

## Paraguay

### PROJECT FOR IMPROVEMENT OF EARTH STATIONS FOR TELECOMMUNICATION VIA SATELLITE

Report Date: April 2003

Field Survey: December 2002

#### 1. Project Profile and Japan's ODA Loan



Project location map



Parabolas of the satellite communications earth station

#### 1.1 Background

The first satellite earth station, which had been in service since December 1977, well beyond its service life of 15 years, had frequent failures. There was a high possibility that a serious problem would cause a breakdown of communications, and the station was in urgent need of rehabilitations. As of 1993, 341 channels were required to meet the needs for international communications but only 282 channels were in use. At that time, it was difficult to increase the number of channels because of the channel allocation limits of the International Telecommunication Satellite Organization (INTELSAT). Moreover, 680 channels were predicted to be needed by the year of 2007 to meet the increasing demand for international communications. In order to close the demand-supply gap and deal with the expected increase in the demand for international communications, it was necessary to increase the number of channels available by constructing a second earth station. On the other hand, all the communications partner countries were in the process of transforming their communications methods from analogue to more efficient digital methods. Paraguay was also required to introduce digital methods to accommodate the digital international communications systems of those countries and INTELSAT was promoting a plan to introduce digital communications channels.

#### 1.2 Objectives

The objective of this project was to eliminate the demand-supply gap in international communications, improve the international communications service and, at the same time, properly respond to the changes in satellite communication technologies to meet international standards.

#### 1.3 Project Scope

- (1) Construction of a second earth station

- 1) a complete earth station, 2) construction of the station building, 3) installation of communications equipment (to be shared with the first earth station)
- (2) Construction of the Digital Microwave Connecting Link between earth stations and the central station
- (3) Rehabilitation of the first earth station
  - 1) Rehabilitation of antennas and the station building, 2) improvement of communications equipment
- (4) Improvement and expansion of Digital International Transit Switching Center facilities
  - 1) installation of additional switching unit, 2) introduction of new software, 3) removal of analogue switches
- (5) Consulting services
  - Hiring of consultants to engage in detailed designing, bidding assistance, management of implementation, and trial operations

#### 1.4 Borrower/Executing Agency

Government of the Republic of Paraguay

Compania Paraguaya de Comunicaciones (COPACO, changed name from ANTELCO in July 2001)

#### 1.5 Outline of Loan Agreement

Loan Amount	3,234million yen
Loan Disbursed Amount	3,234million yen
Exchange of Notes	December 1993
Loan Agreement	February 1994
Terms and Conditions	
-Interest Rate	3.0%
-Repayment Period (Grace Period)	30 years (10 years)
-Procurement	General untied
Final Disbursement Date	October 2000

## 2. Results and Evaluation

### 2.1 Relevance

From 1996 through 1997, before completion of the project, it was frequently the case that placing an international call was impossible due to lack of line capacity, and newspapers often made an issue of the situation. This project, which was to increase international telephone lines and realize transition to a digital system, was important to meet the needs the Paraguayan people and the technical demands on Paraguay's communications systems. At that time, the Internet was not yet widespread and business communications with foreign partners depended on international calls or facsimile transmissions. An international telephone service that could not meet users' demands was a factor impeding the development of international business in Paraguay. This project aimed to satisfy these needs and, therefore, was highly relevant.

The environment of the communications sector has been changing rapidly due to recent technological innovations. In the future, further changes in the communications environment in Paraguay may be brought about by the spread of international calls made via the Internet. From the fact that there are more needs than projected at the planning stage, it is deemed that this project has maintained its relevancy to date, although the role of this project might change in the future.

## **2.2 Efficiency**

### **2.2.1. Project Scope**

The project scope has been changed for technical reasons as follows: (1) the number of newly constructed earth stations was increased to two from originally planned one (second and third earth stations); (2) large scale rehabilitation of the first satellite communications earth station were called off, (3) fiber optic lines were constructed between earth stations and the central station, which was not originally planned, and the existing analogue microwave lines were removed and replaced by digital microwave lines as backup lines; (4) taking into account that the service life of the existing international transit switches would expire in several years, new ones (INTS-2A) were installed; and (5) activities to expand the functions of the international transit switches were added to the project scope.

Behind these changes were innovative technological developments in the field of satellite communications: (1) parts necessary for the rehabilitation of the existing earth station were no longer manufactured; (2) construction of new earth stations was less costly than full rehabilitation of the existing station; (3) it was necessary to install equipment that had the capacity to adapt to technological developments that might occur after appraisal till the start of the project; and (4) falling equipment prices made it possible to procure more equipment at lower cost within the project budget.

### **2.2.2. Implementation Schedule**

This project was scheduled to start in April 1994 and complete in December 1997. The original portion was completed about 8 months behind schedule. The executing agency explains that this delay was caused by (1) the change in the original plan, which resulted in cancellation of the full rehabilitation of the first earth station and construction of a third earth station as stated above, (2) delays in the payments to local contractors due to an economic slump in Paraguay, and (3) inefficient and ineffective transfer of responsibility upon personnel relocation in COPACO, which coincided with the project period.

The original portion was mostly completed in August 1998, and after this additional procurement was carried out for the installation of international transit switches. Consulting services and purchase, manufacturing and installation of equipment for that purpose were completed in April 2000.

When the project was being implemented, the consultant engaging in the consulting services was working within the COPACO office. This consultant took the role of liaison with JBIC with respect to procedures to change the project scope and monitored the implementation of the project, thus contributing to efficient implementation of the project. The consultant rated the skills of COPACO's engineers and the capability of the executing agency highly at that time. It seems that smooth

coordination between COPACO, the consultant, and JBIC enabled efficient operation of the project.

### **2.2.3. Project Cost**

As stated above, the rehabilitation costs of the existing earth station and the costs of equipment required for the construction of second and third earth stations were lower than initially estimated. So the project was carried out at the lower cost than the estimation at the appraisal. On the other hand, additional costs were incurred in the construction of fiber optic lines connecting the earth stations and the central station and the emergency backup microwave transmission lines. Also, after the completion of the original plan of the project in August 1998, additional international transit switches were procured. As a result, the overall project was completed at the cost of the same amount as the ODA loan agreement.

## **2.3 Effectiveness**

### **2.3.1 Operation and Effect Indicators**

As stated in “2.2 Efficiency”, the amended project scope was smoothly carried out using the project fund efficiently, and the project attained a level of achievement beyond its initial plan. Thus, the original objectives of the project, which were to eliminate the demand-supply gap in international communications, improve international communications services, and respond to the changes in satellite communications technologies to meet international standards, have been achieved. These achievements can be confirmed by a comparative analysis of the targeted and actual values of operation and effect indicators (see Table 1).<sup>1</sup> The actual number of international satellite lines has been exceeding the target since 1998 and the capacity of international transit switches has been exceeding the target since 1996. The volume of international telephone traffic has been increasing remarkably, particularly since 1998 when the effects of the project began to be felt. The population of Paraguay is 6 million and COPACO’s customers are estimated at around 300,000. COPACO is capable of handling international telephone traffic of over 100 million minutes a year via 1,260 lines using the international transit switches available as of 2001. According to the data submitted by COPACO, it was providing international telephone services using no other transit switches than those installed under the project as of 2001. This means that users can easily enjoy high-quality overseas telephone connections without being disturbed by busy lines or causing an overload on telephone lines. The capacity of domestic-international transit switches and the number of telephone lines in service are below the target level because, according to COPACO, the capacity for domestic calls has yet to be expanded and COPACO does not have enough capabilities to spread the telephone service widely throughout the country. Therefore, the project is considered to have no relationship to this situation.

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<sup>1</sup> Thanks to effective use of JBIC funds, certain capacities are larger than planned. COPACO considers them not as overcapacities but as the result of effective utilization of the funds.

Table 1: Comparison of Operation and effect Indicators (targets and results)

Indicator		1991	1992	1994	1995	1996	1997	1998	1999	2000	2001	2002
International satellite lines	A	N/A	N/A	<u>378</u>	<u>338</u>	<u>371</u>	<u>395</u>	<u>417</u>	<u>442</u>	<u>465</u>	<u>485</u>	<u>511</u>
	B	N/A	N/A	378	338	380	395	425	455	530	608	608
Capacity of international transit switches (lines)	A	N/A	N/A	530	564	606	643	683	719	759	794	833
	B	N/A	N/A	530	560	872	1,258	1,258	1,258	1,258	1,260	1,260
Capacity of domestic-international transit switches (lines)	A	N/A	N/A	872	872	3,910	3,910	3,910	3,910	5,080	5,080	5,080
	B	N/A	N/A	1,625	1,625	1,625	2,760	2,760	2,760	3,930	3,930	3,930
Number of telephone lines in service	A	N/A	N/A	300,000	350,000	430,000	450,000	480,000	400,000	430,000	470,000	500,000
	B	N/A	N/A	172,250	177,392	198,903	297,979	303,990	318,784	324,774	341,949	341,949
Volume of international telephone traffic (thousand calling minutes)	A	N/A	N/A	<u>49,147</u>	<u>53,706</u>	<u>58,266</u>	<u>62,825</u>	<u>67,384</u>	<u>71,943</u>	<u>75,502</u>	<u>81,062</u>	<u>85,621</u>
	B	N/A	N/A	50,153	57,292	65,040	68,964	91,991	94,267	106,012	110,368	104,992
Average unsuccessful call rate (%) <sup>2</sup>	A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	B	11.7	11.3	N/A	N/A	N/A	12.48	17.2	16.3	16.2	18.3	13.29

A: target value, B: actual value

Note: Underlined values are the targets planned at appraisal. With respect to the items for which targets had not been set at appraisal, target values were calculated by COPACO based on the demand up to the previous year.

### 2.3.2 Recalculation of Financial Internal Rate of Return (FIRR)

The FIRR of this project was initially estimated at 10.5% at the time of appraisal. In a trial calculation based on the data submitted by COPACO at the time of project completion, FIRR was 67%. Although the accuracy of trial calculations is limited, this high rate can be attributed to 1) raised international call rates, 2) increased traffic volume, and 3) earlier appearance of the effects of the project than the original expectation. It shows the high profitability of the international telephone business, as explained by COPACO. The trial calculation was made on the following basis.

Benefit: income from international calls

Cost: investment costs, operation and maintenance costs, and sunk costs

Project life: 15 years

## 2.4 Impact

### 2.4.1 Impact on Those Engaged in International Businesses

At appraisal, expansion of foreign trade and development of dairy farming, which is the main industry of Paraguay, were expected as project impacts. However, amid the changes in external conditions caused by the recent slowdown of the world economy, these initially expected impacts have yet to be confirmed. Still, the improvements in the international telephone service achieved by

<sup>2</sup> According to the interview with COPACO, they do not collect data on call-loss probability and only the unsuccessful call rate was available. Therefore, the unsuccessful call rate is used as an operation and effect indicator in this ex-post evaluation.

the project had a positive effect on companies doing business world wide, such as multi-national companies and trading companies, as well as on citizens who make international calls.

The enhanced capacity of the international telephone service and the conversion to a digital system under the project made it possible to provide a 24-hour on-line service, which was not included in the original plan, in addition to the ordinary international call service. In an interview survey of 7 companies that used the international telephone service, all the respondents said that they are satisfied with the international telephone service after the project completion, although some of them said COPACO is slow in responding to inquires concerning system failure or problems. Before the project, it was often the case that they could not make international phone calls in the morning. After completion of the project, they can make international calls easily whenever they want and whenever necessary. As a result, their business efficiency has improved. An American copier manufacturer we interviewed has reduced the number of telephone machines in the company because it has become easy to make international calls. Some say that data transmission is more convenient than before, when the connection was frequently lost in the middle of data transmission and they had to make telephone calls repeatedly. Now, data transmission can be completed with one call. Major banks in Paraguay also recognize the improvements in the international telephone service after the project completion, particularly the reliability of the service. According to them, the service is offered on a stable basis without forcing them to place international calls again and again because of failed calls, which sometimes happened before. Moreover, the call charge has been reduced by 50% from before, they say. A company which presents IT solution proposals to airline related industries says that the increase in the international telephone lines and the update of the data transmission system implemented under the project enable them to offer more updated telecommunications services to customers and to establish structures that can deal with wide-ranging demands by customers. These facts show that the project has helped companies and organizations doing international business to enhance the efficiency of their business activities.

#### **2.4.2 Environmental Impact**

Since the second and third earth stations were constructed on a vast piece of land owned by COPACO, no land acquisition was required and no impact has been made on houses or buildings in the neighborhood. Also, there has been no particular environmental impact.

### **2.5 Sustainability**

#### **2.5.1 COPACO's Organizational Structure for Operations and Maintenance (O&M)**

COPACO has about 4,000 employees in total. Among them, 123 employees are working at the International Business Division (see Table 2). The International Business Division of COPACO is responsible for O&M of the facilities and equipment constructed or improved under the project, and daily O&M activity is carried out by the International Transit Switch Department and Satellite Communications Earth Station Department. Engineers of these two departments have received technical training in Japan or the training by the Japanese consultant in Paraguay under the auspices of this project. They have sufficient experience and capability to operate the facilities and equipment constructed or improved under this project. In order to grasp the trends in the communications sector

in Paraguay, we interviewed mobile phone companies, which have recently been growing by leaps and bounds across the nation. Every company says that the engineers of COPACO's International Business Division are highly skilled. When we visited the earth stations, they explained that over 90% of all problems can be solved by the staff. Affected by the privatization of COPACO, some employees who were working at the time of project implementation have transferred to other companies or retired voluntarily. COPACO now has the necessary number of engineers and is maintaining employees capable enough to operate and maintain the facilities and equipment constructed or improved under this project. In 2003 COPACO is to be given greater discretionary authority to recruit engineers, and further enhancement of the employees' quality is expected.

Table 2: Breakdown of employees of the International Business Division of COPACO

Department and duty	Number of employees
Engineers, International Transit Switch Department	28
Engineers, Satellite Communications Earth Station Department	30
Engineers, Planning Management Department	17
International Data Collection Department	18
Market Commercialization Department	9
Assistants	21
Total	123

Source: COPACO

Preventive maintenance inspection of the facilities and equipment constructed or improved under the project is carried out once every 3 months. According to the interview survey, there has been no major problem to date; only the kind of problems expected in the course of normal operations.<sup>3</sup> At the central station where international transit switches are installed, operation of these switches is monitored 24 hours a day by staff working in a 2-shift system, and engineers are allocated so that they can address any problem immediately after it occurs. COPACO's O&M capacity is proven by the indicators shown below.

Table 3: Changes in indicators on sustainability (international lines only)

Indicator		1994	1995	1996	1997	1998	1999	2000	2001	2002
Fault rate (see note)	A	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	B	4.1	3.4	3.5	1.4	1.2	0.7	1.2	1.5	1.1
Ratio fault recovery on next working day (%)	A	100	100	100	100	100	100	100	100	100
	B	79	89	87	94	93	97	95	90	97

Source: COPACO

A: target, B: actual

Note: number of faults per 100 telephone calls per year

<sup>3</sup> Problems such as temporary disconnection of domestic telephone lines caused by improperly programmed software in the computers installed at the central station.

### 2.5.2 O & M Budget

In the interview survey, some say that COPACO has not allocated enough budget to maintenance both in domestic and overseas projects, while others say that the facilities and equipment currently used for the international telephone service are maintenance-free and that O&M costs are given high priority in the budget. We cannot determine whether a sufficient amount of the budget is allocated to O&M because of a lack of numerical evidence, as we could not obtain relevant data. In the course of privatization, COPACO has been prohibited from making capital investments for the three years from 2000 to 2002. Whether a sufficient budget will be appropriated in the future depends on the development of privatization and is unpredictable at present.

### 2.5.3 Financial Status of COPACO

According to COPACO's annual report, overall income increased from 1993 to 1998, exceeding expenditure, and net profits increased steadily during this period. In 1998, in particular, net profit marked a substantial increase. However, net profit fell substantially in 1999 and plunged into negative figures in 2000 (see Table 4). As the privatization process started in 2000, the financial status and assets of CAPCO are under review. No official information on the financial status in 2001 and 2002 has been made public.

Table 4: Changes in profit of COPACO (unit: million guaranties (PYG))

	1993	1994	1995	1996	1997	1998	1999	2000
Income	233,555	287,044	356,491	376,132	447,197	615,257	572,435	575,951
Operating income	197,794	275,589	340,881	360,801	426,111	577,031	540,385	548,614
Non-operating income	35,761	11,455	15,610	15,331	21,086	38,226	32,050	27,337
Expenditure	197,604	259,716	288,378	306,390	405,792	497,492	513,991	602,617
Operating expenditure	122,170	151,597	187,710	224,636	331,601	340,162	362,058	405,020
Non-operating expenditure	75,434	108,119	100,668	81,754	74,191	157,330	151,933	197,597
Profit from income	35,951	27,328	68,113	69,742	41,405	117,765	58,444	-26,666

Source: ANTELCO Annual Report 1999 and 2000

COPACO's domestic telephone business is unprofitable due to low telephone rates, and has been compensated for by the profitable international telephone business. However, following the advice for reduction of international telephone rates issued by the supervisory authority CONATEL in 2001, international telephone rates were substantially reduced in the same year (see table 5). Given that COPACO cannot offer a sufficient level of service in its domestic telephone business and that competition in the industry is heating up with the spread of mobile phones, it is virtually impossible to raise telephone rates. Therefore, reductions in international telephone rates might deteriorate the financial condition of COPACO.



Table 5: Changes in international telephone rates (unit: PYG/minute)

Destination		1993	1994	1995	1996	1997	1998	1999	2000	2001
MERCOSUR	A	N/A	N/A	N/A	N/A	3,775	4,28	3,200	3,500	4,500
	B	N/A	N/A	4,400	4,400	4,400	4,400	4,400	4,400	2,700
North America	A	1,368	2,940	3,390	3,390	3,680	3,680	4,000	4,375	5,625
	B	N/A	N/A	5,800	5,800	5,800	5,800	5,800	5,800	3,380
Alaska	A	N/A	3,960	3,390	3,390	3,680	3,680	4,000	4,375	5,625
	B	N/A	N/A	5,800	5,800	5,800	5,800	5,800	5,800	3,380
Central America	A	1,368	3,440	3,390	3,390	3,390	3,390	4,000	4,375	5,625
	B	N/A	N/A	5,800	5,800	5,800	5,800	5,800	5,800	3,380
Panama	A	1,710	2,940	3,390	3,390	6,530	6,530	4,000	4,375	5,625
	B	N/A	N/A	5,800	5,800	5,800	5,800	5,800	5,800	3,380
Caribbean	A	1,710	3,960	3,960	3,960	6,530	6,530	4,000	4,375	5,625
	B	N/A	N/A	5,800	5,800	5,800	5,800	5,800	5,800	3,380
Europe	A	1,710	3,440	3,960	3,960	6,530	6,530	4,800	5,250	6,750
	B	N/A	N/A	6,770	6,770	6,770	6,770	6,770	6,770	4,050
Asia	A	1,710	3,960	4,560	4,560	6,530	6,530	4,800	5,250	6,750
	B	N/A	N/A	7,800	7,800	7,800	7,800	7,800	7,800	4,050
Africa	A	1,710	3,960	4,560	4,560	6,530	6,530	4,800	5,250	6,750
	B	N/A	N/A	7,800	7,800	7,800	7,800	7,800	7,800	4,050
Oceania	A	1,710	3,960	4,560	4,560	6,530	6,530	4,800	5,250	6,750
	B	N/A	N/A	7,800	7,800	7,800	7,800	7,800	7,800	4,050

Source: COPACO  
A: target, B: actual

### 2.5.4 Privatization of COPACO and Future Prospects

Before 1996, ANTELCO was a service provider and at the same time the agency supervising the telephone business. Since 1997, when CONATEL assumed the role of supervisory regulator, ANTELCO has been dedicating itself solely to the telephone service and construction and improvement of facilities for that purpose. The World Bank started assisting privatization of the public sector in Paraguay in 2000, and the National Secretariat of State Reform (SNRE) was established in the same year. At the end of July 2001, ANTELCO was incorporated into and succeeded by COPACO. However, due to a political shift, the privatization process was suspended in June 2002, before shares could be sold to the private sector. In spite this CONATEL is drafting and setting up a number of regulations (laws) necessary for the privatization of COPACO. SNRE was dissolved in late November 2002 and the course of privatization hinges on the results of the presidential election scheduled for 2003, so the situation is fluid. Until the prospects for privatization become clear, COPACO is implementing a short-term action plan (100-day plan). Whether the facilities and equipment constructed or improved under the project will remain important or effective largely depends on whether or not COPACO is privatized and, if it is privatized, on the nature of the privatization process.

## 3. Feedback

### 3.1 Recommendations

#### (To JBIC)

It is necessary to obtain information on the privatization plan of COPACO and to examine based on the operation and effect indicators whether the sustainability of the project can be ensured and the development objectives will be achieved by appropriate operation and maintenance

### Comparison of Original and Actual Scope

Item	Plan	Actual
1. Project Scope	<p>(1) Construction of a second earth station 1) a complete earth station, 2) construction of station building, 3) installation of communications equipment (to be shared with the first earth station)</p> <p>(2) Construction of the Digital Microwave Connecting Link between earth stations and the central station</p> <p>(3) Rehabilitation of the first earth station 1) rehabilitation of antennas and station building, 2) improvement of communications equipment</p> <p>(4) Improvement and expansion of international telephone switching facility 1) installation of additional switching unit, 2) introduction of new software, 3) removal of analogue switches</p> <p>(5) Consulting services: hiring of consultants who engage in detailed designing, bidding assistance, management of implementation, and trial operation</p>	<p>(1) two satellite communication earth stations were constructed</p> <p>(2) – A fiber optic transit system was installed to replace the existing transit circuit – The existing analogue microwave relay system was removed and a digital microwave relay system was constructed to serve as a backup for the fiber optic relay system.</p> <p>(3) Rehabilitation of the first station was called off</p> <p>(4) Improvement and expansion of international transit switches (INTS-2) and installation of international transit switches (INTS-2A)</p> <p>(5) Consulting services: services concerning international transit switches (INTS-2A) were carried out in addition to detailed designing, bidding assistance, management of implementation, and trial operations</p>
2. Implementation Schedule	Apr. 1994 - Apr. 1995	Jun. 1994 - Jun. 1995
Consultant selection (additional portion)	Aug. 1999	Aug. 1999
Consulting services (additional portion)	May 1995 - Dec. 1997 Aug. 1999 - Jun. 2000	Jul. 1995 - Aug. 1998 Aug. 1999 - Apr. 2000
Procurement of equipment (additional portion)	Jun. 1995 - Dec. 1995 Aug. 1999 - Apr. 2000	Jul. 1995 - Jun. 1997 Aug. 1999 - Apr. 2000
Manufacturing of equipment (additional portion)	Jan. 1996 - Aug. 1996 Aug. 1999 - Dec. 1999	May 1996 - Aug. 1997 Aug. 1999 - Dec. 1999
Civil engineering works	Mar. 1996 - Aug. 1996	Jan. 1997 - Jun. 1997
Installation of equipment (additional portion)	Sep. 1996 - Dec. 1997 Feb. 2000 - Apr. 2000	Jan. 1997 - Aug. 1998 Feb. 2000 - Apr. 2000
3. Project Cost		
Foreign currency	3,234 million yen	3,234 million yen
Local currency	913 million yen	872 million yen
Total	4,147 million yen	4,106 million yen
ODA loan portion	3,234 million yen	3,234 million yen
Exchange rate	1 dollar = 124 yen = 1,601 PYG (May 1993)	1 dollar = 111 yen = 2,619 PYG (average for 1995 – 2000)

## **Third Party Evaluator's Opinion on Project for Improvement of Earth Station for Telecommunication Via Satellite**

Oscar Carvallo  
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### **Relevance**

The PGP 10 project has substantially contributed in meeting the objectives established in Government of Paraguay's (GOP) plans for the period 1999-2003 in the area of international communications. This plan calls for an increase in the quality and competitiveness of public services provided by the GOP. It is assumed that infrastructure development and public utilities are the responsibility of the GOP. However, in the area of communication, services could be provided by the private sector, in which case the public sector would be only a regulatory agent.

The decision of the GOP to privatize the former communication agency ANTELCO, now COPACO, has met a very strong objection from the governing political party which, finally, aborted the privatization process. There is a wide consensus, though, that sooner or later privatization or a joint venture arrangement is the most likely outcome for COPACO's future. Regardless of whether the agency remains a government entity or becomes a private organization, the project's relevance will remain strong and valid. In the short and medium term, should COPACO remain in the public sector, its services will not lag behind international quality standards. On the other hand, if it becomes a private entity, the market value of its assets will maintain its integrity. Based on expert opinion from COPACO's technical staff, it should be assumed that the technology introduced under the project will remain viable at least until the year 2007 at which time new breakthroughs in technology will render current ones obsolete. It is expected that the communications sector will eventually move toward an Internet Protocol-based (IP) technology.

In the long run, if COPACO wants to operate competitively, it should expand the range of services offered to the local market, a very difficult proposition without a heavy investment in infrastructure and facilities. Given its present predicament on whether or not it should go private, or remain a public enterprise, it would be very difficult to attract investment thus jeopardizing its future financial feasibility.

### **Impact**

The project, through achievement of its stated goals, has successfully generated a number of positive impacts both in the quality and quantity of the services delivered to the population. A small survey conducted by the Third Party Evaluator among four leading firms who are heavy users of communications has indicated a substantial increase in the quality of the type of services provided by COPACO. The revenues generated by the project-financed facilities continue being an important share of the total company's income (approximately one third), in spite of the substantial drop in international telephone rates. In addition, the O&M operations and maintenance cost has dropped dramatically as a result of the reduced number of telephone operators hired (approximately 80% less) to run the new system.

Other unintended yet positive impacts are worth mentioning. As a result of the project, in the last few years there was a substantial reduction in telephone rates from \$3.00 per minute to \$0.20 per minute. This has resulted in a massive increase in the number of telephone calls. It has also allowed thousands of migrant laborers working in Argentina and other countries to call their relatives in Paraguay, an important social impact considering mitigation of homesickness of the affected population. Communities surrounding key facilities financed under the project have also gained access to badly needed telephone service that would otherwise not be available to them.