AFRICAN DEVELOPMENT BANK GROUP

SAO TOME AND PRINCIPE

TELECOMMUNICATIONS BETWEEN THE ISLAND OF SAO TOME AND THE ISLAND OF PRINCIPE

Project Performance Evaluation Report (PPER)

OPERATIONS EVALUATION DEPARTMENT
(OPEV)

20 April 1994

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CURRENCY - ACRONYMS AND ABBREVIATIONS

CURRENCY

Currency Equivalents

AT APPRAISAL (Q2.84)	ON COMPLETION (MAY 90)	AT POST EVALUATION (JUNE 92)
Currency Unit = Dobra (Db) FUA 1 = Db 41.6776 FUA 1 = US$ 0.980184	Currency Unit = Dobra (Db) FUA 1 = Db 170.017 FAU 1 = US$ 1.19813	Currency Unit = Dobra (Db) FUA 1 = Db 379.601 FUA 1 = US$ 1.26344

ACRONYMS AND ABBREVIATIONS

ADB	=	African Development Bank
CPRM	=	Compagnie Portugaise Radio Marconi, SA (Radio Marconi Ltd, Portugal)
CST	=	Sao Tome Telecommunications Compancy Ltd.
Db	=	Dobra
ENATEL	=	National Telecommunications Enterprise
ADF	=	African Development Fund
ML	=	Main Lines
OPEV	=	Operations Evaluation Office
GDP	=	Gross Domestic Product
GNP	=	Gross National Product
UNDP	=	United Nations Development Programme

DRSTP	=	Democratic Republic of Sao Tome and Principe
PCR	=	Project Completion Report
IERR	=	Internal Economic Rate of Return
IRR	=	Internal Rate of Return
BUA	=	ADB Unit of Account
FUA	=	ADF Unit of Account
ITU	=	International Telecommunications Union

FINANCIAL YEAR
1 January - 31 December

INTRODUCTION

The objective of this report is a post-evaluation of the Sao Tome and Principe Telecommmunications Project for which ADF granted loan N° CS/STP/TL/84/3 for a total amount of FUA 2,030,000 approved in November and signed on 18 December, 1984. This loan represented 89% of the project estimated at FUA 2,269,000. The project may be defined as follows:

- The Government of the Democratic Republic of Sao Tome and Principe was the borrower and ENATEL, the executing agency. Since 1 January 1990, CST has been providing telecommunications services in the country. This company which belongs to Marconi of Portugal (51%) and the Government of Sao Tome and Principe (49%) has inherited ENATEL's assets and liabilities and is the guarantor of the Fund's loan.

- The project was completed in December 1990, i.e. 53 months after the commencement of works with total implementation costs reaching Dbs 950.9 million equivalent to FUA 2.5 million. Full details of the project development stages are provided in the Project Completion Report, prepared by the Bank in June 1990.

The aim of this report is to update and complete the PCR, and review some elements of the project in greater depth.

Special attention will be paid to the institutional and financial aspects of the new telecommunications agency. The data used in this report were obtained during the June 1992 mission.

The project's financial internal rate of return is in the region of -8.34% while the economic rate of return is estimated at 4.20%.

BASIC DATA

PRELIMINARY DATA

COUNTRY	:	Democratic Republic of Sao Tome and Principe (DRSTP)
PROJECT	:	Telecommunications Project (Radio-Link)
LOAN	:	N° CS/STP/TL/84/3/ADF
BORROWER	:	Government of the Democratic Republic of Sao Tome and Principe
BENEFICIARIES	:	The Population of the Two Islands of Sao Tome and Principe
EXECUTING AGENCY	:	Empresa Nacional Telecomunicaçoes (ENATEL)
OPERATING AGENCY	:	Companhia Santomense de Telecomunicaçoes (C.S.T.)

A) BASIC DATA

		ESTIMATED AT APPRAISAL	ACTUAL
1.	DATE OF THE REQUEST	20/01/1982	
2.	LOAN AMOUNT (MFUA)	2.030	
3.	SERVICE CHARGE	0.75% per year on amounts disbursed and outstanding.	
4.	DURATION	50 years	
5.	GRACE PERIOD	10 years	
6.	REPAYMENT TERMS	1% of the principal per annum from 11th through the 20th year and 3% per annum thereafter	
7.	LOAN NEGOTIATIONS	---	
8.	BOARD APPROVAL	---	November 1984
9.	LOAN SIGNATURE	---	18 December 1984
10.	DATE OF EFFECTIVENESS	30 May 1985	10 April 1985

B) PROJECT DATA

		ESTIMATED (1984)		ACTUAL ON COMPLETION (1990)		ACTUAL AT POST-EVALUATION (1992)	
1.	TOTAL COST :						
	A- IN FUA	2,269,000		2,504,838		2,504,838	
	B- IN MILLIONS OF Db	94,565		425,865		950,839	
2.	FINANCING PLAN (FUA)						
	- ADF	2,023,000	89%	1,993,000	79.6%	1,993,000	79.6%
	- GOVERNMENT	246,000	11%	512,000	20.4%	512,000	20.4%
3.	DEADLINE FOR FIRST DISBURSEMENT	31/12/1985		31/12/1985			
4.	EFFECTIVE DATE OF FIRST DISBURSEMENT	---		30/12/1985			
5.	EFFECTIVE DATE OF LAST DISBURSEMENT	---		08/01/1990			
6.	DEADLINE FOR LAST DISBURSEMENT	31/12/1988		31/12/1990			
7.	START-UP OF WORKS AND STUDIES	Jan. 1985		Aug. 1985			
8.	END OF WORKS	Nov. 1987		Dec. 1988			
9.	DATE OF PROJECT COMPLETION	Nov. 1987		Dec. 1990*			

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* Work on radio link up - December 1988
Master Plan - September 1989
Additional Spare Parts - November 1990

C) PERFORMANCE INDICATORS (Basic Data)

C.1 Cost Overrun (at post-evaluation)

TABLE OF COST COMPARISONS								
	IN MILLIONS OF DOBRAS				EN UCF (1000)			
	At Appraisal	At Post-Evaluation	Differ-ence	%	At Appraisal	At Post-Evaluation	Difference	%
Works	78.3	780.6	702.3	897%	1,878.0	2,056.3	+178.3	+9.50%
Consultants	16.3	136.2	119.9	735%	391.0	358.7	-32.3	-8.0%
Studies		34.1	34.1			89.8	+89.8	
Totals	94.6	950,9	856.3	905%	2, 269.0	2, 504.8	235.8	+10.39%

Justification for cost overruns = the most realistic cost overrun is that experienced in FUA (10.39%). The large increase in Dobras (905%) is due to the high Dobra inflation rate and the 3 successive devaluations between appraisal and post-evaluation.

C.2	**Duration of Project Implementation**		
	- DELAY IN THE DATE OF EFFECTIVENESS	-1	-20%
	- DELAY IN THE DATE OF THE FIRST DISBURSEMENT	-	0%
	- DELAY IN THE DATE OF THE LAST DISBURSEMENT	12 months	33%
	- NUMBER OF EXTENSIONS OF THE DATE OF THE LAST DISBURSEMENT	2	
	- EXTENSION OF THE COMPLETION DATE:	13 months	36%
C.3	**Status of Project Implementation**	Completed	
C.4	**Institutional Performance**	Satisfactory	
C.5	**Performance of Contractors**	Satisfactory	
C.6	**Performance of Consulting Engineers**	Satisfactory	
		PAR PCR	PPAR
C.7	**Financial IRR %**	-13.6 -1.0	-8.34
C.8	**Economic IRR %**	----- -----	4.20
C.8	**Overall Evaluation of the Success of the Project**	Satisfactory	

D) MISSIONS

Types of Missions	Number	Date	Number of Persons	M/D
1. Identification				
2. Preparation	1	from 7 to 24-7-82	2	34
3. Pre-appraisal				
4. Appraisal	1	from 23-06 to 7-7-74	2	30
5. Loan Disbursement and Management				
6. Technical Superv./Mon.	1	from 10 to 18-10-88	1	8
7. Completion	1	from 14 to 23-05-90	2	20
8. Post-evaluation	1	from 09 to 17-06-92	2	20
9. Others (Donors' Meeting)				
Total				112

E) **DISBURSEMENTS** (IN THOUSANDS OF FUA)

	ESTIMATED	ACTUAL
TOTAL DISBURSED	2,023.00	1,992.60
AMOUNT CANCELLED	----	----
NOT DISBURSED	----	37.40

DISBURSED YEARLY

1985	1986	1987	1988	1989	1990
68.4	----	155.4	734.1	841.7	193.0

F) PRINCIPAL CONTRACTORS AND WORK IMPLEMENTED

BID PACK.1: CONTRACTOR	:	S.A.T.
NATURE	:	Transmission Equipment
DURATION OF CONTRACT	:	18 mois
DATE OF SIGNATURE OF CONTRACT	:	06-06-1987
DATE OF COMPLETION OF CONTRACT	:	31-11-1988
VALUE OF CONTRACT	:	US$ 1,726,208.2

BID PACK.2: CONTRACTOR	:	E.G.M.
NATURE	:	Buildings
DURATION OF CONTRACT	:	10 months
DATE OF SIGNATURE OF CONTRACT	:	08-06-1987
DATE OF COMPLETION OF CONTRACT	:	31-11-1988
TOTAL VALUE OF CONTRACT	:	FF 1,391,617.55

BID PACK.3: CONTRACTOR	:	STANDARD ELECTRICITY
NATURE	:	Telephone connecting cables
DURATION OF CONTRACT	:	12 months
DATE OF SIGNATURE OF CONTRACT	:	05-11-1987
DATE OF FINAL COMMISSIONING	:	31-12-1988
TOTAL VALUE OF CONTRACT	:	US$ 49,820

BID PACK.4: CONTRACTOR	:	MINISTRY OF P.W.
NATURE	:	Access Road
DURATION OF CONTRACT	:	18 months
DATE OF SIGNATURE OF CONTRACT	:	23-05-1985
DATE OF COMPLETION OF CONTRACT	:	25-11-1986
TOTAL VALUE OF CONTRACT	:	Db 17,000,165.00

BID PACK.5: CONSULTING ENGINEER	:	I.T.U.
NATURE	:	Works supervision
DURATION OF CONTRACT	:	35 months
DATE OF SIGNATURE OF CONTRACT	:	25-11-1985
DATE OF COMPLETION OF CONTRACT	:	September, 1989
TOTAL VALUE OF CONTRACT	:	US$ 308,028

BID PACK.6: CONSULTANT	:	I.T.U.
NATURE	:	Study on the Telecommunications Master Plan
DATE OF SIGNATURE OF CONTRACT	:	22-02-1989
DATE OF COMPLETION OF CONTRACT	:	September 1989
TOTAL VALUE OF CONTRACT	:	US$ 107,576

G) OTHER PROJECTS FINANCED BY THE BANK GROUP IN THE TELECOMMUNICATIONS SECTOR IN THE ISLANDS OF SAO TOME AND PRINCIPE

Project Loan	Amount N	(FUA Million)	Approval (D/M/Y)	Status of Implementat.	Completion PCR Month/Year	Post-evaluation /M/Y

----------NONE----------

SUMMARY OF THE AUDIT MEMORANDUM, CONCLUSIONS, LESSONS AND RECOMMENDATIONS

1. SUMMARY AND CONCLUSIONS OF THE MEMORANDUM

1.1 This performance audit memorandum concerns the "project for Telecommuncations between the Islands of Sao Tome and Principe".

The establishment of a direct visibility, medium capacity, high frequency telecommunications radio link operating in the 2 GHz waveband has made it possible to open up the Island of Principe.

1.2 The poor telecommunications links between the two islands persuaded the Government of Sao Tome and Principe to make a request to ADF to finance a telecommunications project. This request was initiated in 1982 by a feasibility study made by ITU on ABEDA financing.

1.3 The financial budget was set at FUA 2.269 million, FUA 2.023 million, of which was in foreign exchange (ADF contribution) and FUA 0.246 million in local currency (the Government's contribution).

1.4 The loan, which was appproved by ADF in November 1984, was signed in December 1984 and became effective on 10 April 1985, namely one month before the projected date.

1.5 In 1992, the real cost of the project was FUA 2.504.838 million which corresponds to 950.839 million Dobras. The loan of FUA 2.030 million covered the totality of foreign exchange expenditures, namely 79.6% of the total project cost. On completion, there was an undrawn balance of FUA 37.40 million.

1.6 The project was completed 13 months behind schedule, due mainly to the delay in recruiting the consultant and the time taken by the Government to approve the bidding documents. This delay did not affect the project cost.

1.7 On the whole, great efforts were made to address all the difficulties and ensure the succesful implementation of the project.

1.8 The work was implemented in accordance with the contractual terms. The procurement of goods and services was satisfactory and the supervision, monitoring and consultant's advice contributed to the success of the project.

1.9 In general, the technical criteria for project design and the quality of the equipment and materials selected and installed were satisfactory. The system installed will undoubtedly have a long economic life.

1.10 With regard to operations, the privatization of the company will ensure the continuity of the project, for it will provide the capital for expansion, maintenance and continuing staff training.

1.11 From a financial standpoint, a positive result was not to be expected right from the appraisal and design stages of the project. Despite the large increases in the tariffs for telecommunications services, the estimated IRR is in the region of -8.34%.

Such a result should not be surprising, if the investment cost per subscriber is taken into account (more than US$ 25, 000).

1.12 The internal economic rate of return is estimated at 4.2%. There has been considerable spinoff from the implementation of this project concerning both the inhabitants of Sao Tome and those of Principe.

2. LESSONS

2.1 A project design based on a sound feasibility study is a factor for long-term success.

2.2 Sound technical supervision by the Consulting Engineer will make a substantial contribution to the project's success.

2.3 The organizational and staff training aspects are factors in the success of the project as well as evidence of institutional viability; and

2.4 Demand should be analyzed accurately, taking into consideration the socio-economic aspects of the different categories of beneficiaries.

3. RECOMMENDATIONS

3.1 To ensure that the operating agency is in a sound financial position, the State should settle payment arrears and set up a continually improving collection system (initially, the system of compensation could be used).

3.2 Clarify the relationship between the State and CST by establishing a Telecommunications Directorate within the Supervising Ministry which will ensure the overall monitoring of regulations and the allocation of frequencies.

3.3 Effort should be made to provide adequate regulations for the telecommunications sector to ensure its development.

3.4 The Government should confirm to ADF that the debt service will be paid by CST during the franchise period.

3.5 A financial audit should be carried out by a qualified international firm.

3.6 The Government should set up the structure recommended by the study conducted on UNDP financing to improve the management of public funds.

3.7 Particular emphasis should be placed on the rehabilitation and regular maintenance of the two access roads to the Macambrara and Sundi sites.

1. GENERAL PROJECT BACKGROUND

1.1 Geographic and Economic Setting

Sao Tome and Principe is an island State situated in the Gulf of Guinea 300 km west of Gabon.

Its territory comprises the islands of Sao Tome (836 km^2) and Principe (119 km^2) plus many small islands the largest of which is Das Rolas (2 km^2).

The country's current total population is around 112,000 inhabitants 106,000 of whom are in Sao Tome and 6,000 in Principe. According to the 1981 census, the country's largest towns are: the capital, Sao Tome (35,000 inhab.) Trindade (11,338 inhab.),Santana(6,190 inhab), Angolares (3,311inhab), Guadalupe (3,889 inhab.), Neves (5,919 inhab.) and Santo Antonio (5,255 inhab.); the latter is located on the island of Principe.

The official language of this former Portuguese colony, which has been independent since 1975, is Portuguese.

Sao Tome and Principe's economy is agriculture based (cocoa, coffee, coprah and oil palm) which represents more than 25% of the country's GDP.

The annual rise in GDP in real terms since 1987 varies between 2% and 3.5%. The trend in GDP growth during the 1992-1994 period is expected to fluctuate between 4% and 6% per year, due mainly to tourisme and fisheries, two sectors which have greatly benefited from foreign investments.

1.2 Telecommunications Sector Problems

1.2.1 Background

Since its independence on 12 July, 1975, the Government of Sao Tome and Principe has attached priority to the development of the telecommunications sector.

On 1 January, 1992, the Government split posts and telecommunications into two separate enterprises.

- The Telecommmunication Enterprise (ENATEL) comes under the Ministry of Social Equipment and the Environment and is 100% owned by the State of Sao Tome and Principe; and

- The Post Office which distributes mail.

In December 1989 a franchise contract for the telecommunications public service was signed between the Goverment and Radio Marconi Ltd., Portugual (CPRM). The franchise was awarded to the Companhia Santomense de Telecomunicaçoes, Ltd. (CST) a mixed enterprise in which CPRM has a 51% holding and the State 49%.

1.2.2 General Statistics

Between 1980 and 1983, much of the country's telecommunications system was rehabilitated. The telephone exchanges, cable networks and interurban links were replaced in all the major towns of the country. The number of main lines increased from around 800 in 1979 to more than 1, 820 by the end of 1983.

Despite these major investments, the link between the islands of Sao Tome and Principe was provided by a HF system of poor quality and insufficient capacity (a telephone and cable circuit).

According to ITU data, in 1984 Sao Tome and Principe had the fourth highest telephone density per hundred inhabitants after South Africa, Algeria and Egypt (see Annex 2).

This relatively high rate for a country, the GNP per head of which fluctuates around US$400, is principally due to two factors:

1. the high level of investment in the telecommunications sector which covers a large proportion of the country's population (91.1% of potential demand is satisfied)

2. the lowest tariffs on the African continent (see Annex 3).

1.3 Socio-economic Background of the Impact Area

The project impact area, the island of Principe is situated around 160 km north of Sao Tome. It covers an area of 119 km^2 and has a total population of around 6,000 inhabitants, namely 5% of the total population of the country. In view of the nature of the project (interurban link up), the extended impact area is the whole of the country affecting a population of 112,000 inhabitants.

The island of Principe's principal economic activity is agriculture and a large part of the production is given over to coffee.

Roads are much less developed in Principe than in Sao Tome while public electricity is available 9.5 hours per day in Santo Antonio, the principal town in which almost 90% of the island's total population lives.

1.4 Identification, Preparation and Appraisal

1.4.1 Project Genesis

Because of the poor telecommunications links between the islands of Sao Tome and Principe, the Government of that country made a request to the Bank for the financing of a telecommmunications project in 1982. The project feasibility study, concerning the establishment of a medium capacity direct visibility telecommunication radio link-up operating in the 2 GHz wave band was conducted by ITU experts on ABEDA financing. This study showed that this project could largely meet the demand for telecommunications between the islands of Principe and Sao Tome. The financial budget was set at FUA 2.269 million with a rate of return of 9.63% with extension of the Principe network or -13,6% without extension of the network.

1.4.2 Project Objectives

The project's principal objective was to open up the island of Principe by providing a reliable, high quality telecommunications system with sufficient capacity to meet demand and connect its telephone exchange automatically to the one in Sao Tome, the country's capital.

Although unquantified the long-term benefits of the project for Principe were, on the one hand, improved administrative and economic relations with the capital and on the other, the encouragement of economic activities such as tourism and agriculture.

1.4.3 Project Components

In general terms, the radio network links up the exchanges in Sao Tome and Santo Antonio (Principe). (See diagram attached in Annex of PCR).

The line is composed of three bonds:

-Sao Tome - Macambrara
-Macambrara - Sundi
-Sundi - Santo Antonio

The principal project components are the following:

A) Radio and Multiplex Equipment

This component comprises the purchase and installation of:

- a radio-electric terminal at Sao Tome and at the terminal station of Sundi (Principe);
- a radioelectric relay at the Macambrara relay station (Sao Tome);
- frequency and space diversity and remote monitoring devices and baseband switching of type 1+1;
- multiplexing equipment at the terminal stations.

Overall the original specifications were complied with.

The technical modifications made are discussed in chapter 2.2 (modifications during project implementation).

B) Masts, Shelters, Enclosures and Feeder Roads

- The feeder road which at appraisal, was to be 4.6 km was extended to increase the altitude of the Macambrara station thus accruing additional local currency costs. This deviation from the budget was absorbed by ENATEL.

- The braced masts, shelters and enclosures were constructed in accordance with the specifications. The initially planned 50 m^2 building for operating machinery made it possible to accommodate two offices and a laboratory.

C) Connecting Cables

The original specifications included the delivery of cables of 60 pairs over a distance of 0.7 km in Sao Tome and 5 Km in Principe.

D) Energy

- According to the original specifications, this component consisted of the purchase and installation at Macambrara and Sundi of solar energy equipment with and output of 1,000 w crest comprising solar panels, battery regulators and associated batteries with an autonomy of at least eight days.

- A 48 V battery was installed at Sao Tome.

E) Maintenance Equipment

- This component involved the purchase and installation of spare parts for radio and multiplex equipment (for a period of four years), measuring devices, two vehicles, two 48 V mobile generators.

F) Training

- An engineer and four technicians were to be trained for a period of three months with the manufacturer of equipment and the second phase was to be on-site with the assistance of the consultant; on completion eight persons had been trained (1 engineer and 7 technicians).

G) Consultant

- The consultancy services were to start in August 1986, but started in March 1987. The consultant provided by ITU helped to update the

technical specifications, bidding documents and evaluate bids with ENATEL, as well as with the negotiation of contracts, works supervision and the installation of equipment. The consultant's services were 30% below the estimated costs. The surplus was used to cofinance the master plan with UNDP.

1.4.4 Works Design

The problem was to link up the two islands and find a solution to the sea crossing, for the choice of system was limited in view of the existing technologies in 1983.

- Overall the system was well designed and specified. At the time, digital radiolinks were not very widespread. In addition, the distance of 176.5 km between Macambrara and Sundi was great and almost entirely over water which could therefore create reflection problems. The system retained was adapted to this situation (it exists in Sicily and Saudi Arabia over the Red Sea).

- The technical problem was resolved with adequate frequency and space diversity devices (Macambrara-Sundi diversity 4 of 8 Mbit/s).

- The field visit during the performance audit mission made it possible to verify that the system has been operating very well since its completion. The earths, enclosure, etc. are also well designed and all the security factors are satisfactory.

1.5 Executing and Operating Agency

1.5.1 Executing Agency

The loan agreement between the Government of Sao Tome and Principe and the African Development Fund (ADF) signed on 18 December 1984 designated ENATEL as the project executing agency.

The technical and financial management of the project was carried out entirely by the enterprise for its duration. ENATEL's mandate included disbursement requests, the preparation of activities reports, the award of contracts, and the monitoring of consultants and contractors' activities.

1.5.2 Operating Agency

The operating agency between the date of completion of the work on the radio link-ups in December 1988 and December 1989 was ENATEL. Since 1 January 1990 CST acted as the operating agency.

1.6 Project Costs and Financing

The financing plans at appraisal and completion are set forth as follows:

Comparative Table of Financing Plans
in FUA 1,000

	F.E.		L.C.		Total		Diff.
	Est.	Actual	Est.	Actual	Est.	Actual	
ADF	2,023	1,992.60			2,023	1,992.60	-5%
GOVERNMENT			246	512.24	246	512.24	108%
TOTAL	2,023	1,992.60	246	512.24	2,269	2,504.84	+11.2 %

Analysis of this comparative table and the trend of the different costs by component in paragraph 3.5 of the PCR reveals that:

i) The 108% increase in the Government share is mainly due to the extension of the access road to the Macambrara station in Sao Tome (a component, the total cost of which was borne by ENATEL). This increase was completely absorbed by the Ministry of Public Works in Sao Tome.

ii) The decline in ADF financing is mainly due to the fact that the consultant's services were less expensive than estimated (ITU's billing, therefore was closer to the real cost).

2. PROJECT IMPLEMENTATION

2.1 Loan Negotiations and Signature

The Government of Sao Tome and Principe initiated the project in 1981. A feasibility study of the Sao Tome - Principe link was conducted by ITU and financed by the Arab Bank of Economic Development in Africa (ABEDA). In January 1982, the Government submitted a request for financing to ADF.

The investment to be made to supply 400 to 500 subscribers by 2000 was too high in relation to GDP. Despite that the technology selected was suitable and represented a minimum investment to cover the planned number of subscribers.

2.2 Modifications

Overall there were no major modifications to the project. The most important secondary modifications to the project are the following.

a) The change in the position of the Macambrara mast required a greater local currency investment which was fully absorbed by the Sao Tome Ministry of Public Works.

This modification had no major impact on the works completion date.

From a technical and functional standpoint, the moving of the mast to a higher position should make it possible to serve other areas of the island of Sao Tome. From this standpoint that solution appeared more attractive than the basic solution and is thereby technically justified.

b) The other modification concerns the master plan studies which were one of the conditions of the loan that the Government of Sao Tome was to fulfill by the end of December 1987. Since the Government was still unable to finance the study in early 1988, ADF and UNDP agreed, for an amount of US$107.000, to finance the services of the ITU experts including the director of the study who had taken part
in the suppliers selection committee and supervision of the works. These studies were initiated after the radio link was completed in September 1989. This master plan provides the country with a coherent, and thoroughly mastered strategy for

the development of telecommunications. In fact, all the specific studies which were prepared will serve as a basis and framework for the preparation of future projects.

c) The two other secondary modifications to the terminal station and the connecting cables to the telephone exchanges, were discussed in paragraph 3.2 of the PCR.

2.3 Implementation

2.3.1 Loan Effectiveness

The loan, appproved by ADF in November 1984, was signed in December 1984.

The Government made the necessary commitments and the loan became effective on 10 April 1985, or one month before the anticipated date.

2.3.2 Compliance with ADF Loan Conditions and Procedures

The conditions prior to the first disbursement as well as the other conditions were complied with, except for the plan for the repayment of the arrears of public corporations and no action has been planned to correct this situation.

However, privatization of ENATEL does not affect commitments with regard to ADF. In fact, all contractual obligations have been transferred to CST.

However, the Bank was neither informed nor consulted during the ENATEL privatization process by the Sao Tome and Principe authorities who could have benefited from the Bank's advice in defining CST's obligations in view of the State's commitment and with regard to future investment programmes in the telecommunications sector.

2.3.3 Procurement of Goods and Services

With regard to the ADF financed component, it should be mentioned that, overall, the procurement of goods and services took place in accordance with the usual procedures of ADF.

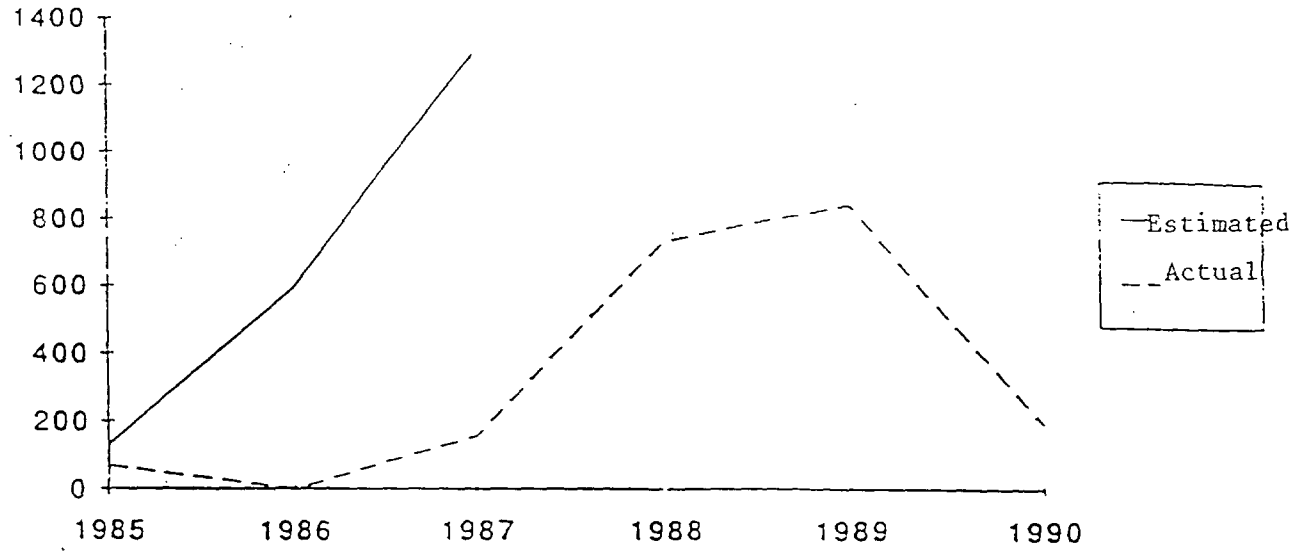
2.3.4 Disbursements

The first ADF disbursement in 1985 corresponds to the payment made to ITU on December 1985 when the contract became effective.

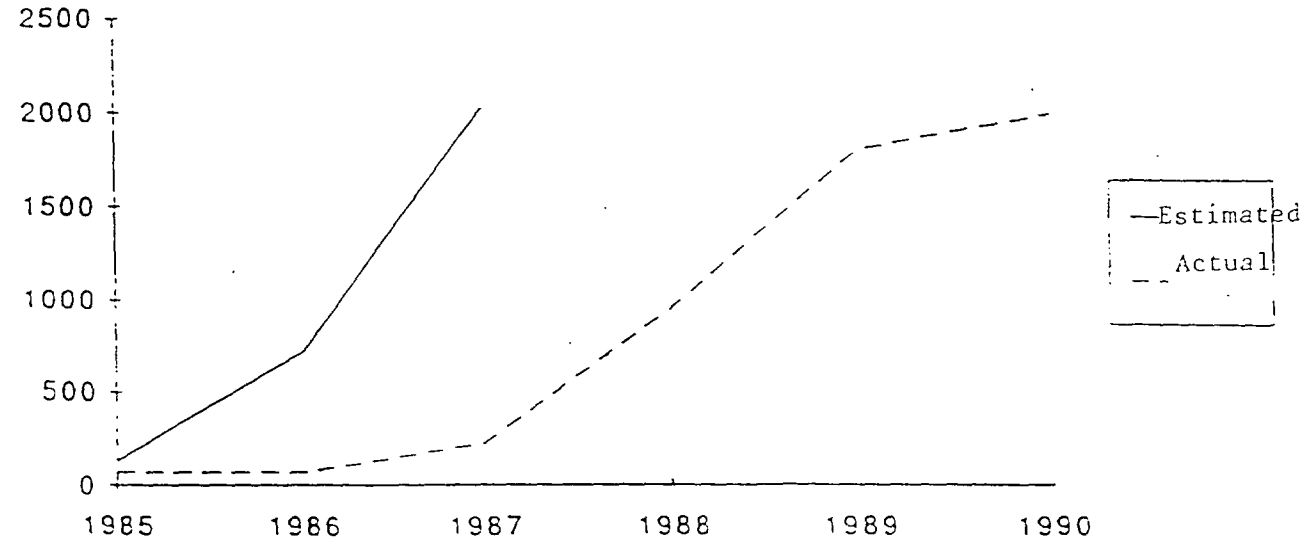
The second payment was made in 1987 when the supplies and works contract was signed and it coincided with the start of the physical project works.

The following graphs show the disbursement trend, details of which are provided in Annex 4:

a) Graph - ADF Disbursements in UA 1000



b) Graph-Cumulated ADF Disbursements in UA 1000



It is noted that the disbursement forecasts are below actual disbursements. They should have been in relation to the repayment schedule.

2.3.5 Implementation Schedule

The overall delay of 13 months in the date of works completion is partly due to the delay in recruiting the consultant and the time taken by the Government to approve the results of the bidding analysis.

This delay did not, however, lead to any additional expenditure. However, it is not easily justifiable and should be reduced in future.

2.4 Supervision and Monitoring

2.4.1 The Consultant

The consultant assigned to the project was the ITU expert who also took part in the suppliers' selection committee. His technical supervision was very good and he monitored the training of local managers who now satisfactorily ensure the operation of the system established.

He also assisted with the preparation of the telecommunications master plan.

2.4.2 The Executing Agency

The executing agency was ENATEL, the State Telepone Company. The progress reports were submitted slightly behind schedule to the Bank just at the start of work.

2.4.3 ADF

ADF only carried out one monitoring mission during the project. This was insufficient. This lack of supervision was offset by the efficiency of the consultant.

3. PROJECT RESULTS

3.1 Technical Results

A radio transmission system with a medium capacity of 120 channels was installed to link the subscribers of Sao Tome (the island of Sao Tome) and Santo Antonio (the island of Principe). The radio link (digital) consists of three bonds and a passive transponder; this makes it possible to achieve high quality commmunications across 176 km of sea in all weathers.

The system has operated very well since its completion on 31 November 1988 despite the extremely difficult access conditions to the transmitter sites.

This system is capable, subject to further small investments (around US$150, 000) of also transmitting data and radio and television programmes.

3.1.1 Radio and Multiplex Equipment

The multiplex terminals in Sao Tome and SUNDI have a rated capacity of 30 channels but only have 24. The equipment for the radio terminals for each of the islands has a rated capacity of 480 circuits but is only equipped for this phase with 24 telephone and 2 cable circuits.

Moreover, the Macambrara radio relay and the SUNDI radio terminal are equipped with space and frequency diversity devices.

The equipment installed is functioning very well and did not show any deterioration in the tests.

3.1.2 Connecting Cables for Telephone Exchanges

The equipment had initially been omitted for there had been no switching analysis at the time of the feasibility study.

The connecting cables were vital to interconnect the circuits to the analog switchboards. Since the purchase, outwith the project, of an EMPTEL digital switchboard (EWSD) in Sao Tome (max 1828 lines) and in Santo Antonio (max 160 lines) the two connecting cables are no longer in use.

The cables were supplied by Portugal's Standard Electric. The equipment was delivered and installed on 31 December 1988, but was not commissioned, for the supplier did not submit the plans for attaching them to the system despite several reminders.

3.1.3 Masts

The Macambrara and SUNDI masts were installed according to the technical specifications (i.e. respectively 72 and 60m). With regard to the other masts and in view of the design change to the link between SUNDI and SAN ANTONIO to ensure a better performance of the system, 2 were installed (1 of 24 m at Alto Nazaré and 1 of 8 m at San Antonio) as a replacement for the initially planned 8 m pylon at Sao Tome.

The masts are all in good condition and have a good earthing system.

3.1.4 Shelters, Enclosures, Buildings

Overall the building in Sao Tome is in good condition with adequate ventilation and good earthing. The same applies to the shelters in Macambrara and Sundi.

In addition, the metal enclosures are in good condition but painting will be required in all the sites especially at Sundi and Alto Nazare where the humidity is greater. The enclosure gates at Alto Nazare and Sundi must be changed regularly since they are rusty and have holes in them.

3.1.5 Access Roads

At appraisal, the construction of a 4.6 km access road was planned in Macambrara. At the consultant's suggestion it was decided that the road should continue a further 500 metres higher to enable a better view of the island of Sao Tome.

Shifting the mast to a higher part of the mountain would also make it possible to link Sao Tome with several regions of the island through Macambrara for a very low marginal cost.

Although the road was constructed in accordance with strict specifications, it is now in very poor condition and requires major maintenance work.

It has been noted that the Sundi access road is in very poor condition and virtually inaccessible during the rainy season. This access road is not a direct part of the project but may prevent proper site maintenance.

3.1.6 Energy

According to the original specifications, the component concerning energy for the supply of the system were the following:

Sao Tome - 48V batteries

Macambrara - 1,000 W crest solar energy comprising solar panels, regulators and associated batteries.

Sundi - 1,000 W crest solar energy comprising solar panels, regulators and associated batteries.

In addition, two 5 KVA mobile electric generators with 48 V rectifiers FUA 15 to 10,200/generator were planned. On completion, these items of equipment had been replaced by fixed electric generators installed in Sao Tome, Macambrara, Sundi and Santo Antonio.

The Sao Tome and Santo Antonio generators were added to meet the shortage of public electricity which was quite frequent, particularly in Santo Antonio where batteries are in great demand and therefore require much more maintenance and supervision.

All the energy equipment is in good condition and functioning in accordance with the specifications required at purchase.

3.1.7 Maintenance Equipment, Spare Parts and Documentation

In all the sites the spare parts are well stocked and classified and the quantity selected seems adequate. The largest investment in maintenance materials was the purchase of 2 vehicles (one in Principe and the other in S. Tome).

The Sao Tome vehicle is in good condition despite the poor state of the Macambrara access road. In its replacement programme CST has planned to purchase a new vehicle for the island of Principe to replace the one purchased under the project but which has to be scrapped because of the poor state of the access road.

In general, the testing equipment and the documentation are generally in good condition.

3.1.8 Training

It was initially planned that an engineer and four senior technicians would be trained using ADF funds.

On completion three other officials had been trained from the master plan funds.

In all 8 people (1 engineer and seven technicians) had been trained. It was noted that the quality of this staff was adequate and the knowlege acquired is still being applied.

3.2 Impact on the Environment

The whole project has had no significant impact on the environment. The technology used (radio link) causes no deterioration of the environment for it does not require the construction of actual poles and lines along the route.

4. PERFORMANCE EVALUATION

4.1 Project Performance

4.1.1 Operational Performance

4.1.1.1 The Operating Agency

Before tackling the issues concerning the overall management of the operating agency, we shall set forth the broad lines of the terms of the CST franchise contract.

In December 1989, a franchise contract concerning the telecommunications public service was concluded between the Government of the Democratic Republic of Sao Tome and Principe and Radio Marconi, Portugal Ltd. (CPRM).

The franchise commenced on 1er January 1990 and is valid for a period of 20 years renewable for a similar period if the two parties consider it necessary.

The franchise was awarded to the Companhia Santomeense de Telecomunicaçoes (CST), a mixed enterprise with a capital stock of 246 million Dobras in two shareholdings: CPRM (51%) and the State of Sao Tome and Principe (49%).

The Chairman and two advisers are appointed by CPRM while the Government appoints two advisers. CST's commitments include a short and medium-term investment plan totalling US$ 12 millions over 10 years plus a training programmme costing US$ 76,000 per year.

With regard to tariffing, the Government, through the Minister responsible for the telecommunications sector, and on the recommendation of CST, sets the overall principles governing the revision of tariffs:

- the national services tariffs are set in accordance with the economic and social assessment of the country, with a view to making the enterprise profitable;

- the international service tariffs take into account the value of negotiated international charges.

CST pays a franchise charge of 20% of the operating cost flow.

During the first five years of the franchise, CST received total exoneration from taxes, duties, levies and other fiscal constraints. In the 5 following years the franchise received reductions of 80%, 60%, 40%, 20% and 10% respectively.

Under the terms of the franchise contract, CST inherited all the assets and liabilities of ENATEL.

The obligation to pay ADF's debt is automatically transferred to CST which, by agreement, has 20 years in which to repay the debt to the Government of Sao Tome while the latter has a 50-year repayment period with regard to ADB.

4.1.1.2 Tariffing

New tariffs have been applied since July 1992. This latest increase is the third since privatization. Connection costs have increased significantly to cover the installation costs.

Moreover, in order to improve its financial position, CST introduced a parallel tariffing system for foreign firms operating in the country. These subscribers are automatically billed for all the services (local, interurban and international) in US$.

With regard to international calls, a high temporary increase of around 30% was introduced, which tended to balance the inflow/outflow of foreign exchange with international organizations such as INTELSAT. Due to this new international tariffing, there is now a surplus regarding the sharing of income with international partners.

4.1.1.3 CST's Policy

One of the conditions of the ADB loan was the preparation of a master plan. The master plan was prepared by ITU experts with a joint ADF-UNDP financial contribution. The master plan which was completed in 1990 was approved in principle by CST although it established its own investment organization structure, staff training and computerization programmes.

In broad outline, there is no significant difference between the policy of CST and that of the master plan.

a) Investment Programme

Since January 1990, CST has invested US$ 4.5 million in Sao Tome and Principe. In 1991, CST purchased a digital switchboard in Sao Tome with two concentrators assembled and installed at Trindade and Santo Antonio (Principe). In addition, an 8 Mbit/s radio link between Trindade and Sao Tome was installed by using the 34 Mbit/s link between Sao Tome and Macambrara.

This digital switchboard made it possible to improve output technically and the management of subscribers especially with regard to billing.

Moreover, an optical fiber transmission system between the earth station and Sao Tome's National Television (TVE) was installed to receive television programmes via satellite. Finally, systems of alternative energy to the public network have been installed in Sao Tome and Trindade (electric generators, batteries, etc.).

b) Billing

A computerized subscriber billing and accounting centre was established to enable the administration to speed up the billing process which is now 3 to 4 months beyond schedule. In view of the high annual inflation rate (60% in 1991), the company is losing income in real terms in substantial amounts.

Billing is expected to be fully automatic by the third quarter of 1992. The improved billing system has not removed the impact of unpaid Government arrears which, in February 1992, amounted to 151 million Dobras.

c) Staff and Training

In 1991 the enterprise employed 213 people, i.e. an increase of 2 over the previous year. A new organization chart is expected in the course of this year. This restructuring anticipates a reduction in overstaffing to around 200 employees by the end of the year.

Training courses which vary between 15 days and 3 months are scheduled for the year and concern 23 employees.

4.1.2 Financial Performance

According to the 1984 appraisal report, the internal rate of return (IRR) of the project was estimated to be 9.63% under the scenario of an extension of the Principe system and -13.6% without the extension.

On completion of the project, the PCR estimated the IRR to be -1% without an extension of the system.

The final evaluation projects an IRR in the region of -8.34%. This downward evaluation in relation to the PCR is mainly due to the slow development of demand both in the whole country and in Principe.

The slow growth in demand is due to the considerable increase in tariffs since privatization (although this tariffing increase is, moreover justified to ensure the sound management of CST).

The table in Annex 5 compares the demand forecast of the Master Plan with those of this report for the district of Pague (Principe). The gap between the two estimates increases over time (from -5% in 1990 to almost -128% in 2010).

The final estimation, while it is based on an increase in tariffs, takes into account the fact that several subscribers have been disconnected due to non-payment since 1990 (73 subscribers in 1990 and 221 in 1991 for the whole country). Moreover, several major projects planned for Principe in 1990 do not appear to be materializing. The only major project is the construction of a hotel at Bombom with a capacity of 30 rooms. A sensitivity test on tariffs shows that the IRR is -6.63%, -5.23% and -4.04% with respective tariff increases of 10%, 20% and 30% (see tables in Annex 8).

The financial situation of CST improved between 1990 and 1991. The operating revenues grew from 346.8 to 649.9 million Dbs. This increase was due to a large extent to inflation (around 60%) and the new tariff increases since 1990.

Operating expenditure increased from 346.7 million Dbs in 1990 to around 661.3 million in 1991. This increase was due, on the one hand, to inflation and the increase in amortization costs.

Annual losses fell from 41.9 million in 1990 to 11.4 million in 1991. Finally CST's debt ratio in 1991 stood at 81% of its total assets. The main reason for such a ratio is the high level of investment since privatization as well as by the transfer of the ADF debt. The Marconi Company of Portugal guarantees a large part of the debts to suppliers.

Moreover, receivables reached 397.5 million dobras (61% of the annual income) in 1991. A major part of these accounts comes from private sector as well as Government accounts unpaid for some years.

The new policy of disconnecting customers who have not paid their bills for more than 3 months should significantly reduce receivable accounts.

Due to a policy oriented towards the profitability of the enterprise, CST's financial situation should significantly improve from 1992.

4.1.3 Economic Performance

4.1.3.1 Economic Results in the Telecommunications Sector

The implementation of the project has had direct positive effect on the telecommunications sector:

a- The 50 m^2 building which was originally designed to accommmodate the equipment of the Sao Tome terminal station also accommodates two offices and a laboratory.

b- The telecommunications master plan for 1990-2010 has been prepared as a result of pressure from the Bank which made it a condition of the project loan for a radio link-up between Sao Tome and Principe.

ADF cofinanced this study with UNDP.

c- The eight ENATEL officials who were trained for the project are now able to use modern operating and maintenance techniques for all the enterprise's operations

d- The automatization of billing began in July 1989 due to the training of employees assigned to the radio link-up project.

e- The electric generator installed for the Sao Tome terminal station is also used to back-up the telephone exchange in the event of public electricity power cuts (although a second electric generator had been purchased with the EMPTEL digital exchange).

f- The extension of the access road made it possible to install the mast at an altitude which could serve other localities of the island, not included in the project. As a result, the benefits are huge, for it is no longer necessary to build a new station for the future servicing of these areas.

4.1.3.2 Results in the other Sectors of the Country's Economy

No quantitative evaluation has ever been done to assess the economic spin-off of the project. It was noted that the construction of the access road to Macambrara has made it possible to create jobs in the agricultural sector where several small market garden operations have sprung up along the road.

This road thus makes it possible for several hundred farmers to gain access by foot or vehicle to previously non-existent fields. Some private houses are also beginning to appear around the road.

In addition, Monte Cafe (a coffee growing company) uses much of the road to transport its coffee. Lorries from this firm, have also seriously affected the condition of the road.

In Principe the population is much less isolated as a result of the project, thus making it possible to communicate with the capital and the rest of the world.

The opportunity cost is air transport which cost 14,246 Dobras for a return ticket from Sao Tome to Principe. However, the impact of the telecommunicationss project will be greater when construction of the Papagaio hydro-electric dam is completed.

At present public electricity in Principe is limited (9.5 hours per day at most) which is discouraging tourism, trade and the establishment of industries. The construction of the hydro-electric scheme at Papagaio has certainly been facilitated by the existence of the telephone service in Santo Antonio (the island of Principe). The project will also make the implementation of other technical assistance projects easier.

The economic analysis tables are presented in Annex 7. The internal economic rate of return (IRR) is evaluated at 4.2%. The following scenarios were used for the economic evaluation:

a) Monte Cafe

The road to Macambrara would enable lorries from Monte-Cafe to transport coffee to the distribution centres. The annual economic savings were estimated at US$ 50,000 in 1991 and are expected to reach US$ 100,000 in 2010.

b) Agricultural Development

The access road to Macambrara has also made it possible for several smallholders to settle in the area to carry out market gardening. This activity which was completely non-existent in this area was estimated at US$ 25,000 in 1991 and is expected to reach US$ 50,000 in 2010.

c) Economic Impact in PRINCIPE

Overall, it is expected that much will be achieved as a result of the project, combined with the construction of the hydroelectric dam in Papagayo. This amount will vary between US$ 80,000 in 1991 and US$ 250,000 in 2010.

4.1.4 Institutional Performance

The existing CST management has been greatly improved since privatization in 1990.

The quality of service is ensured by a capital contribution for expansion, maintenance and on-going staff training.

In addition, tariff increases of more than 30% in international communications and a more rigorous debt recovery policy will considerably improve the enterprise's financial situation which showed an alarmingly high deficit before privatization.

4.2 Performance of the Parties

4.2.1 ADF

The Bank, which only carried out one monitoring mission during the project, was kept informed of the situation through the quarterly reports prepared by the consultant.

4.2.2 The Executing Agency

ENATEL's performance evaluation is described in chapter 3.7 of the Completion Report. The criticism aimed at ENATEL is of an administtrative nature and concerns the preparation of activities reports and the preparation of the list of goods and services. These shortcomings were particularly in evidence at the start of the project.

In addition, the participation of ENATEL's technical employees both during the implementation of the project and during training was satisfactory.

ENATEL also worked closely with the ITU expert.

4.2.3 The Other Operators

a-The Consultant

With regard to works supervision and the training of technical staff, the ITU expert was excellent.

With regard to the master plan, although it was satisfactory from a technical point of view, it lacks rigour with regard to demand forecasts, both for the whole country and the island of PRINCIPE. This study should have taken into consideration a classification of potential customers on the basis of their incomes and in relationship to GNP.

Even if, at the time, telephone tariffs were the lowest on the African continent, demand forecasts for 1990 and 2000 were too high for a country with a GNP of around US$ 400 per capita despite optimistic economic forecasts.

b. The Government of Sao Tome and Principe

In view of its financial commitment, the Government of Sao Tome and Principe should have informed ADF of, and involved it in, the ENATEL privatization process.

5. PROJECT VIABILITY

5.1 Technical Viability

Overall, the technical criteria of project design and the quality of the equipment and materials selected and installed are satisfactory. The system installed will undoubtedly have a long economic life.

On all the sites, the spare parts are well stocked and classifed. The testing equipment and documentation are in good condition.

The system is monitoring and maintenance procedures are adequate while staff training is part of the enterprise's five-year plan.

The spare parts, testing and measuring instruments as well as the training of technical staff will guarantee the durability of the system.

5.2 Financial Viability

From the appraisal and establishment of the project, it was impossible to expect a positive financial result, for the principal objective was to open up the island of Principe and develop the region.

Despite major increases in the tariffs of the telecommunications services since the opening of the radio link-up between Sao Tome and Principe, the estimated financial internal rate of return of the project has been in the region of -8.34%. A sensitivity test shows that, even with tariff increases in the region of 30%, the rate of return remains negative (-4.04%). Above such a level the vast majority of subscribers would be unable to pay for telecommunications services.

This result should not be surprising when the investment cost per subscriber is considered (more than US$ 25,000).

5.3 Economic Viability

The internal economic rate of return is estimated at 4.2%. The implementation of this project has had considerable impact affecting both the inhabitants of Sao Tome (access road to Macambrara) and those of Principe.

In addition to the quantified aspects, we should also understand that the project has had a major strategic impact on the Government of the country. In fact, with the opening up of the island by the interurban communications system, popular discontent with the Government of Sao Tome has practically disappeared.

The population of Principe feels better integrated into the economic and political life of the country.

5.4 Institutional Viability

The operating agency, CST, has adopted several policies to improve the financial efficiency of the operations of the telecommunications services. With the guarantee of Radio Marconi, Portugal, it carried out a major investment programme (US$ 12 million) for the expansion and improvement of the country's system.

6. SUSTAINABILITY OF PROJECT IMPACT

- Good maintenance associated with staff training is a factor which will guarantee the sustainability of the structure.

- The master plan is an essential basic document for the study and preparation of further investments.

- The investment made by CST will ensure expansion and a high standard of service.

- Rigorous financial management focussing on controlled increases in tariffs and a stricter debt collection policy will improve the company's financial situation.

7. CONCLUSIONS - LESSONS AND RECOMMENDATIONS

7.1 Conclusions

7.1.1 Project Implementation

- This project was appraised on the basis of a sound feasibility study conducted by ITU.

- The project has been successful from a technical standpoint and with regard to works implementation.

- The works were implemented in accordance with the terms of the contract, without requiring major modifications.

- The procurement of goods and services was satisfactory and the supervision and monitoring by the ITU consultant during implementation also contributed to the project's success.

7.1.2 Project Results and Viability

As a general rule, the system was well designed and specified, especially as it was designed in 1983; At that time, digital radio systems were not very well known and in addition, it was not clear that Macambrara and Sundi could be linked (176.5 km almost entirely over water) without causing reflection problems.

The system has been operating very well since the completion of the physical work on 31 November 1988 despite the very difficult conditions of access to the sites with the transmitters.

The privatization of the company will ensure the continuity of the project for it provides capital for expansion, maintenance and staff training.

Although the economic impact in PRINCIPE is slow in materializing, the project has had considerable spin-off in Sao Tome, particularly in the agricultural sector along the access road to Macambrara, and has enabled the extension of the national telecommunications network from Macambrara to Trindade.

7.2 Lessons

- a project design based on a good feasibility study is a long-term factor of success;

- good technical supervision by the Consulting Engineer makes a considerable contribution to the success of a project;

- the organizational and staff training aspects are factors in the success of the project and a guarantee of institutional viability; and

- Analysis of demand must be made accurately taking into consideration the socio-economic aspects of the different categories of beneficiaries.

7.3 Recommendations

- To put the operating agency on a sound financial footing, the State should settle the arrears and introduce a continually improving collection system (initially the compensation system could be used).

- Clarify the relation between the State and CST by establishing a Telecommunications directorate within the supervising ministry, which will ensure the monitoring of regulations in general and the allocation of frequencies.

- Efforts should be made to introduce adequate regulations covering telecommunications to ensure the development of the sector.

- The Government shall confirm to ADF that CST will ensure the debt service during the franchise period.

- A financial audit shall be carried out by a qualified international firm.

- The Government shall set up the structure recommended by the study conducted on UNDP financing to improve the management of public finance.

- Special emphasis should be placed on the rehabilitation and regular maintenance of the access roads to the Macambrara and Sundi sites.

ANNEX 1

Trend of the value of the ADF unit of account in relation to the Dobra and the US Dollar

Trend of the value of the ADF unit of account in relation to the Dobra and the US Dollar				
	1st/Q	2nd/Q	3rd/Q	4th/Q
1984 DB		41.6776		
US$		0.980184		
1985 DB				41.6776
US$				0.975762
1986 DB	41.6776	41.6778	41.6776	41.6776
US$	1.01170	1.04841	1.18460	1.11762
1987 DB	41.6776	41.6776	41.6776	92.1052
US$	1.12662	1.18413	1.17712	1.17862
1988 DB	92.1052	92.1052	95.3897	120.975
US$	1.30666	1.27777	1.20714	1.18852
1989 DB	NA	145.056	NA	146.416
US$	1.23946	1.19065	1.14799	1.17877
1990 DB	NA	170.077	170.075	185.078
US$	1.21041	1.19813	1.21936	1.28262
1991 DB	184.734	183.744	183.744	227.071
US$	1.37034	1.24003	1.21074	1.26000
1992 DB	347.031	379.601		
US$	1.31750	1.26344		

ANNEX 2

Telephone Density in Africa
(1984 Data)

TELEPHONE DENSITY IN AFRICA (1984 Data)

COUNTRY	TEL DENSITY. ML/100 INHAB.	POSITION	COUNTRY	TEL.DENSITY ML/100 INHAB.	POSITION
ALGERIA	2.42	2	KENYA	0.18	20
BENIN	0.49	12	LESOTHO	0.55	9
BOTSWANA	0.96	6	MADAGASCAR	0.54	11
BURKINA FASO	0.12	23	MOROCCO	1.09	5
BURUNDI	0.11	24	MAURITANIA	0.23	17
CAMEROON	0.32	14	MOZAMBIQUE	0.27	15
CENTRAL AFRICA	0.10	25	NIGER	0.13	22
CONGO	0.55	9	NIGERIA	0.20	19
DJIBOUTI	0.94	7	RWANDA	0.08	26
EGYPT	1.86	3	SENEGAL	0.34	13
ETHIOPIA	0.23	17	SOUTH AFRICA	8.42	1
GABON	0.89	8	TANZANIA	0.24	16
GUINEA	0.18	20	CHAD	0.04	27
CÔTE D'IVOIRE	0.63	18	**SAO TOME AND PRINCIPE**	**1.71**	**4**

Source: Public Sector Telecommunications Year Book (14th ITU edition, 1987)

ANNEX 3

Comparison of Telephone Tariffs
(1987 CFA Francs)

SAO TOME AND PRINCIPE TELECOMMUNICATIONS PROJECT

Annex 3

COMPARISON OF TELEPHONE TARIFFS (1987 CFA Francs)

	MALI	CONGO	SAO TOME	GABON	TOGO	NIGER	CÔTE D'IVOIRE
CONNECTION	53,550	35,000	13,900	74,400	81,500	30,000	40,000
RENTAL/ MAINTENANCE	2,680	5,250	1,490	11,160	2,875	3,000	5,220
LOCAL (1 TB)	70	70	15	62	50	60	58
INTERURBAN (200/400 KM)	190	260	83/167	250	300	300	280
INTERNATIONAL-FRANCE	1,120	1,200	1,635	1,240	857	900	995
DEPOSIT	15,000	35,000	-----	-----	130,000	50,000 to 200,000	20,000

ANNEX 4

ADF Disbursements in FUA 1000

ADF DISBURSEMENTS IN FUA 1000

YEARS	ESTIMATED		ACTUAL	
	Per Year	Cumulative	Per year	Cumulative
1985	129	129	68.4	68.4
1986	594	723	0	68.4
1987	1,300	2023	155.4	223.8
1988	0	0	734.1	957.9
1989	0	0	841.7	1,799.6
1990	0	0	193	1,992.6
Total	2,023		1,992.6	

ANNEX 5

Analysis of demand

TABLE 5.1

Forecast of the trend in the number of main lines

YEAR	POPULATION	N.ML	ML Growth Per Year	% Annual Growth	ML/100 INHAB
1988	111700	2088			1.87
1989	113500	2207	119	5.7	1.94
1990	116300	2327	120	5.4	2.00
1991	119200	2496	169	7.3	2.09
1992	122200	2670	174	7.0	2.18
1993	125200	2849	179	6.7	2.28
1994	128400	3034	185	6.5	2.36
1995	131600	3225	191	6.3	2.45
2000	148900	4377	230	6.3	2.94
2005	168400	5865	298	6.0	3.48
2010	190600	7760	379	5.8	4.07

SOURCE: Volume II - 1990 - 2010 Long-Term Development Plan
1990 - 2010 Telecommunications Master Plan
ITU, UNDP, ADF, Geneva, 1990

TABLE 5.2

Estimated and Actual numbers of main lines

YEAR	ITU Estimate	ACTUAL		
	No of Main Lines	No of Main Lines	Gap	% Gap
1988	2088			
1989	2207			
1990	2327	2217	-110	-5%
1991	2496	2187	-309	-14%
1992	2670			
1993	2849			
1994	3034			
1995	3225			
2000	4377			
2005	5865			
2010	7760			

* The 1991 total includes 62 fax lines

TABLE 5.3

Comparison of Estimates

YEAR	MAIN LINE ESTIMATES			% ITU/ADF
	ITU PAGUE	ADF PAGUE	ADF COUNTRY TOTAL	
1988	84	84	2088	0%
1989			2207	
1990	101	96	2217	5%
1991	107	94	2187	14%
1992	112	92	2187	22%
1993	119	94	2242	27%
1994	124	94	2298	32%
1995	131	96	2355	36%
2000	168	102	2665	65%
2005	211	109	3015	94%
2010	260	114	3411	128%

TABLE 5.4

Estimated local and national traffic

Number of ML	84	101	107	112	119	124	131	168	211	260
YEAR	1988	1990	1991	1992	1993	1994	1995	2000	2005	2010
Type of Traffic										
Local	0.8	1	1.1	1.1	1.2	1.2	1.3	1.8	2.3	2.9
National	1.9	2.4	2.51	2.7	2.79	2.98	3.3	4.4	5.6	7.3
International	0.20	0.20	0.19	0.20	0.21	0.22	0.2	0.4	0.4	0.4
TOTAL	2.90	3.60	3.80	4.00	4.20	4.40	4.80	6.60	8.30	10.60
% local	27.95 %	27.78 %	28.95 %	27.50 %	28.57 %	27.27 %	27.08 %	27.27 %	27.71 %	27.36%
% national	65.52 %	66.67 %	60.05 %	67.50 %	66.43 %	67.73 %	68.75 %	66.67 %	67.47 %	68.87%
% international	6.90%	5.56%	5.00%	5.00%	5.00%	5.00%	4.17%	6.06%	4.82%	3.77%

SOURCE: Vol II, p. 46, Long-term Development Plan 1990-2010

TABLE 5.5

Traffic: Trend of Value of traffic (in Erlangs)
Estimate* (ADF)

No of ML	84	101	107	112	119	124	131	168	211	260
YEARS	**1988**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**2000**	**2005**	**2010**
Type of traffic										
Local	0.81	0.96	0.97	0.92	0.96	0.90	0.95	1.09	1.19	1.26
National	1.8	2.26	2.21	2.20	2.19	2.27	2.42	2.70	2.84	3.22
International	0.20	0.21	0.17	0.16	0.17	0.17	0.14	0.24	0.21	0.19
TOTAL	2.90	3.42	3.34	3.28	3.32	3.34	3.50	4.03	4.23	4.66
% local	28%	28%	29%	28%	29%	27%	27%	27%	28%	27%
% national	65%	66%	66%	67%	66%	68%	69%	67%	67%	69%
% international	7%	6%	5%	5%	5%	5%	4%	6%	5%	4%

FINANCIAL ANALYSIS

Table A/1.6

Scenarios

Principe Traffic = 4,3% of the total (source : ITU)

discount rate : 5%

Output 1991 – source CST in Dbs 000

195

Conversion into US$ 000 : 1991 – 195 dobras = $US 1

Total value of investment = FUA 2.3 millions

No. of subscribers

Conversion = – 1,2 US$ 1990 = FUA 1

1.01 US$ 000

other services 37.5 k US$ 37.5

Growth of output – 5% per year

Fixed costs 1991 – source CST in Dbs 000s

465913 195

Conversion into US$ 000 : 1991 – 195 dobras = US$ 1

Year 1–5 = 0% tax on output, 0% tax on profits

$2,389 0.043

(Tax on output = 5%)20% of 5% in year 6

1.09 US$ 000

(Tax on output = 5%)40% of 5% in year 7

residual value 5x output 20 years

(Tax on output = 5%)60% of 5% in year 8

(Tax on output = 5%)80% of 5% in year 9

(Tax on output = 5%)90% of 5% in year 10

(Tax on output = 5%)100% of 5% years 10 to 20

Discount rate 5%

Project returns (in US$ 000)

Subscribers		94	92	104	105	106	107	108	109	110	112	113	115	117	118	119	120	121	122	123	124
	YEAR	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
output – telephone		94.94	97.57	110.29	111.35	112.41	113.47	114.53	115.59	116.66	118.78	119.84	121.96	124.08	125.14	126.20	127.26	128.32	129.38	130.44	131.50
output – other services		37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5
TOTAL OUTPUT		132.44	135.07	147.79	148.85	149.91	150.97	152.03	153.09	154.16	156.28	157.34	159.46	161.58	162.64	163.70	164.76	165.82	166.88	167.94	169.00
COSTS																					
Investments	2760.00																				
Fixed costs		102.65	100.46	113.57	114.66	115.75	116.84	117.94	119.03	120.12	122.30	123.40	125.58	127.76	128.86	129.95	131.04	132.13	133.22	134.32	135.41
Tax on output		0.00	0.00	0.00	0.00	0.00	1.51	3.04	4.59	6.17	7.03	7.87	7.97	8.08	8.13	8.18	8.24	8.29	8.34	8	8
Gross operating income		29.79	34.60	34.22	34.19	34.16	32.62	31.06	29.47	27.87	26.94	26.07	25.90	25.74	25.65	25.57	25.48	25.40	25.31	25.23	25.14
Amortization		138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138	138
Taxable operating income		–108.21	–103.40	–103.78	–103.81	–103.84	–105.38	–106.94	–108.53	–110.13	–111.06	–111.93	–112.10	–112.26	–112.35	–112.43	–112.52	–112.60	–112.69	–113	–113
Profit tax		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net operating income	–2760.00	29.79	34.60	34.22	34.19	34.16	32.62	31.06	29.47	27.87	26.94	26.07	25.90	25.74	25.65	25.57	25.48	25.40	25.31	25.23	25.14
Residual value																					126
Discounted cash flow		–2732	–2700	–2671	–2643	–2616	–2591	–2569	–2549	–2531	–2515	–2500	–2485	–2472	–2459	–2446	–2435	–2424	–2413	–2403	–2312
IRR	–8.34%																				

**10 addit. lines (1993) due to BOMBON project.

ANNEX 7

Economic Analysis

SAO TOME AND PRINCIPE

TELECOMMUNICATIONS PROJECT

ECONOMIC ANALYSIS

ECONOMIC ANALYSIS

(in US$ 000)

Subscribers		94	92	104	105	106	107	108	109	110	112	113	115	117	118	119	120	121	122	123	124
	YEAR	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Products-telephone		94.94	97.57	110.29	111.35	112.41	113.47	114.53	115.59	116.66	118.78	119.84	121.96	124.08	125.14	126.20	127.26	128.32	129.38	130.44	131.50
Prod.other services		37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5
TOTAL PRODUCTS		132.44	135.07	147.79	148.85	149.91	150.97	152.03	153.09	154.16	156.28	157.34	159.46	161.58	162.64	163.70	164.76	165.82	166.88	167.94	169.00
COSTS																					
Investments	2760.00																				
Fixed costs		102.65	100.46	113.57	114.66	115.75	116.84	117.94	119.03	120.12	122.30	123.40	125.58	127.76	128.86	129.95	131.04	132.13	133.22	134.32	135.41
ECONOMIC IMPACT																					
Monte Cafe		50.00	55.00	60.00	65.00	70.00	75.00	80.00	85.00	90.00	95.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Agr.Dev. of Sad T.		25.00	30.00	35.00	40.00	45.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Econ.impact on Princ.		5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00	55.00	60.00	65.00	70.00	75.00	80.00	85.00	90.00	95.00	100.00
Overall econ. impact		80.00	95.00	110.00	125.00	140.00	155.00	165.00	175.00	185.00	195.00	205.00	210.00	215.00	220.00	225.00	230.00	235.00	240.00	245.00	250.00
TOTAL INCOME		109.79	129.60	144.22	159.19	174.16	189.13	199.10	209.07	219.04	228.97	238.94	243.88	248.81	253.78	258.75	263.72	268.69	273.66	278.63	283.59
Net operat.result	-2760.00	109.79	129.60	144.22	159.19	174.16	189.13	199.10	209.07	219.04	228.97	238.94	243.88	248.81	253.78	258.75	263.72	268.69	273.66	278.63	283.59
Residual value																					
Discounted Cash Flow		-2655	-2538	-2413	-2282	-2146	-2005	-1863	-1722	-1581	-1440	-1300	-1164	-1033	-904	-780	-659	-542	-428	-318	-211
ERR	4.20%																				

ANNEX 8

Sensitivity Analysis

Annex 8

AO TOME AND PRINCIPE
ELECOMMUNICATIONS PROJECT

TABLE 8.1

SENSITIVITY ANALYSIS

NSITIVITY ANALYSIS - Project Profitability (in US$ 000) Tariff increases (telephones) of 20% from 1993

scribers	YEAR	91	92	93	94	95	96	97	98	99	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
		94	97	100	104	108	109	110	112	113	115	117	118	119	120	121	122	123	124		
t-telephone		94.94	97.57	132.35	133.62	134.90	136.17	137.44	138.71	139.99	142.53	143.80	146.35	148.89	150.17	151.44	152.71	153.98	155.26	156.53	157.80
t other services		37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5
			132.44	135.07	169.85	171.12	172.40	173.67	174.94	176.21	177.49	180.03	181.30	183.85	186.39	187.67	188.94	190.21	191.48	192.76	194.03	195.30
L OUTPUT																					
S		2760.00	102.65	100.46	113.57	114.66	115.75	116.84	117.94	119.03	120.12	122.30	123.40	125.58	127.76	128.86	129.95	131.04	132.13	133.22	134.32	135.41
stments			0.00	0.00	0.00	0.00	0.00	-1.74	3.50	5.29	7.10	8.10	9.07	9.19	9.32	9.38	9.45	9.51	9.57	9.64	10	10
ed costs			29.79	34.60	56.28	56.46	56.64	55.09	53.51	51.90	50.27	49.63	48.84	49.08	49.31	49.43	49.54	49.66	49.78	49.90	50.01	50.13
on output			138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	-138.00	-138.00	-138.00	138.00	-88.69	-88.57	-88.46	-88.34	-88.22	-88.10	-88
oper.results			-108.21	-103.40	-81.72	-81.54	-81.36	-82.91	-84.49	-86.10	-87.73	-88.37	-89.16	-88.92	-88.69	0.00	70.00	0.00	0.00	0.00	0.00	0.00
antization			0.00	0.00	0.00	0.00	0.00	-82.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	49.43	49.54	49.66	49.78	49.90	50.01	50.13
xable oper. results			29.79	34.60	56.28	56.46	56.64	55.09	53.51	51.90	50.27	49.63	48.84	49.08	49.31							
pfit tax			0.00	0.00	0.00	0.00	0.00	-82.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00							
t operation	R.	-2760.00	29.79	34.60	56.28	56.46	56.64	55.09	53.51	51.90	50.27	49.63	48.84	49.08	49.31							
esidual Value																					
iscounted cash flow		-2732														-2277	-2253	-2230	-2208	-2188	-2168	-2000
RR		-5.21%																			

" 10 lines added (1993) as a result of the BOMBOM project

-2700 -2652 -2605 -2561 -2520 -2482 -2447 -2414 -2384 -2355 -2328 -2302

TABLE 8.2

SENSITIVITY ANALYSIS

SENSITIVITY ANALYSIS - PROJECT PROFITABILITY (in US$ 000)

10% increase in tariffs (telephone) from 1993

SUBSCRIBERS		94	92	104	105	106	107	108	109	110	112	113	115	117	118	119	120	121	122	123	124
	YEAR	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Output-telephone		94.94	97.57	121.32	122.49	123.65	124.82	125.99	127.15	128.32	130.65	131.82	134.15	136.49	137.65	138.82	139.99	141.15	142.32	143.49	144.65
Output other services		37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5
TOTAL OUTPUT		132.44	135.07	158.82	159.99	161.15	162.32	163.49	164.65	165.82	168.15	169.32	171.65	173.99	175.15	176.32	177.49	178.65	179.82	180.99	182.15
COST																					
Investment	2760.00																				
Fixed cost		102.65	100.46	113.57	114.66	115.75	116.84	117.94	119.03	120.12	122.30	123.40	125.58	127.76	128.86	129.95	131.04	132.13	133.22	134.32	135.41
Tax on output		0.00	0.00	0.00	0.00	0.00	1.62	3.27	4.94	6.63	7.57	8.47	8.58	8.70	8.76	8.82	8.87	8.93	8.99	9	9
Gro.operat.result		29.79	34.60	45.25	45.33	45.40	43.85	42.28	40.69	39.07	38.28	37.46	37.49	37.52	37.54	37.56	37.57	37.59	37.60	37.62	37.64
Amortization		138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138	138
Taxable op.result		-108.21	-103.40	-92.75	-92.67	-92.60	-94.15	-95.72	-97.31	-98.93	-99.72	-100.54	-100.51	-100.48	-100.46	-100.44	-100.43	-100.41	-100.40	-100	-100
Profits tax		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net operat.res.	-2760.00	29.79	34.60	45.25	45.33	45.40	43.85	42.28	40.69	39.07	38.28	37.46	37.49	37.52	37.54	37.56	37.57	37.59	37.60	37.62	37.64
Residual Value																					188
Discounted c.flow 5%		-2732	-2700	-2661	-2624	-2588	-2556	-2526	-2498	-2473	-2449	-2427	-2407	-2387	-2368	-2350	-2332	-2316	-2300	-2285	-2171
ERR	-6.63%																				

.. 10 lines added (1993) as a result of the BOMBON project

SAO TOME AND PRINCIPE

TELECOMMUNICATIONS PROJECT

Annex 8

TABLE 8.3

SENSITIVITY ANALYSIS

SENSITIVITY ANALYSIS - PROJECT PROFITABILITY (in US$ 000)

Tariff increases (telephone) of 30% from 1993

Subscribers		94	92	104	105	106	107	108	109	110	112	113	115	117	118	119	120	121	122	123	12
	YEAR	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	201
Output-telephone		94.94	97.57	143.38	144.76	146.14	147.52	148.89	150.27	151.65	154.41	155.79	158.54	161.30	162.68	164.06	165.44	166.82	168.20	169.57	170.9
Output other services		37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.
TOTAL OUTPUT		132.44	135.07	180.88	182.26	183.64	185.02	186.39	187.77	189.15	191.91	193.29	196.04	198.80	200.18	201.56	202.94	204.32	205.70	207.07	208.4
COSTS																					
Investments	2760.00																				
Fixed costs		102.65	100.46	113.57	114.66	115.75	116.84	117.94	119.03	120.12	122.301	123.40	125.58	127.76	128.86	129.95	131.04	132.13	133.22	134.32	135.4
Tax on output		0.00	0.00	0.00	0.00	0.00	1.85	3.73	5.63	7.57	8.64	9.66	9.80	9.94	10.01	10.08	10.15	10.22	10.28	10.35	10.4
Gross operat.res.		29.79	34.60	67.31	67.60	67.88	66.32	64.73	63.11	61.47	60.97	60.23	60.66	61.10	61.32	61.53	61.75	61.97	62.19	62.40	62.6
Amortization		138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.00	138.0
Taxable oper.result		-108.21	-103.40	-70.69	-70.40	-70.12	-71.68	-73.27	-74.89	-76.53	-77.03	-77.77	-77.34	-76.90	-76.68	-76.47	-76.25	-76.03	-75.81	-75.60	-75.
Profit tax		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Net Oper.result	-2760.00	29.79	34.60	67.31	67.60	67.88	66.32	64.73	63.11	61.47	60.97	60.23	60.66	61.10	61.32	61.53	61.75	61.97	62.19	62.40	62.6
Residual Value																					31.
Discounted C.F1.5%		-2732	-2700	-2642	-2586	-2533	-2484	-2438	-2395	-2355	-2318	-2283	-2249	-2217	-2186	-2156	-2128	-2101	-2075	-2050	-188
ERR	-1.04%																				

.. 10 lines added (1993) as a result of the BOMBON project.

ANNEX 9

Capital Repayment Schedule

SAO TOME AND PRINCIPE TELECOMMUNICATIONS PROJECT

Annex 9

CAPITAL REPAYMENT SCHEDULE

40 years after a 10 year grace period
1% of the princ.per year from the 11th 20.3 (000 UC) through the 20th year
3% per year thereafter 60.9 (000 UC)
0.75% per year on the amount disbursed and outstanding

Loan 2030 (000 UC)

Repayment Year	Amount	Year	Amount
1995	35,37	2015	69,58
1996	35,22	2016	69,12
1997	35,07	2017	68,66
1998	34,92	2018	68,21
1999	34,76	2019	67,75
2000	34,61	2020	67,29
2001	34,46	2021	66,84
2002	34,31	2022	66,38
2003	34,15	2023	65,92
2004	34,00	2024	65,47
2005	74,15	2025	65,01
2006	73,69	2026	64,55
2007	73,23	2027	64,10
2008	72,78	2028	63,64
2009	72,32	2029	63,18
2010	71,86	2030	62,73
2011	71,41	2031	62,27
2012	70,95	2032	61,81
2013	70,49	2033	61,36
2014	70,04	2034	60,90

PRINCIPAL (end of year)

Year	Principal	year	Principal
11	2009,70	31	1157,10
12	1989,40	32	1096,20
13	1969,10	33	1035,30
14	1948,80	34	974,40
15	1928,50	35	913,50
16	1908,20	36	852,60
17	1887,90	37	791,70
18	1867,60	38	730,80
19	1847,30	39	669,90
20	1827,00	40	609,00
21	1766,10	41	548,10
22	1705,20	42	487,20
23	1644,30	43	426,30
24	1583,40	44	365,40
25	1522,50	45	304,50
26	1461,60	46	243,60
27	1400,70	47	182,70
28	1339,80	48	121,80
29	1278,90	49	60,90
30	1218,00	50	0,00

AFRICAN DEVELOPMENT FUND

TRANSALATED BY: Mrs. M. FERRAN

PROJECT COMPLETION REPORT

SAO TOME AND PRINCIPE TELECOMMUNICATIONS PROJECT

OPERATIONS EVALUATION OFFICE

OPEV/BSO/0512M

ACRONYMS AND ABBREVIATIONS

db	=	dobra (national currency)
CAPTEAO	=	Conference des Administrations des Postes et Telecommunications d'Afrique de l'Ouest (West African Post and Telecommunications Management Conference).
ENATEL	=	Empressa Nacional Telecommunications (National Telecommunications Corporation)
ADF	=	African Development Fund
Ml	=	Microwave Link
ML	=	Main Line
UNDP	=	United Nations Development Programme
BT	=	Basic Tax
FUA	=	Fund Unit of Account
ITU	=	International Telecommunications Union
ITTAC	=	International Telephone - Telegraph Advisory Committee
CPRM	=	Companhia Portugese Radio Marconi

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This report is written by Messrs K. BEDOUMRA, Telecommunications Engineer and D. CHOKKI, Economist, following their mission to Sao Tome and Principe from 14 to 23 May 1990.

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BASIC PROJECT DATA

1.	COUNTRY	:	Sao Tome and Principe
2.	TITLE OF PROJECT	:	Telecommunications Project
3.	LOAN NUMBER	:	CS/STP/TL/84/3
4.	BORROWER	:	Government of Sao Tome and Principe
5.	BENEFICIARY	:	Empressa Nacional Telecommunicados (ENATEL)
6.	EXECUTING AGENCY	:	ENATEL

A. LOAN

1.	LOAN APPLICATION	:	20 January 1982
2.	LOAN AMOUNT	:	FUA 2,030,000
3.	COMMITMENT CHARGE	:	0.75%
4.	REPAYMENT DEADLINE	:	Fifty (50) Years
5.	GRACE PERIOD	:	Ten (10) Years
6.	DATE OF LOAN APPROVAL	:	November 1984
7.	DATE OF SIGNATURE OF LOAN	:	18 December 1984
8.	DATE OF LOAN EFFECTIVENESS	:	10 April 1985

B. PROJECT DATA

		Estimates at Appraisal	Actual
1.	Total Cost	FUA 2,269,000	FUA 2,524,419.48
2.	Financing Schedule		
	ADF	FUA 2,023,000	FUA 2,012,181.48
	Government	FUA 246,000	FUA 512,238.00
3.	Deadline for First Disbursement	31/12/1985	30/12/1985
4.	Date of Final Disbursement	31/12/1988	31/12/1990
5.	Start of Works		
	- Posting of Consultant	August 1985	March 1986
	- Effectiveness of Main Component Contract	July 1986	September 1987
6.	Date of Works Completion		
	- Microwave Link	December 1987	December 1988
	- Master Plan		September 1989
	- Extra Spare Parts		November 1990

C. PERFORMANCE INDICATORS

1.	Cost Variation	+ 11% (+FUA 255,400)
2.	Behind/Ahead of Schedule	
	- Ahead of Effectiveness	16% (1 month)
	- Delay of First Disbursement	0%
	- Delay of Final Disbursement	68% (24 months)
	No. of Extensions	
	- Final Disbursement	2
	- Delay in Completion	37% (13 months)

3. Project Implementation Status

- Project Take-off Date	August 1985
- Project Completion Date	December 1990
4. Management Performance	Average
5. Performance of Entrepreneurs	Satisfactory
6. Performance of Consultant	Satisfactory
7. Internal Rate of Return	
- Project at Evaluation:	
(a) with the Principe Network Extension:	9.63%
(b) without the Principe Network Extension:	-13.6%
- After Project Implementation without the Principe Network Extension	-1%

D. MISSIONS

	Dates	No. of Persons	Man/Weeks
Preparation	7 to 24 July 1982	2	5
Appraisal	23 June to 7 July 1984	2	4
Supervision	10 to 18 October 1988	1	1
PCR	14 to 25 May 1988	2	3
Total		7	13

E. FUA DISBURSEMENT

	ADF	GOVERNMENT	TOTAL
Total Disbursed	1,881,885.69	512,238.00	2,394,123,69
Amount still to be Disbursed	130,295.63		130,295.63
Unused Balance	17,818.68		17,818.68
Total	2,030,000.00	512,238.00	2,542,238.00

Annual Disbursements (in FUA 1,000)

Year	Estimates at Evaluation		Actual	
	Annual	Accumulated	Annual	Accumulated
1985	220.0	220.0 (10%)	68.4	68.4 (3%)
1986	647.0	867.0 (38%)		
1987	1,402.0	2,269.0 (100%)	611.7	680.2 (27%)
1988			790.1	1470.3 (58%)
1989			841.7	2312.0 (91%)
1990			212.6	2524.4 (100%)

F. ENTREPRENEURS, SUPPLIERS

NAME	SAT (France)	EGM (France)	STANDARD ELECT (Portugal)	MIN. PW. Sao Tome)
Responsibility	Equip. Transmission	Buildings	Telephone	Access Road
Date of Contract Signature	06/06/1987	08/06/1987	05/11/1987	23/05/1985
Expiry Date of Contract	31/11/1988	31/11/1988	31/12/1988	25/11/1986
Duration of Contract	18 months	10 months	12 months	18 months
Amount (FUA 1000)	1523.6	197.35	41.77	403.10

G. CONSULTANT

Name	:	ITU
Responsbility	:	Works Supervision and Master Plan
Date of Contract Signature	:	25/11/1985
Expiry Date of Contract	:	September 1989
Duration of Contract	:	35 months
Amount in FUA		358,652.42

1. INTRODUCTION

1.0.1 The country comprises two main islands, Sao Tome (826 km2; 106,000 inhabitants) and Principe (119 km2; 6,000 inhabitants) situated at 160 km one from the other. Communications between the two islands is by plane, boat, telephone and telegramme. The journey by air between the two lasts 30 m. and there are two flights per week; in 1984, the return trip was 1400 db the equivalent of 12% of a professional's salary. The journey by boat lasts 12 hours and is irregular. Telecommunications connections are hazardous because of old-fashioned equipment and propagation constraints due to the type of equipment installed. To settle any business on the other island travel by plane was virtually the only solution. Principe was therefore in isolation vis-a-vis the capital: it was imperative to disenclose the island by installing basic telecommunications infrastructure and hence creating a reliable link between the two islands in order to foster Principes economic and social development. It was a priority for the Government.

1.0.2 The eight (8) main districts of the island of Sao Tome had a telephone system and were linked to the capital by more or less reliable cables, whereas subscribers in Principe had difficulties getting through to Sao Tome. Principe's low level population (6,000 inhabitants), the limited number of subscribers (94 in 1984) and the 160 km hop over the sea, made a financially profitable choice difficult. Consequently, the least costly solution was chosen, on the basis of the economic and social profits which the country may derive from the project.

1.0.3 Thanks to the project, an automatic microwave link exists between the two islands since December 1988. These types of links over the sea and over such a long distance are very rare and it was the first time the Bank financed such an operation; the reliability of the liaison shows that it is a technical success.

1.0.4 Through the project, the country can also boast of a telecommunications master plan for the 1990-2010 period. The Government now disposes of an important investment tool for years to come. The next actions to undertake in the sector have now been defined.

2. PROJECT IDENTIFICATION, PREPARATION AND APPRAISAL

2.1 Origin

The project was initiated by the Government which had commissioned a feasibility study on the Sao Tome-Principe liaison to be carried out by the ITU in 1981, with funds from the Arab Bank for Economic Development in Africa (ABEDA). The study recommended a microwave link. In January 1982, the Government requested financing from the Bank.

2.2 Preparation

2.2.1 A Bank preparation mission paid a visit to Sao Tome in 1982 and highlighted the major difficulties relating to the project's implementation: the project's cost estimated at FUA 3 million although low for a telecommunications project was still very high for a country with 100,000 inhabitants. It was the equivalent of 10% of the country's GDP for 1981 and one third of ENATEL's fixed assets. This disproportionate investment as compared to the size of the network will only serve between 450 and 550 subscribers even by the year 2000; the project could in no way justify its financial rate of return. The executing agency ENATEL which had just been set up needed technical assistance estimated at 20% of the project's cost.

2.2.2 In concert with the Government, the Bank had asked the ITU to study other possibilities with the hope of finding a less costly solution. ITU compared seven different solutions and made direct contacts with suppliers in connection with three of the seven solutions. The Bank itself requested, just as an indication, quotings from some suppliers. Following all these steps and after comparing the cost of the various solutions and after examining implementation and maintenance (power) constraints and the technological trend, the Bank finally accepted the microwave link solution that the study recommended. The search for alternate solutions led to a 12 month delay in project appraisal.

2.3 Appraisal, Negotiations and Approval

2.3.1 An appraisal mission visited Sao Tome from 23 June to 7 July 1984 in order to appraise the project. The project's cost was brought down to

FUA 2.3 million on the basis of the actual costs proposed by suppliers and it was recommended that ITU be entrusted with supervision. Technical assistance for institutional support had not been included in the project, beause of financial constraints. An improvement was expected however owing to the fact that 6 workers were being trained abroad thanks to grants donated by friendly countries. Negotiations were held in October 1984 and the loan approved by the ADF Board in November 1984.

2.3.2 One can retrospectively assert that the delay recorded during the preparatory phase could have been avoided from the onset if the feasibility study had compared all possible solutions and had looked for other economic and social ways of justifying the project once it became obvious that the project was financially unprofitable. The Bank did not have the terms of reference of this study but it does not seem that all studies necessary for a rapid decision relative to the project's financing were examined.

2.4 Project Objectives

2.4.1 The main objective of the project is to open up the island of Principe by linking it to Sao Tome through a reliable and good quality telecommunications system. In the long-run, it will foster the islands development, by promoting tourism, encourage the technical assistance needed to implement certain projects, providing economic operators and the Government with a quicker and surer means of communication.

2.4.2 It must be pointed out that the project's economic objectives could not be specified or quantified. Indeed, there was no development plan for the island of Principe and projects under consideration such as tourism were still to be concretized. There was some activity around fishing and trade, but no thorough study on them was carried out and so the project's contribution to these sub-sectors is hard to figure out.

2.5 Project Description

The project comprises:

- radio and multiplex electric transmission equipment through microwave links;

- masts, shelters, enclosures and feeder roads to stations;

- energy for supplying the stations;

- cable to connect the Principe terminal station to the exchange;

- maintenance equipment: spare parts, measuring set, two vehicles, two mobile generators;

- training of four technicians in maintenance and operation;

- the services of a consultant to finalize bidding documents, evaluate bids, assist in the negotiation of contracts and supervise works.

3. PROJECT IMPLEMENTATION

3.1 Loan Effectiveness and Start of Project

3.1.1 Loan effectiveness was subject only to precedent conditions representing the following Government commitments:

i) undertake to make the necessary annual budgetary allocations to meet its share of the project cost in accordance with the financing schedule;

ii) undertake to find additional funds in the event of project cost overruns;

iii) undertake not to use the proceeds of the loan to pay for various duties and taxes relative to goods and services needed for project implementation;

iv) undertake to present the ADF with a schedule of repayment of its arrears owed to ENATEL covering a period of three years starting from the date of signature of the loan agreement (para. 4.6.3);

v) undertake to increase the basic telephone communications tax by 10% a year, over a three-year (3) period starting from January 1986 (para. 4.5.5);

vi) undertake to give ENATEL the requisite foreign exchange for the purchase of spare parts (para. 2.2.15);

vii) undertake to have a telecommunications master plan within a maximum period of three years starting from the date of signature of the loan agreement (para. 2.4.1).

3.1.2 The Government had no trouble fulfilling these conditions and the loan was effective less than three month after signature, on 10 April 1985, well in advance of the date chosen during negotiations, that is to say, 30/05/1985.

3.1.3 The project's take-off was delayed owing to difficulties met in the signing and effectiveness of the contract with ITU for works superision. A consultant was to be recruited as of August 1986, but was recruited only in March 1987. The reasons for the delay being:

- the rather long delay in dispatching mail between Geneva (ITU Head Office) and Sao Tome (one month on average), and sometimes letters go astray.

- the problems ITU encountered in recruiting an expert for Sao Tome.

3.2 Revisions

3.2.1 No major changes were made to the project. The microwave link terminal station was installed in the same building as Principe's terminal station instead of using a cable between the terminal station and the exchange as initially planned. This solution reduces the variety of equipment that would have been needed, facilitaes operation and maintenance although it meant the addition of two components: telephone exchange connectors and the master plan study. The Bank accepted the Government's request relating to these two components for reasons explained in the paragraphs below.

3.2.2 Telephone exchange connectors are indispensable to interconnect the speaking circuit and the existing exchanges and to allow for automatic calls. These connectors had been omitted at the time of the studies and telephone exchange surveys had not been conducted. These connectors which represented about 2% of the project's total cost were itemized under the project's unforeseeable expenses.

3.2.3 Studies in view of a telecommunications master plan were one of the loan conditions which the Government was to fulfill before December 1987. Early 1988, the Government had still not mobilized all the funds necessary for the studies. It had obtained part of the amount from the UNDP and the Bank had accepted on the basis of the estimated loan balance to supplement UNDP's financing for an amount of US$ 107,000, i.e 4.77% of the project's total cost. Since ITU experts were on the spot and they already had information on the country, ITU's contract was extended to enable it to formulate the master

plan. These studies were completed in September 1989 after the microwave link and thus contributed to the extension of the project's overall deadline.

3.3. Implementation Schedule

3.3.1 The physical components described in 2.5.1 were to be completed in December 1987 but were actually completed a year later, in December 1988. This delay was due first of all to the difficulties arising out of the ITU contract (para. 3.1.2) and secondly, to the Government which took four months to express its opinion on the bids appraisal report prepared by ITU.

3.3.2 Differences in deadlines by activity and in comparison with the appraisal report schedule, starting from the date of the loan approval, are as follows:

Activity	Dates at Appraisal	Implementation
Recruitment of consultant	+ 7 months	+ 14 months
Preparation of bidding documents and ADF approval	+ 10 months	+ 19 months
Launching of competitive bidding	+ 13 months	+ 23 months
Bid examination and ADF approval	+ 16 months	+ 29 months
Contract negotiation and ADF approval	+ 18 months	+ 30 months
Site surveys	+ 20 months	+ 30 months
Equipment manufacture and delivery	+ 29 months	+ 40 months
Installation and tests	+ 34 months	+ 44 months
Provisional handing over	+ 35 months	+ 48 months

3.3.3 It can be noted that as soon as ADF approved the bids examination report, the remaining activities were implemented according to the appraisal report schedule which means that the schedule was realistic. Only those activities which preceded the awarding of the main contract for the microwave link were delayed.

3.3.4 Delays were difficult to foresee, in so far as ITU had some experience of the country and the Bank. The seven-month delay granted for the posting of its experts was realistic. The Government's delay in expressing its opinion was understandable because two ENATEL engineers stayed in Geneva for three weeks during bid examination and took part in it. These delays fortunately had no cost overrun implications.

3.4 Procurement of Goods and Services

3.4.1 The procurement procedures provided for during project appraisal were respected by the borrower. These procedures were the following:

- supply and installation of the complete microwave link by international competitive bidding;
- access roads by the National Public Works Firm;
- the services of consultant directly through ITU.

3.4.2 The borrower did not respect Bank procedures in connection with two contracts, submitted to the Bank already signed. Considering no objections were raised in that respect, the Bank simply drew the borrower's attention to the irregularity. Details on all signed contracts are given in annex 1.

3.5 Costs

3.5.1 The comparative table of costs at appraisal and on completion is as follows (including provisions for price and physical contingencies);

Table 3.1

Total Costs in FUA Thousand

Components	At Appraisal	On Completion	Gap
A. Microwave Link	1.593	1523.5	-69.5 (-4%)
B. Telephone Connectors	(Not provided for)	41.8	
C. Access Road, Shades, Fences	285	600.5	+315.5 (+11%)
D. Consultancy Services	391	358.7	-32.3 (-8%)
Total	2.269	2524.4	+255.4 (+11%)

Table 3.2

Foreign Exchange Costs (FUA Thousand)

Components	At Appraisal	On Completion	Gap
A. Microwave Link	1.471	1477.3	- 6.9 (+ 0.5%)
B. Telephone Connectors	(Not provided for)	40.1	
C. Access Road, Shades, Fences	161	135.4	-25.5 (-15.9%)
D. Consultancy Services	391	358.7	-32.3 (-8.0%)
Total	2.023	2012.2	-10.8 (-0.5%)

Table 3.3
Total Cost in Dobra Million

Components	At Appraisal	On Completion	Gap
A. Microwave Link	66.4	178.5	+112.1 (+169%)
B. Telephone Connectors	(Not provided for)	5.8	
C. Access Road, Shades, Fences	11.9	35.4	+ 23.5 (+199%)
D. Consultancy Services	16.3	34.9	+ 18.6 (+114%)
Total	94.6	255.4	+164.2 (+174%)

3.5.2 The trend of the foreign exchange portion variation by component is as follows:

Table 3.4

Components	F. Exchange Portion At Appraisal	F. Exchange Portion On Completion	Gap
A. Microwave Link	92.6%	97.0%	+ 4.4%
B. Telephone Connectors	(Not provided for)	5.8	
C. Access Road, Shades, Fences	56.0%	23.5%	-33.0%
D. Consultancy Services	100.0%	100.0%	0.0%
Total	89.1%	79.7%	-10.1%

3.5.3 The cost trend of each component as compared with the project's total cost, is as follows:

Table 3.5

Components	Percentage of Total Cost At Appraisal	Percentage of Total Cost On Completion	Gap
A. Microwave Link	70.0%	60.4%	- 9.6%
B. Telephone Connectors	(Not provided for)	1.7%	
C. Access Road, Shades, Fences	12.6%	23.7%	+11.1%
D. Consultancy Services	17.2%	14.2%	- 3.0%
Total	100.0%	100.0%	

3.5.4 The project's total cost after completion expressed in Fund's units of accounts, increased by 11% (Table 3.1); the foreign exchange portion was virtually the same. It decreased by only 0.5% (Table 3.2); the local currency portion went up from FUA 246,000 to FUA 512,238 i.e, a 108% increase due to the Macambara access road in Sao Tome. Access roads were encumbent on ENATEL

and the initial lay-out of the Macambara station was modified and located further up to the mountain demanding more works than planned.

3.5.5 The ITU expert in charge of project supervision suggested that the position of the Macambara station be changed. This change was justified because initially, the link was meant to connect for Sao Tome to Macambara whereas the new position allows for a mast placed at a height which will enable connection with other areas of the island of Sao Tome, through the installation of new antenna. The overcharge for the access road is an advantage because no new stations will be needed to link up other areas.

3.5.6 The project's cost expressed in standard dobra peaked by 174% (Table 3.3) as a result of the dobra devaluation. At the time of project appraisal, 1 FUA was 41.677 db (third quarter of 1984), devaluated to 1 FUA for 170.017 db, on the second quarter of 1990, i.e an increase of 308%. The dobra devaluation did not have far-reaching repercussions on ENATEL's projections for project financing. ENATEL financed mostly access roads, built in 1987 when the dobra had not yet been devaluated. The dobra's exchange rate was steady till the third quarter of 1987, the first devaluation took place on the fourth quarter of 1987, difficult to foresee at the time of appraisal.

3.5.7 Consultancy services provided for at the time of appraisal (works supervision) was 70% of the estimated cost. The balance was used for financing part of the studies for the telecommunications master plan. The decrease in the cost of consultancy services is not due to an underestimation of the cost of this component. The recommendation to attribute this component by mutual agreement to ITU had not yet been accepted at the time of appraisal, and sufficient provisions had to be made in the event of recourse to consultation based on a short-list. An average cost of UA 10,200 per man/month was taken into account at appraisal, whereas the ITU proposal came to an average of UA 8,400 per man/month. ITU being a non-profitable specialized U.N. organ, its costs are lower than the market.

3.6 Sources of Financing and Disbursements

3.6.1 The trend of the project's financing schedule was as follows:

Table 3.6
Financing Schedule at Appraisal
(in FUA thousand)

Sources	Foreign Exchange	Local Currency	Total	%
ADF	2.023	-	2.023	89.1
Government	-	246	246	10.9
Total	2.023	246	2.069	100.0
%	89.1	10.9	100.0	

Table 3.7
Financing Schedule on Completion
(in FUA thousand)

Sources	Foreign Exchange	Local Currency	Total	%
ADF	2012.18	-	2012.18	79.7
Government	-	512.24	512.24	20.3
Total	2012.18	512.24	2524.42	100.0
%	79.7	20.3	100.0	

3.6.2 On analysis, Table 3.1 shows that only the component comprising the access road increased sharply(+111%) for reasons explained in para. 3.5.5 above. This led to an increase in the Government's share in the project, which was evaluated at 10.9% but which went up to 20.3% after completion.

3.6.3 The modification of the initial implementation schedule (see para. 3.3.2) meant that the initial disbursement schedule was also modified. A comparison between actual disbursements and projections is shown in the table below.

Table 3.8
Disbursement in UA 100

Year	Estimates at Appraisal		Actual		
	Annual	Accumulated	Actual	Accumulated	
1985	220.0	220.0 (10%)	68.4	68.4	(3%)
1986	647.0	867.0 (38%)			
1987	1402.0	2269.0 (100%)	611.7	680.2	(27%)
1988			790.1	1470.3	(58%)
1989			841.7	2312.0	(91%)
1990			212.6	2524.4	(100%)

Table 3.9

Disbursement by Source of Financing

Year	Estimates at Appraisal		Actual	
	ADB	Government	ADF	Government
1985	129	91	68.37	
1986	594	53		
1987	1.300	102	155.44	458.30
1988			734.11	55.94
1989			841.69	
1990			212.57	
Total	2.023	246	2012.18	512.24

3.6.4 The first ADF disbursement in 1985 was the advance deposit paid to ITU in December 1985, to mark the effectiveness of the agreement. Supplies and works contracts were signed only in 1987, when the project's physical implementation started and consequently, when disbursements started.

3.6.5 A close look at the project's expenditure schedule (supplies delivery and services) and the Bank's disbursements shows that there was an average interval of three months between the two.

3.6.6 Annex 4 gives the processing dates of all disbursement requests. One notices that at the level of the Bank, there was an average interval of a month between the arrival of the disbursement request in the Department concerned and actual payment of suppliers. This deadline varies between 9 and 62 days. ITU's bills suffered the longest delays because of the postal delay and because some bills went astray; because of its status, ITU does not attach much importance to bill reminders as opposed to other contractors.

3.7 Performance of Consultants, Entrepreneurs, Suppliers and Borrowers

(a) The Consultant

3.7.1 The project's final design was that recommended by the Consultant. Works supervision, training and training guidance, provided for under the project were carried out to the complete satisfaction of the Bank and the Borrower. The ITU expert posted to the site put up a remarkable performance in respect of the way in which the transfer of know-how to local staff was supervised.

(b) The Entrepreneurs

3.7.2 All entrepreneurs respected their contractural schedule. The quality of installations and their operation seem normal, there are no defects or problems.

(c) Management

3.7.3 Management had some difficulties monitoring and managing the project, especially at the start with disbursement requests activity reports, contracts award and with the list of goods and services. Relations between management, the consultant and the entrepreneurs were excellent. The four microwave technicians showed competence and throughout project implementation, were remarkably and appreciably present.

3.7.4 Although from the very start, the Borrower had been informed about the quarterly reports to be submitted to the Bank, these reports started coming in very late. The Bank received only 4 works progress reports covering the third quarter of 1987, and the first, second and third quarters of 1988. These reports were prepared in consistence with Bank guidelines and made it possible to actually follow the status of works.

(d) The Bank

3.7.5 The Bank should have given more help to ENATEL in the launching of the project, either by making project managers participate in Bank seminars on project management or from the outset send out a project supervision mission which would have helped to give a better understanding of Bank procedures. During project implementation, the Bank sent ample correspondence to ENATEL in order to give it the necessary guidance.

4. OPERATING PERFORMANCE

4.1 Quality of Installations

Specification requirements took into account the specificity of the link which is a long sea hop, not without its difficulties owing to the reflection of the waves on the sea. These difficulties were all the more pronounced since the technology was of the numerical type. Given the country's fuel problems, solar energy for isolated stations was also one of the requirements. A year and a half after the servicing of the link, the minimum quality level as laid down in the specification, was respected. This type of link with its current quality, is a technical reference in the field of numeric transmission.

4.2 Installed Capacity

At the time of appraisal, there was only one speaking circuit and one telegraph circuit between Principe and Sao Tome, operated manually and usually engaged. With the project, both islands have a total potential capacity of 120 speaking circuits actually equipped with 26 speaking circuits and 2 telegraph circuits enabling San Autonio subscribers to communicate automatically with those of Sao Tome and manually by means of quality circuits with those of other areas of the country and abroad.

4.3 Operating Performance

4.3.1 Since the commissioning of the link, communication data makes it possible to compare traffic projections on the link with reality or the after project situation. The output of a transmission link is measured by the number of engaged minutes charged. According to estimates made during appraisal, the number of charged minutes between the two islands were at most, 38,400 per annum without the project, whereas with the project, the number will reach 516,000 a year after the commissioning of the link. Actual traffic data at the end of 1989, i.e a year after commissioning, give a total volume of about 308,000 charged minutes against a value of about 42,000 charged minutes in 1988, before implementation. In absolute value, this number is lower than projections because during appraisal, provisions had been made for 200 subscribers in Principe through the extension of the local network;

however, this has not been the case and there are only 90 subscribers; the total traffic per subscriber after the project, was therefore 2584 charged minutes, estimated at appraisal, against 3348 charged minutes after completion. Statistics are not always adequate and predictions were made for some months and for traffic "into" Principe.

4.3.2 The number of telephone calls from Principe was multiplied by sixteen (16) and communication bills went from dobra 634,373.7 in 1988, to dobra 4,483,565 in 1989. International calls from Principe were impossible before the project and are now possible; in 1989, 95 international calls were made from Principe, whereas during the first four months of 1990, 68 calls had already been made. The opening of a tourist class hotel during 1990 will no doubt increase this traffic.

4.3.3 One can assert, as a whole, that the objective of reaching the most advantageous, the least costly technical solution has been reached. Operating costs, a year and a half after commissioning confirms this. Operating expenses were estimated at db 2.94 million per annum (the 1984 dobra rate), for the first five years, accounting for 3% of the total of investments. Actual operating expenses for 1987 a year after commissioning amounted to db 2.2 million (the 1989 dobra rate) i.e, about db 0.6 million, at the rate of the 1984 dobra. As compared with total investments, they amount to 0.8% against the estimated 3% at appraisal.

4.4 Project Results

4.4.1 The project has had significant impact on the country:

- the technical building of the Sao Tome link terminal station provides two offices and a laboratory;

- the terminal station's generator was installed to meet the needs of the Sao Tome telephone exchange which will still be in working order even with the rather frequent public sector power cuts;

- a telecommunications sector development master plan was formulated for the 1989-2010 period;

- eight (8) workers in all were trained, some in the field of microwave link and others were initiated into modern telecommunications techniques, management, accounting and data processing;

- the corporation possesses 2 micro-computers since July 1989 and has initiated a computerized subscriber billing system.

4.4.2 The economic repercussions of the project have not been reviewed but a qualitative judgement may be made. Prior to the link, the unrealiability of telephone communications forced businessmen etc to travel from Principe to Sao Tome: the project put an end to that constraint and to give a quantitative idea of the advantage drawn one should consider the price of a return air fare between the two islands: db 7,000, whereas, a call lasting one minute costs db 16.5 during the day and db 11 at night. Tourist activities can now thrive in the island and technical assistants are willing to accept positions there.

5. FINANCIAL REVIEW

5.1 Internal Rate of Return (IRR)

5.1.1 During evaluation the project's internal rate of return was estimated at 9.63%, with a tariff of 15 dobras per charged minute. Ever since, these charges have been increased by almost 50% for local services and by 175% for international services (see chapter on tariffs). On the other hand, the local currency was devaluated. At the end of the project investments in Fund Units of Accounts (FUA) are almost identical but in dobras, because of the devaluation of the local currency. They went from 94.60 million to 255.40 million (see chapter 3.5) that is to say, almost three times the initial cost of the project. As a result, operating expenses have also increased but remained equivalent to nearly 1% of the total investment cost; i.e., a rate highly inferior to the 3% estimate made during appraisal.

5.1.2 During appraisal, the IRR was calculated taking into account a supplementary investment which the Government had to make in cable networks in order to increase the coupling of Principe's subscribers. Given the economic recession, this investment was not carried through and the number of Principe's subscribers is still the same, about 90, against the estimated 200 at appraisal. Without this supplementary investment, the IRR at appraisal was negative at -13.60%; after completion of the project, the IRR is still negative (IRR = -1%) but much higher than the initial rate. As a result, it can be concluded that the project has nevertheless reached the set financial objectives and it is more than desirable that a supplementary investment be urgently made to meet the needs expected.

5.2 Financial Commitments

5.2.1 Financial commitments made involved the financial schedule. These were presented in the form of loan conditions obliging the Government to earmark in its annual budget its share of the project cost, in accordance with the financing schedule and to seek other financing sources in the event of project cost overruns. These conditions were respected by the Government and the project was implemented in the right conditions and has been operational since December 1988.

6. ECONOMIC EVALUATION

The project's immediate and main objective was the disenclavement of the island of Principe by linking it to the island of Sao Tome through a reliable telecommunications system, of good service quality and of adequate capacity. Through the project the link has been in operation since December 1988. Considering the fact that telephone and telex connections between the two islands are now of a perfect quality and that subscribers in Principe can now make international calls, the number of calls made from the island has multiplied by 16 as compared to that of 1988. This means a substantial increase in the traffic and consequently in revenues. These profits are translated by better productivity and greater efficiency in the commercial and administrative activities of the users, not to mention an improvement in the life styles of households. These various advantages mentioned during appraisal, invariably testify that most of the needs of economic operators have been met.

7. ENATEL: RESULT AND TREND

7.1 Legal Status and Objective

7.1.1 Since the establishment of the National Telecommunications Corporation (ENATEL) on 28 January 1982 by the separation of the telecommunications section from that that of the postal section, with a view to improving efficiency, it has known no other changes. It is still a state-owned company responsible for managing and improving telecommunications services and ensuring the maintenance of equipment at its disposal. The project completion mission was informed by the Ministry in charge, of a governmental decision to set up a joint company with the portuguese company CPRM to manage the telecommunications network. The mission had not been handed all the documents which would enable it to judge the consequences of this decision.

7.1.2 ENATEL is answerable to the Ministry of Social Equipment and Environment. Its Board of Directors, the company's highest organ, coordinates all its activities and meets once every three months under the chairmanship of the Minister in charge. The Board is, as in the past, made up of a Party Representative, Heads of the Departments of Finance and Planning of the Ministry, Directors and Heads of the Administrative and Financial Departments of enterprises under the jurisdiction of the Ministry.

7.2 Organization and Management

7.2.1 Since project appraisal the ENATEL organization chart has not been altered. A General Manager appointed during the Council of Ministers meeting on the proposal of the Minister in charge, is assisted by two advisory bodies (the Board of Directors and the Technical Cabinet) and is responsible for the day-to-day running of the company.

7.2.2 As the organization chart given as Annex 5 shows, ENATEL still comprises the same five departments since project appraisal, which are run by heads of departments appointed by the Minister in charge, on the proposal of the General Manager. The Principe regional office headed by a head of delegation is still responsible to the General Manager. His duties are the same as those of 1984.

7.2.3 During project appraisal, one of the conditions precedent to the first loan disbursement was the formulation of a telecommunications master plan. This study, financed by the African Development Bank Group and the UNDP, highlighted the non-existence of laws, decrees, regulations, bylaws, instructions and administrative memoranda. This situation explains in part the following inadequacies:

1. Confusion between management and implementation functions: the line management structure not being clearly defined there is no efficient liaison between the Manager, heads of departments and executing agencies. Instructions are badly carried out and a complete modification of structures is inevitable if any development plan is to be set in motion.

2. There is no planning department in the organization chart responsible for defining development guidelines within ENATEL and therefore no clear-cut working programme at the various levels.

3. Inexistence of collective agreements; hence the management of people and careers is vague and is limited to wages. Human resources are not well-known and badly managed.

4. Lack of co-ordination: departments work severally.

5. Lack of an information system.

6. Management shortcomings: no cost accounting and accounts management make it impossible to monitor the running of the company. Objectives are shady and therefore management is rounded off by contacts which come under for the most part, budgetary accounting.

7.3 Personnel and Training

7.3.1 When the project was appraised in 1984, ENATEL had a staff of 184 of which only 2 were engineers, one a top-level technician, six medium-level technicians and 27 technicians; the rest comprised administrative staff and

telephone and telex operators. In five years, the ENATEL workforce increased by 26 workers, that is to say, more than 5 persons per annum. This increase actually came about in 1986 and stabilized as of 1988, varying according to category, as the table below shows:

TREND AND DISTRIBUTION OF ENATEL WORKERS
ACCORDING TO CATEGORIES AND LEVEL BRACKETS

	1984	1985	1986	1987	1988	1989
Executives	2	4	5	7	5	6
Middle Management	7	9	11	13	11	12
Line Staff	27	70	62	102	82	81
Auxilliary Staff	151	103	117	80	106	114
TOTAL	187	186	195	202	214	213

Progress of ENATEL Workers in 1988 and 1989
according to their academic level

Academic Level	1988 No. of Workers	1988 % of Total	1989 No. of Workers	1989 % of Total	Average % on 2 Years
School of Engineers GEC + 5 years	5	2.34	6	2.82	2.58
Degree Level Masters, GCE + 4 years					
Univ. of Tech. Diploma GCE + 2 years	11	5.14	9	4.22	4.68
Grade 11 (GCE Level)	5	2.34	4	1.88	2.11
Grades 9 and 10	20	9.34	19	8.92	9.13
Grades 6 and 8	57	26.63	36	16.90	21.765
Below Grade 6	98	45.80	119	55.87	50.835
No reply or lack of information	18	8.41	20	9.39	8.90
Total	214	100.00	213	100.00	100.00

7.3.2 For the two specific years which the data actually deals with, it appears that on average 16 persons i.e. 7.36% have reached a higher education level; 24 persons, i.e. 11.24% acquired secondary education, 46 persons that is to say, 21.77% have a primary education level (primary school certificate), 128 i.e. 67.73% do not have a primary education level. A comparison of the intellectual level of the staff and their distribution according to category gives the following results:

	Developing Countries	Sao Tome	Difference in %
Executive and Middle Management	10%	7.36%	-2.64%
Supervisory Staff	30%	11.24%	-18.76%
Line Staff	55%	21.77%	-33.23%
Unqualified	15%	67.73%	-62.27%

7.3.3 This table indicates the bearings of the ENATEL personnel management strategy for the years to come. One notices an acceptable management staff situation, a rather significant shortage of supervisory and qualified line staff and a very high level of unqualified staff. Emphasis should thus be put on training to improve the qualification of the staff as a whole and supervisory staff should be recruited in priority and they should have a general level equivalent to the GCE.

7.3.4 In 1984, in a telephone exchange of 1765 main lines, ENATEL recruited 106 workers for 1000 lines. As the table below shows, this productivity indicator declined as the years went by to reach 95 late 1988. This level is rather high as compared with the mean values of between 50 to 60 workers for 1000 main lines that one finds usually in African countries. A reduction should as a matter of course be carried out as soon as possible.

Trend of Main Lines and Telephone Density

	1981	1982	1983	1984	1985	1986	1987	1988
Main Lines	798	1 222	1 555	1 765	1 874	2 001	2 117	2 240
Work Force								
ENATEL	-	-	-	187	186	195	202	214
I.P Int.(0 for thousand)	-	-	-	106	99	97	95	95
Population	96 611	99 900	101 000	103 400	105 000	107 000	109 000	111 700
T.D.	0.83	1.23	1.53	1.71	1.78	1.87	1.94	2.01

Comparision of TD of various countries
(1984 and 1986 values expressed in M.L. for 100 inhabitants)

Country	Telephone Density		Country	Telephone Density	
	1984	1986		1984	1986
Algeria	2.42	2.50	Kenya	0.54	0.61
Benin	0.49	0.51	Lesotho	0.55	0.56
Botswana	0.96	0.97	Madagascar	0.54	1.13
Burkina Faso	0.12	0.12	Morocco	1.09	0.25
Burundi	0.11	0.11	Mauritania	0.23	0.25
Cameroon	0.32	0.32	Mozambique	0.27	0.27
Central Africa	0.10	0.13	Niger	0.13	0.13
Congo	0.55	0.55	Nigeria	0.20	0.23
Djibouti	0.94	0.94	Rwanda	0.08	0.08
Egypt	1.86	1.87	Senegal	0.34	0.36
Ethiopia	0.23	0.23	South Africa	8.42	8.47
Gabon	0.89	1.00	Tanzania	0.24	0.24
Ghana	0.31	0.31	Chad	0.04	0.05
Guinea	0.18	0.18	Togo	0.27	0.06

Telephone Density in various islands
(1984 Values, expressed in M.L. for 100 habitants)

Pays	Area in Km2	M.L. Telephone	Population	Telephone Density	PIB/HAB (US $)
Antigua/Barb.	442	5 796	78 000	7.43	1 572
Cape-Verde	4 033	2 365	295 703	0.80	-
Cook Islands	14	1 817	17 600	10.32	-
Dominique	751	4 812	74 851	6.43	-
Grenada	344	3 904	100 000	3.90	964
Kiribati	723	669	63 883	1.05	332
Maldives	298	2 272	181 453	1.25	530
Mauritius	1 865	39 956	998 471	4.00	911
Saint Lucia	616	6 658	134 066	4.97	962
Saint Vincent/G	338	5 419	100 000	5.42	-
Sao Tome/Pr.	964	1 765	103 400	1.71	309
Seychelles	444	5 893	65 711	8.97	1 783
Tonga	699	2 567	100 000	2.57	-
Trinidad/Tob.	5 128	66 323	1 140 000	5.82	-

7.3.5 The telephone density expressed in the number of mainlines per 100 inhabitants was 2.01 in 1988. This density is relatively high as compared with that of other countries in the African continent. This situation can be explained by certain assumptions :

- Sao Tome and Principe are islands; the specific case of an island, covering a relatively small area and with a low population explains this difference in part.

- Telecommunication prices: from the table below, a comparison of tariffs with those of some african countries, underpins the rather low level of coupling, rental-maintenance and local and interurban communications tariffs. On the other hand, communications with other african countries are more expensive. There is no prior guarantee deposit for coupling with the telecommunications network.

7.3.6 Under the project, ENATEL benefitted, as planned, from the training of 10 of its workers; 5 were trained in the operatiing and maintenane of the microwave system by the suppliers, 3 in accounting and modern telecommunications techniques and 2 in data processing. There is no training centre or department within ENATEL, neither is there any actual training structure. Most executives are trained abroad (in Cuba, URSS, Algeria and Portugal) and middle management staff (mainly in transmission) are trained in France and Portugal. Complementary training is acquired at the manufacturers.

7.4. Accounts and Auditing

7.4.1 The accounting department is headed by a division chief and assisted by a deputy, comes under the administrative and financial department. TEI's general accounts system is a two-fold system. It is carried out by 9 workers attached to the following sectors : fund and liabilities accounting, financial accounting, wage accounting etc. At the end of each fiscal year i.e from 1 January to 31 December, they issue a balance sheet and a general operating account which are submitted to the Ministry of Economy and Finance for auditing and approval. These financial statements are drawn up in consistence with instructions on the national accounting plan from the said Ministry which issues the rules to be applied to all state-owned enterprises. The latter are managers of the patrimony they operate.

7.4.2 As a state-owned company, ENATEL is subject to double supervision :

- that of the Management Board of the Ministry of Social Equipment and Environment (MESE) ; and
- that of the Ministry of Economy and Finance.

7.4.3 The Management Board of the MESE is empowered to carry out inspections at any time after 24 hours notice and several times throughout the year. It is a general check up of the smooth functioning of the enterprise and the auditing of account books.

7.4.4 The control effected by the Ministry of Economy and Finance is to ensure proper application of the accounting plan. In agreement with the Ministry in charge, the MESE's plan, prior to becoming a management instrument, is submitted respectively to the Ministry of Economy and Finance, the Council of Ministers and the National Assembly. ENATEL's financial statements have never been audited by an external auditing firm.

7.5 Tariffs

7.5.1 The Democratic Repubic of Sao-Tome and Principe is divided up into 10 tax zones (9 in Sao Tome and 1 in Principe, connected to that in Sao Tome by a microware link).

7.5.2 Local communications are made by means of an automatic system and interurban communications by means of either an automatic system (Sao Tome city, Trinidade and Santo-Antonio) or a manual system (for the rest of the country). As a result, there are currently two tariff systems :

- the manual system, whereby subscriber charges are recorded by operators on tickets;

- the automatic system, whereby charges are made on the basis of impulses.

International communications are made by way of the earth station standard B Intelsat transiting mainly via Lisbonne. The telex network comprises a single automatic exchange located in the town of Sao Tome.

7.5.3 Since project appraisal the ENATEL tariff structure has not been modified. Tariffs vary depending on the type of calls made (local, intercity or international). A special tariff is applied to calls between Sao-Tome and Principe (Annex 7). There is also a tariff for telexes and one for telegrammes.

7.5.4 Charges in force for telecommunications services date back to 11 February 1989. They have been increased by 50% for national services and by 175% for international. This was done so as to cope with the devaluation of the local currency, inflation and to take into account one of the Bank loan conditions (increase of tariffs by 10% each year for three years).

7.5.5 During appraisal, provision was made for the setting up of a tariff department and for the training of qualified staff in Portugal. To date, both objectives hae been attained but the department set up was not in operation because the professional nominated for the department was posted elsewhere.

7.5.6 The main charges applied are those relating to :

- installation and connection of the various telecommunications equipment to the public network;

- service subscriptions (including maintenance of lines and equipement;

- occupancy of lines and exchange instruments channelling traffic generated by users.

7.5.7 The basic charge of communications went from db 2.50 to db 5.50 as from February 1989. With regard to communications charges, in consistence with the national network organization, provisions have been made for two tax scales :

- a local charge applied to communications between subscribers connected to the same local exchange;

- an intercity variable charge, applied to communications between subscribers connected to two different exchanges.

For automatic intercity communications, the tariff system provides for different peak traffic charges from 7 a.m. to 6 p.m. and low traffic periods. Local communications have a standard basic charge of db 5.50 per communication regardless of the duration and charges vary for intercity communications depending on the operating system used.

7.5.8 Charges are the following when the automatic system is used :

	Rhythm of Impulses (1 basic charge)	Equiv.Charge for 1 minute	Remarks
Connection			
Sao Tome-Trinidade			
07.00 - 18.00	Every 20 sec.	db 16.50	-
18.00 - 07.00	Every 30 sec.	db 11.00	-
Sao Tome-Antonio			
07.00 - 18.00	Every 15 sec.	db 22.00	
18.00 - 07.00	Every 20 sec.	db 16.50	
Trinidade-Santo Antonio			Same charges as for Trinidade-Sao Tome
Santo-Antonio/Trinidade			Same charges as for Santo Antonio/ Sao-Tome

7.5.9 When the manual operating system is used, communications are charged db 10 to db 20 according to directions, per minute, with an initial chargeable duration of 3 minutes. The criteria followed in fixing these charges are not clearly defined and in practice, because of the poor state of the network, communications between areas further away are not possible. International communications are classified (Annex 7) into three charging areas : Portugal, Portuguese-speaking countries, Europe, Africa, other countries. Other charges such as those relating to connecting and subscribing (Telephone and telex) complete the Sao-Tome tariff structure.

7.5.10 This general tariff structure with its range of charges, details of which are given as annex, reflects the three main sources of telecommunications revenues, namely the telephone service, the telex service and the traditional telegraph service. The charges for some additional services (circuit rental, facsimile, radiocommunications) have also been provided for and are applied. In addition, embassies, diplomatic missions, companies and foreigners are expected to pay international telephone services in convertible currencies. Proceeds from services represent almost 50% of foreign exchange earnings.

7.5.11 The scale of charges provided for in the tariff structure covers in principle, services requested by users which ENATEL offers; although they are not strictly levied and cases of non-payment are frequent reducing substantially actual revenues.

7.5.12 Taxes collected at national level for telephone services is one of the lowest in Africa (see chapter 7.3.5). Furthermore, the gap between telephone and telex charges is much more noticeable than in most african countries. Generally, distribution charges for international communications involving both telephone and telex services negotiated with transit and destination authorities, are the same in any given two directions. In the case of Sao Tome and Principe, there are big differences, between charges collected for the same call depending on the direction. The CCITT has recommended that certain limits are to be observed so that these differences are not too great and so as not to change or reverse the normal in-coming and out-going traffic proportions.

Comparison between telecommunications services tariffs
(1987 price in CFA francs)

Telecommunications		MALI	CONGO	SAO TOME	GABON	TOGO	NIGER
Connection	Telephone	53550	35000	13900	74400	81500	30000
	Telex	53550	56000	41700	111600	87500	30000
Rental	Telephone	2680	5250	1490	11160	2875	3000
Maintenance	Telex	56000	176000	12500	148800	36900	132000
Basic charge		70	70	15	62	50	60
Intercity(200/400km)		190	260	83/167	250	300	300
Communications	Telephone	1120	1200	1635	1240	857	900
France/Minute	Telex	840	1000	1350	868	700	639
Communications	Telephone	560/1120	720	2180	620	500	423
CAPTEAO per minute	Telex	840	500	1140	434	415	336
Guarantee Deposit	Telephone	15000	35000	-	-	130000	50/75000
	Telex	135000	280000	-	-	500000	200000

Sao Tome and Principe
1989 Prices in dobras and CFA Francs

Telecommunications Services		DOBRAS	Francs CFA
Connection	Telephone	5000	19230
	Telex	15000	57690
Rental	Telephone	300	1150
Maintenance	Telex	4500	17300
Basic charge			
Local Telephone IBC	5,5	21	
Intercity	30/3 mn	115/3m	
Communications/	Telephone	290,5	1117
CAPTEAO per minute	Telex	240	923
Guarantee Deposit	Telephone	-	-

7.6. Billing and Debt Recovery

7.6.1. The telephone billing system was a manual one until late March 1989, it has since been computerized. The telex system is still manual because subscribers are very few. The computer software purchased under the formulation of the masterplan will lead to the computerization of the company's accounting system. The first computerized bills saw the light of day in June 1989. Actual telephone and telex bills are issued monthly to all subscribers. Private subscribers pick up their bills at the post office where they have to pay within a maximum period of fifteen days. After this deadline, the bill is sent to the "dispute" section which recovers it normally or through legal action.

7.6.2 Bills for Government organizations are delivered to them monthly by ENATEL staff. In principle, they have to settle the bills within 15 days, although this deadline is not always observed. Their recovery is almost impossible and ENATEL has no coercive means of making these organizations settle their bills.

7.6.3 In 1984, total outstanding represented more than db 12.50 million, that is to say 28% of the sum that was to be recovered (see Annex 6). By 1985, the sum had more than tripled, settling down to one and a half times in 1988 following recovery measures taken in 1987 (reduction of public telephones

and communications by 50% and administrative measures were taken to reduce out-going traffic : a 30 minute reduction per month for households and a 50 minute reduction for offices), involving Government offices whose arrears owed to ENATEL represent on average, almost 80% of the total.

7.7. Operating Analysis

7.7.1 This analysis will involve operating account analysis from 1983 to 1989 as shown in the table below :

Summary of ENATEL Operating Accounts
from 1983 to 1989
(in dobras million)

		1983	1984	1985	1986	1987	1988	1989
I.	OPERATING PROCEEDS	34.94	49.16	63.38	68.65	76.35	76.45	85.63
	National Telephone	12.73	13.64	14.54	15.53	17.04	17.97	20.68
	International Telephone	14.04	25.16	36.29	38.56	44.05	38.92	48.40
	Telex	6.61	8.98	11.36	13.78	14.25	18.71	15.40
	Telegraph	1.26	1.23	1.19	0.78	0.90	0.77	1.05
	Other	0.30	0.15	-	-	0.11	0.08	0.10
II.	OPERATING EXPENSES Non Amortization	22.11	23.51	24.92	33.67	44.96	63.91	48.37
	Material	2.22	2.64	3.07	7.38	7.92	15.21	8.70
	Personnel	13.43	13.21	12.99	15.23	19.70	23.56	24.28
	Works and Services	3.44	4.59	5.74	7.35	10.01	7.51	9.06
	Transport	1.14	0.95	0.76	1.27	1.12	3.05	0.80
	General Expenses	1.10	0.79	0.47	1.55	2.39	3.24	1.25
	Financial Expenses	0.05	0.04	0.04	0.06	2.86	10.30	3.07
	Taxes and Charges	0.73	1.29	1.85	0.83	0.96	1.04	1.21
	Gross Performance	12.83	25.65	38.46	34.98	31.39	12.54	37.26
	Amortization	1.95	2.42	2.90	18.54	18.76	18.50	18.50
	OGE*	6.33	7.96	9.59	13.14	10.09	0.00	14.99
Net Result		4.55	15.27	25.97	3.30	2.54	-5.96	3.77

*OGE : Contribution to state budget (ORCAMENTO Geral de Estado).

7.7.2 From 1982 to 1987, the financial structure varied each year and operating account results were reviewed and harmonized. For 1988, the account was recalculated on the basis of the budget performance statement and an estimate was made of the balance sheet which was not yet available. For 1989,

the draft budget served as a basis for calculation. In 1984, for lack of data, the average of those for 1983 and 1985 were used.

7.7.3 The above table illustrating the operating accounts, shows that the only two items to change almost regularly, were the national and international telephone systems (14.4% on average per annum) representing almost 80% of the proceeds total. Charges also progressed, but despite the trend, the gross result remained positive going from db 12.38 million in 1983 to db 34.98 million in 1986 and db 37.26 million in 1989; influenced by amortizations. In actual fact, these annual levies are rather marginal as compared to liabilities as ENATEL is considered as a mere manager of equipment allowed. It is besides, to enable the Government to ensure amortization of this equipment that the accounting plan drawn up by the Ministry of Economy and Finance and applicable to all state-owned enterprises, includes payment to the Government of about 80% (OGE) of the projected profit.

7.7.4 In 1988, stagnation of proceeds resulting from the rapid increase in charges led to a negative result. Material account and financial expenses account recorded the highest increase as a result of irregular customs expenses for the importation of microwave link equipment. Generally, one can conclude that the proceeds total is more regular in its progress than that of charges, which are badly controlled and also often mis-evaluated (lack or under-estimation of amortizations, no provisions for bad debts or for exchange losses). Consequently, the positive results recorded and the significant payments made to OGE are in fact fictitious.

7.8 Balance Sheet Analysis

7.8.1 Balance Sheet Analysis

The financial structure was analysed on the basis of the 1984 to 1989 balance sheets as shown in the table below:

Summary of ENATEL Balance Sheets 1984-1989
(in dobra million)

	1984	1985	1986	1987	1988	1989
I. TOTAL ASSET	431,50	434,971	451,204	477,350	663,00	616,741
1. Immobilized Asset	337,54	375,337	363,247	350,82	550,00	419,274
A. Operating Liabilities	377,54	375,337	362,396	347,84	550,00	411,529
B. Current Liabilities	-	-	0,851	2,98	-	7,745
2. Current Asset	35,96	59,633	88,808	126,53	113,00	197,467
. Stocks	3,40	1,412	2,518	2,73	3,00	6,254
. Available	13,41	20,301	34,967	30,714	100,00	24,968
Current	19,15	37,92	51,323	93,086	100,00	166,245
II. LIABILITY	413,50	434,971	451,204	477,35	663,00	616,741
. Net position	404,78	426,547	361,204	393,82	196,00	234,70
. DLMT	-	-	-	-	253,00	253,00
. DCT	8,72	8,424	90,00	83,53	214,00	129,041
. Revolving Fund	27,24	51,209	- 1,192	43,00	-101,00	68,426
. Liquidity ratio	4,12	7,08	0,98	1,51	0,53	1,53

*Recorded the highest increase.

7.8.2 The above table, shows in particular, a sharp rise in the 1986 debts, as account was taken of sums still to be paid to equipment suppliers although according to legislation, the Government should invest. Usually the balance sheet total increases regularly. One can also see the steady and alarming increase in the customers' account. This situation is redeemable as some debts are very old and non-accrual, whereas ENATEL bears financial expenses relating to supplier credits.

7.8.3 ENATEL's financial structure, shows the low level of short-term debts for 1984 and 1985 and the absence of long-term debts up to 1987. In 1986, the Standard Electrica Company debts, relative to non-reimbursed international communications, were incorporated into the liability item. This led to a negative revolving fund and illustrates the states divestiture from the sector, to the benefit of ENATEL. In 1988, the increase in short term debts was the result of the devaluation on foreign exchange debts and on the financing of part of its liabilities with these debts. At the end of the year, an inventory of these liabilities was conducted and account was taken especially of the depreciation and age of equipment purchased in 1980. With the recent microwave link of Principe, equipment was estimated at db 550

million. In order to have an aggregate view of the telecommunications sector, the Government's debts for the sector were incoporated into liabilities. The balance sheet is largely negative and the debt ratio is lower than 0.40, which translates the sector's high debt level. In 1989 the balance sheet was adjusted following the auditing of ENATEL accounts.

7.8.4 As a result of the various specificities explained in this chapter, accounting entries do not reflect the actual situation at ENATEL. A glance at the telecommunications sector leads us to the conclusion that to ENATEL's debt to CPRM must be added those of the Government in its role as investor. The reasons for the high debt level are several:

- The tariffs applied were for a long time very low and operating profits were not enough to amortize investments ;

- The rather high level of arrears owed by clients and mainly by the Government;

- The fact that ENATEL does not monitor its investments amortization allocations are inadequate, tariffs are extremely low and bad payers are not sanctioned.

8. PROJECT JUSTIFICATIONS

8.1 Technical Justifications

The link between the island of Sao Tome and that of Principe is satisfactory in terms of quantity, quality and least operating costs, justifying perfectly the direct visibility micro-wave numerical technical solution.

8.2 Economic Justifications

8.2.1 Traders no longer have to go to Sao Tome to transact business, or Government workers to settle administrative matters. Thanks to the telephone connection, a tourist complex is being built and will be operational during the course of 1990. The projects contribution to the country's economic development is patent, even if it is not quatifiable.

8.2.2 Financially, the initial project was not profitable. To remedy the situation, provisions were made to extend Principe's network so as to increase the number of subscribers and hence increase earnings. But following the projects' completion the extension was not made and since the same hypotheses put forward during appraisal were reconsidered, apart from the complementary investment, the rate of 13.60% was arrived at. After completion, this rate dropped to -1% (see Annex 8) which is still a rather positive performance.

8.3 Institutional Aspect

The project has had influence on ENATEL's institutional development; despite some improvement, the same weaknesses subsist, especially with regard to its financial management capacity. Owing to financial constraints, institutional building was not possible. Nevertheless, drawing up a master plan has made it possible diagnose the company's institutional weaknesses, put forward constructive proposals and to some management improvement, through computerization.

9. BANK PERFORMANCE

9.0.1 The Bank has sent only one project supervisory mission but it has been in constant touch through regular correspondence, to efficiently help the executing agency in its duties. The Borrower is satisfied with the Bank especially as the telecommunications project was one of the rare projects which was satisfactorily implemented in the country.

9.0.2 In demanding and in financing a telecommunications masterplan, the Bank played its part in providing the country with an instrument which should lead to a rational financing option for the sector.

9.0.3 The Borrower did not fulfill one of the prior loan conditions, i.e reducing the Government's arrears owed to ENATEL. This situation worsened with time, despite the Bank's reminder after the first supervisory mission. The Bank is powerless with regard to the respect of these conditions. An in-depth study of the matter is necessary to find realistic solutions that are well adapted to the country's context.

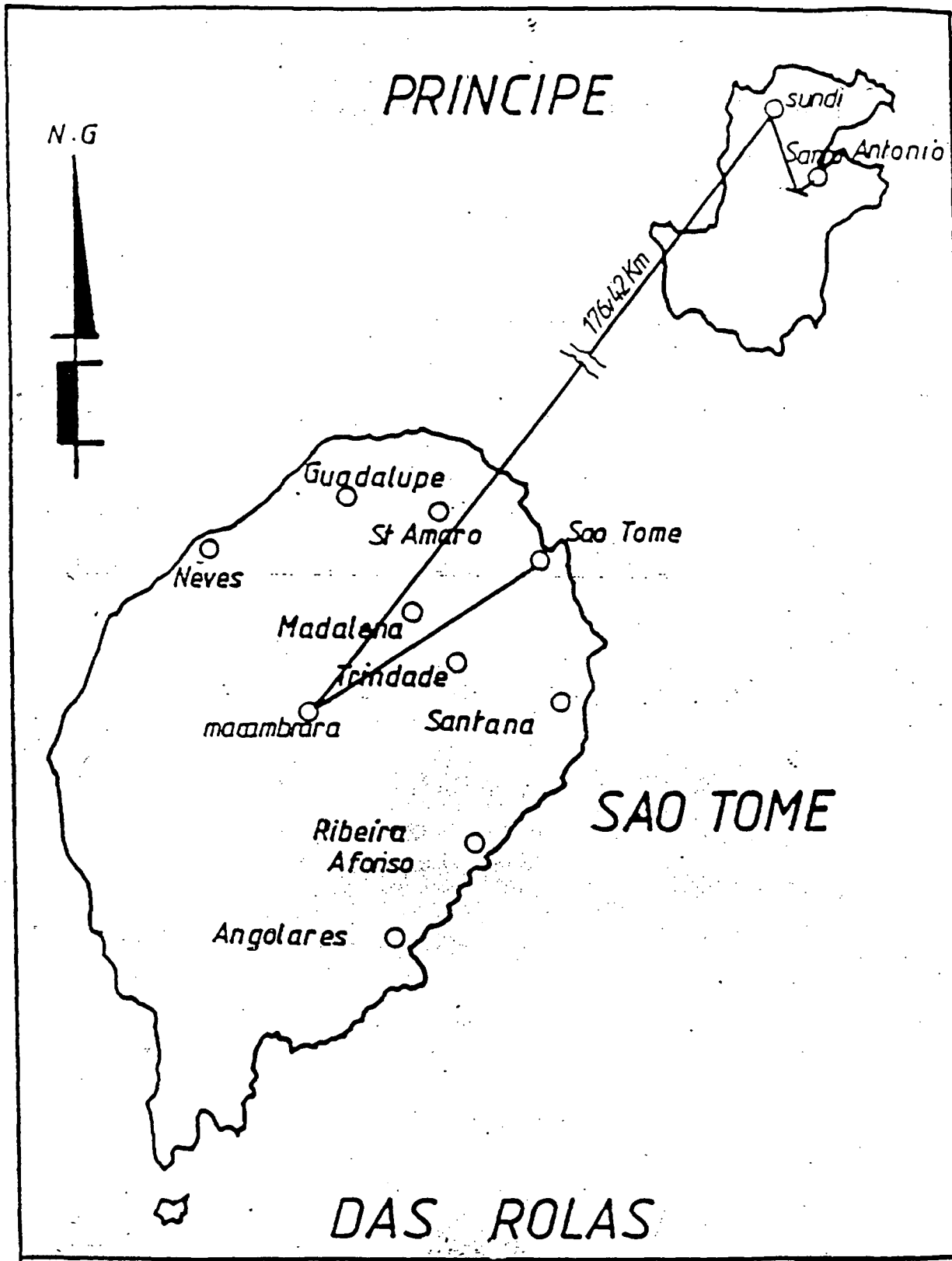
10. CONCLUSIONS

10.0.1 The project was a sucess in so far as its targets were reached. The island of Principe is no longer isolated as far as telecommunications go and the project has had positive repercussions on the country (paragraphs 4.4.1 and 4.4.2).

10.0.2 The project shows that its preparation was very useful because it led to a less costly solution than initially planned and moreover, of very good quality. Thorough preparation of a project is one of the important lessons learnt from this project.

10.0.3 The second lesson learnt is the need to take into sufficient consideration the institutional aspects that are indispensable to a proper management of the sector.

10.0.4 Telecommunications and infrastructure projects in general even if simple, are investments that are often very costly and whose high cost jeopardizes the borrowing capacity of countries like Sao Tome and Principe. Implementing a telecommunications masterplan might come up against these barriers.



SCALE ± 1/300 000	Number 45/8
SAO TOME — SANTO ANTONIO MICROWAVE LINK	

ANNEX 2

SAO TOME AND PRINCIPE

TELECOMMUNICATIONS PROJECT

PROJECT COMPLETION REPORT

Trend of the Number of Subscribers in Principe

Year	Estimates at Appraisal	Actual Trend
1984	90	90
1985	90	81
1986	135	81
1987	175	79
1988	200	80
1989	225	88
1990	246	92

ANNEX 3

SAO TOME AND PRINCIPE

TELECOMMUNICATIONS PROJECT

PROJECT COMPLETION REPORT

Trend of the Number of Calls from Principe

Year	Number of Calls
1987	42 917
1988	35 142
1989	566 089
1990 (From January to April)	276 337

SAO TOME AND PRINCIPE

TELECOMMUNICATIONS PROJECT

PROJECT COMPLETION REPORT

Disbursement Processing Duration

Corporation	Disbursement Request Number	Billing Date	Disbursement Request Date	Arrival Date at FDIS (A D B)	Payment Date (Value Date)	Interval Between Billing and Disbursement	Interval Between Disbursement Request and Arrival at FDIS	Interval Between Arrival at FDIS & Payment	Interval Between Billing and Payment
		(1)	(2)	(3)	(4)	(2) - (1)	(3) - (2)	(4) - (3)	(4) - (1)
UIT	1	26/08/85	25/11/85	04/12/85	30/12/85	91 d	9 d	26 d	126 d
SAT	2	22/07/87	18/08/87	09/09/87	18/09/87	28 d	21 d	9 d	58 d
EGM	3	15/07/87	18/08/87	09/09/87	18/09/87	35 d	21 d	9 d	65 d
SE	4	05/11/87	13/11/87	23/12/87	18/02/88	9 d	40 d	56 d	105 d
EGM	5	13/11/87	13/11/87	23/12/87	08/01/88	1 d	40 d	15 d	56 d
EGM	6	13/11/87	13/11/87	23/12/87	08/01/88	1 d	40 d	15 d	56 d
EGM	7	13/11/87	13/11/87	23/12/87	08/01/88	1 d	40 d	15 d	56 d
UIT	8	25/11/87	29/12/87	26/01/88	12/02/88	36 d	28 d	16 d	80 d
EGM	9	01/02/87	01/02/88	04/03/88	13/03/88	1 d	30 d	9 d	40 d
EGM	10	01/02/87	01/02/88	04/03/88	13/03/88	1 d	30 d	9 d	40 d
EGM	11	01/02/87	01/02/88	04/03/88	13/03/88	1 d	30 d	9 d	40 d
SAT	12	23/02/88	22/03/88	13/04/88	25/04/88	28 d	21 d	12 d	61 d
SAT	13	23/02/88	22/03/88	13/04/88	25/04/88	28 d	21 d	12 d	61 d
UIT	14	05/05/88	30/06/88	05/08/88	24/08/88	35 d	36 d	19 d	90 d
EGM	15	01/08/88	04/08/88	24/08/88	13/09/88	3 d	20 d	20 d	43 d
EGM	16	01/08/88	04/08/88	24/08/88	13/09/88	3 d	20 d	20 d	43 d

SAO TOME AND PRINCIPE

TELECOMMUNICATIONS PROJECT

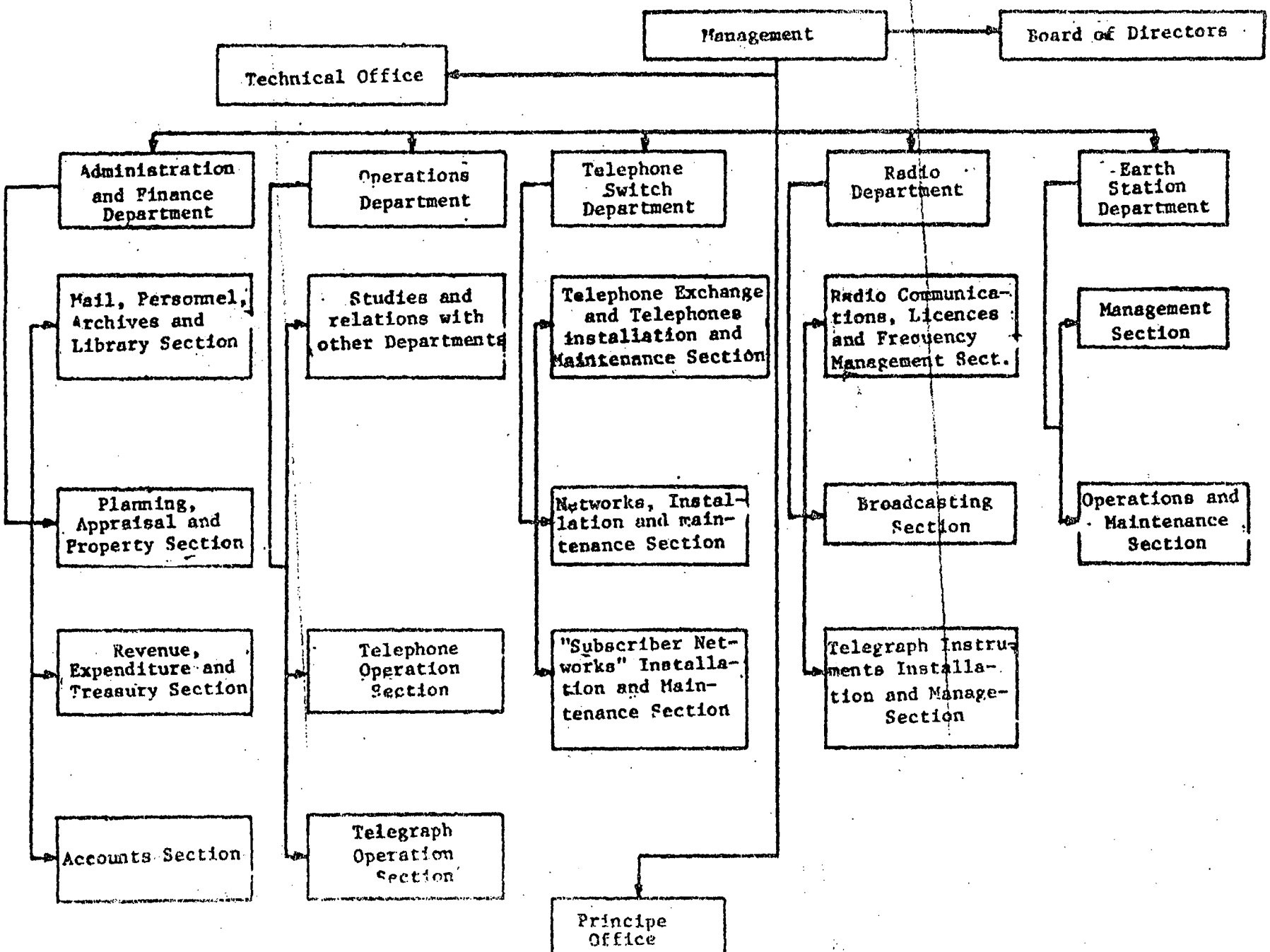
PROJECT COMPLETION REPORT

Disbursement Processing Duration

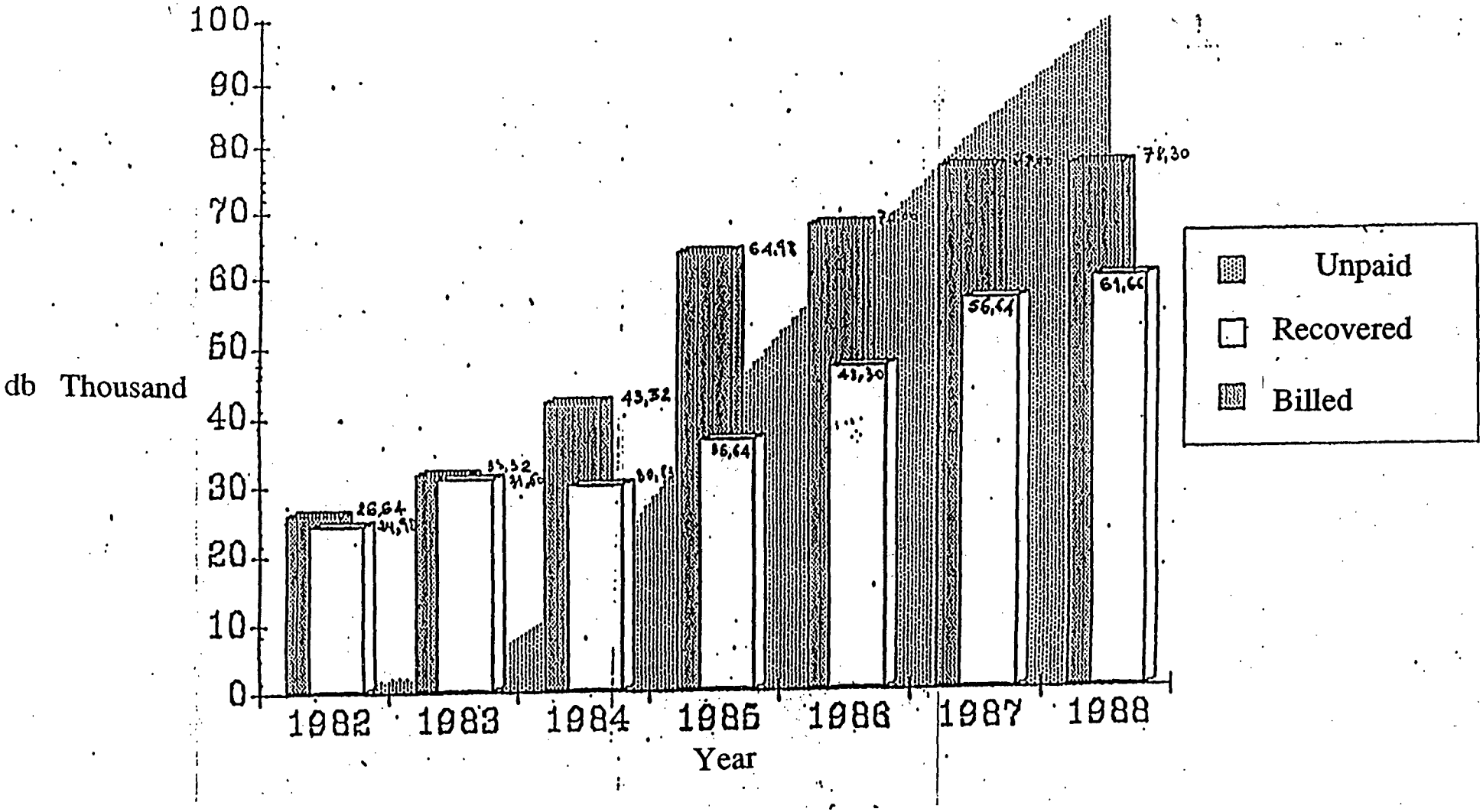
Corporation	Disbursement Request Number	Billing Date (1)	Disbursement Request Date (2)	Arrival Date at FDIS (A D B) (3)	Payment Date (Value Date) (4)	Interval Between Billing and Disbursement (2) - (1)	Interval Between Disbursement Request and Arrival at FDIS (3) - (2)	Interval Between Arrival at FDIS & Payment (4) - (3)	Interval Between Billing and Payment (4) - (1)
SAT	17	07/07/88	04/08/88	24/08/88	14/09/88	28 d	20 d	21 d	69 d
SAT	18	07/07/88	04/08/88	24/08/88	14/09/88	28 d	20 d	21 d	69 d
EGM	19	27/09/88	10/10/88	24/10/88	12/12/88	13 d	14 d	49 d	76 d
EGM	20	27/09/88	10/10/88	24/10/88	12/12/88	13 d	14 d	49 d	76 d
SE	21	12/10/88	15/11/88	19/12/88	11/01/89	27 d	34 d	23 d	84 d
SAT	22	05/10/88	11/10/88	19/12/88	11/01/89	6 d	69 d	23 d	98 d
SAT	23	30/11/88	15/12/88	04/01/89	02/02/89	16 d	19 d	29 d	64 d
SAT	24	8/12/88	17/12/88	04/01/89	02/02/89	10 d	17 d	29 d	56 d
SE	25	15/11/88	21/12/88	22/02/89	06/07/89	36 d	63 d	134 d	233 d
EGM	26	27/02/89	27/02/89	05/05/89	06/07/89	1 d	66 d	62 d	129 d
UIT	A - 27	07/03/89	13/03/89	05/05/89	06/07/89	6 d	53 d	62 d	121 d
SE	28	28/03/89	19/04/89	05/05/89	06/07/89	22 d	16 d	62 d	100 d
UIT	29	08/02/89	16/08/89	06/12/89	08/01/90	189 d	112 d	33 d	334 d
UIT	A - 30	08/02/89	16/08/89	06/12/89	08/01/90	189 d	112 d	33 d	334 d
	Gross Average Value					29 d	36 d	30 d	95 d
	Gross Average Value excluding asterisked exceptional cases*					15 d	29 d	26 d	70 d

ANNEX 5

ORGANIZATION CHART OF ENATEL



TREND OF UNPAID



Trend of Outstanding in % and DB Thousand

	1982	1983	1984	1985	1986	1987	1988
- Rate of recovery %	98.94	94.83	71.17	56.39	69.00	72.61	78.75
- Outstanding %	1.06	5.17	28.83	43.61	31.00	27.39	21.25
- Outstanding in db thou.	1.66	1.72	12.49				

SAO TOME AND PRINCIPE

TELECOMMUNICATIONS PROJECT

TARIFF STRUCTURE

		Former	Current
I.	TELEPHONE		
	1 - Subscriber Charge		
	- Residential	db 200/month	db 300/month
	- Mixed public enterprises	db 800/month	db 1,200/month
	- Government debts	db 600/month	db 900/month
	2. Installation charge		
	- Urban	db 2000	db 5000
	- Rural From the urban area	db 2000/km	db 5000/km
	3. Local conversation	db 2.50 per call	db 5.50 per call
	4. Inter-Urban conversation (1)	db 5/minute	db 10/minute
	5. Conversation Sao Tome-Principe (1)	db 15/minute	db 30/minute
	6. International conversation (1)		
	. Portugal + Portuguese speaking Africa	db 120/minute	db 393/mn
	. Europe-Africa	db 180/minute	db 586.6/mn
	. Other countries	db 240/minute	db 784.5/mn
II.	TELEX		
	1 - Subscriber Charge	db 300	db 4,500
	2. Installation charge	db 10,000	db 15,000
	3. Conversation charge		
	. Portugal + Portuguese speaking Africa	db 120/minute	db 3240mn
	. Europe-Africa	db 180/minute	db 410.5 to 486/mn
	. Other countries	db 240/minute	db 684/mn

III. TELEGRAMME

*1.	Portugal	db 140+db 6/word	db 378+db 16.20/word
2.	Portuguese-speaking Africa	db 140+db 18/word	db 48.60/word
3.	Europe	db 140+db 26/word	db 80.60+90and db 20/word
4.	America	db 140+db 42/word	db 113.9 to 127.4/word
5.	Africa	db 140+db 53/word	db 92.13 to 113.4/word
6.	Asia-Australia	db 140+db62/word	db 92.8 to 122.4/word

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(1) Minimum of 3 minutes: (Between the first 1 to 3 minutes, the rate does not change even if the duration does not exceed 3 minutes and if more, every extra minute is charged).

* The former charge was made up of telegramme deposit charge and communication charge: the new charge does not include communication charge except for Portugal. There will be preferential charges between Sao Tome and Principe:

Peak hour : From 7 a.m. to 6 p.m. - db 22/minute
Off peak hour: From 6 p.m. to 7 a.m. - db 16.50/minute

SAO TOME AND PRINCIPE

TELECOMMUNICATIONS PROJECT

PROJECT COMPLETION REPORT

Calculation of the Internal Rate of Return (IRR)

1. INVESTMENTS

To make this calculation, actual project investments were taken into consideration, that is to say, the various disbursements made between 1985 and 1989 on the basis of the various values of the FUA and db.

Quarterly FUA Values in dobra

Years	First Term	Second Term	Third Term	Fourth Term
1985	41.6776	41.677	41.6776	41.6776
1986	41.6776	41.677	41.6776	41.6776
1987	41.6776	41.677	41.6776	92.1052
1988	92.1052	92.1052	95.3897	120.9750
1989	120.975	145.0560	145.1960	145.1960
1990	145.196	170.0170	-	-

2. Operating Expenses

These are made up of maintenance expenses (seasonal replacement of microwave link patterns, vehicle, maintenance: fuel, vehicle spare parts, generator maintenance, and personnel expenses: some auxilliary staff and four of the six ENATEL engineers devote one third of their working time to operating the project. With regard to maintenance expenses they are evaluated annually at nearly dobra 700,000; in respect of personnel expenses, one third of their salaries and charges settled at dobras 2.3 million per annum will be earmarked, which in respect of annual operating expenses means dobras 1.5 million. Given the possible aging of the project installations, allowances have been made for a 5% increase of maintenance expenses after the initial years, whereas for economic reasons salaries will remain the same.

3. Revenues

These come from the island of Principes' equipment. In 1989, traffic from Principe to Sao Tome represent in dobras, almost 4.5 million and from Sao Tome to Principe, 3.6 million, i.e. a traffic of 14,500 minutes leaving Sao Tome and 11.300 minutes arriving from Sao Tome. In quarters of the number of calls, 566,089 were made in 1989 and in the first four months of 1990, 276,337 calls were made, that is to say, nearly 830,000 calls in a year. This represents almost a 50% increase as compared with 1989. This upward trend, tributary to the implementation of the project and the island of Principe's development programme, launched by the Government, makes it possible to forecast continued increase as follows: 50% in 1990, 20% in 1991 and 10% in the following years.

Internal Rate of Return (IRR)
(db thousand)

Years	Investment	Operating	Expenses	Revenues	Cash-flow
1985	2.90			(2.90)	
1986	11.40			(11.40)	
1987	85.30			(85.30)	
1988	121.70			(121.70)	
1989	34.10	1.50	8.10	(34.10)	
1990		1.50	12.15	10.08	
1991		1.50	14.58	13.08	
1992		1.50	16.04	14.54	
1993		1.50	17.64	16.14	
1994		1.535	19.41	17.815	
1995		1.535	21.35	19.815	
1996		1.535	23.48	21.945	
1997		1.535	25.83	24.295	
1998		1.535	28.41	26.875	
1999		1.570	31.25	29.68	
2000		1.570	34.40	32.83	

I R R = -1.00%

This IRR calculated during project appraisal without any supplementary investment for 1991 which the Government for economic reasons, could not bear, has given the results given below, using the same calculation hypotheses, with the exception of the supplementary cost which brought about an increase in expenses and revenues as of 1992. As a result, 3% investment for operating cost remain the same and revenues steady starting 1991.

(db thousand)

Years	Investment	Operating Expenses	Revenues	Cash-flow
1985	9,170			(9,17)
1986	26,964			(26,964)
1987	58,431			(58,431)
1988		2.84	12.08	9.24
1989		2.84	13.60	10.76
1990		2.84	14.86	12.02
1991		2.84	16.32	13.48
1992		2.84	16.32	13.48
1993		2.84	16.32	13.48
1994		2.84	16.32	13.48
1995		2.84	16.32	13.48
1996		2.84	16.32	13.48
1997		2.84	16.32	13.48
1998		2.84	16.32	13.48
1999		2.84	16.32	13.48
2000		2.84	16.32	13.48

I R R = -13.6%