THE ARGENTINE REPUBLIC

STUDY ON THE DEVELOPMENT PLAN OF TELECOMMUNICATIONS AND BROADCASTING NETWORKS IN THE PROVINCE OF MENDOZA

FINAL REPORT

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OCTOBER, 1987

JAPAN INTERNATIONAL COOPERATION AGENCY

PREFACE

In response to the request of the Government of the Argentine Republic, the Government of Japan has decided to conduct a study on the Project for Developing the Telecommunications and Broadcasting Networks in the Province of Mendoza and entrusted the study to the Japan International Cooperation Agency (JICA).

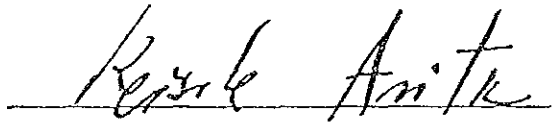
JICA sent to Argentina a study team headed by Mr. Masashi SHOJI of the Japan Telecommunications Engineering and Consulting Service from August 15 to November 22, 1986, March 10 to 27, 1987 and July 26 to August 8, 1987.

The team had discussions on the Project with the officials concerned of the Government of Mendoza and conducted a field survey. After the team returned to Japan, further studies were made and the present report has been prepared.

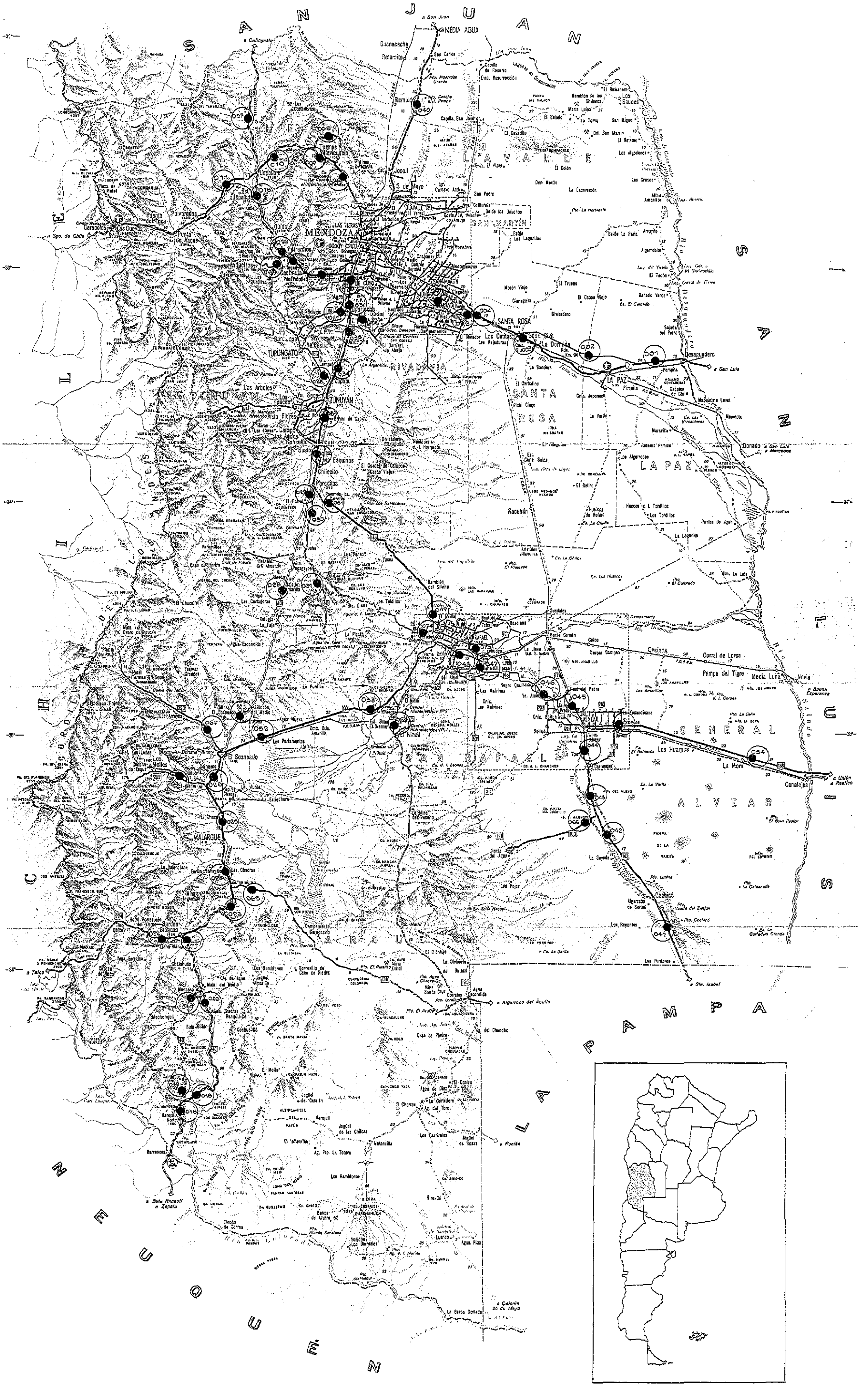
I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Governments of Mendoza and Argentine Republic for their close cooperation extended to the team.

October, 1987



Keisuke ARITA
President
Japan International Cooperation Agency



THE PROVINCE OF MENDOZA OF THE ARGENTINE REPUBLIC

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Abbreviation (areas)

AGR Agrelo
ALT Alto Verde

BLA Blanco Encalada
BOW Bowen

CAN Canada Seca
CAS Colonia Andes
CBN Cuadro Benegas
CDA Costa de Araujo
CDC Chacras de Coria
CHL Chilecito
CHP Chapanay
CMZ Mendoza Toll Exchange
CPM Campamentos
CRM Carmensa
CRA Carrizal Abajo
CRR El Correo
CSG Colonia Segovia

DEA Desaguadero
DOR Dorrego

EBU Eugenio Bustos
ECH El Chacay
ENI El Nihuil
EPA El Pastal
ESC Escandinava
ESO El Sosneado
EZM El Zampal

FLB Fray Luis Beltran

GAN Gustavo Andre
GDC Godoy Cruz
GOG Goudge
GRA General Alvear
GRP General Paz

HPD Hipodromo

IGI Ing. Giagnoni

JOC Jocoli
JPR Jaime Prats
JUN Junin

LAC La Central
LAG Las Aguaditas
LAH Las Heras
LAV Lavalle
LCA Las Catitas
LCN La Consulta
LCU Las Cuevas

LDC Lujan de Cuyo
LDR La Dormida
LGU La Guevarina
LLL La Llave
LMT Las Materrina
LMV Las Malvinas
LPR La Primavera
LPZ La Paz
LRA Loria

MAL Malargue
MAP Maipu
MCO Monte Coman
MDR Medrano
MDZ Mendoza

NCA Nueva California

PAL Palmira
PAR Pareditas
PHL Philipps
PHR Puente de Hierro
PTR Potrerillos

RAM Rama Caida
RDC Rodeo de la Cruz
RDM Rodeo del Medio
RDP Real del Padre
RDU Reduccion
RIV Rivadavia
ROP Rodrigues Pena

SAJ San Juan
SAL San Luis
SAR Santa Rosa
SJO San Jose
SMR San Martin
SPB San Pablo
SRA San Rafael

TDM Tres de Mayo
TRP Tres Portenas
TUN Tunuyan
TUP Tupungato

UGR Ugarteche
USP Uspallata

VDM 25 de Mayo
VFL Vista Flores
VLA Villa Atuel
VLN Villa Nueva

ZAP Zapata

Abbreviation (broadcasting)

S.O.C.	Secretaria de Comunicaciones (Secretary of Communications)
S.O.R.	Servicio Oficial de Radiodifusion (Official Service of Broadcasting)
S.I.P.	Secretaria de Informacion Publica (Secretary of Public Information)
COMFER	Comite Federal de Radiodifusion (Federal Committee of Broadcasting)
ATA	Asociacion Teledifusoras Argentinas (Argentine Television Broadcasting Association)
ARPA	Asociacion Radiodifusoras Privadas Argentinas (Argentine Private Radio Broadcasting Association)

SUMMARY

1. Telecommunications network development plan

1.1 Amplification of services and expansion of facilities

1.1.1 Amplification of telephone service

(1) The telephone demand in the province of Mendoza amounts to about 120,000 main lines including a waiting list of 40,000 at present. The demand will increase to 323,000 main lines in the year 2005 according to the demand forecast. Table 1 and Fig. 1 show the telephone demand forecast.

Table 1 Telephone demand forecast

Unit : Thousand lines

Year	1990	1995	2000	2005
Argentina	4,458	5,529	6,857	8,499
Mendoza	169	210	261	323

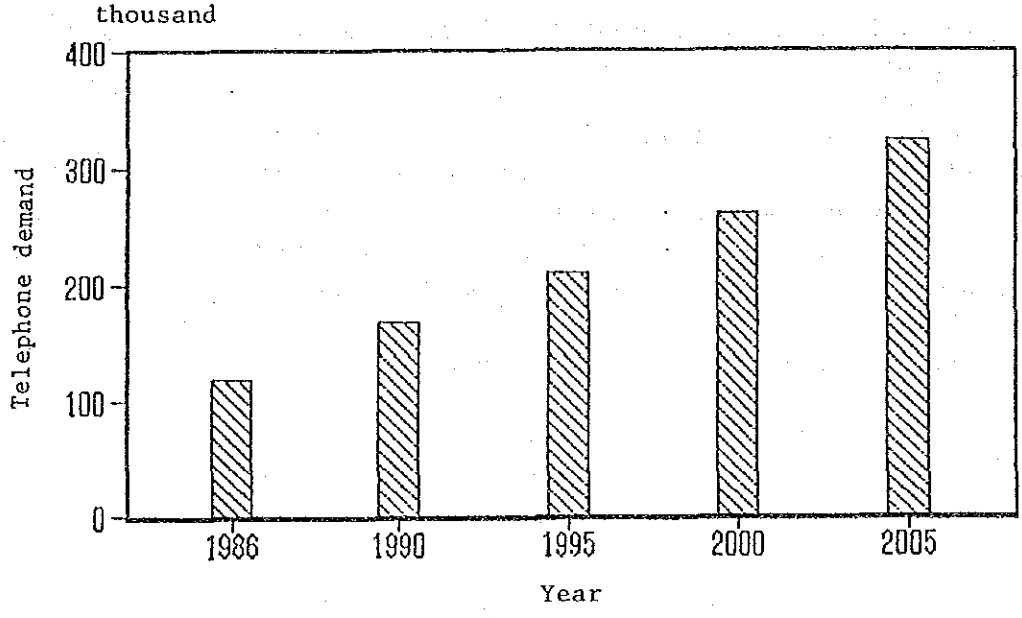

Fig. 1 Telephone demand forecast

(2) The development plan aims at resolving the above-mentioned waiting list and meeting the future demand completely by the year 2005, by installing 236,000 main lines.

For that purpose, the number of central offices will be increased from 57 to 78 as shown in Table 2.

Table 2 Number of central offices

Year	1986	2005
Automatic (Host)	29	19
Automatic (Remote)	1	59
Manual	27	0
Total	57	78

At present, the area which the central offices serve by subscriber cable is one to two kilometers in radius, excepting relatively large cities such as Mendoza and San Rafael.
The cable service area will be extended up to a five-kilometer radius from central offices, in order to satisfy the telephone demand in the cities, comparatively densely populated suburban areas and cultivated land surrounding them.

For the areas more than five kilometers away from the central office, where the telephone service is not available by subscriber cable, the rural telephone system will be applied to meet the demand. 1,500 main lines will be installed applying the rural telephone system (subscriber line multiplex system, multiple access subscriber radio system and HF radio system) by the year 2005.
Fig. 2 shows the concept of service areas.

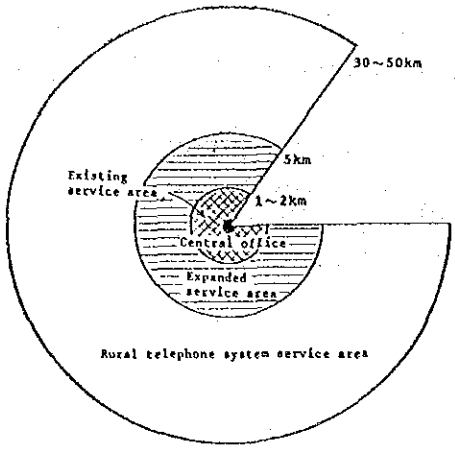

Fig. 2 Service area

(3) With the diffusion of subscriber telephones, expansion of public telephone service will be demanded. In the province of Mendoza, there are around 900 public telephone sets at present. The number of telephone sets will be increased by the year 2005, to 4,400 sets of which 500 sets will be installed in areas apart from the central office, areas where the telephone service is not presently offered, by means of rural telephone system.

All public telephone sets will be of the type allowing toll dialing.

With regard to "Centro de poblacion" at 63 places in the desert area, the telephone service will be provided in 38 places by multiple access subscriber radio (MAS) system and the remaining 25 places will be provided with the public telephone service by HF radio system, because the latter locations are very distant from central offices and the MAS system is not economically applicable.

(4) As a result of the above-mentioned plan, the telephone demand in the province will mostly be satisfied and telephone service will become available also for the areas where the service is not provided at present.
Figs. 3 and 4 show the expanded service areas and Table 3 and Fig. 5 show the telephone demand fulfillment plan.

(5) The telephone density will increase from 6.3 to 18.5 main lines per 100 inhabitants (one main line per 5.4 inhabitants) in the year 2005.
The density of public telephones will also increase from 0.7 to 2.5 units per 1,000 inhabitants in the same year.
Thus the telephone service in the province will be improved remarkably.

(6) Interprovincial traffic conditions are extremely bad at present, and an increase in the number of interprovincial toll lines is planned in order to improve the situation.
After completion of this plan, the connection grade of interprovincial calls will be improved notably. However, consultation with telecommunications operating entities in other provinces on the contents and timing of the plan is required before it is implemented.

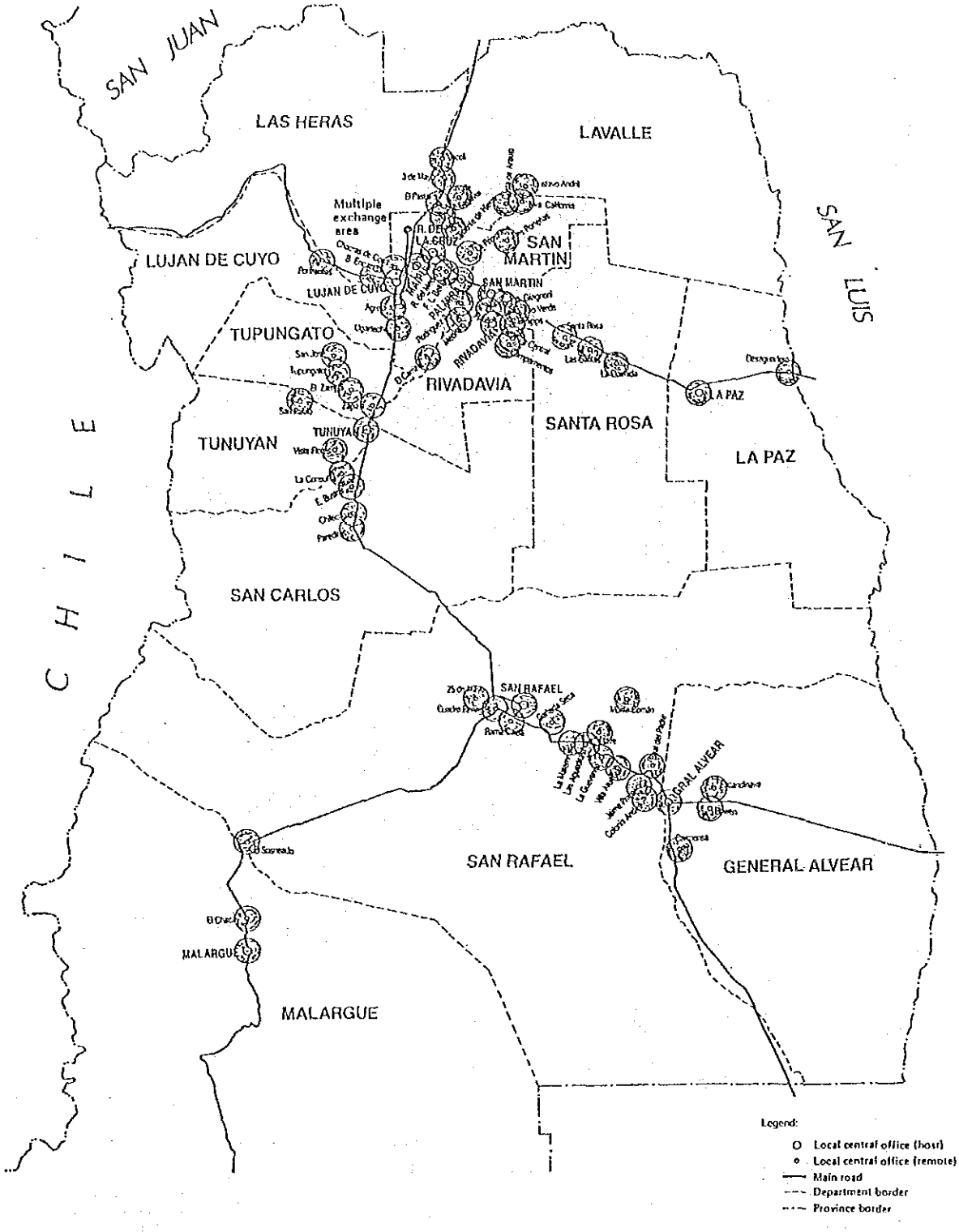

Fig. 3 Expanded cable service area of central offices (excl. Gran Mendoza multiple exchange area)

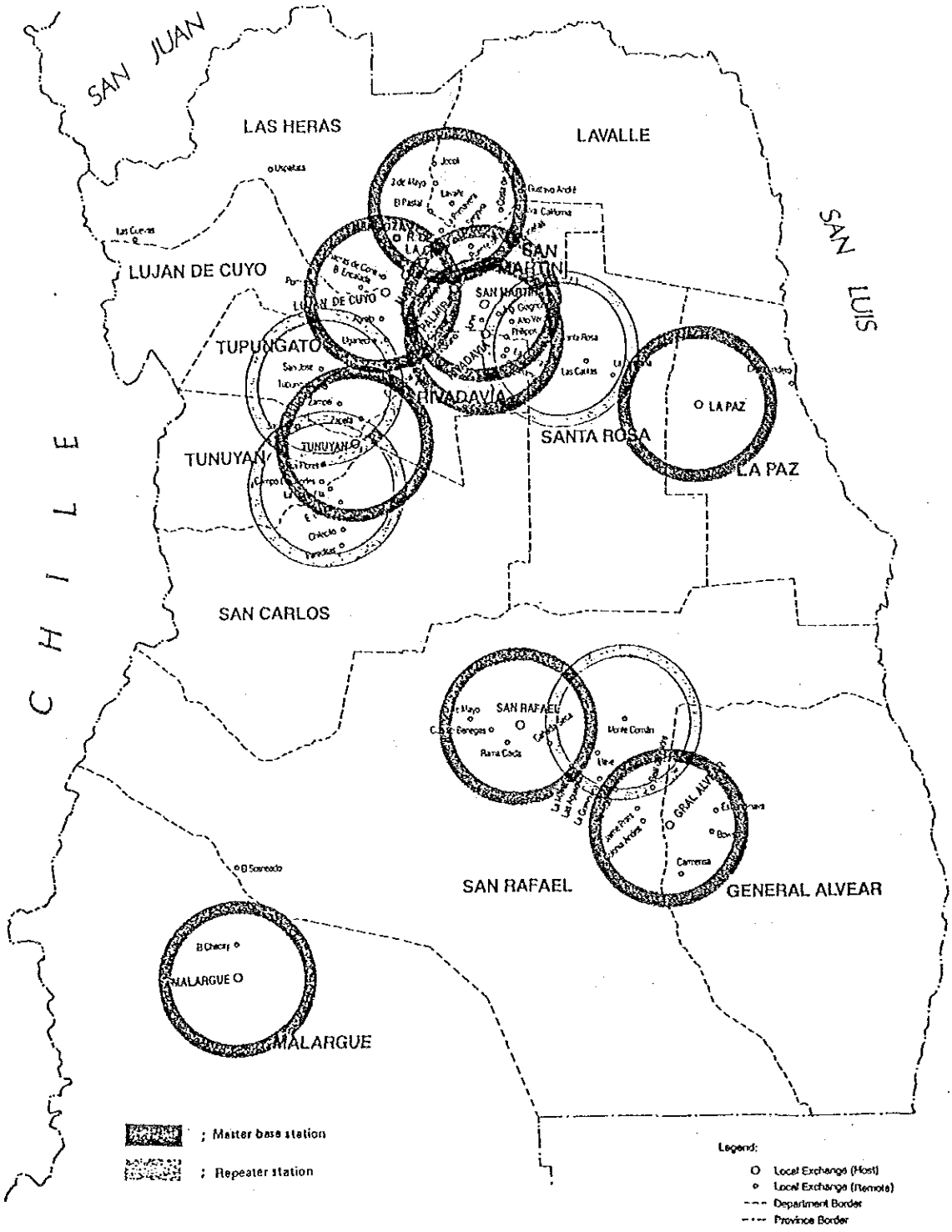

Fig. 4 Rural telephone system service area

Table 3 Telephone demand fulfillment plan

Unit: Thousand lines/Thousand inhabitants

Year	1986	1995	2000	2005
Subscriber telephone inside the cable service area	81.5	135.7	210.6	316.1
Subscriber telephone outside the cable service area	0	0.6	0.9	1.5
Public telephone inside the cable service area	0.9	1.3	2.6	3.9
Public telephone outside the cable service area		0.2	0.3	0.5
Total number of telephones	82.4	137.8	214.4	322.0
Population	1,302	1,526	1,632	1,740
Telephone density	6.3	9.0	13.1	18.5

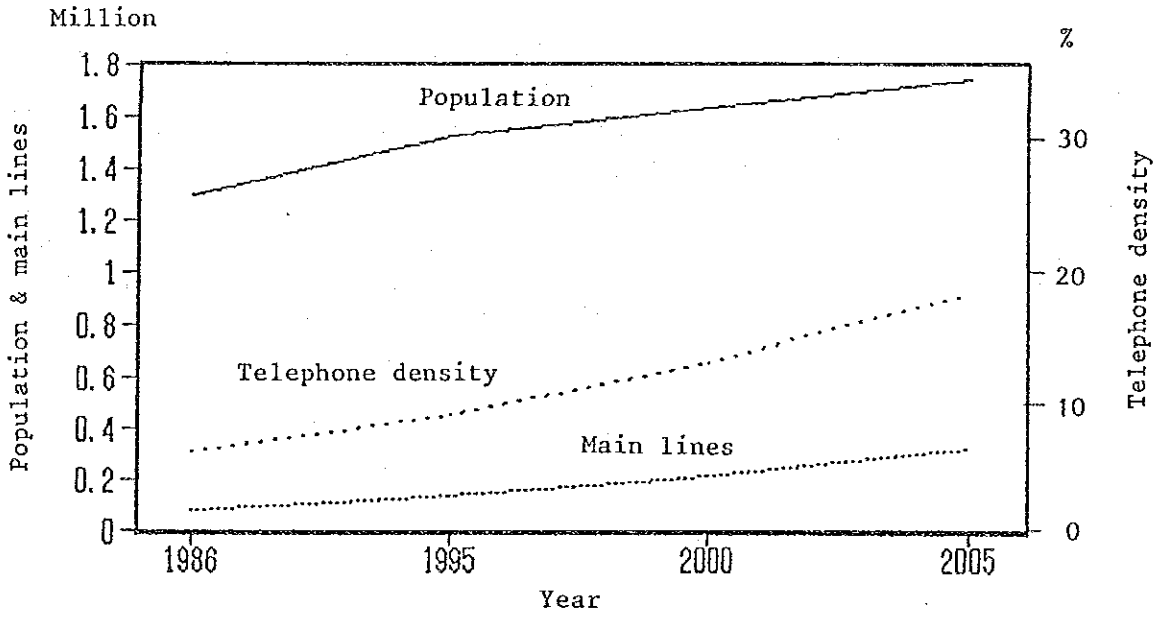

Fig. 5 Population, main lines and telephone density

1.1.2 Introduction of land mobile telephone service

Land mobile telephone service is not yet provided in Argentina.
Although only limited demand (around 230 units) is forecast in the province, the introduction of this service is planned in the Gran Mendoza area at the end of the development plan period on the understanding that the service may become one of the major new services in the future.

1.1.3 Digitalization of telecommunications network

(1) All telecommunications networks in the province, including exchanges and transmission lines, will be digitalized by the year 2005.

(2) As the result of the digitalization of exchanges, diversified new telephone services, as shown in Table 4, can be provided economically.

(3) Digitalization of telecommunications network enables the economical introduction of packet switching system and a variety of data communications services. Some examples of the services are listed in Table 5.

1.1.4 Facsimile communications service

Demand for facsimile communications service will be satisfied easily by using the improved telephone network.

1.1.5 Telegraph service

The telegraph system has been modernized by employing an automatic message transmission system (SITRAM), but not all the terminal offices in the province have been phased into the system and, where the telecommunications medium is not provided, the reception and transmission of telegrams is performed by regular car services.
As telephone networks in rural areas will be improved under the development plan, the introduction of a facsimile communications system is planned for 64 terminal offices to accelerate the reception and transmission of telegrams.

Table 4 Subscriber services by digital switching system (1/2)

Digital switching system can economically provide a wide range of subscriber services. The following is a list of the service feature available, along with a brief description of each.

Feature	Brief description
Abbreviated dialing	This feature allows subscribers to dial a 3-digit code ('Special code' + 2 digits) and be connected to the number associated with the code.
Call forwarding	This service allows a subscriber to have his incoming calls automatically transfered to another number which he has preregistered.
Don't disturb	Enables the subscriber to restrict incoming calls. The denied call is connected to an announcement.
Call waiting	If a second call is made to an already busy line, the busy line subscriber hears a tone alert which indicates the waiting call. The subscriber can place either call in a hold status while talking to the other.
Three-way calling	A third party can be added to a two-way conversation (Add-on) without operator assistance.
Hot-line	Allows subscribers to be connected to a predetermined number without dialing.
Wake-up (Alarm-call service)	Enables the subscriber to be rung up at a predetermined time. He will hear an announcement when he answers.
Service interception	Terminating calls to the designated subscriber are routed to operator or announcement machine.
Special ringing	Two telephone numbers are given to a single party line. Depending on which of two telephone numbers is dialed, two different ringing patterns are possible. By the above function, one telephone line is used as a two-telephone line similar to a two-party line.

Table 4 Subscriber services by digital switching system (2/2)

Feature	Brief description
PB dialing	Subscriber who has the PB class of service can dial by PB telephone.
Toll restriction	This feature is included in Restriction of Outgoing Calls.
Inward wide area telephone service (IN-WATS)	Service which allows a customer to place a toll call to the telephone of this service class without charge.
Outward wide area telephone service (OUT-WATS)	This service permits a customer having this service class, for a flat charge, to place toll calls to telephones within a prescribed service area.
Line lockout	The subscriber line goes into line lockout after a predetermined time interval without dialing.
Visible charge information	Visually indicates the charge information at the subscriber's terminal

Table 5 Examples of new services by digital networks

Services	Brief description
Data base service	Enables a subscriber to access data bases.
Electronic mail service	Provides mail service by means of facsimile or teletex system
Videotex service	Enables a subscriber to access data bases provided by information providers. Displayable information is presented on a television receiver or other visual display device.
Banking system	Provides data processing services for banks and other financial agencies.
Reservation and information system	Enables to make enquiry into and reservation for hotel, transportation and entertainments, etc.
Automatic meteorological data acquisition system	Enables to acquire, transmit and process automatically meteorological data necessary for weather information.
Emergency medical information system	Enables to provide all kinds of medical information for emergency use.
Market information service system	Enables to provide market information such as sales of vegitable, fruit and meat, quantity of supply and market price, etc.
Computer network communication system	Enables computers to communicate mutually.

1.1.6 Renewal of facilities

Existing analogue exchanges and transmission lines will be removed as the digitalization of telecommunications networks progresses.
As for the cables, existing old cables will become obsolete during the development plan period. Replacement of cables over 30 years old is included in the plan in order to prevent the failure from increasing.

1.1.7 Outline of the installation plan

Main facilities to be constructed under this plan are as shown in Table 6. The period of the plan is divided as shown below.

Phase 1 : 1991-1995
Phase 2 : 1996-2000
Phase 3 : 2001-2005

1.2 Telecommunications network basic plan

1.2.1 Numbering plan

The present 8-digit numbering plan (7-digit in certain areas) is to be changed to the uniform 9-digit numbering plan to increase the numbering capacity.

1.2.2 Network plan

The present configuration of toll network in the province of Mendoza is 3-level hierarchy. Toll exchange function is provided to the central offices in Mendoza, San Martin, San Rafael and General Alvear.

It is planned to change the toll network configuration to 2-level hierarchy with only one toll exchange in Mendoza, as exchange digitalization progresses.

The development plan also proposes a step for developing ISDN.

1.2.3 Signaling system

Adoption of the No. 7 signaling system is proposed in consideration of future introduction of new services.

1.2.4 Network synchronization plan

The master-slave synchronization system is to be adopted.

1.3 Engineering standards

1.3.1 Grade of service

Engineering standards for loss probability are assigned on the basis of CCITT recommendations and those for post dial delay on the basis of realized values.

1.3.2 Transmission engineering standards

The overall corrected reference equivalent and the error performance objectives for digital connection are provided on the basis of CCITT recommendations.

Table 6 Telecommunications installation plan (1/2)

Unit: Thousand lines/Thousand terminals/Thousand pairs

Phase	Phase 1	Phase 2	Phase 3	Total
Subscriber telephone inside the cable service area	54.2	74.9	105.5	234.6
Subscriber telephone outside the cable service area	0.6	0.3	0.6	1.5
Public telephone inside the cable service area	1.3	1.3	1.3	3.9
Public telephone outside the cable service area	0.2	0.1	0.2	0.5
Rural telephone system	0.8	0.4	0.8	2.0
Local exchange	79.1 (20.7)	92.1 (8.2)	161.1 (48.6)	332.3 (77.5)
Subscriber's line	76.1 (24.6)	109.3 (28.5)	131.3 (9.4)	316.7 (62.5)
Toll exchange	2.2 (0)	1.8 (0)	3.0 (2.0)	7.0 (2.0)
Mobile telephone	0	0	0.2	0.2

Note: Values with parentheses show the number of facilities to be removed.

Table 6 Telecommunications installation plan (2/2)

Unit: System/RF channel

Phase	Phase 1	Phase 2	Phase 3	Total
Junction circuits in Gran Mendoza	9	2	0	11
Trunk lines (excluding TV transmission lines)	21	12	41	74

1.4 Construction costs

The construction costs for the implementation of the plan amount to 291,540 thousand US dollars.
The detail of the costs is shown in Table 7.
The construction cost of rural telephone system is limited within 10% of the total investment, considering the economic burden that the high construction cost of the system per main line places upon the telecommunications operating entity.

Thus the number of main lines by the rural telephone system is around 1% of the total number of main lines to be installed under the plan, as shown in Table 6.

Table 7 Construction cost of telecommunications

Unit: Thousand US dollars

Phase	Phase 1	Phase 2	Phase 3	Total
Subscriber telephone	6,594	9,138	12,856	28,588
Public telephone	2,469	2,469	2,469	7,407
Rural telephone system	9,969	4,613	13,537	28,119
Switching equipment	23,956	24,588	42,988	91,532
Subscriber's line	24,350	34,963	42,031	101,344
Junction line	1,944	844	175	2,963
Trunk line	10,756	4,981	10,856	26,593
Mobile telephone	0	0	4,875	4,875
Telegraph	44	6	69	119
Total	80,082	81,602	129,856	291,540

1.5 Evaluation of the plan

1.5.1 Financial analyses

Financial analyses are conducted using the following conditions.

(1) Facilities useful life 20 years

(2) Corporation tax 3%

The results of analyses predict a very fair future for the plan, both in the case where rural telephones are included and in the case where they are excluded.

The results are as follows :

(1) Rural telephones included
Internal rate of return 12.00%

(2) Rural telephones excluded
Internal rate of return 14.47%

1.5.2 Economic analyses by an estimation of production inducement value

Production inducement value is calculated using the Argentine Input output table.

Setting the construction cost of the development plan at 100, the value including the construction cost itself is expected to be 289.
It consists of:

(1) 190 which comes from direct effect

(2) 75 from household consumption

(3) 24 from fixed capital formation

2. Broadcasting network development plan

2.1 MF broadcasting

Improvement of reception at nighttime and in the isolated areas is planned and the renewal of existing broadcasting equipment is intended to make maintenance easy. To that end, following items are planned.

1) Change of transmitter location and power.

2) Introduction of precise synchronous broadcasting to eliminate beat interference.

3) Improvement of nighttime reception and construction of additional FM broadcasting station.

4) Construction of mini-power transmitters in some isolated areas.

5) Transmission of MF program superimposed upon TV signal via satellite relay.

2.2 FM broadcasting

In order to establish high fidelity FM broadcasting service throughout the province, following items are considered.

1) Establishment of frequency allocation plan in reference to TV frequency allocation plan.

2) Multi-hop relay broadcasting to send the program to each downstream station

3) Construction of mini-power stations in the isolated areas.

4) Joint construction of all transmitter facilities within the same premises.

5) Adoption of studio modulation to cope with future technical development.

2.3 TV broadcasting

In order to expand the TV broadcasting network, the following items are taken into consideration.

1) Introduction of national, education/university and public broadcasting.

2) Construction of transmitter stations at the top of high mountains.

3) Joint construction of all transmitter stations to save construction and maintenance cost.

4) Mutual advance of broadcasters into each service area within the province to respond to the public's demand for more channels.

5) Multi-hop relay of translators to send program to each downstream station.

6) Transmission of national and education/university broadcast programs via satellite from Buenos Aires to Mendoza and superimposition of MF and FM programs.

2.4 New service.

Commencement of teletext and bilingual broadcasting is planned to upgrade the broadcasting service to the same level as broadcasting in the most advanced European countries at present. Considering the experience in introducing color TV standards, engineering concept for introducing new technology is explained.

2.5 Others

1) Introduction of an inter-communication system, and a facsimile and data communication network are planned among main stations between Buenos Aires and Mendoza.

2) Establishment of maintenance system is planned based on the actual situation for making sophisticated maintenance.

3) Staff training under Governmental guidance is planned and the merged use of education/university broadcast studio and training institute is tentatively suggested.

2.6 Improvement of broadcasting facilities.

(1) Network

1) Television.

Increase of program transmission links from one to four is planned, two of them terrestrial and the other two via satellite. Time share use of the link is proposed.
All existing main transmitter stations in Mendoza and San Rafael are expected to move to Co. Arco and Co. Alto (or Co. Negro) respectively.

2) MF and FM

Telephone line, converted from analogue to digital, will be used for the transmission of MF and FM programs from Mendoza to Malargue via San Rafael.

(2) Transmitter station

1) Television

All solid-state transmitter provided with redundancy system is to be constructed, so as to make the whole station unattended. Common use of engine-generators and other equipment is also planned, including tower, site and building, etc.

2) FM

Standerdization of transmitter and translator is planned for common use of standby equipment.

3) MF

After the completion of TV and FM broadcasting networks, renewal of old equipment is to be implemented. Improvement of antenna radiation efficiency is expected for the main stations.

(3) Studio

Although it is not included within the scope of this report, construction of studios for extension and continuation of broadcasting service is required in the case of national, public and private broadcasters.

2.7 Coverage of each medium

As shown in the Figures 6 through 9, land and population coverage of broadcasting will be greatly expanded for each medium.

1) MF; more than 98% of population coverage will be achieved.

2) FM; more than 98% of population coverage will be achieved.

3) TV; more than 96% of population coverage will be achieved.

2.8 Technical standard

Referring to the recommendation of CCIR and the existing Argentine technical standarad, the following technical standards are applied for the isolated areas where inhabitants are sparse.

MF	---	more than	50	dB
FM	---	more than	36	dB
TV	---	more than	42	dB

1) Degradation of signal

Prevention of signal quality degradation through tandem connection of translator stations ensures picture and sound quality of better than 3 for five-grade evaluation.

2) Frequency allocation plan.

Standard frequency allocation plan is established based partially on the nation-wide frequency allocation plan.

2.9 Construction Plan

2.9.1 MF, FM and TV broadcasting

Construction of stations shown in Tables 8 through 10 is planned.

2.9.2 Program transmission line

1) Satellite relay

Construction of a new building in San Martin, and two down links are planned in San Martin and San Rafael, and construction of one uplink in San Martin is also planned for program relay among major stations within the country.

2) Terrestrial line

One more microwave transmission line will be added for TV use, and wide-band sound program transmission lines will be constructed between major cities in the province.

3) Satellite reception in the isolated area

Satellite reception in the two isolated sites is planned tentatively.

2.10 Establishment of maintenance system

Establishment of a maintenance section is planned to maintain all of the equipment scattered in the province and neighbouring provinces. Necessary equipment is to be provided for efficient maintenance.

2.11 Commencement of new media

Teletext and bilingual broadcasting are planned in the second phase of the development plan.

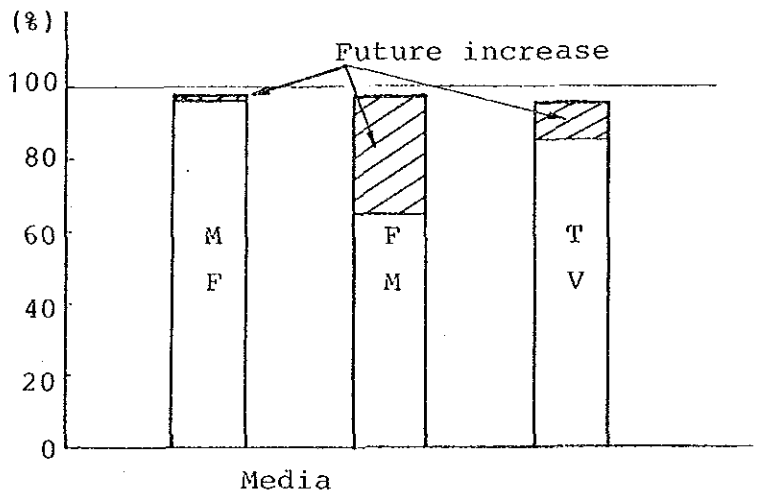

Fig. 6 Increase of population coverage

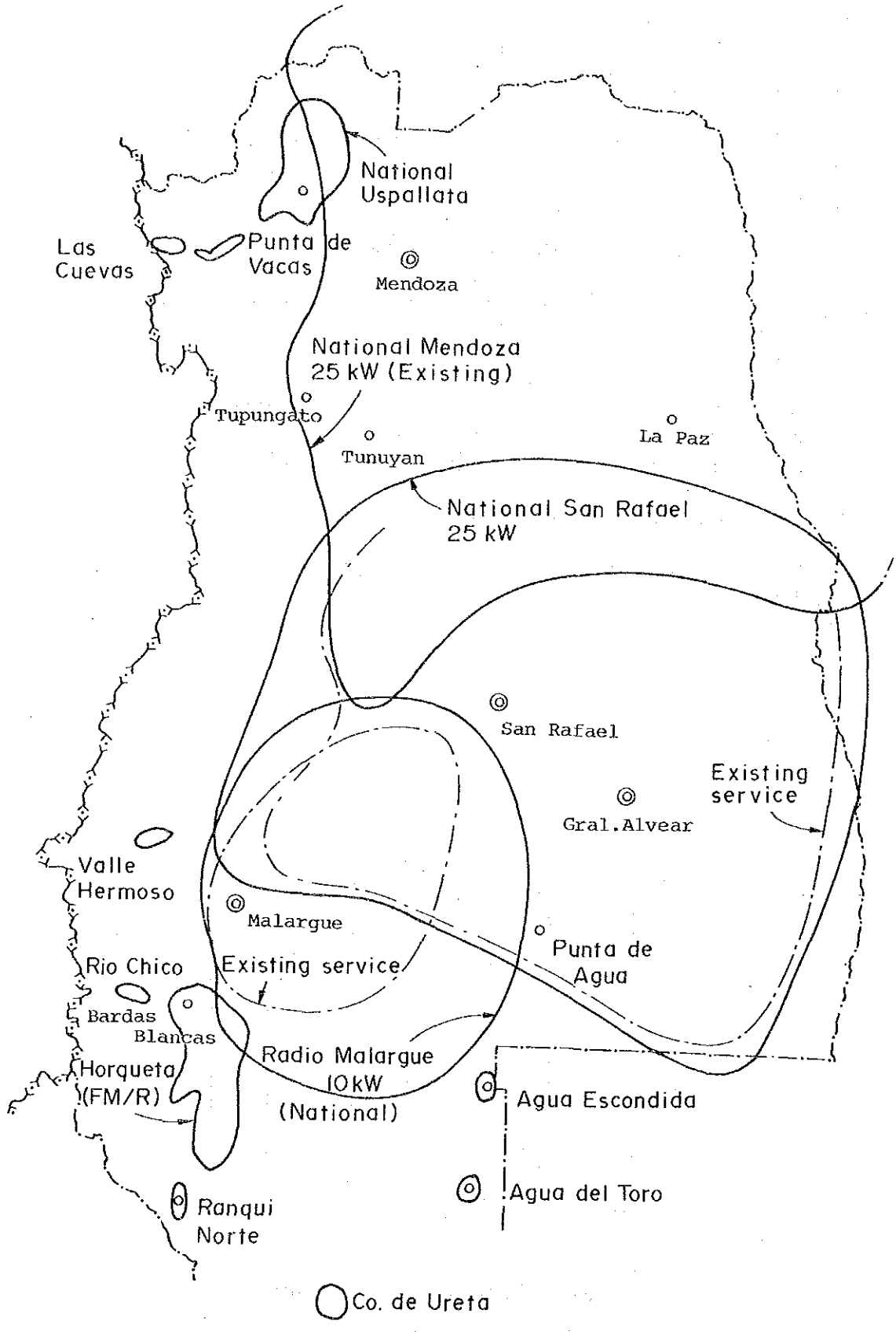

Fig. 7 Expected coverage of MF broadcasting

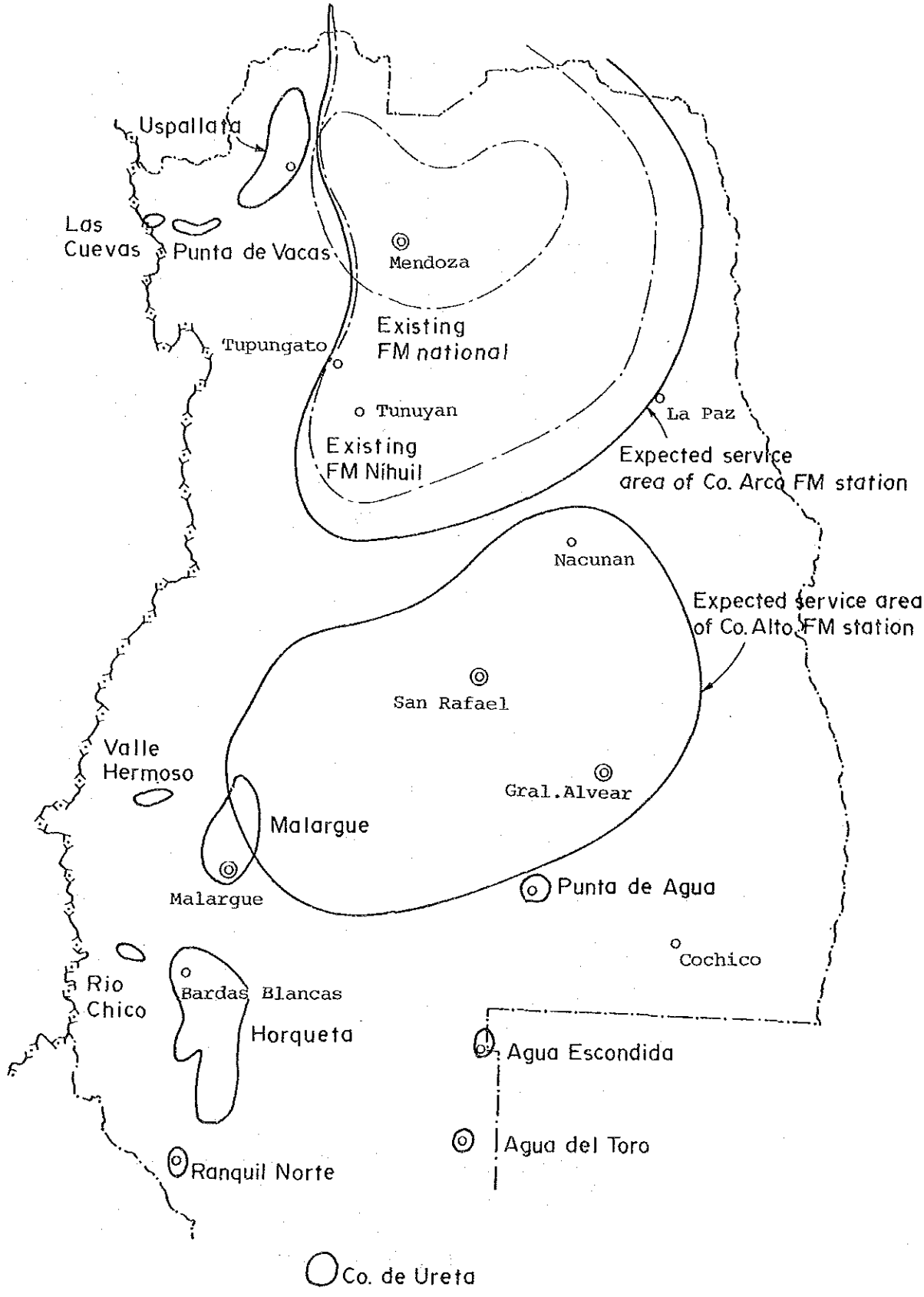

Fig. 8 Expected coverage of FM broadcasting

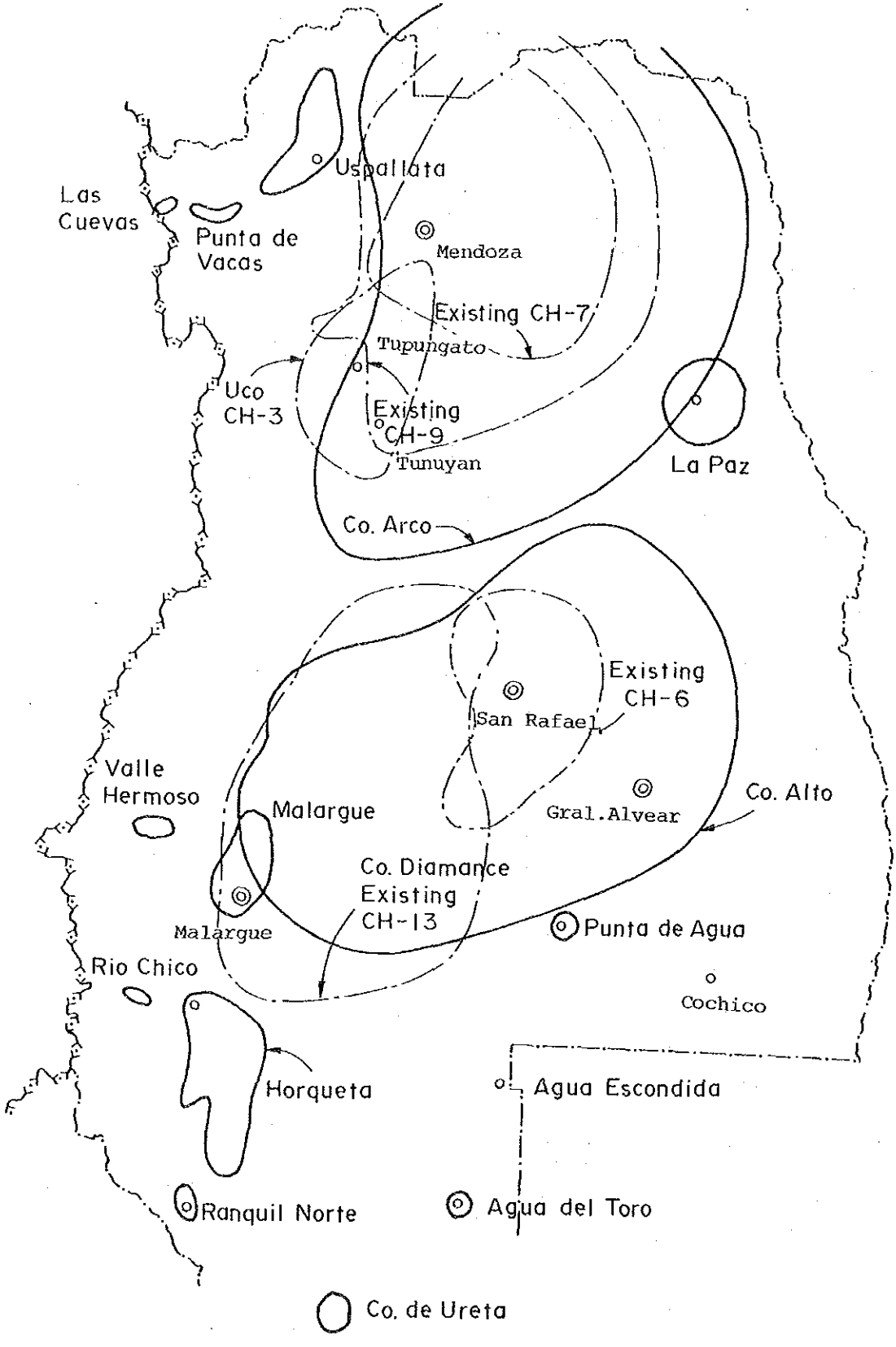

Fig. 9 Expected service area of TV broadcasting

Table 8 Construction of television transmitter stations

Station	National	CH－7	CH－9	CH－6	E/U	Pub
Mendoza	5kW	5kW	5kW	5kW	10kW(U)	10kW(U)
San Rafael	5kW	5kW	5kW	5kW	10kW(U)	10kW(U)
Uco	50W	Existing	Existing	50W	200W(U)	200W(U)
Uspallata	50W	ditto	ditto	50W		
Malargue	50W	50W	50W	50W		
La Paz	50W	Existing	50W	50W		
Horquetas	50W	50W	50W	50W		
Pte. las Horquetas	CATV	CATV	CATV	CATV		
Media Luna	CATV	CATV	CATV	CATV		
Canalejas	CATV	CATV	CATV	CATV		
Cochico	1W	1W	1W	1W		
Punta de Agua	5W	5W	5W	5W		
Agua Escondida	1W	—	—	—	1W	
Agua del Toro	1W	—	—	—	1W	
Ranquil Norte	1W	1W	1W	1W		
Rio Chico	1W	1W	1W	1W		
Valle Hermoso	5W	5W	5W	5W		
Hotel Termas	CATV	CATV	CATV	CATV		
Las Cuevas	5W	Existing	5W	5W		
Punta de Vacas	10W	ditto	10W	10W		
Paramillos	10W	10W	10W	10W		
Las Sauces	CATV	CATV	CATV	CATV		
Arrojito	CATV	CATV	CATV	CATV		
Desaguadero	CATV	CATV	CATV	CATV		
La More	CATV	CATV	CATV	CATV		
Potrerillos	5W	5W	5W	5W		

Table 9 Construction of FM broadcasting stations

No. Station	National	FM−1	FM−2	FM−3
1 Mendoza	1 kW	1 kW	1 kW	1 kW
2 San Rafael	1 kW	1 kW	1 kW	1 kW
3 Uco	10 W	10 W	10 W	10 W
4 Uspallata	10 W	10 W	10 W	10 W
5 Malargue	10 W	10 W	10 W	10 W
6 La Paz	10 W	10 W	10 W	10 W
7 Horqueta	20 W	20 W	20 W	20 W
8 P.l.Horquetas	CATV	CATV	CATV	CATV
9 Media Luna	CATV	CATV	CATV	CATV
10 Canalejas	CATV	CATV	CATV	CATV
11 Cochico	CATV	CATV	CATV	CATV
12 P.d.Agua	1 W	1 W	1 W	1 W
13 Agua Escondida	1 W	1 W	1 W	1 W
14 Agua del Toro	1 W	1 W	1 W	1 W
15 Ranquil Norte	3 W	3 W	3 W	3 W
16 Rio Chico	1 W	1 W	1 W	1 W
17 Valle Hermoso	1 W	1 W	1 W	1 W
18 Hotel Termas	CATV	CATV	CATV	CATV
19 Las Cuevas	3 W	3 W	3 W	3 W
20 Punta de Vacas	3 W	3 W	3 W	3 W
21 Paramillos	5 W	5 W	5 W	5 W
22 Las Sauces	CATV	CATV	CATV	CATV
23 Arrojito	CATV	CATV	CATV	CATV
24 Desaguadero	CATV	CATV	CATV	CATV
25 La More	CATV	CATV	CATV	CATV
26 Potrerillos	1 W	1 W	1 W	1 W
27 Cachueta	1 W	1 W	1 W	1 W
28 Co de Ureta	5 W	5 W	5 W	5 W

Table 10 Construction of MF broadcasting stations

San Rafael national	25 kW
Malargue	10 kW
Mendoza Libertador	10 kW 25 kW
Mendoza Cuyo	renewal
Mendoza Nihuil	renewal
Tunuyan	0.25 kW 1 kW
Las Cuevas	Mini-power
Los mollos	ditto
Agua Escondida	ditto
Ranquil Norte	ditto
Punta de Agua	ditto

2.12 Cost estimation of the broadcasting development plan.

In Table 11, cost estimations for the expansion of broadcasting networks are shown, and in Table 12, construction cost for private broadcasters is tabulated. As for the minimum studio facilities for the continuation of broadcasting, estimated cost is given in Table 13.

Table 11 Construction cost of broadcasting (excl. private broadcasting)

Unit: Thousand US dollars

	Pre-phase	Phase 1	Phase 2	Phase 3	Total
TV network	113	6,563	438		7,114
FM network		1,250	375		1,625
E/U TV network		1,380	1,500		2,880
MF network		1,000	1,000	400	2,400
Earth station		880	810		1,690
Teletext		630			630
Bilingual			630		630
Public TV			1,380	1,380	2,760
Maintenance			440	130	570
Intercom.			380		380
Data network			380	250	630
CATV			125	375	500
Others		500	500	300	1,300
Sub-total	113	12,203	7,958	2,835	23,109
ENTEL link		1,560	210	3,400	5,170
Grand total	113	13,763	8,168	6,235	28,279

Table 12 Construction cost of private broadcasters

Unit: Thousand US dollars

	Phase 1	Phase 2	Phase 3	Total
TV network	2,200	1,100		3,300
FM network	930	930	450	2,310
MF network	410	160	1,200	1,770
Teletext		1,260	630	1,890
Bilingual		1,260	630	1,890
Others	3,540	4,710	2,910	11,160

Note: Concerning the construction schedule of private broadcasters, as there are many unknown factors, only a tentative estimation is given.

Table 13 Construction cost of studio facilities

Unit: Million US dollars

VHF 4 stations (TV)	1.81	in Mendoza
UHF 2 stations (TV)	1.5	in Mendoza
VHF 4 stations (TV)	2.38	in San Rafael
UHF 2 stations (TV)	1.5	in San Rafael
FM 4 stations	0.25	in Mendoza
FM 4 stations	1.5	in San Rafael
MF 25 kW station	0.5	in San Rafael
MF 10 kW station	0.5	in Malargue
O.B. VAN, 4 TV stations	2.5	in Mendoza
Total	12.44	

3. Benefits from improved telecommunications and broadcasting

Table 14 shows the expected impact of improved telecommunications and broadcasting in the province of Mendoza.

These benefits and impact have been observed by many telecommunications and broadcasting experts in many countries, though quantitative analyses are very difficult to conduct in telecommunications and broadcasting projects.

Especially the province of Mendoza is now poised on the brink of opportunity of future economic expansion.

The role and value of expanding telecommunications and broadcasting networks is surely the most important among all the many items.

Table 14 Benefits of telecommunications and broadcasting development in the province of Mendoza (1/2)

	Item	Direct effects	Indirect effects
1	Food supply	(1) Increase in agricultural products (2) Supporting management of large-scale organization and administrative structure (3) Enhanced efficiency and productivity in agricultural sector being supported by smooth flow of market information	(1) Stabilized national income (2) Foreign currency earning
2	Diversified economy	(1) A way of supporting economic development (Scale expansion, modernization and moneymaking)	(1) Development and diversification of industries from sightseeing, manufacturing and wholesale to tertiary (including service) industry.
3	Employment in rural areas	(1) Infrastructure to raise new economic activities	(1) Increased chances of employment in rural areas
4	Illiteracy rate and skills of workers	(1) Improved national standard of living and worker skill development	(1) Cost reduction by decreasing the number of teachers (2) Cost reduction by decreasing the number of educational facilities
5	Medical service level	(1) Increased chances of diagnosis and treatment by doctors of rural clinics and hospitals (2) Wide range medical network adjustment	(1) Cost reduction in hospitals (2) Solution of doctor shortage

Table 14 Benefits of telecommunications and broadcasting development in the province of Mendoza (2/2)

	Item	Direct effects	Indirect effects
6	Participation in national economy	(1) Closer relationships between rural and central areas	(1) Orders from customers and communication between suppliers and customers (2) Acquisition of market information at low cost
7	Reduction of migration flow	(1) Reduced migraitons of workers	(1) Reduced population inflow to cities by increased chances of employment in rural areas (2) Improved standard of living by telephone services and broadcasting
8	Closer relation-ship between provincial communities	(1) Enhanced social ties of communities	
9	Geographical and climatological conditions	(1) Reduction of transpor-tation system cost by telecommunications featuring no physical distance (2) Quick actions for natural calamities (3) Prevention of disasters	(1) Strengthened emergency service systems such as police
10	Contact with government	(1) Closer administrative contacts between provinces and the central government by the changed means of communications (change from physical means to tele-communicaions)	(1) Involvement of rural inhabitants in national policy, influence on national consciousness, and influence on governmental programs

PART I INTRODUCTION

CHAPTER 1 BACKGROUND OF THE REQUEST AND OBJECTIVE OF THE STUDY

1.1 Background of the Request

The province of Mendoza is comparatively well developed with wineries, chief among the industries of the province, as well as such natural resources as petroleum, uranium and others, construction equipment industries, and hydroelectric power plants.

The province has, however, many old facilities for telecommunications and broadcasting services. The waiting list of telephone service is around 40 thousand, equivalent to half of the 80 thousand main lines in use at the end of 1985. As regards the broadcasting service, the coverage has not reached all the inhabited points in the province yet. Thus the telecommunications and broadcasting services still remain incomplete in the province.

In view of the above conditions, the Government of Mendoza envisaged a plan to improve the telecommunications and broadcasting networks which could contribute to economic and regional development policies of the province. Hence the provincial government has requested the government of Japan, via the Government of the Argentine Republic, to conduct a study essential in formulating the plan.

1.2 Dispatch of a Preliminary Study Team

In response to the above request, the Government of Japan, working through the Japan International Cooperation Agency (hereinafter referred to as JICA), the official agency responsible for the implementation of the overseas technical cooperation programs of the Government of Japan, sent a preliminary study team to the Argentine Republic from February 16 to March 3, 1986. The duty of the team was to confirm the contents of the request, the attitude and intention of Argentina and to make an agreement on the scope of the study.

1.3 Objective of the Study

According to the agreement, the objectives of the study are as follows:

(1) to propose a long-term development and improvement plan for the telecommunications networks in the province of Mendoza up to the year of 2005, including the introduction of new telecommunications services and the expansion of telephone service in rural areas, and,

(2) to propose an outline for a long-term development and improvement plan for the broadcasting networks in the province of Mendoza up to the year of 2005, including the expansion of coverage and the improvement of poor reception of the sound and television broadcasting services.

The development and improvement plan for the telecommunications and broadcasting networks puts emphasis on the goals and guidelines of the development and improvement, because the provincial government intends to use the plan in its policy making.

CHAPTER 2 ORGANIZATION FOR THE STUDY, COMPOSITION OF STUDY TEAM AND STUDY PROCEDURE

2.1 Organization for the Study and Composition of Study Team

The JICA undertook the study in close cooperation with the Ministry of Public Works and Services of the Government of Mendoza (hereinafter referred to as the Ministry). In order to implement the study, the JICA entered into a consultant contract with the Japan Telecommunications Engineering and Consulting Service (hereinafter referred to as JTEC). The JICA also established an advisory committee to supervise the work of the study team formed by the JTEC. The composition of the advisory committee and the study team is shown in Tables I -2-1 and I -2-2. The Ministry likewise appointed counterparts on their side. The composition of the counterpart members is shown in Table I -2-3.

A coordinating group consisting of members from the Government of the Argentine Republic and related agencies has been established. Its function is coordinating the long-term development and improvement plan for the telecommunications and broadcasting networks in the province of Mendoza with long-term national plans of the Argentine Republic.

2.2 Study Procedure

The study was conducted from July 1986 through October 1987. The itinerary of the study is shown in Table I -2-4. The itinerary of the local study carried out from August 1986 through November 1986 is indicated in Table I -2-5.

Table I -2-1 JICA advisory committee members

Name	Duty-in-charge	Position
Shinichi TAKEUCHI	Chairman (July, 1986 to June, 1987)	Special Advisor for International Cooperation, International Cooperation Division, Communication Policy Bureau, Ministry of Posts & Telecommunications
Satoru ITO	Chairman (July, 1987 to October, 1987)	Special Advisor for International Cooperation, International Cooperation Division, Communication Policy Bureau, Ministry of Posts & Telecommunications
Takao YAMAZAKI	Member	Expert/Telecommunications, International Cooperation Institute, JICA
Hideaki KOBAYASHI	Member	Chief of Central and South America Section, International Cooperation Division, Communication Policy Bureau, Ministry of Posts & Telecommunications
Taketo HORIO	Member	Plan and Policy Division, Communication Policy Bureau, Ministry of Posts & Telecommunications
Mikio YOKOYAMA	Member	Chief Engineer, Central Television Transmitting Station, Engineering Headquarters, Japan Broadcasting Corporation
Ryotaro TOTSUKA	Coordinator	Social Development Cooperation Department, JICA