

**THE MASTER PLAN STUDY REPORT
ON
NATIONAL TELECOMMUNICATIONS & BROADCASTS
DEVELOPMENT PROJECT
IN
THE REPUBLIC OF PARAGUAY**

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PREFACE

It is with great pleasure that I present to the Government of the Republic of Paraguay, this Report on the National Telecommunications & Broadcasts Development Project in Paraguay.


The report embodies the results of a study on the master plan of the above Project requested by the Government of Paraguay to the Government of Japan. The study was carried out from September 1981 to March 1983 by a Japanese study team organized by the Japan International Cooperation Agency (JICA).

The Study team, headed by Mr. Masaru Tomioka, Deputy Director, Technical Investigation Division, Radio Regulatory Bureau, Ministry of Posts & Telecommunications, had a series of discussions with officials concerned of the Government of Paraguay on the Project and conducted an extensive field survey.

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

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

May 1983



Keisuke ARITA
President

Japan International Cooperation Agency

Abbreviations

1. MPT ----- Ministry of Posts and Telecommunications
2. NTT ----- Nippon Telegraph & Telephone Public Corporation
3. KDD ----- Kokusai Denshin Denwa Co., Ltd.
4. NHK ----- Japan Broadcasting Corporation
5. JTEC ----- Japan Telecommunications Engineering and Consulting Service
6. ANTELCO ----- Administración Nacional de Telecomunicaciones
7. MOPC ----- Ministerio de Obras Públicas y Comunicaciones
8. IPT ----- Instituto Paraguayo de Telecomunicaciones
9. MEC ----- Ministerio de Educación y Culto
10. ITU ----- International Telecommunication Union
11. CCITT ----- International Telegraph and Telephone Consultative Committee
12. CCIR ----- International Radio Consultative Committee

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MASTER PLAN SUMMARY

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1. The Objectives of the Master Plan: The projects' roles in the country

The Paraguayan government's expansion and fulfilment policy for telecommunications and broadcasting will serve as the basis for the development of the Paraguayan economy and society, stabilization of the Paraguayan people's livelihood, and enhancement of the Paraguayan people's welfare.

Meanwhile, the present status of these media in terms of their services to the people are not necessarily satisfactory (for example, the provision of the monitoring and regulation of radio systems, or the satisfaction of telephone demands, or the contribution of broadcasting to national education and culture); they need further improvement and expansion.

The objectives of this Master Plan is to contribute to the development of Paraguay and to the enrichment of Paraguayan life by accomplishing the following projects which form a part of the core of the Paraguayan government's National Development Plan.

(1) Domestic telecommunications

With its emphasis on satisfying the demand for telephone service throughout the country, introducing new services, the use of telephone and telegraph in rural areas and so, expansion and improvement of domestic telecommunications includes among its goals:

- 1) streamlining government and business operations

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- 2) building up the infrastructure for agriculture, Paraguay's major industry, and strengthening the competitive power in both the domestic and overseas market
- 3) raising the standard of living of the people
- 4) supporting an emergency medical system and maintaining public safety
- 5) encouraging the people's settlement in new regional areas
- 6) rectifying information gaps between various areas of the country and cultivating "information oriented society" in the country

(2) International telecommunications

Fulfilment and enrichment of international telecommunications includes among its goals:

- 1) contributing to diplomatic relations and exchange and active trade
- 2) enhancing national prestige abroad
- 3) eliminating information gaps between Paraguay and other countries and cultivating "information oriented society" in the country

(3) Radio regulation and monitoring

Improvement and fulfilment of radio regulation and monitoring strive to promote efficient and impartial use of the radiowaves and include among its goals:

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1) efficient use of frequencies as precious resources, and systematic response to the demand for radio communications

and intermediately;

2) improving government services, national safety, protection of life and property, etc.

3) increasing profits and returns on capital in business

4) improving daily life

(4) National educational television

The implementation of the national educational television has as its goal:

the urgent need, as a cornerstone of Paraguay's economic development, to improve the situation caused by currently inadequate school attendance rate and the adult literacy rate, serving as their supplement.

(5) Manpower development

Expansion and strengthening of the Instituto Paraguayo de Telecomunicaciones has as its goal:

the securing within Paraguay of, in addition to staffs required for the implementation of the Administración Nacional de Telecomunicaciones's Master Plan, skilled electronic and telecommunications engineers who will have a great role in the fields of power generation, air traffic

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control, etc. and might otherwise be lost through the "brain drain" if they were sent abroad for study.

2. The Principal Policy of the Master Plan: The projects' managerial targets and main steps

This Master Plan has as its principal policy the fulfilment and achievement of the following managerial targets in the fifteen year period from 1983 to 1997.

(1) Domestic telecommunications

- 1) Satisfaction of the demand for subscriber tele-phones:
By 1997, this project will satisfy 100% of the demand for subscriber telephones in Asunción and other major cities. In the remaining cities, the ratio will be 90%.
- 2) Digitalization of the telecommunications network:
As the first step, the entire local network of Asunción will be digitalized by 1997.
- 3) Fulfilment of telephone demand in rural areas:
By 1997, this project will introduce telephone service into 25 rural areas.
- 4) Introduction of new services:
This project will make available new telecommuni-cation services, such as land mobile radio tele-phones and data transmission.

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(2) International telecommunications

1) Subscriber dialing:

This project will make international subscriber dialing (ISD) available throughout the country from 1985.

2) Shortening of waiting time:

This project will, in certain areas, eliminate long waits for connection of operator-assisted calls.

3) Introduction of new services:

This project will introduce international public data transmission and other new services.

(3) Radio regulation and monitoring

This project will review and complete the entire control system for the radiowaves, a precious national resource. In particular , it will

1) complete authority over frequencies within Paraguay, enforce a plan for assigning them, and perfect law and ordinances for radio communications, and others.

2) establish new radio monitoring stations and adopt new technology, and others.

(4) National educational television broadcasting

This project will establish a public enterprise and through this, enhance the cultural and educational level of people throughout Paraguay. In particular,

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- 1) this enterprise will establish a production center with principal functions in Asunción and a total of twelve (12) television stations throughout Paraguay.
- 2) this enterprise will devote itself to the production of educational programs for schools, adults, and teachers, cultural programs, and information program (news).
- 3) the expected population coverage for the Asunción station is 45%. With the addition of the other 11 stations, it would reach 93%.

(5) Manpower development

The project will

- 1) provide the systematic and organized training in both existing and new technology required for the Master Plan for domestic and international telecommunications, radio monitoring and regulation, and educational television.
- 2) drastically expand the Instituto Paraguayo de Telecomunicaciones to fill the need for telecommunication and electronic engineers not only in the Administración Nacional de Telecomunicaciones, but also in Paraguay as a whole.

The major steps needed to achieve the objectives of all the above projects in the fifteen years appear in Table 1.

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Table 1 Major steps in each project

Domestic telecommunications

1. Subscriber telephones installed	336,000 lines
2. Public telephones installed	3,394 telephones
3. Rural telephones installed	3,060 telephones in 25 areas
4. Local telephone exchanges	
Digitalization	11 exchanges (Asunción)
Capacity expansion	318 exchanges (total construction number)
5. Toll telephone exchange	8 exchanges (total construction number)
6. Optical fiber systems	14 systems
7. Long distance microwave routes	10 routes
8. New television transmission routes	7 routes
9. Replace and capacity increase of telex circuits	5,500 terminals
10. New telephone services	
Mobile telephones	3,167 subscribers

International telecommunications

- | |
|---|
| 1. Increased international circuits |
| 2. Modification of Aregua Earth Station |

MASTER PLAN SUMMARY

3. Introduction of international subscriber dialing (ISD)
In all automatic exchanges in the country in 1985
4. Construction of the second earth station
5. Other new services
International public facsimile telegrams
International public data communications

Radio regulation and monitoring

1. Expansion and fulfilment of Radio Regulatory Bureau's authority
2. Establishment of Frequency Administration Division
3. Enforcement of frequency assignment plan
4. Perfection of laws and ordinances
5. Establishment of licensing and monitoring methods for radio stations
6. Construction of VHF monitoring stations
7. Construction of facilities to establish the monitoring system
 - (1) Stage I
 - (2) Stage II
 - (3) Stage III

National educational television broadcasting

1. Establishment of an operating entity (public enterprise)
2. Establishment of a television program production center

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educational programs for schools and adults
cultural programs
information program (news)

3. Establishment of television stations
Asunción and eleven (11) other areas

Manpower development

1. Relocation of the Instituto Paraguayo de Telecomunicaciones (Step 1), expansion in three stages at approximately five year intervals, and augmentation full-time teaching staff (Step 2 and 3)
2. Fulfilment of on-the-job training staff and expansion of on-the-job training curriculum
3. Establishment of a committee to deliberate and make recommendation on fundamental matters relating to personnel training under the immediate control of the Administración Nacional de Telecomunicaciones top management

Note: The major step listed in this table also includes the appropriate clerical operations of the office work operating divisions.

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The fifteen year totals for each project are shown in Table 2-2.

Table 2-2 Total capital investments per project

<u>Projects</u>	<u>Guaranies (million)</u>	<u>US\$ (million)</u>	<u>Guaranies (million)</u>
	<u>Total</u>	<u>Foreign currency</u>	<u>Local currency</u>
Domestic telecommunications (in addition, 12,475 million Guaranies in existing contracts)	84,625	519.92	19,115
International telecommuni- cations	3,860	27.67	373
Radio regulation and monitoring	810	4.88	193
National educational television	6,618	46.80	722
Manpower development	5,951	31.23	2,017
Grand total	114,339		

MASTER PLAN SUMMARY.

5. Profitability (Financial Analysis) - Financial Plan and Internal Rate of Return

Of the five projects covered by this Master Plan concrete revenue (or subsidy) figures are not yet available in quantitative basis for radio regulation and monitoring, national educational television, and manpower development. We therefore restrict our financial analysis to the domestic and international telecommunications projects.

(1) Profit and loss planning:

Table 3 shows the financial plan for the combined domestic and international telecommunications projects under the assumptions listed as Notes to the table. We shall describe detailed explanation of these trial figures (in PART V):

The table shows the following;

- (a) Over the entire period, revenue greatly exceeds expenditure - an extremely favourable balance position.
- (b) This excess of revenue over expenditure (net profit) greatly exceeds the debt redemption. Therefore, there is ample fund-raising capability.

Table 3 Revenue, expenditure and debt redemption
(Domestic and international telecommunications)

Unit: Million Guaranies

Year	Revenue	Expenditure	Difference	Debt redemption	Year	Revenue	Expenditure	Difference	Debt redemption
1983	0	48	Δ 48	34	2001	50,338	21,202	29,136	6,189
1984	2	386	Δ 384	265	2002	50,925	20,774	30,151	5,655
1985	213	778	Δ 565	951	2003	51,524	20,333	31,191	5,120
1986	448	1,020	Δ 572	1,067	2004	52,138	20,111	32,027	2,290
1987	471	2,059	Δ 1,588	1,748	2005	52,713	19,855	32,858	2,069
1988	3,491	3,977	Δ 486	4,290	2006	53,356	19,678	33,678	1,847
1989	6,228	5,664	564	4,909	2007	50,907	18,929	31,978	0
1990	9,983	7,473	2,510	5,447	2008	45,559	16,793	28,766	0
1991	13,664	9,556	4,108	8,205	2009	42,067	15,165	26,902	0
1992	19,795	12,155	7,640	8,729	2010	39,515	13,899	25,616	0
1993	24,108	14,529	9,579	9,252	2011	35,478	12,067	23,411	0
1994	28,918	16,628	12,290	12,046	2012	21,322	8,250	13,072	0
1995	36,803	19,304	17,499	11,785	2013	16,669	6,255	10,414	0
1996	44,434	21,845	22,589	11,910	2014	12,356	4,349	8,007	0
1997	50,240	23,005	27,235	13,075	2015	9,140	2,804	6,336	0
1998	48,664	23,046	25,618	10,586	2016	7,345	1,699	5,646	0
1999	49,209	22,338	26,871	9,781					
2000	49,767	21,635	28,132	8,977	Total	977,790	427,609	550,181	146,227

Note: The revenue and expenditure plan is a trial profit and loss statement of the Master Plan, and the term "difference" used therein differs from the revenue/expenditure balance, or the cash flow, referred to Item (2) Internal rate of return.

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Notes on Table 3

ASSUMPTIONS

The calculations in this table assume the following:

1. Figures for revenue, operating expenses, maintenance expenses

These are taken directly from the financial analysis results.

2. Financial expenses

- (1) Loan agreements with three year terms of deferment will be taken out every three years.

- (2) The source of these loans is indefinite at present, but interest rate will be 12%, the opportunity capital cost in Paraguay.

- (3) The repayment period will be ten years.

3. Depreciation

- (1) The period of depreciation will be twenty years.

- (2) The residual value will be zero.

- (2) Internal rate of return:

The internal rates of return will be:

Domestic telecommunications	24.6%
International telecommunications	45.4%
Combined	27.4%

The above shows that the domestic and international telecommunications projects are sufficiently financially feasible and that there is adequate internally generated financing to cover the loans.

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6. The Effects of This Master Plan on the Economy (Economic Analysis) - Assumptions and Estimation of the Internal Rate of Return and of the Least-Cost Method

The effects of the five projects covered by this Master Plan on the economy (economic analysis) is based on the following concepts:

- (1) Radio regulation and monitoring, national educational television, and manpower development

The socioeconomic benefits are qualitative ones and have already been described in 1. "The objectives of the Master Plan: The projects' roles in the country". The costs are estimated by converting to present values using the least-cost method. (see ATTACHMENT-II.)

Concrete examples follow.

Project & Cost		Benefits
Radio regulation and monitoring	404 million guaranies	<ul style="list-style-type: none"> 1. Effective use of an precious resource, the radiowaves 2. Improving government services, national safety, protection of life and property, etc. 3. Increasing profits and returns on capital in business 4. Improving daily life

MASTER PLAN SUMMARY

Project & Cost		Benefits
National educational television	2898 million guaranies	Since the school attendance rate and the adult literacy rate are inadequate, national educational television has, as its goal, to quickly improve the situation as their supplement and serving as the cornerstone of Paraguay's economic development.
Manpower development	2832 million guaranies	This Master Plan will ensure a supply of skilled electronic and telecommunications engineers not only for the Administración Nacional de Telecomunicaciones, but also various sectors of the Paraguayan economy and, in addition, put a stop to the "brain drain".

Note: The costs for the above projects have all been converted into 1983 present values.

(2) Domestic and international telecommunications

Converting values of the financial analysis above through the prescribed conversion factors, we obtain:

Domestic telecommunications	36.7%
International telecommunications	47.1%
Combined	38.1%

MASTER PLAN SUMMARY

The profitability of these two projects exceeds 12%, the opportunity capital cost rate in Paraguay. The social benefits generated by these investments greatly exceeds the social expenses. These investments will also foster the growth of domestic industry and increase opportunities for employment.

7. Appropriateness and Justification of This Master Plan

Since the ultimate responsibility for this Master Plan rests with the Paraguayan government, it must be evaluated from the following points of view:

- (1) Political-Sociological - Does this Master Plan make an appropriate contribution to the national welfare?
 1. Does it fully contribute to the improvement of the Paraguayan people's welfare, the advancement of industry, and the performance of state functions such as politics, administration, and security?
 2. Are the demand forecast accurate?
 3. Will the proposed improvements and expansions in services fit the Paraguayan people's needs?
 4. Do the economic benefits warrant the expenditure required?
- (2) Managerial - Are the Administración Nacional de Telecomunicaciones and other organizations involved able to carry on these projects on managerially and financially sound basis?

MASTER PLAN SUMMARY

1. Will these projects be self-supporting profitable?
 2. Will it be possible to raise fund and repay loans?
 3. Have the capital investments been properly equalized?
 4. Are there no shortages nor surplus in the capital investments?
 5. What control ("feedback") measures are there between and among the Master Plan, plans for individual years, and management - i.e. between planning, implementation, and revisions?
- (3) Technical - Does this Master Plan approach world-wide technical levels?
1. Does it make efforts to catch up with the world-wide technical levels?
 2. Does it introduce appropriate new technologies and services?
 3. Have all fields been properly co-ordinated with each other?

Leaving the details of the evaluation process to the MAIN DOCUMENT, we shall present only the results here.

(1) Contribution to the national welfare

After discussing all potential problems 1), 2), 3) and 4) in the projects with the appropriate Paraguayan

MASTER PLAN SUMMARY

authorities and incorporating their judgments to the problems, we conclude that this is the optimized plan available at this time. However, since the projected demand is based on certain assumptions, it remains necessary to watch out for the future changes in conditions and in demands.

(2) Evaluation on the management of the Administración Nacional de Telecomunicaciones and other organization involved

- 1) & 2) As already described in Item 5. Profitability (Financial Analysis), we conclude that the domestic and international telecommunications projects show both profitability and capital-raising capability. The finances of the radio regulation and monitoring project, the national educational television project and the manpower development project, will sooner or later have to be firmed up by securing sufficient revenue (or subsidies) in quantitative basis for normal operations.
- 3) & 4) As documented in the MAIN DOCUMENT, the construction works have been equalized between years to the utmost and the capital investments have been thoroughly examined to ensure that no shortages nor surplus can arise.
- 5) Feedback measures will be dealt with later in 8. "Remakrs - Topics for future study".

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(3) Evaluation on world technical level and trends

- 1) & 2) This Master Plan has been worked out with the appropriate Paraguayan authorities in due consideration of the needs of the Paraguayan people, economic factors, etc., to ensure steady introduction of digitalized networks, optical fibre transmission, satellite transmission, data communications, and other advanced technologies.
- 3) As documented in PART III, SECTION VI "MASTER PLAN INTER-FIELD COORDINATION", care has been taken to integrate all projects into one body functioning as a unit and to provide coordination between the various parts of the individual projects. However, as the Master Plan is being implemented, it will always remain necessary to make such coordinations, between the interrelated projects as well as on the organization and operations of the enterprise, with the changes of the situations, e.g. the introduction of new services and technologies.

The overall evaluation from all of the above viewpoints combined is that this Master Plan can be justified as the optimized and most balanced one. There remains, however, the need to constantly scrutinize the assumptions behind it and the topics for future study.

8. Remarks - Topics for future study

In order to ensure proper implementation of this Master Plan and to achieve the expected results, it is important to observe the following two points.

- (1) The position of this Master Plan, coping with changes and an effective management system

Since this Master Plan has a very long time scale of fifteen years, it will be necessary to review it to accommodate to changes in the environment - particularly, changes in demands, the appearances of new technologies or services, and changes in financial conditions and implement it through the subordinate projects and annual plan.

Furthermore, it is necessary to establish appropriate managerial targets for each field of operations - for example, customer service, finances, process control - and build up a Planning/Implementation/Reflection feedback system in order to realize the effects which is the intention of the plan.

- (2) Ensuring the supply of necessary personnel, capital, and materials

This Master Plan in part deals with the subject of necessary personnel, but does not contain concrete concepts for a detailed manpower schedule. This is true also for raising capital, or for procuring materials. These subjects require further study to take form.

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ATTACHMENT-I
Concepts for Each Project

MASTER PLAN SUMMARY

1. Domestic Telecommunications

(1) Subscriber telephones

For Asunción and other major cities, this project will satisfy 100% of the total demand at the end of 1997. In the other areas, it will satisfy 90% of the demand.

(2) Public telephones

This project plans 4,400 public telephones at the end of 1997.

(3) New telephone services

This project will actively promote push button telephones introduction in Asunción where the telephone exchanges will be digitalized.

(4) Rural telephones

This project plans to extend telephone service to all areas where it is economically feasible.

(5) Mobile telecommunications

For reasons of profitability, this project restricts the mobile telephone service coverage area to the region with the most traffic, i.e. Asunción and Central, but aims to satisfy all demand.

This project will delegate a paging service to the private companies, not having as ANTELCO's own since ANTELCO has decided to do so.

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This project will extend the current coverage area of the ship communication service to provide the Pilar, Concepción, and Bahía Negra areas with the service using the VHF band.

(6) Telegraph and telex

This project will strive to further expand the public telegraph service area.

This project plans to expand telex service to meet all demands.

Since the first five year stage of this project will replace the existing telex exchange with digital one, it will permit the introduction of such new services as "camp on" and immediate billing information notices.

(7) Data communications

The Administración Nacional de Telecomunicaciones has decided to provide switchable data transmission lines using leased lines and digital telex exchange and leased lines to a privately owned data communications system. This plan does not include any details for a data communications system operated directly under the Administración Nacional de Telecomunicaciones since many factors, such as demand trend, cannot yet be predicted.

The Administración Nacional de Telecomunicaciones is to plan to introduce the packet switching system not before 1998.

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(8) Facsimile transmission

For the present, facsimile service over the telephone network will be possible. Further study will be required to decide whether the Administración Nacional de Telecomunicaciones or the subscriber will provide the terminals.

(9) Visual communications

This plan does not include any details for the introduction of visual communication services since most of them are still at the discussion or trial stage even in the leading industrial nations and many factors, such as demand trends in Paraguay, cannot yet be predicted.

(10) Expansion of basic facilities

1) Digitalization of the telecommunications network

The direction over the long term is toward digitalization of the entire telecommunications network, including the exchanges and transmission lines, but as time will be needed to train the necessary personnel in the digital technology and to lay the basic groundwork, this Master Plan has adopted the following gradual approach.

- a) complete digitalization of the Asunción local network by 1997.
- b) digitalization of local exchanges in other cities and digitalization of long-distance lines later than 1997.

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2) Increasing the reliability of transmission lines

As the first step in increasing the reliability of transmission lines, this project plans loop routes for all longer long-distance trunk lines and some shorter ones as well.

3) Television transmission lines

This project plans the construction of all television transmission lines necessary for present and future commercial television stations and for the national educational television system covered by this Master Plan.

4) Telegraph, telex, and data communications networks

This project will make a digital telex exchange installed during the first 5 year stage as the focal point for the expansion of the telegraph, telex, and data communications networks.

MASTER PLAN SUMMARY

2. International Telecommunications

(1) Satellite transmission

From the point of view of the demand for circuits and of cost, it would be advisable to adopt the FDM/FM system, but, since the traffic is quite heavy over the Atlantic satellite and it is impossible to tell what the demands on the new technology will be, this project will introduce the TDMA system to cope. Out of consideration of the service lifetime of the current antenna, it will construct a second one. This will both contribute to increase the efficiency of the Atlantic satellites and increase the reliability of the international circuits.

(2) International telephone service

This project will initiate international subscriber dialing (ISD) service in 1985. This service will permit modernized, effective use of facilities in response to growing demand. On the other hand, it will probably quicken the growth of demand and surpass the current exchange capacity sometime before this plan comes to an end. Therefore, this project will plan large scale expansion of the exchange with higher capacity one. The facility will also be able to handle new services such as conference calls.

(3) International telegraph service

Since no large increase in demand for international telegram service is projected, it is considered unnecessary to introduce automatic telegram processing equipment.

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Similarly, there would be no point in introducing GENTEX service since the United States and Argentina which form the bulk of Paraguay's demand do not plan to introduce it.

(4) International telex

The demand for international telex service is expected to steadily grow and before long traffic would surpass the maximum capacity of the current exchange. Therefore, this project will replace it with a new one. The Administración Nacional de Telecomunicaciones is planning to introduce new exchange equipment after careful consideration of the introduction of new services and the modernization of maintenance and operations. Quickly must be clarified the commercial and technical conditions for the leased circuits.

(5) International data communications

As a great demand for international data communications services is not expected over the next fifteen years, this project will provide as much service as can be accommodated with the new telex/data exchange.

For the present, this project will limit international public data communications service connection to circuit-switching networks, but in the future additional equipment will be added to cope with connection to packet-switching networks as needs arise.

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(6) Others

The postal situation in Paraguay leads us to believe that there is great potential for BUREAUFAX, i.e. international facsimile telegrams. This new service will not only satisfy a need not currently filled by current communications methods - telegraph, telex, and the mail - but produce additional revenue from the use of telephone circuits during off-peak hours.

MASTER PLAN SUMMARY

3. Radio Regulation and Monitoring

This project will review and perfect the entire radio regulation and monitoring system as follows.

(1) Radio regulation

1) Authority

This project will complete the Radio Regulatory Bureau's authority over all frequencies used within Paraguay.

2) Organization

This project will establish a Frequency Administration Division within the Radio Regulatory Bureau to provide organized management of radio frequencies.

3) Frequency administration

In order to maintain the national interest in frequency administration, a negotiation system with neighbouring countries will be established.

Stillmore, to cope with the demands of frequencies in Paraguay, the establishment of frequency allocation principles based on international treaties and a drawing of a frequency allocation programme will be planned.

4) Revision of laws and ordinances

This project will complete and unify related laws and ordinances.

MASTER PLAN SUMMARY

5) Licensing and supervising radio stations

This project will particularly emphasize the following preparations.

- a) setting up licensing standards, technical standards for facilities, etc.
- b) establishing an inspection system for radio stations
- c) establishing a radio operator system

(2) Radio monitoring

1) Organization

This project will establish a VHF/UHF Fixed Monitoring Station within the Monitoring Section of the Engineering Department to monitor frequencies of 25 MHz and over.

2) Monitoring emphasis

It would be economically impracticable to monitor all frequencies and all radio stations, so it is better to consider actual conditions and focus on certain areas. Therefore, for the present, this project shall monitor the frequency range 100 kHz to 1,500 MHz.

3) Configuration of the monitoring system

There will be one HF Fixed Monitoring Station in the existing facility in Luque City.

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There will be one VHF/UHF Fixed Monitoring Station installed in Asunción City.

HF Fixed Direction Finder Station will consist of one unit of fixed direction finder unattended and two vehicles of mobile direction finders.

A vehicle of VHF/UHF band mobile direction finder will be equipped having a role of a mobile monitoring vehicle.

For exchanging informations between monitoring facilities, HF band and VHF band radio circuits will be equipped.

In the future, remote control monitoring system will be installed.

4) Installation programme

For urgent needs, monitoring systems will have their scheme established in the First Five-Year. Particularly, as for monitoring facilities operating on VHF or higher frequencies, preference will be given before HF bands.

Remote control monitoring systems will be installed in the Second Five-Year.

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4. National Educational Television Broadcasting

This project will establish a production center in Asunción having principal functions of TV program production and twelve television stations for broadcasting throughout the country including Asunción.

(1) Operating entity and management

It is necessary to rapidly establish a principal entity charged with running the national educational television. This entity shall be a public organization with the purpose of promoting Paraguayan culture and upgrading the level of education. A Consejo de Administración, made up of representatives from related government departments, the field of education, regional cities, and other fields, shall run this public body.

It is most important to obtain a prospect of securing the necessary financial resources as soon as possible for the national educational television since construction and operation will entail some considerable expense. The national educational television should, at least for the present, be financed totally from the national treasury, and in no way be supported by advertising revenue considering the objectives of education.

(2) TV program

In accordance with the Paraguayan government's plans, the TV programs will consist primarily of educational programs for schools and adults, cultural programs,

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and information program (news).

The TV program, for the most part, will be produced in the Asunción production center. The project also allows for the production of information program (news) and other small-scale local programs at the local television stations.

- (3) The Asunción station will broadcast from facilities within the Asunción production center.

Initially, the outlying stations will broadcast videotapes distributed from the production center, but this will gradually be replaced by microwave transmission as the domestic telecommunication network is built up.

- (4) Implementation strategy

This project will divide the fifteen year period from 1983 into three stages. First, it will complete the basic production and broadcasting facilities in the capital of Asunción. Then it will construct television broadcasting stations in regional cities successively up to the last year of the Master Plan. In the middle of this network expansion, the Asunción production center will expand its facilities to permit expanding the broadcast time and to improve program quality.

- (5) Programming and use of programs

- 1) Basic programming strategy

- a) Initial daily broadcasting time will be approximately 3 hours, but the target is 6 hours by the end of the Master Plan.

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- b) Programming will consist primarily of educational programs for schools, adults, and teachers, cultural programs, and information program (news). For the convenience of viewers, the schedule shall provide rebroadcasts of each program. For this reason, the primary medium for production shall be videotape recording.
 - c) School broadcasts will be scheduled in the middle of both the morning and afternoon school shifts. Other programs will be in the evening.
 - d) A broadcast consultative committee, centered around education authorities and teachers, will set policy for the contents, broadcast times, and relative ratios of the various types of programs.
- 2) Program content
- a) School broadcasts

The school broadcasts shall be directed at pupils in the primary (6 years) and junior high school (3 years) grades.
 - b) Programs for adults

The programs for illiterates, technical programs for farmers and other producing workers, and general education programs for housewives will be offered.

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c) Programs for teachers

These programs shall cover curricula, research in teaching methods, actual examples of education using television, professional guidance, etc.

d) Cultural programs

Initially, high-grade programs of music, film dramas, documentaries, animated pictures, etc. will be procured and televised to raise the general cultural level of the Paraguayan people, but, as it grows in production capability, it will add coverage of sports events and its own special programs.

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5. Manpower Development

- (1) Expansion and improvement of the Instituto Paraguayo de Telecomunicaciones

This radical expansion project will relocate the Institute Paraguayo de Telecomunicaciones which forms the nucleus of training in telecommunications and electronics not only for the Administración Nacional de Telecomunicaciones, but also for Paraguay as a whole and upgrade its facilities.

- 1) New site

This project expects to utilize the existing HF transmission station as a site being wide enough to handle the long-term demand.

- 2) Buildings and facilities

This plan calls for three times expansions every five years over the next fifteen years in accordance with the demand for telecommunications and electronics engineers throughout Paraguay.

- 3) Instruments and measuring devices for training

The project plans three times expansions paralleling those in buildings.

- 4) Teaching staff

Initially, the staff will consist primarily of foreign specialists, but teaching staff and instructors will be expanded in stages.

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(2) Improving on-the-job training

This project will use Paraguayans trained either abroad or at home (at the Instituto Paraguayo de Telecomunicaciones, for example) and foreigners under contract as instructors in an active program of on-the-job training. This training will use all facilities available without interfering with current services to ensure compatibility with actual conditions.

Those destined for maintenance operation will take part in acceptance tests for construction so that they become acquainted with existing equipment and polish their abilities.

(3) Institutionalizing personnel training

Personnel training is an integral part of management. It cannot be expected to produce fruitful results without a long-term, planned, organized approach.

Therefore, the top management of the Administración Nacional de Telecomunicaciones shall set up a directly-controlled deliberative committee to examine the basic aspects of personnel training, and, after winning company-wide authorization and acceptance, put them into practice.

This committee will try to ensure retention of these trained personnel by instituting a training record system and skill benefits.

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ATTACHMENT-II

**Conversion of Equipment Investments
Using the Least Cost Method**

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1. Assumptions

- (1) The tables below give the capital investments for the radio regulation and monitoring, national educational television, and manpower development projects for the years 1983 to 1997 converted into 1983 values using the least-cost method.
- (2) Normally the discount rate used is the country's opportunity capital cost rate, but, after consulting with the Paraguayan authorities, we have substituted 12%, the short-term lending rate in Paraguay as of November, 1981.

2. Radio Regulation and Monitoring

Capital Investments
(all figures in million Guaranies)

Fiscal Year	Investment	Fiscal Year	Investment
1983	(66) 59	1991	(11) 4
1984	(118) 94	1992	(11) 4
1985	(87) 62	1993	(53) 15
1986	(87) 55	1994	(116) 30
1987	(34) 19	1995	(65) 15
1988	(23) 12	1996	(85) 17
1989	(22) 10	1997	(21) 4
1990	(11) 4	Total	(810) 404

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3. National Educational Television

Unit: Million Guaranies

Fiscal Year	Investment	Fiscal Year	Investment
1983	(0) 0	1991	(487) 176
1984	(115) 92	1992	(439) 141
1985	(569) 405	1993	(446) 128
1986	(704) 448	1994	(730) 188
1987	(839) 476	1995	(407) 93
1988	(405) 205	1996	(351) 72
1989	(405) 183	1997	(0) 0
1990	(721) 291	Total	(6,618) 2,898

4. Manpower Development

Unit: Million Guaranies

Fiscal Year	Investment	Fiscal Year	Investment
1983	(20) 18	1991	(0) 0
1984	(1,655) 1,319	1992	(0) 0
1985	(157) 112	1993	(0) 0
1986	(0) 0	1994	(80) 21
1987	(0) 0	1995	(1,897) 434
1988	(50) 25	1996	(140) 29
1989	(1,782) 805	1997	(0) 0
1990	(170) 69	Total	(5,951) 2,832

Note: Figures with parentheses show the investment without conversion.

PART I. INTRODUCTION

PART I. INTRODUCTION

CHAPTER 1. BACKGROUND OF MASTER PLAN FORMULATION

1-1. Background of Paraguayan Request for Japan's Cooperation

In 1966, the Paraguayan Government formulated a 20-year National Telecommunications Development Plan with the cooperation of the International Telecommunication Union (ITU). In the years that followed, Paraguayan authorities concerned continued entiring efforts for the realization of the projects and succeeded, in 1981, in achieving all of the project targets.

At present, the Paraguayan Government is working out a number of socio-economic development plans including the "Chaco Area Development Program," "Itaipú Hydropower Plant Electricity Utilization Program" and "Yacyreta Hydropower Plant Utilization Program for Irrigation" etc.

These programs are being formulated to meet the pressing national demand for "agricultural development through productivity increase, distribution channel consolidation, and competitiveness increase in domestic and overseas market" and "decentralization of population, industries and administrative organs in local areas," which are of vital importance to Paraguay's future growth.

For the purpose of these socio-economic development programs, the Paraguayan Government considered it essential to promote telecommunication and braodcasting services which can be incorporated in the country's long-term Socio-Economic Development Plan and accelerate the pace of development in various areas. This led to the Government's decision to map out a new National Telecommunications and Broadcasts Development Plan covering the entire country and consequently to its formal request for Japan's technical assistance in formulating the Master Plan.

1-2. Dispatch of Contact Mission

Acceding to the above request from the Paraguayan Government, the Japanese Government sent a contact mission to Paraguay in September 1980 through the Japan International Cooperation Agency (JICA). During its stay in Paraguay, the contact mission confirmed the particulars of the Paraguayan request and studied the necessity and possibility of Japan's technical cooperation, and further made recommendations concerning the basic policies of the following study.

1-3. Dispatch of Preliminary Study Mission

On the strength of the recommendations of the contact mission, the JICA sent a preliminary study mission to Paraguay in March 1981 for the dual purpose of making an agreement with the Paraguayan Government regarding the scope, timing, method and other particulars of study and collecting basic data and information essential to the study.

After a series of discussions between the preliminary study mission and the Paraguayan authorities concerned, the Scope of Work for the Master Plan study was concluded. Then, the Master Plan Study was conducted for about two years from July 1981.

CHAPTER 2. STUDY OBJECTIVE AND OUTLINE

2-1. Overall Planning

An outline and the object of the study on the basis of the Scope of Work are as given below.

The Master Plan Study would be conducted for the purpose of formulating a long-term (15-year) Master Plan covering the entire country and including the following five development fields, and the study report would be finalized and presented by March 1983.

- 1) Domestic telecommunications
- 2) International telecommunications
- 3) Radio regulation and monitoring
- 4) National educational TV broadcasting
- 5) Manpower development

The Master Plan, covering a period of 15 years from 1983 to 1997, has three phases as shown below.

- 1) First 5-Year Plan (1983 - 1987)
- 2) Second 5-Year Plan (1988 - 1992)
- 3) Third 5-Year Plan (1993 - 1997)

As for the below-mentioned 3 items which are urgently required in Paraguay, in parallel to the Master Plan Study, the Feasibility Study would be conducted and the report would be finalized by March 1982.

- 1) Introduction of international subscriber dialling telephone system in all areas in the country where automatic telephone exchanges are installed.
- 2) Introduction of digital telephone switching system in the Asunción area.

- 3) Consolidation of rural telephone system in the five major areas (Concepción, Hohenau, San Pedro, Villarrica, and Carapegua).

2-2. Relationship between Master Plan Study and Feasibility Study

The Feasibility Study was conducted prior to the Master Plan Study at the strong request of the Paraguayan Government.

Therefore, the Feasibility Study was given precedence and independence in regard to the Plan formulation.

Accordingly, this Master Plan was formulated in such a way as to superpose it upon the result of the Feasibility Study which is already been determined to be given Japanese yen credit.

Therefore, the result of the Feasibility Study constitutes the main project segment in the domestic and international telecommunications fields of the First 5-Year Master Plan (1983 - 1987).

Although this Master Plan Study Report doesn't include the plan descriptions of the Feasibility Study, its annual distribution of construction and operation cost and benefit is incorporated into the result of this Master Plan Study.

Therefore, at the stage of comprehensive evaluation (financial analysis, economic analysis, social appraisal) of this Master Plan, the result of the Feasibility Study is reviewed being combined together.

CHAPTER 3. INSTITUTION BUILDING, AND FORMATION AND
ITINERARY OF MASTER PLAN STUDY TEAM

3-1. Institution Building

Since the study was intended, for the first time in Japan, to formulate a long-term master plan for development of telecommunications and broadcasting service (excl. radio broadcasting) in the entire land of a country, the JICA established the institution shown in Fig. I-1.

In view of the uniqueness of the study which is aimed at working out a long-term, comprehensive development plan for the whole country, it was determined that the study should be conducted directly by Japanese government and public organizations responsible for telecommunications and broadcasting service, without relying on any private consultant companies.

The names and assignments of these organizations are as shown below.

1) Ministry of Posts and Telecommunications (MPT)

Radio regulation and monitoring, manpower development in the radio regulation and monitoring field, and overall coordination and control of the study

2) Nippon Telegraph & Telephone Public Corporation (NTT)

Domestic telecommunications, and manpower development in the domestic telecommunications field

3) Kokusai Denshin Denwa Co., Ltd. (KDD)

International telecommunications, and manpower development in the international telecommunications field

4) Japan Broadcasting Corporation (NHK)

National educational TV broadcasting, and manpower development in the national educational TV broadcasting field

The multiple number of study organizations inevitably necessitates a single unifying organ which is to compile plans formulated by respective organizations into a well-balanced overall master plan by careful inter-field coordination, and the Japan Telecommunications Engineering and Consulting Service (JTEC) was assigned to this task.

For the purpose of smooth inter-field communication and coordination, an Inter-Field Coordination Committee was organized within the JTEC.

3-2. Formation of the Master Plan Study Team

The Master Plan Study Team under the General Team Leader from MPT was organized as shown in Table I-1,

3-3. Organization of Inter-Field Coordination Committee

The Inter-Field Coordination Committee with the general team leader as the chairman was organized as shown in Table I-2.

3-4. Itinerary of Master Plan Study Team

The itinerary of the Master Plan Study Team is as shown in Table I-3.

(Fig. I-1) Institution Building

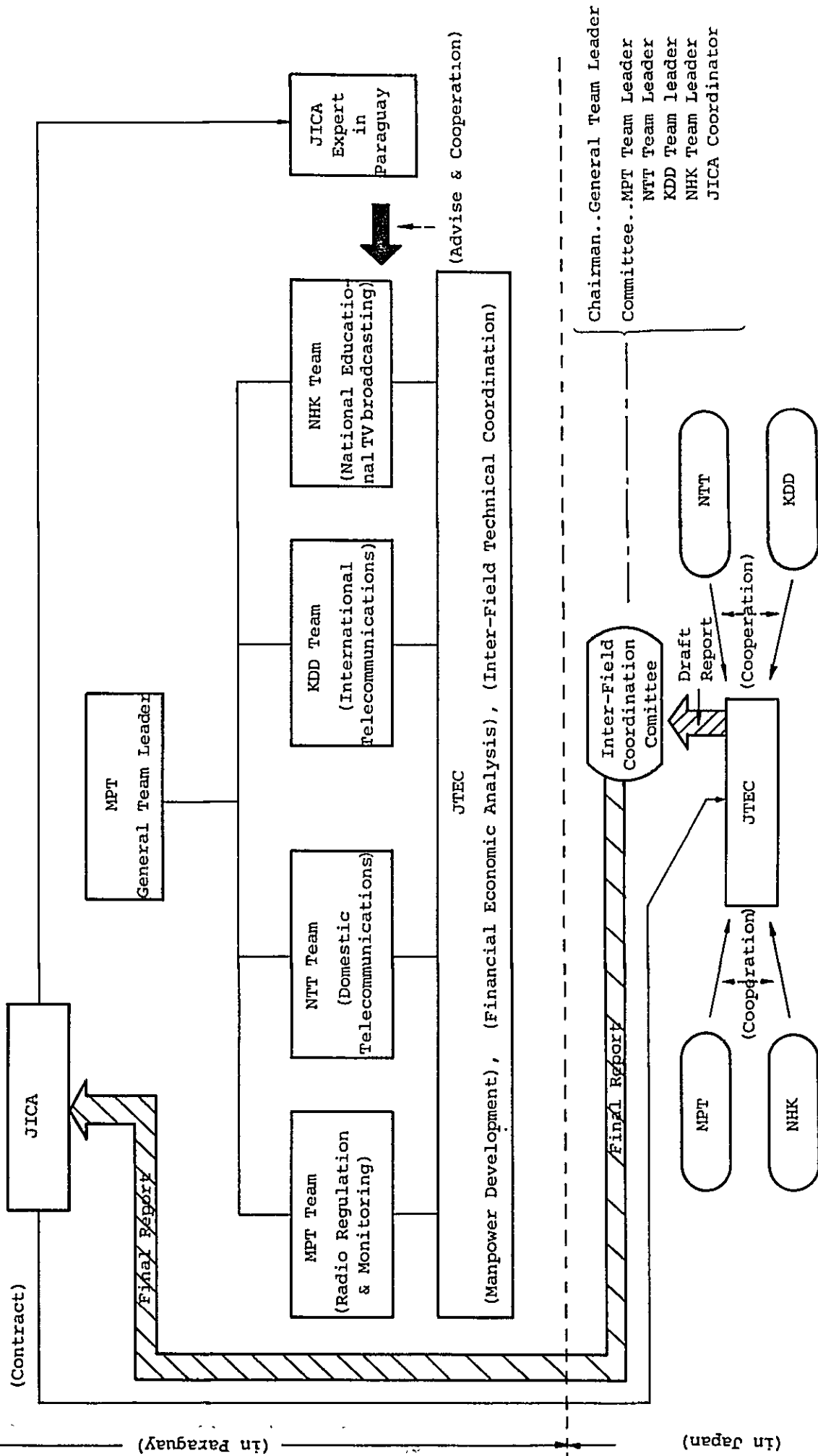


Table I-1 Master Plan Study Team Members

No.	Category	Name	Field in charge	Position
1	General	Masaru TOMIOKA	General Team Leader	Deputy Director, Technical Investigation Div., Radio Regulatory Bureau, MPT
2		Akira OOI	Deputy General Team Leader	Deputy Director, Monitoring Div., Monitoring Dep., Radio Regulatory Bureau, MPT
3		Tsunenatsu YANO	Telecommunications & Broadcasts Policy	Chief of Training Affairs Sec. International Cooperation Div., Minister's Secretariat, MPT
4	Domestic Telecommunications	Masashi SHOJI	Team Leader	Senior Engineer, International Affairs Bureau, NTT
5		Tsuneo IKOU	Switching System	Senior Engineer, International Affairs Bureau, NTT
6		Masayuki NOJIRI	Switching System	Senior Engineer, International Affairs Bureau, NTT
7		Shoichi MIYAZAKI	Transmission System	Senior Engineer, Kanto Telecommunications Bureau, NTT
8		Masaharu SUGANO	Outside Plant	Senior Engineer, International Affairs Bureau, NTT
9		Kuninori TANAKA	Data telegraph System	Senior Engineer International Affairs Bureau, NTT
10		Kunio KUWAHARA	Tariff System	Senior Adviser International Affairs Bureau, NTT
11		Nobuo ITO	Financial Analysis	Senior Adviser Telecommunications Institute, NTT
12	International Telecommunications	Tomoichiro FUNABASHI	Team Leader	Senior Engineer International Cooperation Dep., KDD
13		Hiroo OKUHATA	Satellite Communication	Senior Engineer International Cooperation Dep., KDD
14		Yukimasa ITO	Switching System	Senior Engineer Otemachi Central Office, KDD
15		Kouhei SODEYAMA	New Services	Data Communication Engineering, KDD
16		Yoshio HATTORI	Demand Forecast	Tokyo International Office, KDD
17		Kazuo KURABAYASHI	Financial Analysis	Planning Dep., KDD
18	Radio Regulation & Monitoring	Takeshi SAITO	Team Leader	Senior Engineer Radio Regulatory Bureau, MPT
19		Shigeo MORI	Radio Monitoring	Engineer Radio Regulatory Bureau, MPT
20		Keiji NAGANUMA	Radio Regulation	Engineer Radio Regulatory Bureau, MPT
21	National Educational TV Broadcasting	Kenji HIBINO	Team Leader	Senior Engineer Engineering Headquarters, NHK
22		Yoshio KOJIMA	Channel Plan	Senior Engineer Radio Regulatory Bureau, MPT
23		Yasumitsu KONDO	Program Plan	Chief Director, NHK
24		Kenichi SHITE	Transmitting Facilities	Senior Engineer Engineering Headquarters, NHK
25		Yoichi ISHII	Site Plan	Engineer Engineering Headquarters, NHK
26		Masamichi TSUJI	Studio Facilities	Engineer Engineering Headquarters, NHK

No.	Category	Name	Field in charge	Position
27	General	Fujio IKEGAMI	Manpower Development	Senior Engineer, International Affairs Bureau, NTT
28		Hirokazu SHIMADA	Technical Coordination	Special Adviser, JTC
29		Akira ARAKAWA	Project Evaluation	Economist, International Affairs Bureau, NTT
30	Coordinators	Masahito OYAMA	Total Fields	Project Officer, JICA
31		Toshimitsu KIKUCHI	TV Broad Casting & Radio Regulation	Project Officer, JICA

Table I-2 Inter-Field Coordination Committee.

No.	Name	Function & Position
1	Masaru TOMIOKA	Chairman
2	Masashi SHOJI	Domestic Telecommunications NTT
3	Tomoichiro FUNABASHI	International Telecommunications, KDD
4	Takeshi SAITO	Radio Regulation & Monitoring, MPT
5	Kenji HIBINO	National Educational TV Broadcasting, NHK
6	Fujio IKEGAMI	Manpower Development NTT
7	Hirokazu SHIMADA	Technical Coordination JTEC
8	Akira ARAKAWA	Financial, Economic & Social Analysis NTT
9	Masahito OYAMA	Planning Coordination JICA

CHAPTER 4. CHARACTERISTICS OF THIS STUDY

As this Master Plan is quite unique in that it covers the whole country for development in diverse fields such as 1) domestic telecommunications, 2) international telecommunications, 3) radio regulation and monitoring, and 4) national educational TV broadcasting, special consideration was given to the following points to make this report more significant and meaning ful.

1. The Paraguayan Government's policies and judgements were much respected in regard to "target establishment" "demand estimation" and "approaches for new services" which constitute the basis of the Master Plan formulation.
2. The "Manpower Development Plan" including the pertinent facilities expansion plan and financial plan was given the same weight as the field-wise development plans as a proposal to facilitate the progress of each development plan, in order to make this report more practical and acceptable.
3. Since the Master Plan covers a number of different fields, special importance was attached to inter-field technical coordination.
4. Due account was taken of the need to cope with the possible future changes.

In the preparation of any long-term master plan, it is essential to take into consideration the possible future changes in situation. In the case of this Master Plan, a separate part is devoted to the approaches/measures to cope with the possible future changes for the following reasons.

- 1) This 15-year long master plan is most effectively utilized when it is organically combined into various socio-economic development projects in the coming 15 years.

However, in Paraguay, there has been no concrete national development plans into which this master plan should be properly combined.

Therefore, it is probable that this Master Plan is to be modified to match with various development plans to be planned in the coming 15 years.

- 2) In the telecommunications and broadcasting fields, technological innovation is advancing at a rapid pace, which includes the "introduction of optical fiber communication for practical purposes," "switching of exchange and transmission from analog to digital system," and "computerization of communication networks." If the technological innovation accelerates the pace of manufacturers' cost reduction, the adoption in Paraguay where existing facilities are rather less would be very much possible.

At the moment, however, it is difficult to give an accurate forecast of the future pace of technological innovation and the resultant economic revolution, and any such forecast made at present will very probably be required modifications in the future.

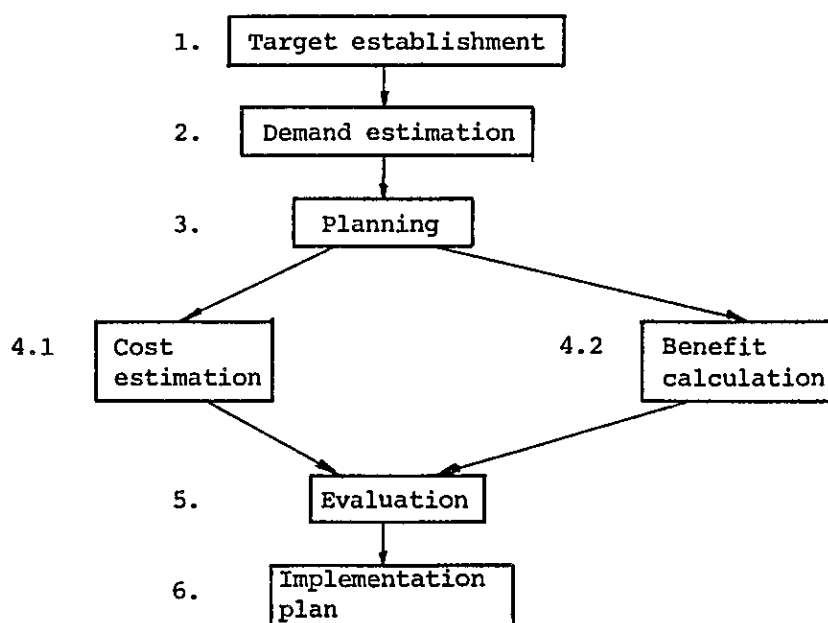
Taking above-mentioned characteristics into full consideration, a special part for dealing with future changes has been added in this report (PART VII ADAPTATION TO CHANGES IN FUTURE).

CHAPTER 5. STRUCTURE OF REPORT

This report is prepared along the following basic policies in consideration of the characteristics of the Master Plan mentioned in CHARTER 4.

First, for the purpose of balanced, horizontal inter-field coordination, each individually formulated field-wise plan is re-compiled according to the flow chart shown below except for Radio Regulation & Monitoring, National Educational TV Broadcasting and Manpower Development.

Flow Chart of Master Plan Formulation



This part, Introduction, is followed by "PART II. SIGNIFICANCE PROJECT IMPLEMENTATION IN PARAGUAY," in which the Master Plan is given an overall positioning in relation to Step 1 of the flow chart.

"PART III. PLANNING BY AREA" gives details of each field-wise development plan in relation Steps 1, 2 and 3 of the flow chart. In this part "Manpower Development" and "Master Plan Inter-field coordination" are given the same

weight as attached to field-wise development plans.

"PART IV. ESTIMATION OF PROJECT COST AND REVENUE" is for Steps 4-1 and 4-2 of the flow chart.

In "PART V. EVALUATION" which relates to Step 5 of the flow chart, the Master Plan is given an overall evaluation based on the analysis of its financial, economic and social aspects.

"PART VI. IMPLEMENTATION SCHEDULE" which corresponds to Step 6 of the flow chart, is significant in that it serves as the conclusion of the Master Plan.

Lastly, the report presents measures to cope with the possible future changes in "PART VII. ADAPTATION TO CHANGES IN FUTURE."

PART II. SIGNIFICANCE OF PROJECT IMPLEMENTATION IN PARAGUAY

PART II. SIGNIFICANCE OF PROJECT IMPLEMENTATION IN PARAGUAY

CHAPTER 1. EXISTING STATE OF THE REPUBLIC OF PARAGUAY

The existing state of the Republic of Paraguay is introduced below with specific reference to the social structure and socio-economic development in the country which have close bearings upon this Master Plan.

1-1. Economic Growth - Gross national product and per capital income

The Paraguayan economy still involves a number of problems, but it has shown a notable growth in recent years, with the gross national product recording an annual growth rate of 7.3% for 1977, 7.2% for 1978, 17.5% for 1979, and 11.4% for 1980 (Refer to Table II-2). This rapid pace of growth is ascribable mainly to the diversification of agricultural products which carries a heavy weight in the government's economic development scheme, the expanding scale of regional development, and the systematic improvement and construction of infrastructural facilities.

The per capita income also pursued a steady course of growth since the 1950s, registering a growth rate of 3.1% for 1977, 3.9% for 1978, 15.2% for 1979, and 7.7% for 1980 (Refer to Table II-2). This high pace of income growth has worked to scale up the domestic market of durable consumer goods including, in particular, automobiles and electric appliances. The per capita income amounted to \$710 (about ¥170,000) in 1980. Considering the low commodity price level in the country, this can be estimated to be equivalent to about ¥340,000 in net purchasing power.

In the formulation of this Master Plan, which is based on the long-term growth prospects of Paraguay's gross national product and per capita income for the coming 15 years, it was assumed that the recent growth tendency would be maintained in the future with a solution brought to a number of currently indeterminate factors.

1-2. Population

Paraguay's population totalled 3,168,000 in 1980. Its growth rate has been at a level of slightly less than 3% in recent years, and this trend is assumed to continue in the future in this Master Plan. 75% of the total population is found in Asunción, the capital city, and in the eastern and southeastern parts of the country within a radius of 120 km from Asunción. Owing to this extreme lack of uniformity in area-wise population distribution, the population decentralization and settlement in local areas is given high priority in the country's socio-economic development plan, and telecommunications are expected to play an important role in promoting this population decentralization policy.

1-3. National Socio-Economic Development Plan

Under its Fifth National Socio-economic Development Plan (1977 - 1981), the Paraguayan Government attached special importance to the following domestic development policies, and it is expected that the Government will maintain the same, supporting attitudes toward these policies in the future.

- 1) Augmentation of marketability and competitiveness of agricultural products in domestic and overseas markets.
- 2) Decentralization and settlement of population in new, underpopulated areas.
- 3) Decentralization of administrative organs in local areas.
- 4) Improvement of educational system for development of human resources.

The Government entertains much expectations for the role to be played by telecommunications in all these areas, and these expectations constitute the background of its support of the National Telecommunications and Broadcasts Development Project.

1-4. Education

The educational system in Paraguay consists of the elementary education (6 years), secondary education (6 years), and college and higher education. There are also vocational training schools. The six-year elementary education is compulsory, and the secondary education comprises a three-year course of basic studies and another three-year course of specialized studies covering industry, agriculture, commerce, and general education.

As of 1979, there were a total of 3,288 elementary schools and a total of 18,038 elementary school teachers. The lack of uniformity in population distribution is reflected in the marked regional differences in the distribution of elementary schools and their teachers. In Asunción and other urban areas, the number of schools shows a relative shortage, but the number of both pupils and teachers per school rather large. The number of pupils per teacher is 28 on the national average and 26 in Asunción.

As for secondary education, both junior and senior high schools are concentrated in Asunción. 32% of all schools and 42% of all students are found in the capital city.

The school attendance percentage is 87% for elementary education, but drops to 22% of the schoolable population (13-18 years old) for secondary education. Higher education is provided at two universities, the National University and the Catholic University which has a number of branch schools. Total student enrollment of the National University is about 15,000, and that of the Catholic University is about 6,000.

The illiteracy rate in Paraguay is said to range from 20 to 22% on the national average. Adult reading and writing courses are now conducted in various parts of the country (Refer to "NATIONAL EDUCATIONAL TV BROADCASTING", SECTION IV of PART III).

1-5. Industrial Structure

Paraguay is known as a typical primary industry country. Unlike many other developing countries, the Paraguayan agriculture has already made a take-off from monoculture and is producing many export crops such as vegetable oils, meat, lumber, tobacco, soybeans, cotton, coffee and suger. This versatility of agricultural production is quite advantageous to Paraguay in that it makes it possible for the country to distribute the risks due to the price fluctuations of its export products in international trade.

Table II-1 shows the component ratio of each industrial sector. While primary industries account for about 33.4% of the gross national product, those engaged in agriculture and livestock raising occupy a high rate of about 51% in the country's total working population. In the last 10 years, the degree of dependence on primary industries showed no discernible changes, with about 30% of GNP accounted for by these industries. It can nevertheless be seen from the table that the component ratios of manufacturing industry, construction, electricity, transportation and communications have been on a slow but steady increase.

Table II-1 GNP structure (Component ratio)

Classification		1970	1980	(average) 70/80	
Manufacturing Industries	Agriculture	Agriculture	17.7	18.1	17.3
		Stock raising	13.9	8.3	11.9
		Forestry	4.2	2.9	4.1
		Hunting and fisheries	0.1	0.1	0.2
		Sub-total	35.9	29.4	33.4
	Mining and Manufacturing	Mining	0.1	0.4	0.3
		Manufacturing	15.7	16.4	15.3
		Construction	2.4	6.1	4.4
		Sub-total	18.2	22.9	20.0
	Total		54.1	52.3	53.4
Service Industries	Public Utility	Electricity	0.8	2.0	1.4
		Water supply and public sanitation	0.2	0.3	0.3
		Transportation and communications	3.8	4.2	4.2
		Sub-total	4.8	6.5	5.9
	Services	Commerce *	23.0	25.9	23.7
		Government agencies	5.1	3.4	4.4
		Housing	2.8	2.6	2.7
		Others	10.0	9.0	10.1
		Sub-total	40.9	41.8	40.9
	Total		45.8	47.7	46.6
Gross national product		100	100	100	

* : Includes banking services.

Source: Central Bank of Paraguay

1-6. Economic Stability

As will be described in Item 1-10 (Public Finance & Monetary Policy), the balanced financial policy adopted by the Government worked successfully, making the Paraguayan guarani one of the most stabilized currencies in Latin America. The official exchange rate, maintained at ¢126 to the U.S. dollar since July 1960, has virtually given place to the floating system and the Paraguayan guarani is now converted at the rate of ¢145 - 235 to the dollar in the free exchange market. As a consequence, the Government determines the official rate on a case-by-case basis according to the changes in economic relations with the U.S., Argentina and Brazil.

Consumer price showed an increase of 12.8% in 1973 and 25.2% in 1974 owing to the global impact of the oil crisis, but the increase diminished thereafter, registering 6.7% in 1975 and 4.5% in 1976. In subsequent years, however, the price level kept rising at a rapid pace owing to the business boosting effect of the National Development Plan, recording an increase of 9.4% in 1977, 10.6% in 1978, 28.2% in 1979, and 22.4% in 1980.

The dispute over the Malvinas Islands produced the following adversary effects on the Paraguayan economy.

- (1) Decline of the Argentine economic potential due to the dispute resulted in a temporary import suspension of Paraguayan commodities.
- (2) Value of the Argentine peso to the guarani dropped sharply with the aggravation of inflation in Argentina, causing many Paraguayans to cross the border for shopping in Argentina and thus adversely influencing the Paraguayan economy.

However, these influences are not attributable to any structural causes and will therefore disappear soon or later.

1-7. View of Values of Paraguayans

The greater part of the Paraguayans are the mix-blood people of Spanish and the indigenous Guaranis who constitute a homogeneous nation free from any racial issues. The encounter of European culture with the simple, vigorous Guarani culture resulted in the creation of a unique Guaranian-Spanish culture.

The process and pattern of thinking of Paraguayans is based on this Guaranian-Spanish culture. It is generally said that Paraguayans are cheerful and hardworking, and this constitutes an important element of the country's economic growth which calls for the availability of abundant human resources. Many investment projects in Paraguay are facilitated, in no small measure, by the abundant availability of labor force, balanced industrial relations, and the excellent aptitude of Paraguayans to new technologies and skills. It is also said that Paraguayans are quick to acquire management and technical skills. Considering these national traits of Paraguayans, it is quite probable that the ongoing repletion of the education system, coupled with the learning of techniques and management, will eventually result in an abundant supply of highly capable, skilled labor force.

1-8. Political Stability

Since President Alfredo Stroessner came to power in 1954, he has successfully maintained the nation's political stability with the powerful support from the ruling Colorado Party and the military.

This long political stability has dispelled much of social unrest resulting from criminal acts, labor disputes and organized violence, contributing largely to the improvement of the people's standards of living. This presents a striking contrast to the situation in other South American countries where the mainstay of society is often threatened with danger imposed by terrorist outrages.

1-9. Infrastructure

Paraguay was once known for the delayed development in land, sea and air transportation and communication and in energy industries, and this set a formidable impediment to the country's economic growth. In recent years, notable and rapid growth has been achieved in all these delayed areas with aid provided from foreign countries and international organizations including the World Bank and the Inter-American Development Bank.

The following is a summary of infrastructural improvements in Paraguay from 1954 to 1979.

- (1) The total length of roads was increased by 8.5 times. Although the percentage of asphalt paved roads is less than 13% at present, elaborate efforts are being made to increase the pavement ratio.
- (2) The total power plant capacity was increased by about 15.9 times from 17,000 kW to 2,700,000 kW.
- (3) As for bridge construction, the "Bridge of Friendship" on the Parana was completed in 1960, opening a new, important highway traffic route between Paraguay and Brazil. This new overland route links the country directly with the exclusive Paraguayan free port areas in the port of Paranagua on the Atlantic Coast of Brazil.
- (4) The bridge on the Paraguay linking the Chaco area and the eastern part of Paraguay was completed in 1978. This accelerated the road traffic between Paraguay and Northern Argentina, producing an immense incentive effect on Paraguay's regional economy as well as on international economy involving the neighboring countries.

In spite of these magnificent improvements, it cannot be denied that Paraguay must make further efforts for infrastructural development in order to gain sufficient competitiveness in inter-

national trade. As will be described later in CHAPTER 4. SOCIAL SIGNIFICANCE OF TELECOMMUNICATIONS AND BROADCASTS DEVELOPMENT PROJECT, the delay is notable especially in the consolidation of communication and road networks for agricultural and stock-farming operations, and elaborate endeavors are being made to improve these important infrastructural arteries of the national economy.

The following two projects, now being implemented, deserve attention as reflecting the government's endeavors for infrastructural development.

One is the hydroelectric power generation project undertaken by the National Administration of Electricity (ANDE - Administración Nacional de Electricidad) in collaboration with Brazil and Argentina for construction of two water power plants of the World's largest scale, one at Itaipu on the upstream of the Parana and another at Yacyreta downstream of it. Completion of these giant power plants, scheduled for some time after 1980, will augment Paraguay's power supply capacity phenomenally and make it possible to export surplus power. However, it is unknown to what extent the domestic power demand will increase in the future and how much the export of surplus will contribute to the country's international balance of payments.

The other is the national project for constructing an airport in the central part of the South American Continent as an important, strategic base of international airway service. The Paraguayan Government has already secured foreign loans to finance part of the construction cost.

1-10. Public Finance and Monetary Policy

The Paraguayan Government has been consistent in maintaining its sound financial policy and balanced budget as the basis of national economy. The public finance and monetary policy, enforced in a well-controlled manner over the past years for the specific purpose of avoiding inflation, made Paraguay the most successful country ever seen in Latin America in the stabilization of commodity price.

Since 1960 the role of the Government's financial sector gained rapidly in importance in the development of the Paraguayan economy. Under its National Development Plans, the Government has pursued its positive policy for expanding public investments and introducing foreign funds.

	<u>Scale of national finance</u>		
	(In millions of guaranies)		
	(1978)	(1979)	(1980)
Revenues	87,454	104,430	142,089
Central government	35,267	42,126	53,491
Government agencies	52,187	62,340	88,598
Expenditures	85,213	102,049	137,780
Central government	35,122	41,851	53,488
Government agencies	50,091	60,198	84,292

1-11. Foreign and International Trade Policies

Paraguay's foreign policy is based on its liberal, anti-Communist approaches. It has always maintained close relations with the United States and West Germany. Especially with West Germany, very friendly relations are established because of the large number of immigrants from that country.

It also encourages amicable relations with the two neighboring countries, Argentina and Brazil, but has no diplomatic relations with any countries in the Communist bloc excepting Yugoslavia.

Exports increased rapidly in the 1970s, registering \$305,170,000 in 1979, and \$310,230,000 in 1980. However, imports amounted to \$431,750,000 in 1979 and \$517,140,000 in 1980, showing an excess over imports each year. The balance of foreign trade

has thus shown a deficit for some years in the past. Owing to the lack of consolidation of the taxation system, no details are known about the actualities of trade deficit. The Government is curbing the growth of imports under its extreme financial retrenchment policy and in this connection, it can be said that the Paraguayan national economy is treading a thorny path of development.

In the face of the overwhelming industrial power of other Latin American countries such as Brazil, Argentina and Mexico, Paraguay specializes in the production of primary products consisting mainly of farm produce and is thus forced to accept the international division of productive activities. To strengthen the export competitiveness of its agricultural products is an indispensable prerequisite to the growth of its national economy.

Foreign currency reserves

(In millions of U.S. dollars)

	(1976)	(1977)	(1978)	(1979)
Gold	0.1	0.3	0.5	4.4
Foreign exchange	133.5	243.9	413.9	538.9
IMF A/C	14.5	15.4	16.0	22.6
Other reserves	26.0	26.8	34.9	82.3
Receipts	-11.0	-16.9	-26.8	-43.1
Total	163.1	269.5	438.5	605.1

1-12. Conclusion

From the socio-economic conditions described above, it can be said, in conclusion, that Paraguay is pursuing a steady course of growth by stabilizing its economy through positive measures to suppress consumption and promote public investments and regional development, in spite of the heavy deficit in international trade mainly consisting of agricultural products, in which it is forced

to specialize under the pressure of international divisionalization or specialization of productive activities in Latin America.

In the coming years, it is expected that the Paraguayan economy will continue growing as steadily as in the past. While the master plan is based primarily on this prospect, it is to be noted that the anticipated growth can be achieved, as often repeated already, only by satisfying the following two conditions.

- (1) Increase of competitiveness of agriculture and stock-farming at home and abroad by accelerated infrastructural improvement.
- (2) Development of capable human resources by repletion of the educational system.

CHAPTER 2. TELECOMMUNICATIONS IN PARAGUAY

2-1. Telecommunication Facilities and Services

(1) Local exchange service

At the end of 1981, telephone subscribers in Paraguay totalled 54,741 in number, accounting for 1.7% of every 100 residents. This rate is considerably low when compared with the average level of the 12 South American countries, not to speak of the World's level. There are a total 206 telephone exchange offices, of which 46 are equipped with automatic exchanges and 160 with manual switchboards. The automation rate of telephone service is 96.0%. All automatic exchanges are EMD (step-by-step) switching equipment excepting that for international exchange (cross-bar system).

41,204 customers, or 76% of all telephone subscribers, are found in Asunción, and the remaining 13,537 customers are distributed in local areas. As for the classes of customers, residence customers account for 64.2% of all subscribers, business for 30.1%, public sector customers for 4.0%, and others for 1.7%.

Demand for telephone service is very high and far surpasses the current telephone installation capacity. There is a heavy potential demand in addition to the actual backlog for telephone service.

Although no accurate data are available regarding the call completion rate (percentage of calls connected) and fault rate (percentage of fault occurrence), there seems to be much room for improving the telephone facilities. Owing to the lack of facilities compatible with the telephone traffic, there are cases where a call is connected only after dialling several times especially in the daytime in business districts. To cope with this rapid growth of demand for telephone service, the NATELCO has formulated the third

and fourth additional installation programs, slated for completion in 1982 and 1987, respectively.

Paraguay covers a land area of 407,000 km² and has a population of about 3,170,000 (est. as of end of 1980). Except in the Asunción area inhabited by about 650,000 people (end of 1980), the country bears a very low population density which is about 15 persons/km² in the area east of the Paraguay river and about 0.3 persons/km² in the western area (Chaco area). The average of the two areas is as low as about 6 persons/km². Telephone service in rural areas is offered only in rural cities and in the central part of relatively densely populated towns and villages. In these, sparsely populated settlement areas where the people are engaged in agriculture, stock farming and forestry, virtually no telephone service is provided. In these areas, private radio telephones are used by many people as a means of communications.

To cover these telephone service unavailable areas with its telephone service, the ANTELCO is planning to introduce its rural telephone systems in a total of about 14 local areas.

(2) Toll message service

The direct subscriber dialling system is introduced for toll calls between customers of automatic exchanges, and manual operator exchange service for other toll calls. There still remain a substantially large number of areas where the delay basis operation is adopted for toll calls. In these areas, introduction of the no-delay operation is urgently required and efforts should be made to improve the call completion rate and reduce the fault rate.

As of the end of 1981, the automatic toll exchange was installed only in Asunción, which had trunk circuits connected in star shape with local automatic exchanges.

Microwave circuits are used for main trunk lines, and open wire carrier circuits and open wire voice circuits for branch trunk lines. The trunk facilities as of the end of 1981 are as follows.

Microwave circuits	244,144 CH·km
Open wire carrier circuits	13,896 CH·km
Open wire voice circuits	12,341 CH·km
Shortwave circuits	3,029 CH·km

The total toll traffic is increasing year after year, and recorded a total of 11,989,107 calls in 1981, showing an increase of 22.9% over 1980. To cope with this growing traffic load, the ANTELCO is planning to establish two additional toll exchanges, one in Encarnación and another in Cnel. Oviedo.

(3) International telephone service

At present, the International Telephone Office in Asunción has 148 telephone circuits connected with the countries in Central and South America, North America and Europe through the satellite and international microwave transmission systems.

International telephone calls are increasing rapidly year after year both in communication number and message minutes. In 1981, originating and terminating calls combined number 1,325,891 in total, showing an increase of 18% over 1980. There remain many areas where the delay basis operation is still adopted for international calls, but it can be said that the international telephone service is generally satisfactory at present in terms of call completion rate and fault rate.

(4) Telegraph service

Telex subscribers are also increasing rapidly in Paraguay. In 1981 they totalled 642, with an increase of 71 new subscribers over 1980.

There are at present 101 international telex circuits linking Paraguay with seven countries, and the total traffic of originating and terminating communications recorded 2,211,965 minutes in 1981, showing an increase of 15% over 1980.

As for telegrams, the number of both domestic and international telegrams has been on a gradual decline after reaching its peak in 1974. 1981 registered a total of 196,201 domestic telegrams and 109,586 international telegrams (incoming and outgoing combined for both).

2-2. Telecommunications and Economy

The relationship between the indices of telecommunication and major economic indices is an important, essential criterion for forecasting the future trend of telecommunication service in any country.

In this Master Plan, the number of telephone lines, telephone density, and revenues from telecommunication service are taken up as indices of telecommunications, and the gross national product, per capita national income, population, and consumer price index are taken up as major economic indices. Table II-2 shows the changes in these indices that took place in Paraguay in the last ten years, and Fig. II-1 is a graphical presentation of Table II-1.

Table II-2 and Fig. II-1 indicate the following facts about the telecommunication service in Paraguay.

- (1) Number of telephone circuits increased from 100 to 251 in the last ten years, outgrowing the gross national product (100 + 186), per capita national income (100 + 151) and population (100 + 121) by a considerably large margin. This is the outcome of the Government's telecommunication service improvement efforts (notable especially in terms of fund raising and equipment investment) and also indicates that there is great potential national demand for telecommunication service.

- (2) Growth of telephone density in the last ten years (100 → 193) is related more closely to the growth of gross national product (100 → 186) than to that of per capita income (100 → 151). It is probable that the telephone density outgrew per capital income because the telephone has become one of essential goods of life in the last ten years.
- (3) Number of telephone lines increased shaply in the 1976 - 1979 period during which a notable growth was recorded for the gross national product.
- (4) Revenues from telecommunication service increased from 100 to as much as 1,184 in the last ten years, by far outgrowing any of economic indices. This is the result of revision of rate and charges conducted several times recently.
- (5) It is likely that the trends mentioned in (1), (2) and (4) above will continue for a long time in the future. However, the growth of telephone density and revenues will probably be influenced by the personal income distribution and the people's telephone rate bearing capacity.

Table II-2 Indices of telecommunications in Paraguay

Year	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
1 Gross national product (In millions of dollars)	731 [100]	769 [105]	829 [113]	898 [123]	941 [129]	1,008 [138]	1,082 [148]	1,160 [159]	1,363 [186]	1,404 [192]
2 Per capita income (In dollars)	267 [100]	276 [103]	291 [109]	306 [114]	313 [117]	326 [122]	336 [125]	349 [130]	402 [151]	
3 Population (In thousand persons)	2,359 [100]	2,433 [103]	2,513 [107]	2,598 [110]	2,686 [113]	2,779 [118]	2,873 [122]	2,970 [126]	3,068 [130]	3,168 [134]
4 Number of telephone lines	19,700 [100]	20,874 [105]	23,788 [121]	27,401 [139]	29,977 [152]	31,957 [159]	35,271 [179]	40,153 [203]	45,852 [233]	49,508 [251]
5 Telephone density (Per 1,000 persons)	8.35 [100]	8.58 [112]	9.47 [118]	10.55 [132]	11.16 [139]	11.50 [145]	12.28 [155]	13.52 [173]	14.95 [190]	15.62 [193]
6 Revenues from telecom- munication service (In thousands of guaranis)	627,830 [100]	653,486 [104]	785,784 [125]	1,067,196 [170]	1,602,426 [255]	2,087,848 [333]	2,482,155 [395]	3,130,443 [499]	4,287,384 [683]	7,433,726 [1,184]
7 Consumer price index	-	-	100	125.2 (+25.2)	133.6 (+6.2)	139.6 (+4.5)	152.7 (+9.4)	168.9 (+10.6)	216.5 (+28.2)	265.0 (+22.4)

Note: Population is based on "Proyección de la Población del Paraguay por Sexo y Grupos de Edades 1950 - 2025, División de Programación de Población y Recursos Humanos de Secretaría Técnica de Planificación.

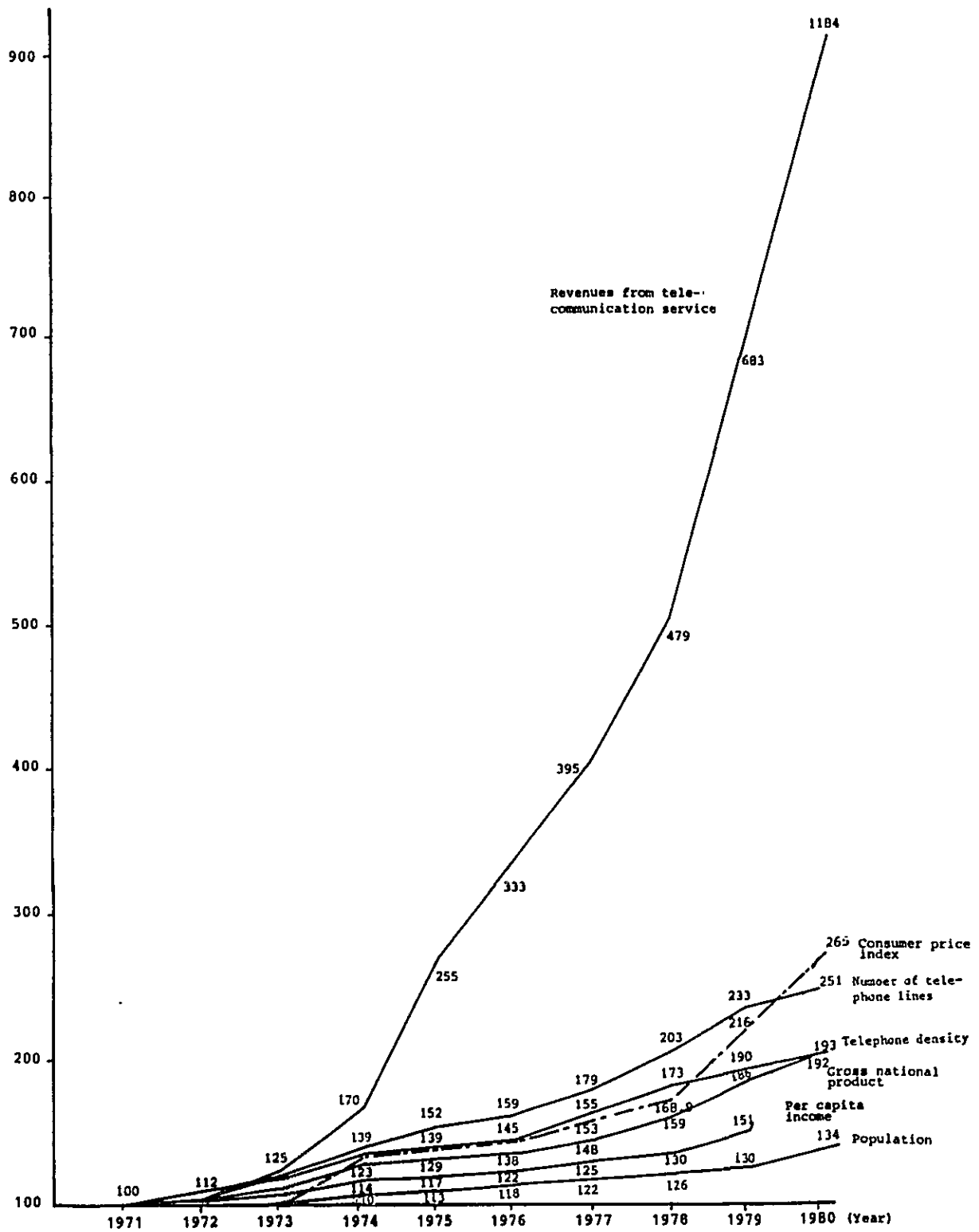


Fig. II-1 Major economic indices and main indices of telecommunications

2-3. Conclusion

As mentioned in Item 2-1 (Telecommunication Facilities and Services), the demand for telephone service is very active in Paraguay. As it is growing at a pace faster than the national economy, there is a heavy potential backlog for telephone service besides the subscriptions already on the waiting list, and this is quantitatively substantiated by the tendency curve shown in the preceding item (Telecommunications and Economy).

It is expected that the number of telephone subscribers, traffic, and revenues from telecommunication service will keep growing at a pace considerably higher than the economic growth. On the other hand, however, it is likely that if the existing telephone facilities are left without any efforts for improvement and expansion, they will eventually fail to catch up with the increase in the traffic load and the whole telephone service system will become paralyzed to cause wild confusion in society and retard the growth of economy.

CHAPTER 3. NATIONAL ADMINISTRATION OF TELECOMMUNICATION
(ANTELCO)

3-1. Outline

In Paraguay, both domestic and international telegraph and telephone services are performed monopolistically by the National Administration of Telecommunications (Administración Nacional de Telecomunicaciones, hereafter abbreviated to ANTELCO) which is under the supervision of the Ministry of Public Works and Communications.

The ANTELCO consists of the head office organs and local branches in 14 areas. The head office organs include the board of directors, management sector, and the training institute for telecommunications.

An outline of the ANTELCO is introduced below.

(1) Line of business

Domestic and international telephone, telegraph and telex service, radio regulation and monitoring and others.

(2) Number of telephone subscribers/telephone sets

54,741 subscribers and 64,262 sets (end of 1981).

(3) Revenue and expenditure

Revenue : \$8,968,680,000 (1981)

Expenditure : \$7,264,350,000 (1981)

(4) Number of staff members

3,134 persons (1981)

(5) Total assets

\$34,457,640,000 (1981)

(Fixed assets \$27,842,160,000)

(6) Capital structure

{ Capital (legal)	¢ 5,239,400,000
{ Reserve	¢10,680,600,000
{ Surplus	¢ 1,704,330,000
Owned capital (total)	¢17,624,330,000

(7) Total length of toll circuits

273,409.6 CH-km

Details of the ANTELCO's organization, names of its top executives, particulars of its telecommunication facilities and financial statements are presented in its Annual Report.

3-2. Management Condition of ANTELCO

Main financial indices of the ANTELCO are introduced below for analysis of its management condition.

(1) Balance of current account, revenue to expense ratio, net profit and net profit rate to revenue

	<u>1979</u>	<u>1980</u>	<u>1981</u>
Revenue	¢4,287,380,000	¢7,433,730,000	¢8,968,680,000
Expenditure	¢3,765,410,000	¢6,048,700,000	¢7,264,350,000
(Balance of current a/c)			
Net profit	¢521,900,000	¢1,385,030,000	¢1,704,330,000
Revenue to expense ratio	87.8%	81.4%	80.9%
Net profit rate to revenue	12.1%	18.7%	19.4%

(Net profit/revenue)

As seen above, the ratio of revenue to expense has been improved year after year, and the net profit rate to revenue has also been maintained at a high level, surpassing the 11% average of industrial levels in Japan and the United States.

(2) Billing collection rate

About 85% on the monthly average.

(3) Other financial indices

1) Revenue increase over preceding term

$$\frac{\text{Current term sales} - \text{Preceding term sales}}{\text{Preceding term sales}}$$

$$1979 : 36.96\% = \frac{\text{¥4,287,380,000} - \text{¥3,130,440,000}}{\text{¥3,130,440,000}}$$

$$1980 : 73.39\% = \frac{\text{¥7,433,730,000} - \text{¥4,287,380,000}}{\text{¥4,287,380,000}}$$

$$1981 : 20.25\% = \frac{\text{¥8,968,680,000} - \text{¥7,433,730,000}}{\text{¥7,433,730,000}}$$

The revenue increase rates shown above surpass the expenditure growth rates which recorded 22.46% in 1980 and 20.25% in 1981, and thus indicate that the ANTELCO's management has been sound and balanced over the past years.

2) Ordinary profit ratio of total capital in use

(Ordinary profit/Owned capital)

$$1979 : 8.43\% = \text{¥521,970,000} \div \text{¥6,190,900,000}$$

$$1980 : 14.30\% = \text{¥1,385,030,000} \div \text{¥9,712,400,000}$$

$$1981 : 9.89\% = \text{¥1,704,330,000} \div \text{¥17,624,330,000}$$

Compared with the average profit ratio of 15% of industrial levels in Japan and the United States, the above rates are rather low even if account is taken of the ANTELCO's special nature as a government enterprise. It can be seen, however, the ratio was improved notably in 1980 and 1981.

3) Current ratio

(Current assets/Current liabilities)

1979 : 1.27 times = $\text{¥}1,700,340,000 \div \text{¥}1,340,610,000$

1980 : 2.1 times = $\text{¥}2,846,160,000 \div \text{¥}1,384,080,000$

1981 : 1.9 times = $\text{¥}3,161,670,000 \div \text{¥}1,658,770,000$

The values for 1980 and 1981 can be evaluated as satisfactory because the average of industrial levels in Japan and the United States is 2.5 times.

4) Net worth ratio

(Net worth/Total liabilities and net worth)

1979 : 31.5% = $\text{¥}6,190,920,000 \div \text{¥}19,634,210,000$

1980 : 41.2% = $\text{¥}9,712,400,000 \div \text{¥}23,600,600,000$

1981 : 51.1% = $\text{¥}17,624,330,000 \div \text{¥}34,457,640,000$

The net worth ratio rose to more than 50% in 1981 to indicate the ANTELCO's excellent self-financing capacity.

5) Capital turnover ratio

(Current term sales/Total liabilities and net worth)

1979 : 0.22 times = $\text{¥}4,287,380,000 \div \text{¥}19,634,210,000$

1980 : 0.24 times = $\text{¥}7,433,730,000 \div \text{¥}23,600,600,000$

1981 : 0.26 times = $\text{¥}8,968,680,000 \div \text{¥}34,457,640,000$

Considering the fact that the ANTELCO is a capital-intensive public enterprise, it can be said that the above figures are generally satisfactory especially because they indicate a gradual upward tendency.

6) Sales per employee (Productivity index)

(Current term sales/Current term total employees)

1971 : $\text{¢}1,588,507 = \text{¢}4,287,380,000 \div 2,699$ persons

1980 : $\text{¢}2,522,567 = \text{¢}7,433,730,000 \div 2,944$ persons
(+59.05%)

1981 : $\text{¢}2,861,376 = \text{¢}8,968,680,000 \div 3,134$ persons
(+13.44%)

As seen above, the productivity recorded a growth rate of 59.05% in 1980 and 13.44% in 1981. These values are satisfactory as they are either higher or close to the growth rate of personnel expenses which averaged about 15% in the 1979 - 1981 period.

(4) Conclusion - Need of evaluation along management target

From the evaluation made above along eight indices, it can be concluded that the ANTELCO's management is generally satisfactory.

It is to be noted, however, that all eight indices are related only to the financial aspect of management, and there is the need to evaluate along various environmental aspects of management in the future. These aspects will have to cover items related to customer service such as the call completion rate, fault rate and subscription filling rate as well as the progress of construction work.

CHAPTER 4. SOCIAL SIGNIFICANCE OF NATIONAL TELECOMMUNICATIONS AND BROADCASTS DEVELOPMENT PROJECT

As described already, telecommunications and broadcasting are expected to play an important incentive role in the following policy areas under the National Socio-economic Development Plan formulated by the Secretaria Technica of the President.

- (1) Strengthening of competitiveness of agricultural products in both domestic and international markets

In the production and marketing of agricultural and grazing products, it is of vital importance to have a ready access to various sources of information that enables the producer to hold a constant, firm grasp of the ever changing market situation and adjust and optimize the process and means of production accordingly. Such ready accessibility to information is an absolute necessity proven by recent researches and studies on agricultural production and marketing in various institutions.

While the Paraguayan economy depends heavy on a limited variety of primary products, its agricultural products now face fierce competition from Argentina, Brazil and the EC countries in both domestic and international markets, and their greater competitiveness is strongly hoped for. It is pointed out that Paraguay is delayed in the development of means of information communication as an agricultural infrastructure indispensable for the following purposes.

- 1) Adjustment of shipment schedule and inventory control of agricultural products.
- 2) Constant follow-up of market price fluctuations.
- 3) Improvement of farming techniques.

Thus, it can be said that the development of telecommunications bears very closely on the growth of the Paraguayan agriculture and consequently on the very existence of the country itself.

(2) Decentralization and settlement of population in new areas

Under the said National Socio-economic Development Plan, great importance is attached to the population decentralization and settlement in new areas, especially the Chaco area, and telecommunication service is considered very important as a means of providing domestic and international information essential to the daily lives of new settlers in these areas.

(3) Improvement of living standards

A subscriber survey in the exchange areas of Asunción, Caacupe, Paraquari and Cdad. Stroessner disclosed that the telecommunication service is expected to play an important role in following aspects in addition to the two policy areas mentioned above:

1) Emergency medical service

In farming areas of Paraguay, houses are scattered far apart from each other. When any one gets suddenly sick, someone of his or her family runs to the doctor's house or goes to the telephone office to contact him by public telephone. The loss of lives resulting from this situation will be greatly diminished if subscriber telephones or public telephones are installed in these areas.

2) Maintenance of public peace

When a crime or any other emergency situation occurs, the people are forced to run to the telephone office to contact the police by public telephone. This situation can be solved by installing subscriber telephone or public telephone.

3) Disaster control

Nearly all branch roads in Paraguay are not paved yet. When it rains, therefore, a damage is caused to crops. If the telephone service network is consolidated, this damage can be alleviated to an extent as it will become possible for farms to communicate each other and take necessary precautions.

(4) Rectification of information disparity, and promotion of information industry

In Paraguay, on-line computer service is not offered and the data base storage is still on a low level. In countries like this, data bases should be used jointly either on a national or international scale. Without such cooperative approach, not only universities and research institutes but also industries and armed circles will continue suffering the disparity in information service existing between Paraguay and advanced countries. In particular, consolidation of the digital network, which constitutes the basic component of the international and domestic packet switching service, is indispensable for rectifying the existing information disparity. Improvement of domestic and international data communication services will contribute largely to the progress of information revolution in Paraguayan society.

(5) Repletion of educational system, and development of human resources

Improvement of the nation's educational level is given high priority under the National Socio-economic Development Plan. Although there is a keen general concern for improving the nation's school education, the data of compulsory primary school education indicates that the attendance percentage declines sharply for higher graders. This is due to the practice of depending on child labor which still prevails in the Paraguayan economy. Promotion of adult education is also given great importance under the National Plan because those

who are illiterate or unable speak the official language account for about 20% of total population, numbering about 260,000 persons (1972 census).

Educational TV broadcasting for primary schools, which is capable of conveying versatile information quickly and universally, is produce immense promotional effects by covering the drawbacks of the current shcool education or substituting for it in certain aspects, by replenting the adult education, and by protecting the cultural environment of Paraguay.

- (6) Impartial and efficient radio wave utilization for enhanced contribution to administration, economy, and national life

Radio waves are precious resources for improving the administrative functions and the people's life in various areas, and their utilization can be made more efficient and fruitful by increasing frequency bands/channels under an improved radio regulatory and monitoring system.

- 1) Development of radio communication for administrative, defense and security purposes brings forth better administrative service, greater national security and more elaborate protection of human lives and properties, and can also accelerate the pace of rationalization and energy preservation in many areas.
- 2) Increased use of radio communication in industrial areas can add to the rentability and capital efficiency of enterprises.
- 3) Smoother flow of cultural and social information resulting from the consolidation of the broadcasting network can improve the quality of life of the entire nation.
- 4) Development of radio communication is expected to produce many indirect effects such as longer service life of roads and road structures due to rationalization of dis-

tribution channels, decrease of traffic accidents due to reduction in traffic volume, efficiency increase of various social overhead capitals due to expansion of distribution areas, and improvement of educational effect due enhancement of inter-regional interchanges.

- (7) Improvement of international relations, and enhancement of national prestige

Consolidation of the international communication service is intended to achieve the following objectives.

- 1) Enforcement of a more positive foreign policy, and activation of cultural interchange and trade with other countries.
- 2) Enhancement of Paraguay's national prestige in the community of nations.
- 3) Rectification of information disparity in the international society, and promotion of information revolution by active international data communication and packet exchange service.

- (8) Upbringing of capable personnel in telecommunications and electronics

In Paraguay, university education is offered only at the Asunción University and the Catholic University, and the number of senior high schools is still limited. Students going abroad to receive higher education tend to stay overseas, thus giving rise to the continued outflow of brain from Paraguay. The structural reinforcement of the Paraguayan Institute for Telecommunications is intended to cultivate high capable personnel whose services are essential to smooth execution of the ANTELCO's basic business plans as well as to Paraguay's industrial development in many areas such as electricity (e.g., operation of Itaipú power plant) and air traffic control.

PART III. PLANNING BY FIELD

PART III. PLANNING BY FIELD

SECTION I. DOMESTIC TELECOMMUNICATIONS

CHAPTER 1. PRESENT STATUS OF DOMESTIC TELECOMMUNICATIONS

1-1 Telephone Service

In Paraguay as of the end of 1981, there were 206 telephone offices (46 automatic exchanges and 160 manual exchanges), and the telephone lines numbered 54,700. As the population was 3,263,000, the telephone density was 1.7 per 100 inhabitants.

75% of the telephone subscribers lived in Asunción, where the telephone density was 6.2%. In the local regions, the houses are far and few in between over a wide tract of land, and the telephone density is 0.5%. Namely, the telephone service in the rural regions is far behindhand compared with Asunción.

In Asunción, expansion after expansion of telephone systems falls far short of the people's needs. So heavy is the demand for telephone service in Asunción. The number of telephone lines was 26,200 toward the end of 1976, and was increased to 41,200 at the end of 1981, or a 1.6 times increase in about 5 years. Because the demand is so strong, the subscriber's lines have been sold out as soon as the switching systems have been expanded.

Since the telephone service is not available immediately, there are many who have given up subscribing for telephone service, and the number on the waiting list would be even more larger.

In the regions other than Asunción, the availability of telephone service is limited to local cities or central parts of towns where the population density is comparatively high.

In the rural districts where there live people engaged in the nation's key industries such as agriculture, livestock rearing, and forestry, the telephone service is extended little. In fact, there are strong demands voiced for the improvement of telephone service there.

Without exception, the automatic exchanges employ the step-by-step system using EMD switches (partly HDW switches).

In Asunción, every switching stage is often in a busy state, and there are many troubles due to faulty subscriber lines. The improvement of these is an urgent matter, accordingly.

A subscriber trunk dialing system is applied to the areas covered by automatic exchanges. But, other toll calls are handled by operators.

There are many manual exchanges which share an open-wire trunk circuit in common with 4 to 6 other exchanges, and the toll traffic improvement of these exchanges is strongly urged.

An automatic toll exchange is installed only at Asunción (as of 1981), and is connected to local automatic exchanges with trunk circuits in a star network.

The toll calls have been rising year after year; the toll traffic in 1981 rose 22.9% from a year-before level. It is therefore planned to install toll exchanges at Encarnación and Cnel. Oviedo, in addition to the existing toll exchange in Asunción.

Microwave circuits are used for principal toll circuits, and open-wire carrier system circuits and open-wire voice frequency circuits are mainly used for branch toll circuits. As the open-wire trunk circuits leave much to be desired from the standpoints of transmission performance and maintenance, they will preferably be replaced by cable system or radio system.

1-2. Telegraph and Telex Service

The public telegraph service is achieved by making use of telex network between automatic telephone offices, while of telephone circuits between automatic and manual telephone offices.

The number of telegrams peaked in 1974, and has been on a steady decline since then.

The telex subscribers have been growing in number; as of the end of 1981, they reached 642.

There is only one telex switching office in Asunción, and the local telex subscribers are nationwide accommodated by the Asunción office.

1-3 Others

(1) Telecommunication services in Chaco

Chaco accounts for 60% of the national land. Because of its severe climate, Chaco is sparsely inhabited. The population density is as small as about 0.3 persons per km². Chaco is totally denied telecommunication services except for some limited parts.

The improvement of traffic and communication means is indispensable for the promotion of industry there. Particularly, it is of paramount importance to introduce telecommunication services in an economic way.

(2) Data communication

No data communication service is available. In the future, however, the demand for data communication services will grow with center around commercial, financial and service businesses in keeping with the invigoration of economic activities.

(3) Mobile radio communication

At present, ANTELCO is extending ship communication service and small-scale land mobile radio telephone service. In Asunción, there is a private business extending personal radio paging service to about 200 subscribers.

With the expansion and ramification of socio-economic activities, the demand for mobile radio communication services will sure shoot up.

CHAPTER 2. BASIC POLICIES OF THE MASTER PLAN

The master plan should be made in keeping with the future socio-economic development plans and at the same time in a manner to greatly improve the socio-economic activities and the people's livelihood.

Namely, the master plan must be worked out in anticipation of the future growth of socio-economic activities and the standard of living and at the same time as a spearhead underlying the future national land development plan in Paraguay.

2-1 Amplification of Services

As an economy, Paraguay has so far enjoyed a steady growth. (See PART II, CHAPTER 1)

The Master Plan here has been formulated on presupposition that Paraguay will follow this steady growth course peacefully.

2-1-1 Subscriber telephone

Telephone service is the most fundamental telecommunication service. As touched upon earlier in para. 1-1, the telephone service diffusion in Paraguay is still below par.

It is no doubt that the future population increase and socio-economic development will send up demand for telephone service in Asunción and any other places in Paraguay, therefore the amplification of telephone service is planned according to the following principles.

- (1) In Asunción and other major cities, the telephone systems should be amplified to fully meet the demand by the end of 1997.

- (2) In the areas other than above, the telephone service systems should be amplified enough to meet more or less 90% of the demand by the end of 1997.

2-1-2 Public telephone

The public telephone service should also be promoted with energy. The coverage planned for the year 1997 is 0.87 telephones per 1,000 inhabitants.

2-1-3 Diversification of telephone services

With the progress of socio-economic activities and with the popularization of telephones, the modes in which the telephone is used will be diversified, and new telephone services will have to be introduced in future.

In line with its management policy that the telecommunication services be spread over the entire country on an equal basis, ANTELCO is committed to simultaneous introduction of new services throughout the country. Therefore, this report describes an infrastructural buildup plan for the introduction of new telephone services, and explanation of each of the new services are summarized in ANNEX (Tables A I-15 and A I-16).

In the project period, digital local exchanges will be introduced in Asunción as discussed in para. 7-4, "Local Exchange." They have a high potential to realize new telephone services at a low cost. When combined with the digital exchange, the push-button dial telephone set offers various new communication services, and the introduction of this telephone will be promoted in Asunción area. In 1997, the subscribers of push-button dial telephone sets will amount to about 160,000, or about 59% of the total number of telephone subscribers in Asunción.

2-1-4 Rural telephone

To make the people attach and root themselves to local communities is a matter of great importance for the promotion of agriculture, animal husbandry, and forestry, which are an economic engine of Paraguay, and also for the socio-economic development plans in Paraguay. Evidently, this sets a premium on the improvement of roads, electric and water services and telephone service in the rural districts where farming communities and ranches exist.

At present, the rural areas are foreclosed out of telephone service. In this Master Plan, therefore, emphasis is placed on the introduction of rural telephone service. Namely, rural telephone service will be extended, wherever economically justifiable, to any local communities. In the Master Plan, it is planned to have some 3,000 subscribers in 25 rural districts.

2-1-5 Mobile radio communication

(1) Land mobile radio telephone

For want of railroad services, most of land transportation in the country is borne by motor vehicles.

With the progress and expansion of socio-economic activities, the need for land mobile radio telephone service is expected to grow in future. In the Master Plan, therefore, the amplification of the land mobile radio telephone service will be planned.

At present, land mobile radio telephone service is operated on a small scale in Asunción with only ten subscribers. In the Master Plan, the land mobile radio telephone service will be amplified to fulfill the demand.

To be covered within the Master Plan period will be Asunción and Central where vehicular traffic is heavy. It is planned that the number of land mobile telephone subscribers will be about 3,200 in 1997.

(2) Ship Communication

At present, ship communication service is extended to ocean-going vessels by HF-band radio equipment and to those going up and down the Paraguay River near Asunción by VHF-band radio equipment.

In the Master Plan, VHF-band ship communication service will be expanded to Pilar, Concepción and Bahía Negra where the potential demand is high.

The ship communication equipment now in use is a conversion of much-used international telecommunication equipment, and takes heavy toll on the operators and maintenance crew alike because it is at once superannuated and designed not for ship communication use. It is therefore necessary to upgrade all the facilities of the existing operation center, transmission station and receiving station as well as the lines interconnecting them.

The ship communication traffic will not increase so much, and the upgrading work will be limited to a minimum necessary level.

(3) Personal radio paging

At present, manual type personal radio paging service is undertaken by a private establishment for about 200 subscribers in Asunción.

ANTELCO is expected to leave this service to the private business and not to operate it directly. In the Master Plan, therefore, the personal radio paging service will not be planned.

By way of reference, however, a forecast of demand for radio paging service in Asunción, Cdad, Pte. Stroessner, and other data are appended in ANNEX, I-5 and Table A I-18 to Table A I-24.

2-1-6 Telegraph and telex

As in the past, the telex service network will be amplified to expand the service coverage. The manual telephone offices will be furnished with a mini-facsimile for exchange of telegrams with the automatic telephone offices for speedy, accurate, and efficient telegraph service.

As regards the telex service, the systems planning will be made to fulfill the demand totally.

It is planned that toward the end of 1997, the telex terminals for public telegraph will be 132 in number and subscriber's telex terminals will amount to 5,050.

The existing telex exchange is scheduled to be replaced by digital one in 1984, which will offer camp-on service, real-time detailed charging information service, and other various new services.

In the Master Plan, the teletex service is excluded in line with the ANTELCO's policy because the trend of demand for this service is unknown at present. But, ANTELCO is recommended to take into account the future trends in demand

for this kind of service and to prepare itself ready to meet such demand in a flexible manner.

2-1-7 Data communication

ANTELCO's policies concerning the introduction of data communication service are as summarized below.

- (a) What is managed directly by ANTELCO is limited to public data communication service.
- (b) The intra and inter enterprise data communication is left to private business, and ANTELCO offers transmission and switching services for it.
- (c) The packet exchange system for domestic communication is not introduced within the Master Plan period.

In the present Master Plan, the data communication service will be planned in line with these ANTELCO's policies as follows.

- (1) To offer transmission lines (leased lines) for privately operated data communication systems.
- (2) To offer circuit-switched transmission lines to privately operated data communication systems by making use of the digital telex switch to be introduced in 1984 and which have a data transmission circuit switching function.
- (3) To withhold to elaborate on the introduction of ANTELCO's directly managed public data communication service because of many unpredictable factors including demand trends. The information about the services conceivable for the moment is summarized in ANNEX (I-4 and Fig. A I-1 to Fig. A I-14).

In consideration of ANTELCO's policies summarized in the foregoing, the packet exchange system is not included in the Master Plan. It should be added by the way that the packet system is a powerful means for realization of data transmission and a variety of additional services in an efficient and

economic way, and that ANTELCO should always be geared to the future demand for data communication so that it will be able to rise to the occasion pro re nata.

It is therefore recommended for ANTELCO to assimilate and disseminate the knowledge and art of data communication system through data transmission service using the aforesaid digital telex switches for the purpose of preparing itself for the introduction of data communication services in future.

2-1-8 Facsimile communication

The demand for facsimile communication service will also increase with the expansion and diversification of socio-economic activities.

Facsimile communication service for subscribers, i.e. Telefax is economically achievable as the existing telephone network is readily available for it without so much investment in basic facilities.

Whether the subscriber's terminal equipment should be prepared by ANTELCO or subscribers themselves will need further study, and the investment costs for the facsimile communication service are excluded from the Master Plan.

As for the domestic public facsimile telegram (BUREAUFAX) service, the introduction will be studied consulting with the post-office authorities when the letter delivery system in the country is improved. (Refer to PART III, SECTION II, CHAPTER 3, Item 3-1-3 (2))

2-1-9 Visual communication

Even in the most advanced countries, the introduction of visual communication services such as video telephone and videotex are still in their inchoate stage of study or experiment. In Paraguay, the trends of demand for this kind of

services are quite in nebulosity, and the visual communication may be passed over in the present Master Plan. It will not be too late to study its introduction when the demand begins to show itself up.

2-2 Expansion of facilities

The expansion of facilities will call for heavy investment, and its plan should need careful consideration of how the demands will move and how the new technological developments will go, as well as of the economics of investment incidental to it.

Considering the demand for communication services in the future information-oriented society and the trends in the development of digital technology in the world, the best policy will be to center the expansion of communication facilities around digital technology.

Successful introduction and management of new technologies come with the upbringing of personnel in construction, maintenance and operation. Thus, the introduction of new technologies should be planned by taking all the visible and invisible factors on balance.

Paraguay feels a dearth of telecommunications engineers, and ANTELCO has determined to forge ahead with its communication network digitalization plan in the following steps.

- (1) To digitalize Asunción local network (local exchanges and junction lines) by 1997.
- (2) To digitalize the local switches in other areas and toll networks (toll exchanges and trunk network) starting in 1998.

Along with these ANTELCO's policies, the facility expansion plan is formulated. But, its implementation should preferably be expedited by stepping up efforts to pave the way for the introduction of digital technology.

2-2-1 Local telephone network

In line with the telephone demand fulfillment policy discussed under para. 2-1-1, "Subscriber telephone," a plan will be worked out for the installation of necessary exchange equipment, subscriber lines and junction circuits.

The telephone exchanges in Asunción will be phased into digital ones, and their digitalization will be completed by 1997. For those exchanges where installed capacity is required to be expanded prior to digitalization, EMD switches removed from the digitalized exchanges will be used.

For the new installation or expansion of the local exchanges in other than Asunción, EMD switches removed from Asunción will be reused. Shortages will be covered by new purchases of EMD switches.

As regards the subscriber lines, physical abuse of drop wires due to cable shortage is one of major causes of telephone troubles. Accordingly, cable installation will be amplified with emphasis.

The junction circuits in Asunción will be expanded in an economic way on presupposition that the digitalization will be completed by 1997.

2-2-2 Toll network

EMD equipment will be purchased for the expansion of toll switches. As regards the toll transmission lines, the construction of long-distance microwave circuits between Asunción, Cnel. Oviedo and Encarnación and between Rep. Pte. Stroessner and Saltos del Guairá and many short-distance microwave circuits and UHF/VHF circuits have already been contracted. In the present Master Plan, a microwave transmission line will be planned between Cdad. Pte. Stroessner and Encarnación in order to increase the circuit capacity,

and dualize the transmission route, between Cnel. Oviedo and Cdad. Pte. Stroessner. For the existing radio transmission lines, the installed capacity of channels will be increased as required.

Up until now, ANTELCO has been so busy expanding its transmission lines to immediate needs that it has not got around to providing reliability improvement measures such as multiple routing. In the future information-oriented society, any failure of communication circuit will bear bitterly upon the socio-economic activities. The communication circuits should be so arranged as to sustain emergency needs whatever disaster may happen. For this reason, the long-distance toll trunk lines and important short-distance toll transmission lines will be dualized to make a step forward toward improving the transmission reliability.

In addition, emergency circuits will be installed between Asunción and Brazil to back up the international communication circuits via satellite.

While the digitalization of toll exchanges and toll transmission lines except for short-distance circuits in and around Asunción is held over along with ANTELCO's policy, ANTELCO should take every opportunity to promote digitalization of toll exchanges and toll transmission lines because the digital technology will display its full worth in terms of both function and economy when all the local, toll and international networks have been integrated digitally.

2-2-3 Telegraph, telex and data communication networks

The telex and data communication network will be expanded with focus on digital telex switching equipment in keeping with the policies stated in sub-para. 2-1-6, "Telegraph and telex," and sub-para. 2-1-7, "Data communication."

2-2-4 TV transmission lines

At present, the commercial TV broadcasting is divided into two systems; Canal 9 and Canal 13. In Canal 9, broadcasting TV stations are located at Asunción, Cdad. Pte. Stroessner, Encarnación and Pilar. TV programs are exchanged between Asunción station and the others. In Canal 13, TV broadcasting service is extended to Asunción, and it is planned to install TV stations at Pedro Juan Caballero and Concepción by the end of 1982.

It is also planned to install educational TV stations in Asunción and 11 local cities within the period of this Master Plan, (See PART III, SECTION IV, "National Educational TV Broadcasting.")

As these new stations cannot do without TV program transmission lines, the expansion of TV program transmission lines will be planned.

When local commercial TV stations crop out in future to exceed the capacity of TV program transmission lines planned in the Master Plan. it is recommended to transfer the existing telephone microwave systems to TV use and newly install digital transmission lines for telephone systems.

2-2-5 Radio program transmission lines

At present, radio programs are transmitted between Asunción and local broadcasting radio stations over voice frequency circuits. The future demand for radio program transmission will not be so large. The demand for high-quality transmission of music programs, etc. is also scarce. In view of these, the radio program transmission lines will be planned as included in the toll telephone circuits.

2-2-6 Domestic satellite communication

Although domestic satellite communication is conceivable as a means to cover those spans which defy the line-of-sight microwave circuit construction, it is forgone in the Master Plan as uneconomical considering the balance between demand and the costs for construction, operation and maintenance.

However, the introduction should be re-studied according to the increase of demand for telecommunications and broadcasting services in the rural areas such as Chaco and the decrease in the construction and operation cost of the satellite communication system in the future.

3

2-3 Relations with the On-going Projects

This is a master plan for telecommunications and broadcasts development in Paraguay for fifteen years from 1983 to 1997.

As for the domestic telecommunications, prior to the formulation of the Master Plan, ANTELCO has decided to implement the following projects during the period from 1983 to 1987.

- (1) Expansion of telephone, telegraph and telex services within the country.

Contracts for this project has already been concluded.

- (2) Introduction of digital telephone switching system to Asunción and rural telephone system to five local districts

In order to implement these projects, the Paraguayan Government has requested the Japanese Government for loans.

But these projects are in effect to be included within the Master Plan; namely, they are pitched as the first five-year plan (1983-87) of the Master Plan.

The second five-year plan (1988-92) and the third five-year plan (1993-97) will be planned on condition that the aforesaid on-going projects will have been performed as planned.

2-4 Relations with the Plans in Other Fields

The formulation of the domestic telecommunications master plan has been made with due considerations given to the plans in other fields, specially the plans for international telecommunications and educational TV broadcasting.

In the event it is required in future to modify the domestic telecommunications plan and/or the aforesaid plans, such modification should be made after due consideration to the relations with other plans.