunications
- Present situation of telecommunications services and facilities
- Provision/investment plans for telecommunications
- Telecommunications demand and traffic
- Other data/information related to the study

b) Field survey
- Collection of data/information related to the study
- Investigation of existing telecommunications facilities and services

c) Forecast
- Demand and traffic forecasts
- Trends of new technologies and new services

d) Strategies and targets for telecommunications development

e) Telecommunications networks and facilities plan
- Telecommunications networks plan
- Switching systems plan
- Transmission systems plan
- Outside plant and supporting facilities

f) Organization and management plan

g) Operation and management plan
- Operation and maintenance plan
- Network management plan

h) Project evaluations
- Project formulation
- Cost estimation
- Project evaluations

i) Implementation plan

1.3 Method of Approach

1.3.1 Basic Concept on Master Plan Study

The JICA study team investigated the current situation of telecommunication services and reviewed the problems now being encountered by UPTC in details. The findings were reflected to the "new" Master Plan. The study aims "**To make the optimum plans and strategy for telecommunications development in Uganda**". The basic concept on the study and its outputs are as follows:

(1) Basic Policy of Telecommunication Development

The master plan shall be made considering the Rehabilitation Programs by the Government and the World Bank. The priority projects be formulated considering the Government Policy.

The optimum development scenario be proposed based on the analysis of objectives and financial conditions including the grant aid and loan from foreign countries. The budget allocation plan of foreign fund be also studied.

(2) Demand Forecast

The nationwide telephone demand be forecasted in macroscopic analysis based on the data of various countries in similar development conditions. The telephone demand of rural areas be forecasted in microscopic analysis based on the data collected through the field survey in sample areas. The non-telephone service demand be roughly forecasted based on the socio-economic data in major cities in Uganda.

(3) Telecommunications Network and Facilities

To make the development plan of telecommunications network and facilities, the expansion of telephone service as basic requirements and the introduction of new services be considered as well as the latest technologies. Especially, the plan be made in view of the following major considerations:

a) Digitalization in several steps
b) Use of Remote Switching Units in small demand areas
c) Use of radio subscriber systems in rural areas
d) Establishment of leased circuits for data transmission
e) Introduction of mobile radio services in major cities

Especially, the rural telecommunications network be studied as one of the important services. For the sample areas, the model design be made and the results will be reflected to the nationwide expansion program.

(4) Operation and Maintenance of Network

The survey and investigation be made on the capability, assignment, salary and structure of operation and maintenance personnel. The long term improvement plans be proposed. The special case study be carried out to improve the capability of repair work teams using Total Quality Control (TQC) management method.

The existing training system be also reviewed, and the improvement plans be proposed including training programs in Uganda and abroad.

(5) Organization and Management of UPTC

The organization and management system of UPTC be studied. The guide lines be proposed for improvement. The study be made mainly in the financial matters. The guidelines for major technical matters be also proposed.

The introduction of computer system be studied as the management tools for financial, logistics, human resources and network facilities. In this study, the technical capabilities and cost performance be considered.

(6) Expansion of UPTC Activities

The expansion of international telecommunications services is most profitable activities of UPTC. The traffic estimation and network expansion plan be studied in this service. The introduction of new services, such as data and mobile communications be also studied, as well as the expansion of telephone services.

The current tariff system be investigated referring to the data in other countries. The improvement plans be proposed.

(7) Project Evaluation

On the proposed master plan, the financial and economic evaluation be made to confirm the feasibility in total. The economic evaluation be carried out in terms of consumer's surplus and foreign exchange premium.

For the priority projects, the financial evaluation be made by using the Financial Internal Rate of Return (FIRR) to confirm the project feasibility.

1.3.2 Specific Approach of Study Work

The specific approach in this master plan study work is as mentioned below.

(1) Progress Report

In the first study in Uganda, the survey and investigation work was mainly carried out to confirm the present situation of telecommunication services and socio-economic conditions of Uganda. The analysis and planning was carried out only in the basic development strategies. The macroscopic demand forecast and basic concept for supply was finalized based on the discussion with UPTC.

(2) Sample Areas to Study Rural Telecommunications

The six districts were selected as specific areas for study of rural telecommunications. They are Mpigi, Soroti, Arua, Moroto, Kabarole and Rukungiri. These districts represent the characteristics of whole country of Uganda. In these sample areas, the study team carried out the demand survey to forecast rural telecommunications demand.

(3) Data Analysis by Computer

For the analysis of collected data and planning of the network, the personal computers were used mainly for the following items:

a) Demand forecast
b) Traffic forecast
c) Estimation of trunk lines
d) Estimation of transmission link capacity

(4) Technology Transfer to UPTC Counterpart Personnel

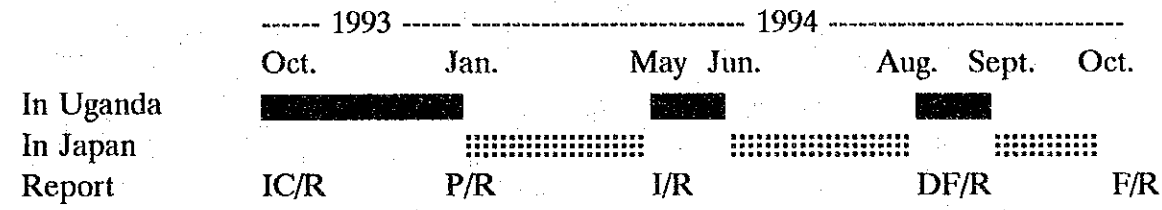
The most effective method for the technology transfer is the on-the-job training. Throughout the whole work period of this study, a joint work was made with the counterpart personnel of UPTC, aiming at the training in jobs to be required in each stage, both technically and managerially. That is, each expert of JICA Study Team carried out the technology transfer through the execution of his own duties.

A special training program be made during the First Study and the Second Study in Japan. During the first study, JICA invited one (1) counterpart staff from UPTC planning division for about one (1) month.

1.4 Work Schedule

1.4.1 Total Schedule

The time schedule of the Master Plan Study is as follows:



(Note)
- IC/R: Inception Report
- P/R: Progress Report
- I/R: Interim Report
- DF/R: Draft Final Report
- F/R: Final Report

1.4.2 Progress in the First Study in Uganda

During the three months period from 5 October, 1993 and 5 January, 1994, the JICA study team carried out the following work in Uganda together with UPTC counterpart personnel:

a) Discussion on Inception Report
b) Collection and analysis of information and data
c) Field surveys (to investigate demand and facilities)
d) Demand forecast (outline)
e) Study of development strategies
f) Preparation of Progress Report

1.4.3 Progress in the First Study in Japan

During three months from 10 January, to 25 March, 1994, the JICA study team carried out the following work in Japan:

a) Demand forecast (details)
b) Study of basic policy for development
c) Traffic forecast
d) National network expansion plan (draft)
e) National network facilities plan (draft)
f) Study of operation and maintenance
g) Management and organization plan (draft)
h) Socio-economic analysis
i) Preparation of interim report
j) Technology transfer to UPTC counterpart person

1.4.4 Progress in the Second Study in Uganda

During the 1.5 months period from 15 May, to 7 July, 1994, the JICA study team carried out the following work in Uganda, together with UPTC counterpart personnel:

a) Explanation and discussion on Interim Report
b) Collection and analysis of information and data
c) Field surveys (for priority projects)
d) Discussion on network expansion plan
e) Discussion on financial plan

1.4.5 Progress in the Second Study in Japan

During the two months period from 27 June, to 29 August, 1994, the JICA study team carried out the following work in Japan:

a) Network facilities plan (details)
b) Operation and maintenance plan
c) Management and organization plan
d) Project formation
e) Project evaluation
f) Project implementation plan
g) Preparation of draft final report
h) Technology transfer to UPTC counterpart person

1.4.6 Progress in the Third Study in Uganda

During the 0.5 month period from 31 August, to 16 September, 1994, the JICA study team carried out the explanation and discussion on Draft Final Report in Uganda, together with UPTC counterpart personnel.

1.4.7 Progress in the Third Study in Japan

During the one month period from 17 September, to 30 October, 1994, the JICA study team carried out the preparation of Final Report in Japan.

1.5 Study Teams

The study was carried by the following teams:

a) JICA study team: Survey, analysis and planning
b) UPTC counterparts: Joint work with JICA team
c) JICA advisory committee: Check and advise to study team

1.5.1 JICA Study Team

Duty in Charge	Name of Member	Consulting Firm
Team Leader/Operation & Maintenance Plan	KUROBE Junichi	NTC
Development Plan/ Development Policy	IIDA Takaaki	NTC
Organization & Management Plan	KUBO Katsuhei	CRC
Demand Forecast	MATSUDA Naoto	NTC
Network Plan	KATAYAMA Ryuuji	NTC
Switching Facility	IWAMI Akira	NTC
Transmission Facility	OKEDA Daisuke	NTC
International Network & Facility Plan	OHBA Kazunori	KDD
Economic/Financial Analysis	KURODA Tomoyuki	CRC
Administration for the Study Team	NISHINOHARA Akito	NTC

(Note) NTC : Nippon Telecommunication Consulting Co., Ltd.
CRC : CRC Research Institute, Inc.
KDD : Kokusai Denshin Denwa Co., Ltd.

1.5.2 UPTC Counterpart Personnel

Duty in Charge	Name of Member	Title/Division
Chief Counterpart	BAKARUHIRE John	Ag.Chief/Planning
Operation & Maintenance Plan	MIRIAM Kawuma	Ag.SEE/Quality Management
Development Plan/ Development Policy	E.B.SSALI J.KAGOLOBA	Cooperate Plan Ag.SEE/Planning
Organization	NDAWULA Asaph	Personnel Dept.
Management Plan	M.MASEMBE Senkonyo	Chief Accountant
Demand Forecast	R.B.KIZITO KALETE Joel	Ag.SEE/Planning STC/Planning
Network Plan	KARAMAGI Frederick OPIO Nicholas	SE/Cable,Planning SE/Cable,Planning
Switching Facility	E.J.ONYANGO Wadunde	PEE/Switching, Planning
Transmission Facility	MUSISI K.Edward David KULINGA	PEE/Transmission, Ag.DE/Transmission, Planning
International Network & Facility Plan	AMPAIRE Justus	Ag.PEE/International Network
Economic/Financial Analysis	KIZA H.Decolas	Regional Accountant

(Note)

Ag.:	Acting
PEE:	Principal Executive Engineer
SEE:	Senior Executive Engineer
SE:	Senior Engineer
DE:	Deputy Engineer

1.5.3 JICA Advisory Committee

Title	Name of Member	Affiliated to
Chairman (From Oct.1993 to June 1994)	YAMAGUCHI Makoto	Special Advisor Minister's Secretariat, International Affairs Dept. Ministry of Posts and Telecommunications
Chairman (From July to Oct.1994)	MUKODA Motoyuki	Special Advisor Minister's Secretariat, International Affairs Dept. Ministry of Posts and Telecommunications
Member	ISHIZUKA Jinyoshi	Assistant Manager Operator Qualification Office, Radio Department, Telecommunications Bureau, Ministry of Posts and Telecommunications
Member (From Oct.1993 to March 1994)	SUZUKI Yasuo	Development Specialist Institute for International Cooperation, Japan International Cooperation Agency
Member (From April to Oct.1994)	AOKI Shigemaro	Senior Telecom Advisor Institute for International Cooperation, Japan International Cooperation Agency
Coordinator	SUGAWARA Takashi	Second Development Study Division Social Development Study Department Japan International Cooperation Agency

CHAPTER 2

SOCIO-ECONOMY OF UGANDA

CHAPTER 2 SOCIO-ECONOMY OF UGANDA

2.1 Geographical Situation

2.1.1 Geography

Situated astride the Equator, The Republic of Uganda is an entirely inland territory, lying between latitudes 4 deg. North and 1 deg. South and longitude 30 deg. and 35 deg. East. Its capital city, Kampala, is 1,348 km from the Indian Ocean. The country borders Sudan to the north, Zaire to the west, Kenya to the east and Tanzania and Rwanda to the south.

Physical Features:

Total area	:	241,000 sq.km
Fresh water area	:	44,000 sq.km
National game reserves	:	1,532,000 ha
Natural closed forest	:	732,000 ha
Savanna woodland	:	775,000 ha
Plantations	:	25,000 ha

The dominant relief element is that of plateau, about 1,200 meters high, developed in rocks of the pre-Cambrian age. A regional warping of the plateau associated with the formation of the geological rifting system gave rise to the shallow basin in which the waters of Lake Victoria and Lake Kyoga have gathered and produced as a complementary feature of the highland landscape of western Uganda.

2.1.2 Climate

The country has rainy and dry seasons two times per year. The first rainy season is between March and June while the second is in October up to December. The dry seasons are January through March and June through September.

Uganda has an equatorial climate modified by its altitude. Rainfall is highest around Lake Victoria and in the mountains where it can reach 2,000 mm a year. In the western highlands and in the eastern and north-central interior, rainfall is over 1,250 mm and in the north-east and in the south it is less than 750 mm. The average annual maximum and minimum temperatures are 27 deg.C and 16 deg.C respectively.

2.1.3 Drought

Drought, which is a permanent feature seen in Uganda, has been part of a cyclical pattern that the government has to deal with. In the last decade, Uganda suffered from a terrible drought. A drought from 1991/1992 severely affected its agriculture, resulting in decline in GDP growth.

Moroto, Kitgum and Kotido had droughts six or seven times in a decade, which caused underground water to dry up seriously. The government must deal with these drought characteristics.

2.1.4 Deforestation

Deforestation has occurred at an accelerating pace throughout last decade as a result of agricultural expansion, the large demand for fuel-wood/charcoal and overgrazing which are same experience of Asian developing countries.

The above consequence has triggered off the increased soil erosion, loss of reliable water supply, and a resultant decline in agricultural productivity, and eventually developed "Desert" characteristics. This can be seen happening today in Moroto, Kotido and Kitgum districts. Keeping too many cattle in one place prevents the grass from growing since it is eaten by the animals all the time. After some time the land will no longer support cattle, and later may become a "Desert".

Table 2-1-1 shows the historical deforestation in Uganda.

Table 2-1-1 Historic Deforestation

Year	Sq.kilometers of Forest
1900	31,000
1930	23,000
1960	11,000
1985	6,000

Source : Ministry of Planning and Economic Development

In the interior of Uganda a dry area stretches irregularly across the country from Rukungiri in the south-west to Karamoja in the north-east.

2.2 Demographic Trends

2.2.1 Population

According to the results of the 1991 population census, Uganda is presently estimated to have a population of about 16.7 million people with a growth rate of 2.5% per annum between 1980 and 1991, and an average household size of 5.7. Table 2-2-1 shows the population by region in 1991.

Table 2-2-1 Population by Region

Region	Population	%
Central	4,843,594	29.0
Eastern	4,128,469	24.8
Northern	3,151,955	18.9
Western	4,547,687	27.3
Uganda	16,671,705	100.0

Source : Statistical Department, Ministry of Finance and Economic Development

2.2.2 Urbanization

According to the 1991 population census, about 90% of the population of Uganda was classed as rural while about 10% live in urban areas. The most developing districts, Kampala and Jinja, include about 80% of the population in the urban areas. Kampala dominates the urban hierarchy with a population of 774,241, followed by Jinja with about 80,893.

Between 1969 and 1980, the urban population grew by an estimated 3.8% per year which was a low rate by African standards but none the less higher than the overall rate of population growth. With continued security and economic rehabilitation in Urban areas and security and economic difficulty in Rural areas, Uganda may well see faster population growth in the towns in the future. The estimated urban population in 1993 is shown in Table 2-2-2.

Table 2-2-2 Urban Population at 1993

(Unit:1000)

Region	Total pop.	Urban pop.	Ratio
Central	5,088.8	1,239.6	24.36%
Eastern	4,337.4	339.0	7.82%
Northern	3,311.5	177.6	5.36%
Western	4,777.9	228.9	4.79%
Uganda	17,515.7	1,985.3	11.33%

Source: JICA study team estimated based on 1991 Population Census.

2.2.3 Social Indicators

Demographic parameters of Uganda are summarized in the following Table 2-2-3.

Table 2-2-3 Demographic Parameters of Uganda

Parameters	1990
Crude Birth Rate per 1000	51.0
Crude Death Rate per 1000	19.0
Gross enrollment ratios	
Primary, Male	80
Primary, Female	63
Infant Mortality	117
Under 5 Mortality	180
Life Expectancy	
Male	47
Female	50
Female/Male ratio	1.02
Total Fertility Rate	7.30

Source : Country Profile, World Bank

2.3 Social Condition

2.3.1 The Role of Telecommunications in Social and Economic Development

The Republic of Uganda has almost the same land area with that of the United Kingdom. However, it has not been fully utilized.

The Uganda Government is planning to shift its economic focus to agriculture again. Progress in agricultural development in areas such as Central, Eastern and Western Regions where annual rainfall is plentiful, will mean the spread of Uganda's main industry over a vast area.

Improvements in telecommunications is vital to maintaining communications throughout this area and increasing economic efficiency. Furthermore, with the growing surplus of agricultural goods coming onto the market as agricultural development expands, trade in agricultural products, seedlings, fertilizers, fuels and services will expand. To support efficient expansion, rapid, highly reliable long distance communications will become necessary.

Furthermore, because telecommunications replaces some elements of transportation and enables transportation facilities to be used more effectively, it can reduce the energy required to maintain a certain level of communications. For its smooth realization, an early improvement in the telecommunications networks is desired.

Moreover, the development of the telecommunications network will have great impact on sectors such as commerce, finance, transportation, medical services and education.

This means that telecommunications will become a major factor in achieving structural change in Uganda.

2.3.2 Isolated District Centers in Uganda

Isolation is to be a critical core of the bottleneck issue of economic development. An isolated district is generally defined as one which is served with:

- a needy road network,
- poor postal service,
- very poor telephone service,
- very needy linkage with neighboring district centers,
- long distance from a consumer market.

Thirteen typical isolated district centers are described in the following:

(1) Kiboga

Kiboga town is the district headquarters of the newly created Kiboga district, a part of former Mubende district. It is on the main Kampala-Hoima road with relatively small traffic due to the poor road condition. It is served with Kiboga hospital, the only one around the region. It is predominantly an agricultural district with virtually no industrial setups, save for coffee factories. It has poor telecommunications facilities. However, the district has great potential if the road infrastructure is improved.

(2) Kapchorwa

Being at the foothills of Mount Elgon, Kapchorwa district is served with a very poor road network with risky spots all through. It is poorly served by administrative services and poor communication facilities. The people mainly grow coffee trees at the foothills of the mountains. Their only hope lies in the improvement of the road network.

(3) Pallisa

The Pallisa district center is the headquarters newly established. It is formerly a part of Tororo district with almost no industrial setup. Most of the inhabitants depend on agriculture for survival. Their main cash crop is cotton.

This district is not included in the large consumer market and it is very difficult to contact the neighboring district centers and other large consumer markets due to the lack of road linkage. The district is not on the main ring road.

(4) Arua, Moyo and Nebbi

These are neighboring districts along the North Western International border. Arua is the central district and regional headquarters of West Nile region. It is the nearest border town to Zaire and Sudan. Moyo was a part of former Madi district and Nebbi was the old West Nile district. They are known for brisk business and could do well if roads spread properly to the rest of the country.
They are predominantly agricultural districts with growing tobacco holding the top of the list. A few industrial setups have started springing up in the recent years. They are served with both postal and telecommunications facilities and if well linked with central Uganda they will provide a great potential for development.

(5) Kitgum

It is the central district in the former North Acholi and borders on Sudan. Previously well linked with Gulu, Kitgum district has been greatly affected by the recent civil wars.

It is served with a needy road network and poor social, postal and no telecommunications services. With the improved security situation and the World Bank funded Northern Uganda Reconstruction Program, there is great potential for development.

(6) Kotido and Moroto

Kotido and Moroto are located in the North Eastern part of the country with some of the most primitive societies in the country. It has needy social services and a very poor road network with almost no postal and telecommunications services.

Its climatic conditions are semi arid which could do against agriculture. The people survive on their cattle to earn for living. Several NGOs are assisting the region and with literacy campaigns the region could greatly improve.

(7) Bundibugyo

Bundibugyo borders on Zaire at the foothills of Mt. Rwenzori. With almost no industrial setup the populace depend on agriculture for survival and some are pastoralist. Their main cash crop is cocoa.

It is served with one of the poorest road networks and telecommunications services in the country. Being a border town, with improved infrastructure, Bundibugyo will be set to develop very fast.

(8) Kisoro

It is located in South Western part of the country, and is the nearest border town to Zaire and Rwanda. Kisoro was a part of former Kabale district, and is situated in a volcanic ranges with Muhavura National Park famous for mountain gorillas. The place has a big potentiality to be a great tourist resource to get foreign currency.
It is, however, served with one of the poorest road networks in the country with no all weather road, with needy social, postal and telecommunication service.
Improved communications could easily stimulate development since the district is near to the central region.

(9) Kibale

Kibale is a newly formed district, which formerly belonged to Hoima. Having been a center of inter Kingdom wars in the past, Kibale is one of the most sparsely populated districts in the country.

It is predominantly an agricultural district, producing mostly good crops for the consumption of the entire country. It is served with Kagadi Hospital, and poor postal and telecommunications services. Moreover, the road network is sometimes not usable by motorists. With the improved road network system, Kibale will have a high rate of growth.

(10) Kalangala

Kalangala is entirely surrounded by the Lake Victoria and embodies Sese Islands which were formerly a part of Masaka district. The district consists of 84 small islands placed in the Lake Victoria. In this context, this district has quite poor linkage with mainland due to the lack of communication method except for ferry. Telecommunication is one of countermeasures to improve the above situation.

2.3.3 Rural Communities

About 90 % of the population was classed as Rural in 1990. Uganda society is overwhelmingly rural, and compulsorily labor force tends to be a reflection of agriculture potential. Rural population densities are generally less than 100 per sq.km and they fall as low as 12 per sq.km in Karamoja area.

(1) Rural Life

The main problem is poverty. The poor are largely concentrated in rural areas. Consequently, in agricultural research and extension and rural roads and water supply improvement, emphasis should be placed on the areas of high public expenditure priority in order to impact positively on poverty reduction.

Ugandans in rural areas are unlikely to reduce family size quickly. Consequently, alternative sources of generating income for families should be seriously considered.

In a traditional rural economy, a large number of children is considered as an increase of the number of available workers, and, therefore, economic advantage for rural family, even though in most cases children do not increase production by as much as they consume.

(2) Rural Telecommunication Project

The above state of the Uganda economy has an impact on the current situation of public and private resources needed for investments in the development of infrastructure. Rural telecommunication projects require heavy and long term investments and has low returns in this sector. As such, and for the additional fact that they are often considered to be non-productive, they have been given low priority in national budgetary allocation. However, recently government has accorded high priority to transportation, communication and water supply, with emphasis on the rural areas and trunk networks.

While full rehabilitation of the entire telecommunication systems in rural areas will not be possible immediately as a result of economic and institutional constraints, in this Master Plan, the rural telecommunication system should be considered as the basic minimum services of which realization should be given high priority, with the introduction of technologies optimum to the level of the respective regional economic developments, in order to eliminate the isolated districts.

2.3.4 Foreign Expatriate in Uganda

According to the census of all ethnics taken in Uganda in 1959, the population was found to total 6,536,616. Of this number 6,449,558 were Africans, 63,130 Indians, 5,973 Pakistanis, 10,866 Europeans and others.

The distribution of the three main ethnic groups over the provinces and districts in the year of 1959 was as in the following Table 2-3-1. These figures indicated that Asians had spread in the whole country of Uganda in 1959. It is a fact that Rural commercial activity had been heavily depended on their economic potentiality.

Table 2-3-1 Distribution of Main Ethnic Groups in 1959

District	African	Asian	European
Buganda Prov.	1,834,128	38,970	6,683
East Mengo	606,694	5,177	313
West Mengo	688,185	30,206	6,088
Mubende	99,069	254	46
Masaka	440,180	3,333	236
Eastern Prov.	1,872,949	25,729	2,038
Teso	453,474	3,688	252
Bugisu	352,885	361	108
Mbale Town	8,433	4,575	397
Bukedi	397,650	2,192	346
Busoga	660,507	14,913	935
Northern Prov.	1,244,971	3,161	753
West Nile	383,926	774	133
Karamoja	171,945	134	117
Achori	285,530	986	279
Madi	50,627	79	9
Lango	352,943	1,188	152
Western Prov.	1,497,510	4,016	1,368
Toro	347,479	898	743
Kigezi	493,444	752	215
Bunyoro	126,875	1,104	163
Ankole	529,712	1,262	247

In 1972, nearly 80,000 Asians were expelled from Uganda by Idi Amin after giving them only 90 days within which to leave the country. They abandoned a lot of properties which included plantations, industries, schools, hospitals, commercial and residential buildings. After the departure of Asians, their properties were allocated to Ugandans most of whom lacked business techniques.

So after they had left, industrial production declined, some plantations became overgrown with bush while warehouses and shops ran out of sufficient supplies.

Under the above economic activities including those ethnic groups, old telecommunication networks had been developed but these networks were destroyed by the civil wars and/or by lack of appropriate maintenance thereafter.

Consequently, the current stage will require much more careful planning and difficult choices for telecommunication investments. If available funds are used only for full rehabilitation, many areas will have to wait for years to have any significant communication improvement. It is important that the master plan of telecommunications has a development policy to remove the major causes of non communications.

2.3.5 Infrastructure

The provision of infrastructure both in rural and urban areas is poor in quality and quantity; however services are relatively better in urban areas.

(1) Transport

Rehabilitating transport infrastructure has been progressed in recent years, and the Government continues to give high priority to this sector. The Government, however, recognizes the limitations of rehabilitating the entire network, as its cost is estimated to be at least US$ 500 million which is ten times of the current road expenditure level.

The Ministry of Works, Transport and Communication is embarking upon a Uganda National Transport Strategy with technical assistance from UNDP.

(2) Energy

Although over 90% of Uganda's total energy requirements in 1991 were met by mainly fuel-wood and charcoal other than oil and electricity, the rehabilitation and development of the Uganda electric supply system is critical in promoting the rehabilitation of other sectors.

Even after the completion of the on-going "Third Power Project", it will take some time before it becomes economically viable to connect certain isolated areas of the country to the commercial power system.

As announced recently, the Government intends to promote the development of mini-hydro power systems. The priority sites identified for a detailed study are Nyamabuye near Kisoro, Paidha near Nebbi, Musizi, Buseruka and a site on the Ishasha river near Kanungu.

(3) Water

The agricultural and industrial development of Uganda, as well as the betterment of living standards, depends very much on the country's water resources.

At present only 20% of Ugandans have access to clean and safe water. National Water and Sewerage Corporation now operates the water systems in 9 major urban centers, having taken on two more towns, Gulu and Lira, in 1992.

Especially in the rural areas, water quantity and quality are quite poor. For safe drinking water, only 7% increase has been attained in rural population coverage during 1992/1993.

2.4 Economic Activities

2.4.1 Gross Domestic Product (GDP)

Per Capita GDP : USH 198,763 US$ 167 in 1992/93.
Total GDP growth rate : 3.8% during 1983/84 - 1992/93

GDP gives a 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 Uganda in the last decade can be seen from Table 2-4-1.

Real change rate in Gross Domestic Product (GDP) during the 83/84-92/93 period exceeded the population growth. Uganda's economy is anticipated to grow by 7.0% in 92/93 due to a significant recovery in the agriculture sector after severe drought which resulted in overall growth of only 1.8% p.a. in 91/92. In Uganda, droughts cause much damage on the economic growth, because most of peasant farmers depend heavily on extensive water conservation.

Since independence in 1962, economic growth and increase in per capita income have shown an erratic growth pattern, caused primarily by the fortunes of agriculture and political problems. Between 1965 and 1971 the Ugandan economy grew by about 4% a year. By 1980, capital assets in agriculture, manufacturing, transportation and communications were seriously run down due to lack of maintenance and reinvestment. Between 1970 and 1980 the Ugandan GDP fell down to about one fifth.

GDP real change of just 3.8% in 1983/1984-1992/1993 due to the success of economic reforms, implementation of the RDP, greater external donor assistance and improved security in the whole country is reflected in remarkable improvements in GDP growth from 1987/1988 through 1992/1993 compared with previous year.

The newly published official estimate for GDP growth in 1993/1994 was 5.0% (Rehabilitation and Development Pl(1991/1992- 1994/1995)). However, the World Bank predicted, as major economic objectives, an average annual rate of GDP growth of 7.24%. The newly estimated GDP growth rate will be achieved with good weather and bumper crops.

(1) Agriculture

Accounting for about 50% of GDP and over 95% of merchandise exports(mainly coffee), with the employment of over 80% of the labor force, the performance of the agriculture sector is the key determinant of economic growth in Uganda. Since 1987/1988 good agricultural conditions supported a wide range of food crops, especially in the subsistence sector, together with valuable cash crops, led by coffee and cotton.

The World Bank reported in 1993 that Ugandan agriculture is characterized by extremely low productivity, which can be more than double if adequate provisions are made for effective and sustainable research and extension systems.

(2) Industries

According to the index of industrial production there has been a steady through uneven recovery, averaging about 16% a year (1987 - 1991). This sector includes the processing of agricultural commodities, e.g., cotton, coffee, sugar and food crops. Large scale industries include textile, tobacco, beverages, wood and paper product, construction materials, chemicals, etc.
The manufacturing sector contributes about 5% to the GDP. The sector was extremely damaged by the economic and political troubles of the 1970's.

Table 2-4-1 National GDP in 1983/84 through 1992/93

At 1991 Constant Prices

Unit:BilUsh

Item	83/84	84/85	85/86	86/87	87/88	88/89	89/90	90/91	91/92	92/93
Agriculture	396	385	381	386	408	436	460	476	471	514
Mining & Quarrying	3	2	2	2	1.6	1.4	3	6	6	7
Manufacturing	61	55	50	52	64	73	79	82	99	99
Electricity, Gas & Water	9	8	9	10	10	10	11	13	14	15
Construction	55	50	48	69	89	93	102	110	111	117
Commrece	202	191	186	193	215	234	249	259	274	288
Transport, Communication	58	61	65	70	74	78	82	86	87	93
Community Service	203	203	207	215	224	239	255	269	282	295
Non-Montary										
Agriculture	492	474	492	504	534	568	595	607	597	651
Construction	7	7	7	8	8	8	8	10	10	12
Owner-Occupied Dwellings	52	53	54	56	58	59	61	62	64	66
Gross Domestic Product at F. Cost 1991 price	1539	1492	1503	1566	1686	1800	1905	1980	2015	2157
Real Change Ratio		-3.0%	0.7%	4.1%	7.7%	6.7%	5.9%	3.9%	1.8%	7.0%

The construction field consists of 5.4% of GDP, with sector growth rate of 6% in 1992/1993. The basic requirements of construction are produced by local sectors. Uganda has two cement factories; however, production is frequently interrupted. Main cause of this low production is power failures. Estimated total amount of available power is only 5% of the installed capacity.

During the 1960's tourism was the third largest earner of foreign exchange after coffee and cotton, grossing US$ 19 million in 1970. However, it is difficult to see any significant sustained recovery in tourism until foreign confidence in the security situation has been fully restored and tourist services rehabilitated.

2.4.2 Gross Regional Domestic Product (GRDP)

Although the GRDP had not been announced by the Ugandan Government, GRDP is estimated in this study based on several statistical data. These data taken by the Ministry of Finance and Economic Planning include the data on the size of the work force in each major sector by region obtained when the 1989 census of Business Establishments was taken by UNDP. Other major data are 1991 Population Census data and Gross Domestic Product (GDP) by major sectors. For estimating the GRDP, we then revised the figures using data compiled by individual regions and districts, such as production of agriculture products and commercial scales.

Table 2-4-2 indicates that Economic potentiality of Northern region is quite different from other regions. The telecommunications development for the entire country should be planned with technologies optimum to the level of socio-economic developments and expected demand in respective regions. This means that the telecommunication investment of Northern region should be considered as the basic minimum.

While analyzing the agricultural potential of the regions in Uganda one has to consider the following:

- soil fertility;
- weather conditions;
- availability of and population pressure on land; and
- availability of population labor.

(1) Western Region

The soils are fairly fertile and the weather is fine but there is a lot of pressure on the land and a short supply of labor in the south-west. The rest of the region has great potential.

(2) Central Region

With the high level of development, the agricultural potential of the central region has greatly diminished.

(3) Eastern Region

The soils are relatively good and there is plenty of land and an abundant labor force. There is a limited pressure on the land and the weather is relatively good.

(4) Northern Region

Other than the fairly good soils and the abundant labor, the northern region has bad weather (dry) with a lot of pressure on the land.

(5) Summary

From the foregoing, the eastern region has the greatest potential for agricultural development followed by the western, central and northern. Note that this is because most of the potential in the western and central regions has already been exploited.

Table 2-4-2 Gross Regional Domestic Product by Region in 1993

Region	GRDP/CAP(USH)	GRDP/CAP(US$)
Central	370,152	311
Eastern	146,395	123
Northern	116,640	98
Western	120,210	101
Uganda	198,763	167

1993 Current Price
Exchange Rate : 1190.2 USH/US$

2.4.3 Gross Regional Domestic Product by District in 1993

Population, labor population and Gross regional Domestic Product (GRDP) are socioeconomic indicators which illustrate the characteristics of a region.

With a population census completed in 1991, it was possible to obtain detailed data on the overall and labor populations for each district. For Gross Regional Domestic Product, however, no published data were available for 1993, so it was necessary to prepare an estimate of this indicator.

GRDP had not been investigated on a nationwide scale thus far, and the only similar survey which could be considered was the "Census of Business Establishments 1989". The weighing factor was determined from the gross output and the size of the work force for each district, and by multiplying this by the National GDP for each sector, the GRDP for each district was estimated.

Table 2-4-3 Gross Regional Domestic Product by District in 1993

District	GRDP	District	GRDP
Kalangala	3	Apac	47
Kampala	1024	Arua	70
Kiboga	15	Gulu	34
Luwero	49	Kitgum	36
Masaka	92	Kotido	19
Mpigi	111	Lira	52
Mubende	54	Moroto	17
Mukono	192	Moyo	17
Rakai	41	Nebbi	32
CENTRAL	1581	NORTHERN	324
Iganga	94	Bundibugyo	12
Jinja	132	Bushenyi	63
Kamuli	50	Hoima	20
Kapchorwa	13	Kabale	42
Kumi	23	Kabarole	79
Mbale	80	Kasese	39
Pallisa	39	Kibale	23
Soroti	42	Kisoro	19
Tororo	61	Masindi	27
		Mbarara	86
		Rukungiri	41
		Ntungamo	31
EASTERN	534		482

1993 Current Price
Exchange Rate : 1190.2 USH/US$

2.4.4 Currency

In May 1987 a new Ugandan currency unit was introduced with an effective devaluation of 77 per cent. The exchange rate policy was aimed at maintaining and improving competitiveness in the export sector.

Table 2-4-4 Average Exchange Rate
(Unit: Ush/US$)

Year	Exchange rate
83/84	2.25
84/85	5.15
85/86	10.35
86/87	28.40
87/88	74.45
88/89	164.60
89/90	326.00
90/91	581.45
91/92	933.90
92/93	1162.00

Note : All exchange rates in the table are shown in terms of the new currency, based on the data provided by IMF.

2.5 National Development

2.5.1 Rehabilitation and Development Plan (RDP)

RDP consists of three major programs:

- Economic Recovery Program 1987/1988-1990/1991
- Medium Term Structural Adjustment Program 1991/1992-1994/1995
- Public Expenditure Program

The objective of the RDP is to present the Government's principal social and economic policies and to define the specific investment program which has been developed on the basis of these policies.

(1) Economic Recovery Program 1987/1988-1990/1991 (ERP)

The basic objectives of ERP are economic stabilization and structural reform. The damaged social and economic infrastructure called for major rehabilitation and reconstruction efforts.

Since the launching of the RDP, remarkable progress has been made in improving production and export incentives, particularly through exchange rate adjustment.

Such success in RDP has led to a high average growth rate of GDP over 5% p.a. since 1986/87.

(2) Medium Term Structural Adjustment Program 1991/1992-1994/1995

The objective of Structural Adjustment Program is to set up Uganda Government's role at both the macroeconomic and sectoral level to be clearly defined.

a) Macro economic policy

Basic macroeconomic policy is to maintain economic growth whilst reducing macroeconomic imbalances in the economy in order to achieve a sustained improvement for Uganda.

There are several macroeconomic targets as follows:

- to maintain an annual growth rate of 5% p.a.
- to reduce the rate of inflation to 10% by 1994/95
- to improve the economy's external credit worthiness
- to improve substantially in the economic and social prioritization of public expenditure

b) External policy

The Government will continue to peruse its objectives of

- eliminating overvaluation of the exchange rate in order to remove bias against production of exports and import substitutes and

- ensuring an efficient market based system of foreign exchange allocation.

Recently, the official rate has been adjusted frequently as required to maintain a competitive real effective exchange rate and to achieve gradual convergence of the official and foreign exchange bureau rate.

(3) Public expenditure program

The Government is committed to careful planning to ensure that finance, manpower and natural resources are used effectively and in accordance with national priorities. The principles of public expenditure planning and control are that the Government's expenditure targets must take into account the following:

- anticipated Government revenues;
- the consistency of recurrent expenditure growth with anticipated revenue;
- the relationship between development and recurrent expenditure;
- the effects of the Government expenditure growth on the private sector.

Over the last few years, the Government has been able to mobilize donor funds to rehabilitate key areas of the economy. In its immediate need to restore stability, priorities for the rehabilitation of basic infrastructure, communications and social services, were easy to identify.

2.5.2 Foreign Aid

According to OECD figures, gross disbursements of official development assistance (ODA, as defined in the table below) rose from $188.6 million in 1985 to $572.8 million in 1990 as donors provided aid in response to Uganda's restructuring program. During that period total disbursements amounted to US$ 2,046.4 mn, with 43 per cent from bilateral sources and 57 per cent from multilateral sources. The proportion given as grant has been about 58 percent.

Table 2-5-1 Gross Official Development Assistance

(Unit: Million US$)

Aid Type	1985	1986	1987	1988	1989	1990	1991	1992
Bilateral of which;	45.5	88.0	94.3	201.3	192.6	257.3	7.85	73.91
Italy	10.8	30.0	25.1	21.8	14.0	45.1	7.85	4.55
USA	5.0	4.0	14.0	18.0	21.0	39.0	7.25	5.52
UK	10.4	10.8	12.7	49.9	40.7	36.0	13.6	10.99
West Germany	4.4	12.9	15.8	18.7	19.9	27.0	13.74	17.78
							8.0	6.0
Multilateral of which;	143.0	120.3	193.0	180.9	214.6	315.6	226.95	252.16
IDA	91.7	61.7	111.3	68.0	92.0	193.0	94.78	117.92
EC	16.2	16.8	31.8	40.0	36.4	36.4	32.02	30.32
ADF	0.7	0.2	0.9	19.1	21.4	23.2	23.97	28.05
WFP	7.7	9.2	14.3	15.4	15.0	16.5	10.76	8.3
Total of which;	188.6	208.3	287.3	382.2	407.2	572.8	301.45	333.07
Grants	84.0	131.5	153.5	262.7	237.8	311.0	-	-
(%)	44.5	63.1	53.4	68.7	58.4	54.3	-	-

2.5.3 Parastatal Reform

(1) General Policy

In the RDP, the Uganda Government announced current parastatal situation as follows:

The parastatal sector in Uganda is a major burden on the Government budget; a drain on the Government finances which is complicating the Government's effort to place the budget on a sound and sustainable footing. Though the Government has in principle been committed since 1986 to a policy of withholding financial support to the parastatal sector, this policy has not been rigorously enforced. Consequently a high level of financial support (approximately 10% of the Government expenditure) has continued by various means including subsidies and loans as well as arrears on tax and loan payments, not to mention an absence of dividends on Government's equity contribution to the sector.

The major objective of the Government's strategy of reform is to improve the efficiency and profitability of enterprises in the parastatal sector in order to enable those enterprises to contribute more effectively to economic growth and reduce their burden on the Government budget.

In order to achieve these objectives the Government is conducting following three strategies:

a) To liquidate those enterprises which are clearly not viable and whose continued support cannot be justified on the grounds of social and/or political objectives

b) To divest those enterprises which would operate more efficiently in the private sector

c) To restructure the operations of those enterprises remaining in the public sector to improve their efficiency and reduce their burden on the budget.

The positive impact of the reform program on the Government budget will arise from the translation of improvements in efficiency and profitability into budgetary gains. In the case of privatization these gains will be realized in the proceeds from sale of the Private Enterprises and the subsequent various taxes paid.

In the case of liquidation, it will be through the termination of an insupportable subsidy and for those enterprises remaining in the public sector, the object of the reform program is to improve the balance of financial flows between the budget and the Public Enterprises.

(2) The Case for UPTC

The Government set up a commission of inquiry into the affairs of the Corporation in order to streamline its operations. However, by the time of this study the report had not yet been released. None-the-less, a new Board of Directors has already been appointed in the same direction.

The target is to separate Postal from Telecommunications services and at an opportune time in future, divest telecommunications.

2.6 Future Trends

2.6.1 Population Growth Rate

National population growth is largely determined by the difference between birth rates and death rates. The rate of natural increase of the population -the difference between birth and death rates- has risen to about 2.9% in 1988. Thus, a high birth rate and a high rate of growth are fundamental population characteristics of Uganda. The rate at which the population expands and the amount of growth are dependent on future fertility, mortality and migration.

Looking at past population growth rates, Uganda saw growth of 2.59% in its population between 1969 and 1980 and 2.50% between 1980 and 1991. By 1993/1994, the total population had reached about 18 million. However, the Government is committed to birth control. Better education and a large number of nuclear families with urbanization are expected to be the future trends in Ugandan society, and population growth rates are expected to fall over the next 15 years.

Furthermore, Uganda has a serious problem with AIDS. The death rates are one of the determinants of the rate of population growth, the potential demographic impact of AIDS must be taken into account. A national AIDS survey showed HIV-prevalence to be about 9.4 percent in 1988.

The population projection is indicated in Table 2-6-1.
This projection highlights some important implications of population factors for Uganda's development and is organized into the following two reasons:

a) It examined the basic demographic characteristics of the country and considered the potential demographic impact of the AIDS epidemic.

b) It considered some of the policy issues to be taken into account by national decision-makers mentioned above.

Table 2-6-1 Population Growth Rate

Year	Growth Rate (per cent)	Population ('000)	G.rate(U) (per cent)	G.rate(R) (per cent)
93/94	2.50%	17,955	4.02%	2.30%
94/95	2.50%	18,404	3.96%	2.30%
95/96	2.49%	18,862	3.91%	2.30%
96/97	2.48%	19,330	3.85%	2.29%
97/98	2.48%	19,809	3.80%	2.29%
98/99	2.48%	20,300	3.76%	2.29%
99/00	2.47%	20,802	3.71%	2.29%
00/01	2.47%	21,316	3.66%	2.30%
01/02	2.47%	21,842	3.61%	2.30%
02/03	2.45%	22,377	3.60%	2.28%
03/04	2.43%	22,921	3.58%	2.26%
04/05	2.42%	23,476	3.57%	2.24%
05/06	2.40%	24,039	3.55%	2.22%
06/07	2.38%	24,611	3.53%	2.20%
07/08	2.37%	25,195	3.51%	2.18%
08/09	2.34%	25,784	3.38%	2.17%
09/10	2.31%	26,380	3.25%	2.16%

Note ; G.rate : Growth rate
(U) : Urban area
(R) : Rural area
Source : Population factors in national Reconstruction and Development

Table 2-6-2 Population Growth Rate for the past 20 years by Region

Region	Growth Rate		
	1969-80	1980-91	1969-91
Central	2.70%	2.77%	2.74%
Eastern	2.27%	2.20%	2.25%
Northern	2.23%	2.40%	2.32%
Western	3.07%	2.70%	2.88%
Total	2.59%	2.50%	2.57%

Source : 1991 population census

2.6.2 Economic Growth Rate

1983/1984-1992/1993 showed an average growth of 3.8% and especially the last 3 years showed a high growth. However, the Ugandan Government has been devising various means in order to vitalize its economy. In consideration of the nation's background, the economic growth is expected to take a favorable turn.

Economic growth rate of 1993/1994-1995/1996 shown in Table 2-6-3 has been projected by the Macro-Economic Policy Department of Ministry of Finance and Economic Planning (MEPD). Although future economic growth rate up to 2009/1910 and GRDP growth rate had not been published by the Ugandan Government, projection of EGR (Economic Growth Rate) is made by the study team through the discussion with MEPD staff, and with the assumption that stable growth rate of industries could be achieved given that adequate foreign investment continue and privatization in industries would be made steadily in line with the government policy. Economic Growth Rate and Regional Economic Growth Rate projection are shown in the manner of both moderate and high sides in Table 2-6-3 and 2-6-4, respectively.

Table 2-6-3 Economic Growth Rate Projection
(GDP Growth Rate, 1993 Price)

Year	Average 5.6%			Average 7.27%		
	G.Ratio	Mil US$	GDP/cap.	G.Ratio	Mil US$	GDP/cap.
93/94	5.2%	3,074	171	6.0%	3,096	181
94/95	5.3%	3,236	176	6.2%	3,288	188
00/01	5.5%	4,440	208	7.3%	4,852	239
02/03	5.8%	4,956	221	8.0%	5,623	264
07/08	5.9%	6,576	261	8.0%	8,262	344
09/10	5.9%	7,374	280	8.0%	9,636	382

Source : Country Profile, World Bank
Specific data from Ministry of Finance

Note : 5.60% case : 93/94 - 95/96 projected by MEPD
96/97 - 09/10 projected by study team

7.27% case : 93/94 - 04/05 projected by World Bank
05/06 - 09/10 projected by study team

Table 2-6-4 Economic Growth Rate Projection by Region
(GRDP Growth Rate, 1993 Price)

Year	CENTRAL		EASTERN	
	G.Rate	Mil US$	G.Rate	Mil US$
93/94	5.26%	1,664	5.26%	562
94/95	5.30%	1,752	5.27%	592
00/01	5.81%	2,433	5.32%	806
02/03	6.16%	2,734	5.46%	895
05/06	6.25%	3,276	5.51%	1,051
07/08	6.31%	3,701	5.54%	1,170
09/10	6.34%	4,185	5.57%	1,304

Year	NORTHERN		WESTERN	
	G.Rate	Mil US$	G.Rate	Mil US$
93/94	5.10%	341	5.20%	507
94/95	5.10%	358	5.20%	533
00/01	5.05%	482	5.07%	719
02/03	5.06%	532	5.13%	794
05/06	5.11%	617	5.16%	924
07/08	5.13%	682	5.17%	1,022
09/10	5.14%	754	5.19%	1,130

Source : Country Profile, World Bank
Specific data from Ministry of Finance

CHAPTER 3

PRESENT TELECOMMUNICATIONS SERVICES

CHAPTER 3 PRESENT TELECOMMUNICATIONS SERVICES

3.1 Telecommunications Operators

3.1.1 Public Telecommunications Services

Now, UPTC is the only common carrier in Uganda and operates public telecommunications services which include telephone, telegraph and telex for national and international connections. For mobile cellular telecommunications services under preparation, a private company will carry out their operation as another common carrier. Another private company is preparing paging services. These two new services will link to the public telecommunications network by UPTC.

3.1.2 In-government Telecommunications Services

Organizations under the Government, such as URC (Uganda Railways Corporation), UEB (Uganda Electricity Board) and UPF (Uganda Police Force) have and operate their own telecommunications networks. These networks are mainly by radio communications. Radio frequency allocation is prescribed by NFRB (the National Frequency Registration Board).

3.1.3 Private Telecommunications Services

Private companies, e.g., travel agencies and NGO, especially organizations under United Nations, have their own radio communication methods, mainly in HF/VHF bands. These radio communications are also under NFRB regulations.

3.2 Basic Telecommunications Services by UPTC

The historical data of basic telecommunications services is shown in Table 3-2-1.

Table 3-2-1 Historical Data of Telecomm. Services

ITEM	YEAR	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
TELEPHONE	Exchange Office	62	68	76	88	97	105	121	124	103	105	112	117
	Line Capacity	21,580	24,741	26,706	27,781	31,156	33,976	38,175	38,405	36,375	36,480	36,440	36,700
	Automatic Ex.	–	–	–	–	–	–	20	20	20	20	20	20
	No. of DELs	14,417	14,418	16,711	19,347	20,115	19,908	21,058	22,651	19,592	20,626	20,479	22,959
	No. of Tel Set	32,952	34,448	38,296	42,903	45,001	46,106	48,884	52,183	46,359	45,892	43,424	47,328
	No. of Waiters	7,599	7,721	10,365	13,974	13,340	16,125	18,042	13,561	13,467	15,289	21,233	22,000
TELEX	Exchange Office	1	1	1	1	1	1	1	1	1	1	1	1
	Line Capacity	300	300	300	300	300	300	300	300	300	300	500	500
	No. of Telex Subs	82	122	150	183	239	262	287	298	299	300	400	419
	No. of Waiters				10	28	66	115	201	258	286	296	505
TELEGRAPH	Service Office	46	46	48	48	58	64	62	64	64	65	66	66
	No. of Domestic (million)	0.17	0.17	0.16	0.20	0.23	0.29	0.26	0.26	0.09	0.09	0.08	0.07
	No. of International (million)	0.03	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.07	0.08	0.07	0.06

ITEM	YEAR	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
TELEPHONE	Exchange Office							113	101	103	101	98
	Line Capacity				55,645	57,645	58,622		59,231	61,736	57,196	58,862
	Automatic Ex.	20	20	21	22	22	22	24	24	25	26	28
	No. of DELs				26,318	27,371	27,883	24,437	26,672	28,526	28,329	23,666
	No. of Tel Set				57,318	59,283	59,652	53,036	55,125	54,960	57,293	51,094
	No. of Waiters				22,993	25,374	25,345	10,240	13,038	13,378	13,004	6,402
TELEX	Exchange Office	1	1	2	2	2	2	2	2	2	2	1
	Line Capacity	500	500	1,020	1,020	1,020	1,020	1,020	1,020	1,020	1,020	720
	No. of Telex Subs	419	427	584	780	880	880					556
	No. of Waiters											
TELEGRAPH	Service Office							15	15	15	15	15
	No. of Domestic (million)							53.5	55.6	111.5	119.2	103.5*
	No. of International (million)									22	23	17.9

Note: *... December not included.
DELs... Direct Exchange Lines

(HISTDATA.WK3)

3.3 Telephone Service

3.3.1 Telephone Density

Telephone Service still remains a privilege of the urban dwellers. The bulk of the population which lives in the rural areas have no service hence the low telephone density indicated as in Table 3-3-1. There is a serious need to look into this area so as to reduce this imbalance.

Table 3-3-1 Telephone Density at Major Cities

City Name	Area (Region)	Telephone Density (Per 100 inhabitants)
Kampala	Center (Kampala Central)	1.82
Mukono	Center (Kampala Central)	0.05
Mpigi	Center (Kampala Rural)	0.13
Jinja	East (Jinja)	0.47
Mbale	East (Mbale)	0.11
Tororo	East (Mbale)	0.08
Moroto	East (Mbale)	0.06
Soroti	East (Mbale)	0.05
Masaka	West (Masaka)	0.13
Mbarara	West (Mbarara)	0.11
Kabale	West (Mbarara)	0.16
Masindi	North (Fort Portal)	0.09
Gulu	North (Gulu)	0.07
Arua	North (Gulu)	0.02
Lira	North (Gulu)	0.02

3.3.2 Telephone Service in Major Cities

Most of the large towns are presently served by modern digital exchanges with a wide range of new features and facilities. These include Kampala city and its satellites, Masaka, Mbarara and Kabale. They are also linked by micro-wave radio systems. Telecommunications services in these areas are very good.

Two other towns of Jinja and Entebbe have good transmission systems and a newly rehabilitated local distribution network but the switching exchanges are rather old and put in operation to its full to capacity. This results into poor services.

Other key towns of Mbale and Fort Portal lack transmission systems and switching exchanges. The telephone service in these areas are characterized by a very low call completion ratio.

As for Gulu, a manual switchboard is still in operation. However, there are plans to install a new digital telephone exchange and a new microwave system.

Table 3-3-2 shows the situation of transmission links between district centers and Kampala. Of the 40 exchanges in major cities, 5 are non in operation. The number of exchanges having no direct connection to Kampala is 14.

3.3.3 Telephone Service in Rural Areas

Presently most rural areas and remote towns are served by manual switchboards or radio call system. But a large part of the telephone facilities of Uganda, especially in the Northern part, were destroyed during the two wars, and the remaining facilities are old. Before the wars, Gulu, Lira, Kitgum and Arua were linked with each other by radio links, overhead links and overhead line wire systems.

Currently the northern part of Uganda has virtually no communication links with Kampala. The only means of communication is that made by radio call service stations located at Post Offices. The quality of this service is poor. The service lacks security, and always noisy due to the mode of propagation and congestion.

UPTC now intends to introduce DMARS (Digital Multiple Access Radio System) for rural areas. Program is due to start, however it will be only started on in Mityana-/Mubende, Fort Portal and Bundibugyo due to budget constraints.

The location of Radio Call Stations is shown in Figure 3-3-1 and the status of telecommunications by county and the Radio Call Station List are shown in DATA BOOK.

Table 3-3-2 Transmission Link between District Center and Kampala

(As of December, 1993)

No.	Region	Section	Direct/ Indirect or Not Operated	Circuit No. (IC&OG)	Method of Transmission	Remarks
1	KLAC	Entebbe – Kampala	Direct	87	M	
2	KLAC	Mukono – Kampala	Direct	30	P	
3	KLAR	Mubende – Kampala	Direct	13	M / U	URC Micro (10) included
4	KLAR	Mityana – Kampala	Direct	10	M	URC Micro
5	KLAR	Mpigi – Kampala	Direct	4	O	
6	KLAR	Luwero – Kampala	Direct	1	O – U – M	
7	KLAR	Kiboga – Kampala	Indirect	(1)	V – U	
8	MBL	Mbale – Kampala	Direct	47	U – M	
9	MBL	Tororo – Kampala	Direct	8	O – U – M	
10	MBL	Kapchorwa – Kampala	Indirect	(8)	U – M	
11	MBL	Soroti – Kampala	Direct	1	U – M	
12	MBL	Moroto – Kampala	Indirect	(1)	V – U – M	
13	MBL	Kumi – Kampala	Indirect	(1)	U – M	
14	MBL	Kotido – Kampala	Not Operated	–		
15	MBL	Paliisa – Kampala	Indirect	(1)	V – U – M	
16	JJA	Jinja – Kampala	Direct	83	M	
17	JJA	Iganga – Kampala	Direct	10	O – M	
18	JJA	Kamuli – Kampala	Indirect	(1)	O – M	Carrier System Fails.
19	MSK	Masaka – Kampala	Direct	78	M	
20	MSK	Kalangala – Kampala	Direct	1	V – M	
21	MSK	Rakai – Kampala	Indirect	(1)	O – M	
22	MBA	Kabale – Kampala	Direct	68	M	
23	MBA	Mbarara – Kampala	Direct	43	M	
24	MBA	Bushenyi – Kampala	Indirect	(6)	O – M	
25	MBA	Rukungiri – Kampala	Indirect	(5)	U – M	
26	MBA	Kisoro – Kampala	Indirect	(1)	U – M	
27	MBA	Ntungamo – Kampala	Indirect	(?)	O – M	
28	FPL	Kasese – Kampala	Direct	21	M	URC Micro
29	FPL	Fort Portal – Kampala	Direct	18	U	
30	FPL	Masindi – Kampala	Direct	7	U	
31	FPL	Hoima – Kampala	Direct	3	O – U	
32	FPL	Kibale – Kampala	Not Operated	–		
33	FPL	Bundibugyo – Kampala	Not Operated	–		
34	GLU	Gulu – Kampala	Direct	7	U	
35	GLU	Arua – Kampala	Indirect	(3)	V – U	
36	GLU	Lira – Kampala	Direct	2	O – U	
37	GLU	Kitgum – Kampala	Indirect	(2)	V – U	
38	GLU	Moyo – Kampala	Indirect	(1)	V – U	
39	GLU	Apac – Kampala	Indirect	(1)	O – U	
40	GLU	Nebbi – Kampala	Not Operated	–		

NOTE: 1. Entebbe and Mityana are not district centers, but included in this table because of their special statuses. (TRUNK.WK3)

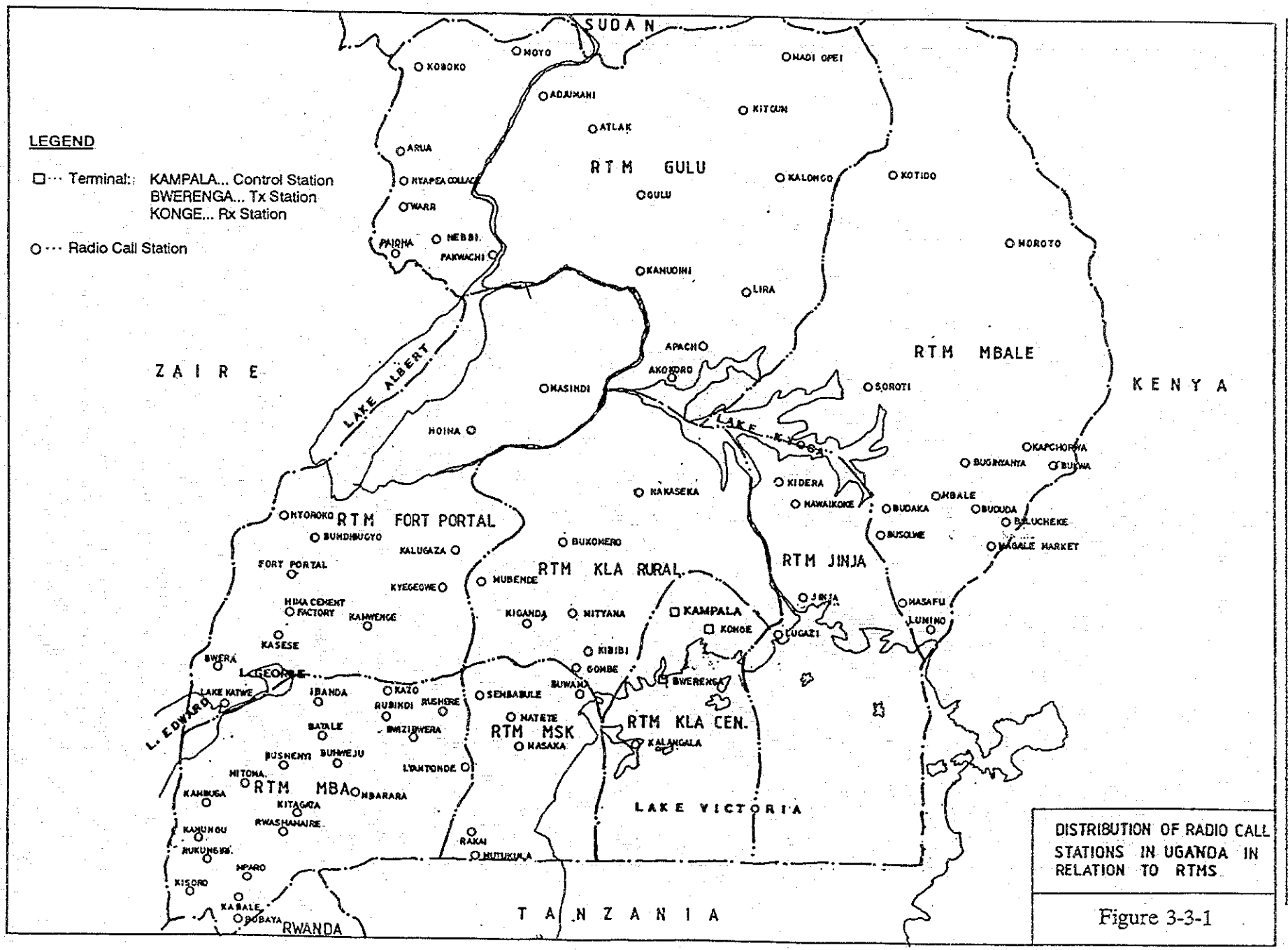
2. Abbreviations

KLAC... Kampala Central	MSK... Masaka
KLAR... Kampala Rural	MBA... Mbarara
MBL... Mbale	FPL... Fort Portal
JJA... Jinja	GLU... Gulu

3. Circuit number inside bracket means the circuit number between the exchange and the transit exchange.

4. Method of Transmission: M... Micro, U... UHF, V... VHF, O... OH, P... PCM Cable

SOURCE: Uganda Automatic Switching Network (Existing)
Uganda Telephone Network Existing Exchanges Trunks & Capacity
Uganda Radio Relay Network (Existing)
Uganda O.W.C. and O.W. Network (Existing)



DISTRIBUTION OF RADIO CALL STATIONS IN UGANDA IN RELATION TO RTMS

Figure 3-3-1