Second Evaluation Study
Strengthening Road Maintenance Project
(Project No. 677-0050)

United States Agency for International Development
N'Djamena, Chad

USAID Contract: PDC-0249-I-00-0019-00

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DeLEUW
CATHER

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EXECUTIVE SUMMARY

Introduction

This second evaluation study of the Strengthening Road Maintenance Project (SRMP) was initiated by the Chad Mission of the United States Agency for International Development (USAID/ Chad) and was performed by De Leuw, Cather International Limited. (The first evaluation study was completed in May 1988.)

Project Description and Objectives

The stated goal of the SRMP is to maintain the road network in Chad; its stated purpose is to assist the Government of Chad in developing a technically competent and financially responsible organization for the maintenance of Chad's road network.

The current objectives of the project are that, by the Project Assistance Completion Date (PACD) of September 30, 1993, the National Roads Office (OFNAR) will be capable of regularly maintaining, with its own personnel and equipment, over 750 km of roads in OFNAR's N'Djamena Regional Agency (ARN) and of financing 70 percent of total recurrent costs. A recently added objective is to increase participation of the private sector in project activities. (The original SRMP objectives were for OFNAR to maintain 1,600 km and finance 50 percent of recurrent costs by 1990).

Project activities, financed with a USAID grant of US$33,105,000, have included: provision of approximately 50 person-years of technical assistance (TA) services, under two USAID contracts with US consulting firms; procurement of road maintenance equipment; rehabilitation and equipping of a workshop, office buildings and a training center; road and equipment maintenance; and construction of a 66 km road, with World Bank co-financing.

Purpose and Methodology of the Evaluation Study

The purpose of this evaluation study is to assess progress toward accomplishing project objectives, and to indicate the most appropriate area(s) for a follow-on road maintenance project.

The evaluation study was conducted in Chad by a three-person team (Project Manager, Senior General Engineer and Senior Transport Economist). Evaluation findings were based on a review of several thousand pages of documents, interviews and discussions with some 70 persons, and visits to project sites.

Findings and Conclusions

The SRMP, in cooperation with other donor projects, has made progress toward developing a technically competent and financially responsible road maintenance organization in Chad.

- Field and workshop personnel have developed the basic skills required for road and equipment maintenance, and some 538 km of roads are currently maintained by ARN brigades equipped, trained and supported by the project;

- Management systems for work programming, execution and control have just been initiated at OFNAR, including the Central Workshop and the ARN; and

- OFNAR had been able, until last year, to pay a growing share of SRMP recurrent costs. (In 1991 it financed 50 percent of ARN costs, instead of 60 percent as originally scheduled.)

The TA contractors were late in mobilizing personnel to the project, and both teams experienced a high personnel turnover. There was practically no overlap between the departing and arriving TA teams, which slowed progress. Personnel qualifications and their performance toward achieving the project's physical outputs were satisfactory overall. The first TA contractor did not develop appropriate management systems needed for institutional development. The current TA contractor has recently developed and introduced such systems.

OFNAR has supported the project and its objectives. The increased cost of its expanding activities, coupled with an apparent slowdown in government revenues, indicates that additional sources of revenue may have to be found to enable OFNAR to pay a growing share of recurrent costs.

USAID has supported the project fully. USAID has had a large involvement in its management and implementation.

There have not been sufficient studies of the socioeconomic and environmental impacts of the SRMP. In general, road rehabilitation and maintenance appear to have had beneficial impacts on people, as evidenced from increased traffic and movement of goods and people, and a lowering of transport costs and prices (the latter also being attributable to deregulation of the trucking industry). The environmental impact of the SRMP does not appear to have been significant.

Private sector participation in the SRMP has been limited.

Recommendations

The SRMP should continue focusing on the ARN, with the flexibility to take into account other road projects, and continue its assistance to the Central Workshop. The SRMP should specifically include the following activities:

- Further develop OFNAR roadway and equipment maintenance capabilities and effectiveness;

- Investigate alternative maintenance techniques and materials;

- Provide additional management and skill training;

- Institutionalize the recently introduced maintenance management systems;

- Improve the equipment inspection function;

- Replace and/or repair equipment which is at or near the end of its useful life;

- Streamline the spare parts and consumable goods procurement system;

- Identify and evaluate development of additional local sources of revenue and equipment financing opportunities;

- Enhance the commercial orientation of the organization; and

- Design and implement a program for private sector participation in maintenance of equipment and delivery of road maintenance services.

Many of these activities have already been initiated, but require further TA contractor input. Thus it is recommended that the TA contract should be extended through September, 1993, with a gradual phaseout of staff. Technical assistance should emphasize technology transfer and management training of OFNAR personnel, with a reduction of direct involvement in line operations.

A suggested schedule of TA staff extensions is:

- Chief of Party: Extend through September 1993.

- Road Maintenance Engineer: Extend through August 1992.

- Financial Advisor (SRMP) and Accounting Advisor (OFNAR): These positions could be combined. The Financial/Accounting Advisor position should be extended through September 1993. (The decision on combining these positions should await the outcome and the recommendations of the ongoing Audit Evaluation of SRMP).

- Shop Superintendent: Extend through September 1993.

- Engine Foreman: Extend through September 1992.

- Field Operations Advisor: Extend through June 1993.

- Field Mechanic Advisor: Extend through June 1993.

- Short Term Specialists: Private Sector Specialist, Management Information Specialist, Financial Specialist, Procurement/Inventory Control Specialist, Sociologist, Environmental Specialist, Soils and Materials Engineer, Labor Intensive Road Maintenance Specialist to be assigned as necessary.

Additional studies should be conducted to evaluate the socioeconomic and environmental impacts of the project.

In addition to the revised activities outlined above, it is suggested that the objectives and targets of SRMP also be redefined. These new objectives and targets should be finalized by USAID and OFNAR in coordination with other donors, based on the 1992-1993 road maintenance program.

- Objectives:

  - Increase ARN's capability to maintain roads;

- Increase Central Workshop and ARN Workshop capabilities to maintain ARN equipment;

- Assist in the development of private sector road and equipment maintenance capabilities in N'Djamena; and

- Increase OFNAR's capacity/sustainability to finance road maintenance in the ARN.

- Targets (to be achieved by 1993):

  - ARN brigades, with SRMP support, maintaining 600 km of road annually;

  - Central and ARN workshops maintaining OFNAR's equipment with trained personnel, adequate shop equipment and tools, and established equipment maintenance management systems;

  - Private firms performing 10 percent of ARN road and equipment maintenance work; and

  - OFNAR financing 70 percent of ARN road and equipment maintenance activities.

Lessons Learned

Management systems for road and equipment maintenance should be introduced at an early stage; otherwise, operations are inefficient and institutional development is limited.

When changing technical assistance contractors during the course of a long-term project, there should be sufficient overlap between key staff of the departing and arriving teams.

The ability of OFNAR or any road maintenance organization to keep pace with ever growing demands must be monitored carefully to allow for the timely undertaking of remedial measures in response to those changed demands.

In designing a road maintenance project more attention needs to be given to the intended beneficiaries of the project; i.e., consumers, farmers, transporters, etc.; baseline socioeconomic and environmental data should be obtained before the beginning of a project and updated periodically to monitor project effects.

Changes in project direction (for example from emphasis on government institution strengthening to promotion of private sector participation) should be carefully planned and implemented gradually, to prevent confusion of the parties involved and dissipation of efforts.

Suggested Strategies for a Follow-on Project

Alternative strategies for a follow-on road maintenance project include: continuing the provision of technical assistance and support to the ARN; expanding assistance to cover other regional agencies or divisions of OFNAR; establishing an "autonomous" road rehabilitation and maintenance brigade within ARN; promoting the participation of private firms in road activities; assisting with the rehabilitation and maintenance of agricultural feeder roads; transferring project resources to the World Bank or another donor to implement the follow-on project; and withdrawing from road maintenance activities (no follow-on project).

Considering the advantages and disadvantages of the various alternatives, it is suggested that a follow-on road maintenance project be undertaken in coordination with other donors and OFNAR. This project should:

- Continue technical assistance to the ARN;
- Procure road maintenance equipment;
- Finance a decreasing share of ARN operations, with a shift from paying for recurrent costs to paying for work actually completed in the field on the basis of established unit prices;
- Increase participation of private firms in ARN activities; and
- Include routine maintenance of paved roads, routine and periodic maintenance of priority earth roads, and feeder road construction and maintenance.

In addition to a road maintenance project, USAID could consider the possibility of co-financing the rehabilitation or construction of priority roads, with implementation undertaken by USAID or another donor, such as the World Bank.

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LIST OF ABBREVIATIONS

ADF	African Development Fund
AID	Agency for International Development
ARN	Agence Régionale de N'Djaména
BDEAC	Banque des Etats de l'Afrique Centrale
CFAF	Communauté Financière Africaine Francs
EDF	European Development Fund
FAC	Fonds d'Aide et de Cooperation
GDP	Gross Domestic Product
GFR	German Federal Republic
GNP	Gross National Product
GOC	Government of Chad
IAF	Italian Aid Fund
IDA	International Development Association
IEE	Initial Environmental Examination
IsDB	Islamic Development Bank
IQC	Indefinite Quantity Contract
IMF	International Monetary Fund
LNBTP	Laboratoire National du Bâtiment et des Travaux Publics
MIS	Management Information Systems
OFNAR	Office National des Routes
OPEC	Organization of Petroleum Exporting Countries
PACD	Project Assistance Completion Date
PASET	Projet d'Ajustement Sectoriel des Transports
PIL	Project Implementation Letter
PVO	Private Voluntary Organization
REDSO	Regional Economic Development Support Office
SMC	Small and Medium Contractors
SRMP	Strengthening Road Maintenance Project
TA	Technical Assistance
UNDP	United Nations Development Program
US	United States
US$	United States Dollar
VOC	Vehicle Operating Costs
WCA	Western Central Africa

Units of Measurement

mm	millimeter
cm	centimeter
m	meter
km	kilometer
q km	square kilometer

PROJECT IDENTIFICATION DATA

1. Country: Chad

2. Project Title: Strengthening Road Maintenance Project

3. Project Number: 677-0050

4. Project Dates:

   a. First Project Agreement: June 29, 1985
   b. Final Obligation Date: Fiscal Year 1993
   c. Project Assistance Completion Date: September 30, 1993

5. Project Funding: AID Grant US$33,105,000

6. Mode of Implementation: AID Direct Contractors:

   a. Gannett Fleming Transportation Engineers (1985-90)
   b. Louis Berger International, Inc. (1990-present)

7. Project Designers:

   a. USAID/Chad
   b. USAID/REDSO/WCA
   c. US Department of Transportation

8. Responsible Mission Officials:

   a. Mission Directors: John B. Woods, Bernard B. Wilder
   b. Project Officers: Iqbal M. Chaudry, H. Van De Pol, Samir Zoghby

9. Previous Project Evaluation: May, 1988

Evaluation Study

Part I

BACKGROUND

INTRODUCTION

This evaluation study of the Strengthening Road Maintenance Project in Chad (SRMP, the Project) was initiated by the Mission of the United States Agency for International Development in Chad (USAID/Chad) and was performed by De Leuw, Cather International Limited (DCIL).

Presented in the following sections are background data on Chad and its transport sector, a description of the SRMP, the evaluation purpose and methodology, the evaluation study's findings, conclusions, recommendations and lessons learned, and suggestions for a follow-on project.

COUNTRY INFORMATION

Physical and Human Geography

Located in Central Africa, Chad stretches for about 1,800 km from its northernmost point to its southern boundary. Chad's average width is about 800 km and its total land area is 1,284,000 sqare kilometers. Chad is a landlocked country. N'Djamena, the capital, is located more than 1,100 km northeast of the Atlantic Ocean; Abeche, a major city in the east, lies 2,650 km from the Red Sea; and Faya Largeau, a much smaller but strategically important center in the north, is in the middle of the Sahara Desert, 1,550 km from the Mediterranean Sea. These vast distances have had a profound impact on Chad's historical and contemporary development.

The country's area can be divided into three climatic zones: a northern Saharan zone (40 percent); a central Sahelian zone (35 percent); and a southern Sudanian zone (25 percent).

The population of Chad is about 5.7 million, with a population growth rate of approximately 2.3 percent per annum and a population density of about 4.4 per square kilometer. The Saharan zone contains less than 3 percent of the total population; the Sahelian and Sudanian zones contain the remainder.

Economic, Political and Social Context

Chad's remoteness, its inadequate infrastructure, its recent history of war, drought and famine, and its dependency on a single cash crop (cotton) for export earnings has made it one of the poorest nations in the world. Chad's Gross National Product per capita of about US$168 clearly reflects the extent of the nation's impoverishment.

Chad's economy is based almost entirely on agriculture and pastoralism. It has been estimated that of the country's economically active population, 83 percent work in agriculture, 5 percent in industry and 12 percent in the service industry, including government employment, trade and other service activities. Figures for Gross Domestic Product (GDP) also reflect agriculture's importance. It has been estimated that approximately 46 percent of Chad's GDP comes from

agriculture and pastoralism. Industry and manufacturing account for only 18 percent of GDP, while services represent 36 percent of GDP.

Since Chad's independence in 1960, there has been considerable civil strife. After the 1979-1982 civil war, a new government was established, which initiated a national reconciliation program. In 1987 a part of northern Chad previously occupied by foreign forces was liberated and brought under Government of Chad (GOC) control. A military coup d'etat in December 1990 resulted in the installation of the current government, which has started a process of democratization. A recurrence of disturbances in the capital, N'Djamena, in October 1991 and recent armed conflicts in various parts of the country reflect the continued uncertain political climate.

The country's economy has swung back and forth. In 1985 real GDP growth was 21.8 percent. The following year, 1986, real GDP growth was a minus 4.1 percent. In 1987 GDP growth was a minus 3.4 percent followed by a sharp upturn in 1988, when real GDP growth was 17.6 percent. Chad experienced a GDP growth of 0.9 percent in 1989. In 1990 the GDP fell by 0.5 percent, the negative growth being due to a fall in agricultural production. In 1991 the GDP is estimated at CFAF 297 billion with a real growth rate of 3.0 percent. The 1991 data are preliminary and are based upon the preliminary estimates of agricultural production and cotton yield. All GDP data should be viewed conservatively, in light of their uncertain reliability.

Since 1983, Chad's governments have participated actively in the economy and fostered a liberal economic development policy. With external assistance, the GOC is improving access to isolated regions, encouraging the growth of the private sector, and improving the efficiency of the government administration.

As increased economic activity intensifies the need and the justification for road transport, the SRMP has been playing a significant role in the development of Chad.

THE ROAD TRANSPORT SECTOR

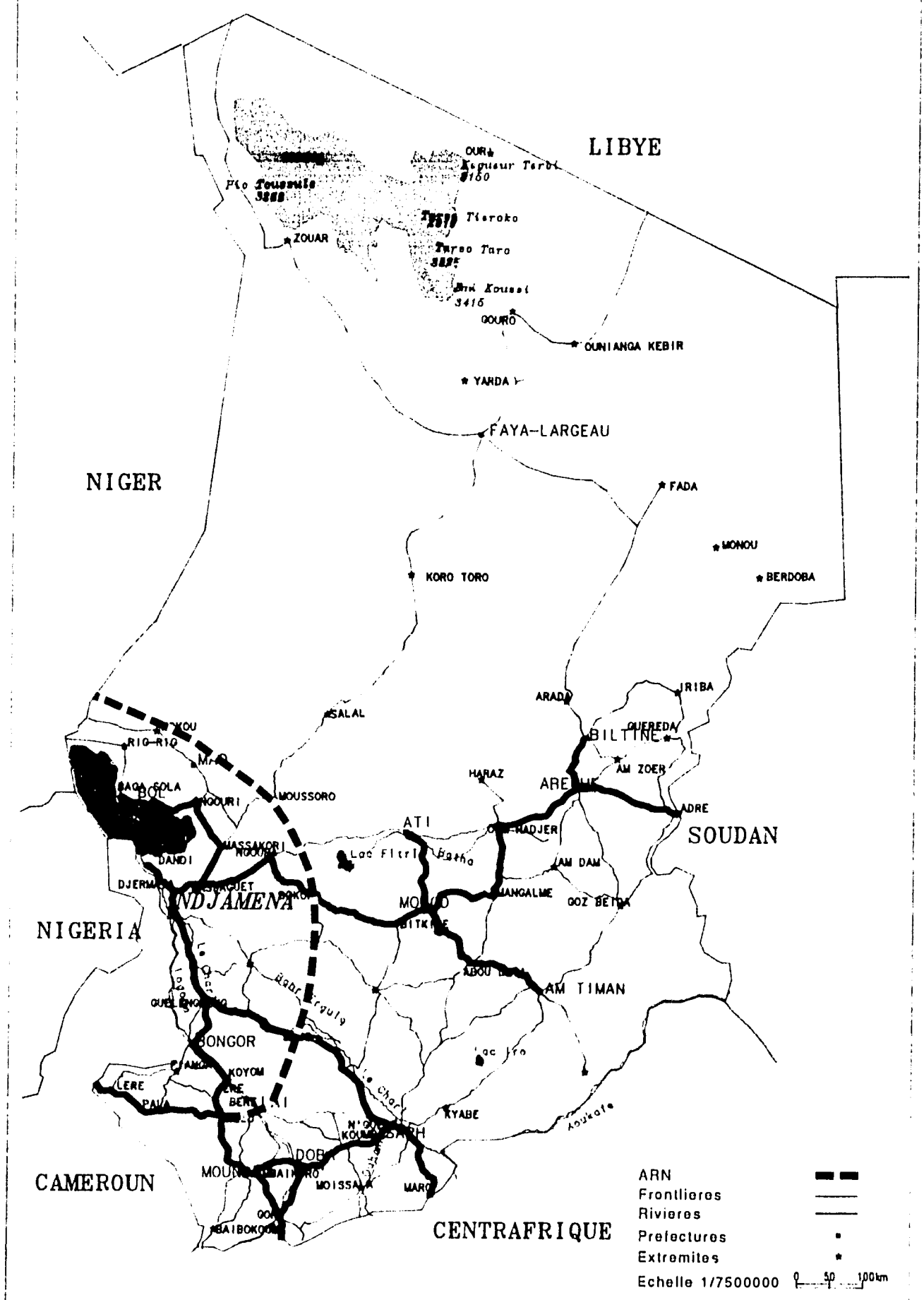
General

Chad's highway network consists of about 7,300 km of classified roads (i.e., roads for whose maintenance the central or regional governments are formally responsible) and about 24,000 km of unclassified tracks in rural areas. (See Figure 1.) With the exception of about 250 km of recently paved roads, most of this road and track network is passable only during the dry season.

The development of Chad's highway network has been constrained by several factors. These include vast distances between major population centers, scarcity of road construction materials, lack of funds for road construction and maintenance, and a low real economic growth rate. Other factors have included a weakening of the GOC road construction and maintenance organizations and a shortage of trained and experienced personnel, the result of civil strife and political instability.

Considerable foreign donor attention has been focused on land transportation problems and several road rehabilitation and maintenance programs have been under way since 1985.

FIGURE 1 - CHAD'S ROAD NETWORK



Road Maintenance Organization

The Directorate of Roads, under the Ministry of Public Works and Transport, is responsible for all road development activities, including planning. construction and maintenance. It has two Divisions: Road Maintenance and Contracting.

The National Roads Agency (OFNAR), created in 1984, is responsible for implementing maintenance activities on the national road network under contract from the Directorate of Roads. OFNAR consists of three Directorates: Works, Equipment, and Administration and Finance (See Appendix 6, OFNAR Organization Chart).

The Directorate of Works consists of the following units: Programming and Control Service; Procurement Service; the Regional Agencies of N'Djamena, Sarh, Moundou, Mongo and Abeche; and the Service for Small and Medium Contractor (SMC) Administration. Each Regional Agency has a Works Section and a Workshop Section. The Directorate of Equipment consists of the Central Workshop, the Equipment Management Service, the Procurement/Warehousing Service and the Inspection Service. The Directorate of Administration and Finance consists of the Finance Service, the Administration and Personnel Service and the Training Service.

OFNAR, since its inception, has received substantial technical assistance and financing from USAID, the World Bank and other donors. The Directorate of Roads has received less assistance. Furthermore, many of OFNAR's senior staff have come from this Directorate. As a result, many of the road maintenance planning and control functions that the Directorate of Roads is responsible for performing are in fact being performed by OFNAR.

The National Public Works Laboratory (LNBTP) is an autonomous entity under the tutelage of the Ministry of Public Works and Transport. Its function is to undertake soils and materials research, recommend design criteria, and perform field and laboratory tests for control of road and building construction.

Road Rehabilitation and Maintenance Activities

USAID was the first donor to begin a major transportation project after the civil war in Chad, i.e. SRMP in 1985. This project has included the provision of technical assistance to OFNAR, rehabilitation and equipping of office and workshop facilities, equipment rehabilitation and procurement, and financing of road rehabilitation and maintenance operations (See project description below).

Several other donors have sponsored road projects since the start of the SRMP. These donors have included the World Bank (IDA), the African Development Fund (ADF), the European Development Fund (EDF), French (FAC), Italian (IAF) and German (GFR) foreign assistance organizations, the Islamic Development Bank (IsDB) and other organizations.

A road maintenance project financed by the World Bank over the period 1987-1989 covered technical assistance, building rehabilitation, equipment procurement and road maintenance in the Agencies of Sarh, Moundou and Mongo; construction of N'Djamena Agency facilities; technical assistance to the Ministry of Public Works; and several studies.

In 1988, the World Bank undertook a road reconstruction project, which included the reconstruction to paved standards of the N'Djamena-Djermaya, N'Djamena-Guelengdeng and Djermaya-Dandi roads and the provision of consulting services to supervise construction. (USAID co-financed construction of the Djermaya-Dandi road in the amount of US$5.6 million.)

In 1988, the UNDP sponsored a Transportation Round Table and obtained commitments or expressions of interest from various donors to fund approximately US$300 million of projects in the transportation sector. As a result of the Transportation Round Table, the World Bank undertook the US$180 million Transport Sector Adjustment Project (PASET), to be implemented during the period 1989-1992. The IDA credit for this project totals US$51.2 million.

The major aspects of the PASET include: rehabilitation of priority roads; construction and rehabilitation of buildings at the Ministry of Public Works and Transport; acquisition of equipment and spare parts for routine road maintenance; institutional strengthening of the Ministry of Public Works and Transport, OFNAR and the LNBTP; abolition of the existing truck transport monopoly; and promotion of private sector participation in road rehabilitation and maintenance.

Under the PASET, OFNAR has received technical assistance for road maintenance planning, programming and control, equipment management, procurement, inventory control and financial management. (Technical assistance is being provided by the French consulting engineering firm BCEOM, hereinafter referred to as the PASET Consultant.) The World Bank has also provided support to the Mongo Regional Agency, including maintenance of the Bokoro-Mongo road section through 1992.

From 1988 through 1992 the European Development Fund has financed maintenance by contractor of the Sarh-Guelengdeng road and maintenance by OFNAR of the Sahr-Moundou-Lere road. Technical assistance and equipment for the latter has also been financed by EDF. During the period 1992-1996, the GFR will finance technical assistance, equipment procurement and rehabilitation by OFNAR of the Abeche-Adre, Abeche-Biltine and Abeche-Oum Hadjer roads in the Abeche Regional Agency.

The following priority roads have now been rehabilitated:

Road Section	Length (km)	Funding
N'Djamena-Guelengdeng (paved)	146	IDA
Djermaya-N'Djamena (paved)	32	IDA
Djermaya-Dandi (paved)	66	USAID/IDA
N'Djamena Bypass (paved)	20	ADF
NGoura-Mongo (earth)	303	FAC
Sarh-Guelengdeng (earth)	379	EDF
Sarh-Moundou-Lere (earth)	623	IDA
Massaguet-Massakory (earth)	68	IAF
Massakory-Bol-Bagasola (earth)	260	IAF
	Total 1897	

On-going or planned priority road rehabilitation projects, together with possible sources of funding, are shown below:

Road Section	Length (km)	Funding
Mongo-Abou Deia (1)	118	IDA/OPEC
Abou Deia-Am Timan (2)	135	Not Identified
Mongo-Mangalme (2)	118	IDA/OPEC
Mongo-Ati (2)	150	Not Identified
Mangalme-Oum Hadjer (2)	228	Not Identified
Oum Hadjer-Abeche (2)	146	GFR
Abeche-Adre (2)	167	GFR
Abeche-Biltine (2)	92	GFR
Guelendeng-Bongor (2)	83	GFR
Bongor-Ere (2)	88	GFR
Ere-Kelo (2)	50	BDEAC
Djermaya-Massaguet (2)	46	ADF/IsDB
Massaguet-Ngoura (2)	125	IsDB
Moundou-Touboro (2)	141	EDF
Maikoro-Gore-Bedaoyo (2)	110	EDF
Sahr-Sido (2)	122	EDF
	Total 1919	

Notes:
(1) Rehabilitation underway by an autonomous brigade.
(2) Planned

A second phase of the PASET, to be implemented during the period 1993-1999, is being planned by the World Bank in coordination with other donors. Its purpose would be to complete the road rehabilitation program and assure the maintenance of completed roads.

Project Description

The SRMP was approved by AID on June 24, 1985 and the Project Grant Agreement was signed on June 29, 1985. The Project has been amended twice, in July 1989, and in June 1991. These amendments extended the Project Assistance Completion Date (PACD) by three years, to September 30, 1993, and increased USAID grant funding by US$5,605,000, to a total of US$33,105,000. (An updated Project Summary - Logical Framework is provided in Appendix 5.)

The stated goal of the SRMP is to maintain the road network throughout Chad; its stated purpose is to develop a technically competent and financially responsible organization for the maintenance of Chad's road network.

The SRMP, since the 1989 amendment, has formally focused its technical assistance and financial support activities on OFNAR's N'Djamena Regional Agency (ARN), as other donors have been supporting road maintenance activities in other parts of Chad. The SRMP has also continued providing technical assistance to the Central Workshop.

The current objectives of the Project are that, at its end, OFNAR would be capable of regularly maintaining, with its own personnel and heavy equipment, over 750 km of roads in the ARN and of financing 70 percent of total recurrent costs. (The original SRMP objectives were for OFNAR to maintain 1,600 km of roads and to finance 50 percent of recurrent costs by 1990.)

Expected outputs of the SRMP include:

- Fully trained local staff managing and operating OFNAR/ARN, including 18 managers and supervisors, 42 equipment operators and drivers, and 50 mechanics and shop technicians;
- ARN brigades regularly maintaining 750 km of roads annually;
- Fully equipped OFNAR Central and ARN Workshops with trained staff repairing and maintaining equipment and vehicles; and
- A rehabilitated Djermaya-Dandi road (66 km).

Project activities, financed with the grant of US$33,105,000, have comprised:

- Provision of some 50 person-years of technical assistance services to OFNAR;
- Rehabilitation of workshop, office buildings, and a training center;
- Procurement of road maintenance equipment, vehicles, workshop equipment and tools, spare parts, office furniture and equipment, and training aids and materials;
- Road maintenance and equipment rehabilitation and maintenance; and
- Construction of the Djermaya-Dandi road (completed under a World Bank project with USAID co-financing).

Technical assistance (TA) services for the SRMP have been primarily provided by two US consulting engineering firms under contract with USAID: Gannett Fleming Transportation Engineers, from December 1985 through July 1990; and Louis Berger International, Inc., hereinafter referred to as the TA Contractor, from June 1990 to the present. The current contract (the TA Contract) ends in April 1992.

A follow-on project to the SRMP, to be implemented over the period 1993-1997, is currently under consideration by USAID and OFNAR. Under this proposed project USAID would continue to provide assistance to OFNAR and would develop a private sector capability to perform road maintenance and support activities.

EVALUATION PURPOSE AND METHODOLOGY

Purpose of the Evaluation Study

This is the second evaluation study of the SRMP. (The first evaluation was completed in May, 1988.) The purpose of this evaluation is to:

- Assess progress to date in accomplishing project outputs; and

- Indicate the most appropriate area(s) for a follow-on strengthening road maintenance project, taking into account other donor activities in the transport sector, OFNAR's absorptive capacity, and the potential for contracting road maintenance services from the private sector.

The Statement of Work for this evaluation (See Appendix 1) lists six basic questions to be answered. These questions are:

1. To what degree has the Project (in cooperation with other donors) developed a technically competent and financially responsible organization for maintaining Chad's road network? (During the course of the evaluation study, USAID/Chad clarified to the evaluation study team that this question pertained to the OFNAR entities supported by the SRMP; i.e., the N'Djamena Regional Agency and the Central Workshop.)

2. How successful have the technical assistance teams, OFNAR and AID been in ensuring the timely provision of satisfactory inputs to accomplish the Project's planned outputs?

3. What effect is the Project having on people, such as farmers, consumers, transporters? What is the Project's impact, if any, on the environment? On women?

4. Are the effects of the Project being produced at an acceptable cost compared with alternative approaches for properly maintaining the Chadian road network?

5. Do project objectives and the strategy for their achievement remain valid within the context of current and planned donor/Government of Chad activities in the transport sector?

6. In designing an AID follow-on activity addressing road maintenance concerns, what areas and related strategies would be most appropriate in terms of achieving a viable, sustainable road maintenance system in Chad?

The results of the evaluation study will be used by OFNAR, USAID/Chad and AID/Washington to determine if the Project is making satisfactory progress in meeting its objectives. AID is also interested in understanding the Project's impact on low income groups and the projected sustainability of project activities following the termination of AID's assistance. USAID/Chad is interested in an assessment of an appropriate scope for a potential follow-on road maintenance activity.

Study Methodology

The evaluation study contractor, De Leuw, Cather International Limited, assigned to Chad a three member study team, consisting of a Project Manager (Mr. Paul J. Couniotakis), a Senior General Engineer (Mr. Robert Kyriacos) and a Senior Transport Economist (Mr. Alan G. Bevis). The evaluation team's field work was carried out during the period January 11 to February 15, 1992.

This evaluation study focused on project implementation activities undertaken since the previous evaluation. (The Executive Summary of the May 1988 evaluation study report is shown in Appendix 4 of this report.)

Evaluation study findings, conclusions, recommendations and lessons learned pertaining to SRMP activities (i.e., answers to evaluation questions No. 1 through No. 5) are presented in subsequent sections of this report, under the following headings (numbers refer to the study question(s) being addressed in each section):

Report Section Heading	Response to Evaluation Question(s):
N'Djamena Regional Agency Activities	1,4
Central Workshop Activities	1,4
Inputs of Technical Assistance Teams	2
OFNAR Inputs to the Project	2,1
AID inputs	2
Impact of Project on People	3
Impact of Project on the Environment	3
Private Sector Road Maintenance Activities	4
Private Sector Equipment Maintenance Activities	4
Project Objectives and Targets	5

Answers to question No. 6 are presented in a separate section entitled: Suggested Areas and Strategies for a Follow-on Project.

Findings of fact were sought in:

- A review of numerous project reports, items of correspondence, contract documents and relevant studies totaling more than 10,000 pages;

- Interviews and discussions with over 70 persons, including staff of USAID, OFNAR, technical assistance contractors, other GOC agencies, other donor organizations and private sector firms;

- Visits to OFNAR's Central Workshop and ARN facilities; and

- Field trips to ARN road maintenance sites (N'Djamena-Djermaya-Ngoura-Bokoro road and N'Djamena-Guelengdeng-Bongor-Ere road).

Lists of documents reviewed and persons contacted are shown in Appendix 2 and Appendix 3, respectively.

At the time this evaluation study was being conducted, an audit of the SRMP was also being performed by the accounting firm of Coopers and Lybrand. Their scope of work included an audit of OFNAR and of the technical assistance contractor expenditures, and an evaluation of OFNAR's system of internal controls, including a recommendation of steps to be taken to improve the Project's accounting controls.

Part II

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

The evaluation study's findings, conclusions and recommendations are presented in the following sections. Recommendations pertain to the SRMP, through September 1993. Suggestions for a follow-on project are presented in Part IV of this report.

N'DJAMENA REGIONAL AGENCY ACTIVITIES

Findings

The N'Djamena Regional Agency is the largest of OFNAR's five regional agencies. The ARN consists of a Works Section, responsible for road maintenance, and a Workshop Section, responsible for equipment maintenance. ARN's field force consists of two road maintenance brigades (north/heavy and south/light) and a drainage brigade. There is also a bitumen brigade, currently involved in the maintenance of paved streets in N'Djamena. (The bitumen brigade does not have the equipment and capabilities to maintain the newly paved network in the ARN.)

Technical assistance personnel assigned to the ARN consist of the Road Maintenance Engineer, the Field Operations Advisor and the Service Foreman/Field Mechanic Advisor.

ARN Road Network

Approximately 1,250 km of Chad's 3,800 km of priority roads are located within the ARN. (See Figure 1.) These are:

Road Section	Length (km)	Status (see Notes below)
North		
N'Djamena-Djermaya	27	(1)
Djermaya-Dandi	66	(1)
Djermaya-Massaguet	46	(2)
Massaguet-Ngoura	125	(2)
Ngoura-Bokoro	103	(2) (5)
Massaguet-Massakory	68	(4)
Massakory-Bol-Bagasola	260	(4)
South		
N'Djamena Bypass	20	(1)
N'Djamena-Guelendeng	144	(1)
Guelendeng-Bongo-Ere	169	(2) (6)
Ere-Lai	65	(2)
Guelendeng-Mogo	149	(3)
	Total 1,242	

Notes:

(1) Rehabilitation/paving completed in 1991-92; no maintenance has been performed (the embankment in some sections has already started deteriorating due to erosion).
(2) Earth road maintained by ARN brigades under the SRMP.
(3) Earth road maintained by a private contractor, with EDF financing. This project is currently scheduled to end in 1992.
(4) Earth road rehabilitated in 1988-90; no maintenance has been performed. (The PASET stipulated that maintenance of these roads should not be done by OFNAR, but by contractors financed by other donors. Since completion of rehabilitation in 1990 no arrangements have been made for their maintenance and the roads have been deteriorating).
(5) OFNAR has considered maintaining this road by private contractor, starting in 1992.
(6) Scheduled for rehabilitation by private contractor starting in late 1992, with GFR financing.

There is a lack of feeder roads connecting agricultural areas with the primary road network.

Personnel and Equipment

ARN's personnel totaled 156 in December 1991. ARN's personnel were distributed as follows: management and administration - 12; ARN Workshop - 33; North/Heavy Brigade - 50; South/Light Brigade - 24; Drainage Brigade - 8; field camp - 7; Bongor, Bousso and Onoko ferry operation - 22. Many of the most experienced and qualified supervisors, operators and mechanics are approaching retirement age.

ARN field and workshop personnel have received training in road and equipment maintenance. The effectiveness of this training has been hindered by the very low educational background or illiteracy of some of the personnel.

ARN's equipment fleet currently includes 4 bulldozers, 5 graders, 3 loaders, 4 compactors, 11 dump trucks, 4 water trucks, 2 fuel trucks, 2 maintenance trucks, 3 trailers, 2 hand compactors, 1 concrete mixer, 1 soil mixer, 1 farm tractor, 4 generators, 2 air compressors, 3 welding units, 10 motorpumps and 13 light vehicles, for a total of 75 units. About 63 units of ARN's equipment were procured under the SRMP, four to five years ago; the remainder consists of old equipment rehabilitated under the SRMP or of newly procured, Saudi Arabia-financed, equipment. On average, about two-thirds of ARN's equipment is in service and one-third is under repair.

Road Maintenance Planning and Implementation

ARN prepares draft annual road maintenance programs and budgets. These are discussed with OFNAR's Works Directorate, revised, if necessary, and approved. Based on the draft programs and the results of a road survey conducted jointly by the Works Directorate and ARN, the required equipment, labor and materials resources are defined and a final work program and budget are prepared. Work programs are developed based on the experience and judgment of engineers in Chad without technical design or laboratory testing. (A discussion of the overall road maintenance planning process is presented in Appendix 7.)

Road maintenance work is undertaken during the dry season, from about mid-September to the end of June. The principal activity during the rainy season is equipment repair. The 1991-1992

campaign started late (in mid-October) due to the unavailability of fuel and late payment of salaries and per diems by OFNAR.

About 508 km of priority earth roads are being maintained by ARN under this year's program (Djermaya-Massaguet-Ngoura-Bokoro and Guelengdeng-Bongo-Ere-Lai roads). In addition, ARN brigades maintain the N'Djamena-Linia road (30 km). ARN has also been involved in the maintenance of access roads to the ferry crossings at Bongor and Onoko (totaling about 15 km) and in the construction of emergency flood protection embankments in N'Djamena.

Road maintenance work includes roadway grading, compacting and resurfacing with up to about 5 cm of materials obtained from road side borrow pits (except for the N'Djamena-Linia road which is only to be graded and compacted). Maintenance work is executed in two passes over the Djermaya-Ngoura and Guelendeng-Ere roads (at the beginning and at the end of the program), and in one pass (in the middle of the program period) over the Ngoura-Bokoro, Ere-Lai and N'Djamena-Linia roads, which have less traffic.

ARN road maintenance costs average about CFAF 1.3-1.5 million per km per year. These costs are comparable to those experienced during the maintenance of the Guelengdeng-Sahr road, which is performed by an international private contractor, and the Sahr-Moundou-Lere road, by OFNAR brigades with technical assistance (financed by EDF).

An increase in ARN work production and quality was reported between the 1989-1990 and the 1990-1991 road maintenance campaign. Large increases were noted in equipment utilization rates. In terms of productivity, (hours of equipment utilization per unit of production output), ARN now compares favorably with other OFNAR Agencies.

ARN field productivity and quality of work are hampered by breakdowns of equipment and long delays in repairing them. Some inefficient use of equipment was also noted, for example the use of dump trucks for liaison and personnel transport due to the lack of pickup vehicles and transport trucks.

Overall, the quality of roadway surface immediately after maintenance by ARN appears to be satisfactory (some signs of roadway deterioration appear two to three months following the first maintenance pass, which is not unusual for earth roads). Some inefficient operations were noted, such as: placing soil materials on top of a stabilized soil surface course (in poor condition) on sections of the Djermaya-Massaguet road (the newly placed materials cannot adhere to the existing hardened surface and tend to be blown away soon after placement); and dry grading without compaction of the relatively hard roadway surface on sections of the Guelengdeng-Bongor road (due to unavailability of a compactor).

Road maintenance in the north has been hampered by poor soil materials (of the black cotton type) and the scarcity of water for compaction (existing wells are at Ngoura and Massaguet, some 125 km apart). To resolve the water problem, the Project has financed the drilling and development, by a local contractor, of about 11 water wells at intervals of 20 to 25 km. Eight of these wells have been built but are not yet operational. (In the south, soils are of better quality and water is obtained from the Chari and Logone rivers which are located near the roads.)

Equipment Maintenance

There are five echelons of equipment maintenance, 1 to 5: echelon 1 is daily routine maintenance performed in the field; echelon 2 is preventative maintenance performed in the field or at the ARN Workshop; echelon 3 involves replacement of minor parts and is performed at the ARN Workshop or at the Central Workshop; echelons 4 and 5 involve major repairs and overhauls and are performed at the Central Workshop.

The ARN Workshop appears well organized, and the quality of its repair work is generally satisfactory. However, several maintenance activities are performed in open air, with equipment standing on the ground, amid dust. There is an insufficiency of electrical and water supply outlets. ARN has its own warehouse for stocking routine parts and supplies. Procurement of parts is done through OFNAR's Central Warehouse and often takes two to three months when an item is not in stock there.

Reports prepared by the TA Contractor indicate that the quality of routine equipment maintenance in the field had been poor. This was attributed to inadequate training and low educational level of field personnel, lack of routine parts and consumables (for example filters), lack of tools, and lack of field maintenance and service trucks. Field servicing of equipment has apparently improved. Fridays are now devoted to equipment servicing in the field, performed under the supervision of the Field Mechanic Advisor. Field maintenance and service trucks have now become available.

Management Systems

The TA Contractor, in November-December 1991, developed management system manuals and procedures for road and equipment maintenance activities. These systems and procedures have just been initiated at the ARN.

Information for monitoring road maintenance progress and costs is derived from a daily site report, which indicates the location and type of work performed, equipment and labor utilized for each activity, and fuel, lubricants and materials consumed. These daily reports are summarized by ARN on a monthly basis and forwarded to OFNAR's Programming and Control Service for control and processing through a computerized cost accounting system. There appears to be insufficient feedback of productivity and cost data from the Programming and Control Service to the ARN.

The equipment maintenance management system provides for the completion and processing of forms for equipment inspections in the field, daily maintenance, incident reports and work orders, and equipment utilization.

Conclusions

ARN with the support of the SRMP has made progress in developing a capability to maintain roads since the last evaluation of the project in May 1988.

The 538 km of earth roads currently being maintained by ARN's brigades with SRMP support exceeds the 1991 SRMP target (520 km) but falls short of the 1992 target (750 km). (Another 149 km are maintained by a private contractor, financed by other donors).

Road maintenance field personnel have acquired sufficient operational skills (e.g., for grading, compacting), as seen from the generally satisfactory work performed. There are deficiencies, however, in the materials being used and the placement techniques. Workshop personnel also appear to have acquired sufficient skills.

Work planning and management skills of senior personnel are still insufficient. The management systems for road maintenance and equipment maintenance planning, implementation and control are still in a start-up phase and will require continual attention if they are to become firmly established.

ARN has a large equipment inventory, but most of it will reach its useful life (estimated at about eight years on average) over the next two to three years and some is already obsolete.

Recommendations

The SRMP should continue providing technical assistance and financial support to the ARN to further develop its road and equipment maintenance capabilities.

The technical feasibility and cost-effectiveness of alternative road maintenance methods should be studied (for example, the utilization of various soil mixes for road resurfacing to enhance durability). These studies could be undertaken by the TA Contractor in collaboration with the LNBTP and other entities.

Equipment servicing and routine maintenance in the field should be improved further. It is advisable to continue devoting a period of time (for example, Fridays or Sundays) solely to this activity, until it is firmly established (i.e., becomes "second nature" to operators and field mechanics).

The head of ARN, and the chiefs of its Works and Workshop sections, should receive classroom and on-the-job training in management, planning and administration; short-term training abroad should also be considered. Equipment operators and mechanics should continue receiving periodic refresher training. Arrangements for recruiting and training personnel to replace those approaching retirement age should be initiated. Training should be provided in conjunction with the training program sponsored by the PASET.

The technical assistance team should ensure that the management systems introduced recently are implemented on a continuous basis. This would involve: periodic checking of the reliability of data inputs on road work performed, labor and equipment utilization and equipment maintenance, through on-site inspections and cross-verification of entries; taking disciplinary action in cases of intentionally entered incorrect data; sensitizing all staff levels, and particularly management, as to the usefulness of these systems; and receiving feedback on productivity and costs from OFNAR's Programming and Control Service to enable ARN to monitor and improve its performance.

Preparation of the 1992-1993 ARN road maintenance program should be coordinated between OFNAR, USAID and other donors, to ensure that recently completed road sections are properly maintained. Programmed activities in the ARN region should include:

- Maintenance by ARN brigades of the Djermaya-Ngoura road (171 km), the N'Djamena-Linia road (30 km) and the Guelendeng-Mogo road (149 km) (if the project currently maintaining it ends in 1992), totaling about 350 km;

- Maintenance of the Ngoura-Bokoro (103 km) road by private contractor or ARN brigades;

- Routine maintenance by ARN, private contractor, or a combination of both, of the 257 km of paved roads (under the SRMP or other donor project);

- Maintenance of the Massaguet-Massakory-Bol-Bagasola road (especially the Massaguet-Massakory section which has significant traffic); and

- Rehabilitation/maintenance of feeder roads by ARN brigades, private contractors or other arrangements.

The ARN field workshop facilities should be expanded to provide adequate space for equipment maintenance and repairs. They should also be provided with sufficient electrical and water supply outlets.

Selected units of equipment should be procured by USAID or provided by others to the ARN to replace equipment that has reached or exceeded its useful life or has become unserviceable (for example compactors), and to provide each brigade with a transport truck and a pickup vehicle.

ARN should start receiving equipment and technical assistance to enable it to perform routine maintenance of paved roads (for example, filling potholes). This could be done by expanding ARN's Bitumen Brigade.

CENTRAL WORKSHOP ACTIVITIES

Findings

The Central Workshop has seven sections: Engine, Heavy Equipment, Heavy Trucks, Electrical, Machine Shop, Body Shop and Light Vehicles. There is a proposal to eliminate the Light Vehicles Section and contract out light vehicle maintenance to private shops.

The technical assistance staff currently assigned to the Central Workshop under the SRMP consists of the Shop Superintendent and the Engine Foreman. A short-term Electrical Specialist has also been assigned.

Facilities and Personnel

The Central Workshop facilities were rehabilitated or constructed under the SRMP. They appear well organized and clean, with sufficient working space. The Central Workshop reportedly lacks appropriate diagnostic equipment, and some of the existing shop equipment is in poor condition or not-operational. On the other hand, the Central Workshop seems to have acquired shop equipment used for repair work performed infrequently.

The Central Workshop has a staff of about 50. Workshop personnel have received substantial training in equipment repair and maintenance. This has included on-the-job training, classroom

and demonstration instructions, a two-week training program organized in collaboration with the Caterpillar dealer (Tractafric/SHO-Tchad) and attended by more than 25 mechanics, a program sponsored by SHO-Cameroun involving classroom lectures and hands-on training in the shops, and other activities undertaken under the SRMP and the PASET. Training effectiveness has been hampered by the low educational level or illiteracy of many mechanics and aides. Senior and mid-level staff training in management and administration has reportedly been insufficient. The more experienced personnel are nearing retirement age.

Equipment Maintenance

A new equipment maintenance management system has been developed by the TA Contractor in coordination with the staff of the PASET Consultant assigned to the Equipment Directorate. The system's objectives are to provide a basis for planning and budgeting equipment repairs and maintenance, control investments in spare parts, audit equipment maintenance performance, and forecast the production capacity of an equipment unit.

The system includes elements for equipment inventory management, cost control and production control, and an equipment rental scheme. It provides for an improved paper trail system between the various OFNAR sections responsible for equipment maintenance, computerization of data, and a cost accounting data base.

The equipment maintenance management system was formalized in December 1991 and it is currently being introduced. (Field input data on equipment servicing forms are often inadequate. For example, equipment noted as recently greased are found not to have been greased. Many odometers and hourmeters are broken.)

The procedure for equipment repairs at the Central Workshop is as follows: The request for repair is initiated by an Agency ("Avis d'Incident"); the Equipment Directorate inspects the equipment to determine work to be done ("Fiche d'Inspection"), and issues a work order to the Central Workshop ("Ordre de Travail-OT"); the Central Workshop Chief issues internal work orders to its various sections that will perform the work ("Ordre de Travail-OT/2"); upon completion of each section's work the internal work orders (OT/2) are returned to the Central Workshop Chief, indicating the work performed, manhours used and parts replaced; the Central Workshop Chief consolidates the information received from each section on the work order (OT) and forwards a copy to the Equipment Directorate for data management and cost accounting purposes (a computerized system for data processing has been initiated); the Equipment Directorate inspects the repaired unit prior to its return to the Agency.

The quality of equipment repair work performed at the Central Workshop appears to be satisfactory.

Equipment Inspection and Evaluation

The TA Contractor has developed a system for periodically evaluating the condition of equipment. A Reliability Index from 5 to 0 is assigned to each equipment unit, based on a visual technical inspection (See Appendix 8). Indices 5, 4, and 3 identify equipment ranging from excellent to fair condition, which can be programmed for road maintenance operations with a relatively predictable breakdown rate of under 15 to 20 percent. Indices 2, 1, and 0 reflect non-operational

equipment, requiring, respectively, major repairs or a component exchange, general overhaul, or scrapping.

The equipment evaluation system has been introduced at the ARN, with the help of a guide prepared by the TA Contractor. It is difficult to implement it throughout OFNAR, because the Equipment Directorate has only one equipment inspector. (There is a proposal to add another inspector, who has just returned from training in France.)

A discussion of equipment inventory management at OFNAR is presented in Appendix 9.

Spare Parts Procurement and Inventory Control

OFNAR's system for procurement of spare parts involves some 16 steps and numerous signatures (See Appendix 10). Sometimes it takes up to six months to procure urgently needed spare parts, especially when OFNAR is short of funds. USAID has established a separate budget (some US$200,000, 100 percent funded by USAID) and a streamlined procedure for the procurement of major or urgently needed parts and supplies to repair ARN equipment.

OFNAR has a list of some 100 "approved" suppliers, many of whom are not reliable. The requirement that a part be procured from the lowest bidder often results in the procurement of inferior, counterfeit or inappropriate parts.

A computerized inventory control system has been initiated at OFNAR's Central Warehouse and once a year all inventory is counted physically. There appears to be insufficient coordination between the inventory systems of the Central Warehouse and Regional Agency warehouses. The Central Warehouse has a large quantity of obsolete parts.

Conclusions

The Central Workshop with the support of the SRMP has made progress in developing management and operational capabilities to repair and maintain OFNAR's equipment.

The recently introduced systems and procedures for equipment evaluation, management and maintenance/repair, and for inventory control will require additional efforts until they are firmly established. The vital function of inspecting equipment to ensure it is appropriately maintained is still embryonic.

The spare parts procurement system continues to be cumbersome and results in equipment repair delays, which reduce equipment utilization rates and hinder road maintenance. The lowest cost suppliers sometimes provide inferior products.

Recommendations

The SRMP should continue providing technical assistance and support to OFNAR's Central Workshop, with a concentration on repairing ARN equipment.

Training of mechanical personnel should continue, with provisions made for recruiting and training replacements for retiring staff. Workshop managers and section heads should receive

additional training in planning, management and administration. Training should be provided under the PASET training program to avoid duplication.

The equipment maintenance management systems introduced recently at the Central Workshop should be followed up until they are firmly established. This would include sensitizing management and other personnel to the importance of these systems, periodic verification of entries, and utilization of processed data for work planning, and quality and cost control.

The equipment inspection function should be strengthened. A technical assistant should assist with this function until sufficient local staff is recruited and trained. The inspection function should cover: periodic inspection of equipment to evaluate its condition; checking the adequacy of repair work performed; spot checks to verify the performance of preventative maintenance and the proper operation of equipment in the field; and checking the reliability of data entries.

The procurement system for spare parts and supplies should be streamlined, by reducing the number of persons involved in that process (and the number of times they are involved in each transaction) and by increasing their responsibility and accountability. The inventory control and procurement systems of the Central Warehouse and workshop warehouses should be compatible and coordinated. A Procurement/Inventory Control Specialist should develop an improved system, introduce it with OFNAR's approval, and train personnel in its implementation.

The list of OFNAR suppliers should be scrutinized to eliminate unqualified suppliers, those who have delivered late or provided inferior products.

Obsolete spare parts and supplies should be sold or otherwise disposed of. This would free warehouse space, would improve the inventory control function, and would generate funds to procure urgently needed parts.

INPUTS OF TECHNICAL ASSISTANCE TEAMS

Findings

Senior Advisor to OFNAR

The Senior Advisor to OFNAR, recruited under a USAID-financed host country contract, was terminated for lack of performance in July 1988 and the position was eliminated.

Gannett Fleming Transportation Engineers

Since the last SRMP evaluation study of May, 1988, Gannett Fleming Transportation Engineers continued as technical assistance contractors until the end of their (extended) contract on July 31, 1990.

Gannett Fleming staffed ten positions. None of the candidates included in the firm's proposal were assigned to Chad; substitute staff was provided. Personnel turnover was high. There were four terminations for cause, three resignations for personal reasons and three terminations for medical reasons.

The first SRMP evaluation showed that, as of March 1988, the person-months provided had averaged 85 percent of the scheduled person-months. (The person-months provided for the key positions of Field Engineer, Shop Superintendent, Accountant and Planning Engineer had averaged 69 percent of requirements; the person-months provided for the other six positions had averaged 93 percent of requirements.)

By the end of July, 1990, the person-months provided had averaged 95 percent of scheduled inputs. The person-months provided for some positions exceeded the original requirements (as a result of the contract extension), while others fell short. Some positions were deleted as the persons left the Project and for the last contract year the TA team included only five persons.

The following table shows the person-months of resident staff scheduled to be provided originally and those actually provided by the end of the contract on July 31, 1990:

Position	Person-Months		
	Scheduled	Used	Percentage Used
Field Engineer (3)*	31.0	44.2	143%
Accountant Advisor	45.0	46.2	103%
Brigade Foreman (2)*	26.0	34.3	132%
Equipment Foreman	26.0	20.7	80%
Shop Superintendent (4)*	45.0	37.8	84%
Parts Specialist (2)*	36.0	34.3	95%
Engine Foreman (2)*	36.0	29.9	83%
Machine Shop Foreman	36.0	34.7	96%
Service Foreman (2)*	36.0	42.6	118%
Planning Engineer (2)*	36.0	9.5	26%
Total	353.0	334.2	95%

* The numbers in parentheses indicate the number of persons that staffed the position, if more than one. The TA contract did not provide for a Chief of Party position. At times, this function had been assigned to the Field Engineer, the Planning Engineer, or other members of the TA team. There was a home office-based Project Manager of the TA contractor, who had been substantially involved with the Project and had made frequent visits to Chad.

The performance of the technical assistance personnel as measured by physical outputs (number of equipment units rehabilitated, number of persons trained in the field, etc.) was satisfactory. Development of systems and procedures for road and equipment maintenance operations was minimal, resulting in limited progress towards institutional development and strengthening.

Louis Berger International, Inc.

In October, 1989, USAID issued an RFP for the provision of technical assistance services after the expiration of Gannett Fleming's contract. One month was allowed for the preparation of proposals. Three firms responded, including Gannett Fleming and Louis Berger International, Inc. The latter was selected.

A contract between USAID and Louis Berger International, Inc. (the TA Contractor) for the provision of technical assistance services under the SRMP was signed on April 27, 1990.

The TA contractor was to staff seven multi-disciplinary long-term positions: Chief of Party, Road Maintenance Engineer, Financial and Procurement Advisor, Field Operations Advisor, Service Foreman/Field Mechanic Advisor, Shop Superintendent and Engine Foreman. Six short-term experts were also to be provided: Private Sector Specialist, Management Information Systems (MIS) Specialist, Operations Research Specialist, Personnel Specialist, Training Specialist and Electrical Specialist.

There was practically no overlap between the arriving staff of Louis Berger International, Inc. and the departing staff of Gannett Fleming in June-July 1990. This was the result of both late arrivals and early departures. This lack of overlap slowed the start-up of the TA Contractor. (Moreover, the Chief of Party of the TA Contractor did not arrive until September 1990).

Of the original seven long-term professionals proposed by the TA Contractor, five were assigned to the Project, the other two had to be substituted. Four of the TA team subsequently departed the Project (two were terminated and two resigned). There have been two Chiefs of Party, two Field Mechanic Advisors and three Shop Superintendents. (The second Shop Superintendent was the short-term Electrical Specialist whose assignment was extended to fill the position of Shop Superintendent temporarily. This position was filled again by a long-term person in October 1991.)

The second Chief of Party arrived in late December 1991 and had an overlap of less than one week with his predecessor. This slowed his familiarization with the Project. The Financial Advisor departed the project at the end of January 1992. Another Financial Advisor came to Chad for about one week, in January, 1992, to meet USAID and OFNAR staff and to decide if he would take up the position. (Apparently, he is scheduled to return to Chad in March 1992.)

Two of the six short-term personnel have been to Chad: the Electrical Specialist and the MIS Specialist. The latter was assigned to the SRMP in October 1991, instead of at the beginning of the TA Contract, as originally scheduled. (One of the reasons other short-term specialists have not been assigned to the Project is that similar specialists have been provided under the PASET.)

The position of Accounting Advisor to OFNAR was added to the TA Contract in October, 1991, following utilization of the person-months available for this position under the PASET. (The person filling this position was transferred from the payroll of the PASET Consultant to the TA Contractor's payroll, using some unused person-months.)

The person-months of technical assistance scheduled to be provided and those actually provided from the commencement of the TA Contract, in June, 1990, through January, 1992 are shown in the following table:

Position	Person-Months*			
Long-Term	Total Scheduled	Scheduled through Jan 92	Used through Jan 92	Percentage Used
Chief of Party (2)**	22.0	20.0	16.0	80%
Financial Advisor	22.0	20.0	18.0	90%
Road Maintenance Engineer	22.0	20.0	9.0	45%
Field Operator Advisor	22.0	20.0	15.0	75%
Field Mechanical Advisor (2)**	22.0	20.0	12.0	60%
Shop Superintendent (3)**	22.0	20.0	20.0	100%
Engine Foreman	22.0	20.0	16.0	80%
Accounting Advisor (OFNAR)	0.0	0.0	3.0	N/A
Short-Term				
Electrical Specialist***	3.0	3.0	3.0	100%
MIS Specialist	6.0	6.0	2.0	33%
Private Sector Specialist	3.0	3.0	0.0	-
Operation Research Specialist	2.0	2.0	0.0	-
Personnel Specialist	3.0	3.0	0.0	-
Training Specialist	1.0	1.0	0.0	-
Total	172.0	158.0	114.0	72%

Notes:

* During December 1990-January 1991, 5 persons were evacuated from Chad for about a month due to the security situation.

** Numbers in parentheses represent number of persons filling the position, if more than one.

*** The Electrical Specialist returned to Chad at the end of January 1992 for an additional three months.

A part-time Project Manager of the TA Contractor, based at its Paris, France, office, has oversight responsibilities for the Project and has made frequent visits to Chad to address problems involving personnel, report submissions and other issues.

The qualifications of the TA Contractor's staff have in general been good, and there is only one staff member whose insufficient knowledge of French has created some communication difficulties with counterpart staff.

There have been personality conflicts amongst some TA Contractor staff. There have also been conflicts between the first Chief of Party of the TA team and the then USAID Project Manager (both have subsequently departed Chad). Communication between TA Contractor staff and personnel of OFNAR and of the PASET Consultant has at times been insufficient.

The performance of the TA Contractor, as measured by physical outputs achieved (equipment units repaired, achieving ARN annual program targets for road maintenance) has been

satisfactory overall. Progress towards institutional development has been slow. (Management systems for the Central Workshop and the ARN were established in November-December 1991, a year late.)

The TA Contract provides for the submission of work plans and quarterly progress reports. The first progress report was submitted late, some eight months after the start of the TA Contract. It was rejected by USAID/Chad as being inadequate and had to be resubmitted. The TA Contractor's first work plan was also submitted late and rejected by USAID/Chad, as being too general and inadequate.

Work plans describe the tasks to be achieved and include a bar-chart implementation schedule. No numerical values have been assigned to the various tasks to reflect their importance.

Progress reports describe the work done during the reporting period, discuss problems that have been encountered and state project objectives for the following reporting period. The layouts of the reports have not been consistent from one reporting period to the next, making it difficult to follow progress. It is also difficult to evaluate attainment of project objectives because "progress" has been generally indicated in a bar-chart format rather than as a percentage of tasks achieved.

The most recent quarterly progress report (for the period October-December 1991) was submitted on time, has a better layout than the previous reports, and provides some quantification of progress achieved and planned.

Conclusions

There has been a high rate of personnel turnover with both technical assistance teams.

The performances of the TA teams, as measured by the achievement of physical outputs, have been satisfactory. Progress toward institutional development has been slow - management systems were only introduced in November-December 1991.

The TA Contractor was slow in complying with work plan and reporting requirements.

In spite of the problems experienced by the TA Contractor, they have had a beneficial influence on ARN and central workshop productivity.

Recommendations

In consideration of the fact that:

- Progress toward objectives and resultant benefits have been realized;
- There remains much work to be accomplished; and
- It would be detrimental to stop the project at this time

It is recommended that the TA Contract be extended through September, 1993 (PACD) and amended to provide the technical assistance necessary to continue the SRMP. There should be a growing emphasis on technology transfer and training of OFNAR personnel and a lessening

of direct involvement with line operations. Suggested extensions of long-term positions and assignments of short-term specialists are shown below:

Long-term Positions

- Chief of Party: Extend through September 1993.

- Road Maintenance Engineer: Extend until about August 1992 to provide for continued assistance during the 1991-1992 road maintenance program, and participation in the preparation of the 1992-1993 program. The advisor filling this position should increase his technology transfer and counterpart training efforts. After August 1992, the Chief of Party should assist ARN with program management.

- Financial Advisor (SRMP) and Accounting Advisor (OFNAR): These positions could be combined. This would result in cost savings and would be beneficial to both OFNAR and the SRMP in that accounting, budgeting and payment procedures would be based on the same system (with some variations to account for USAID requirements). The TA Contractor's accounting could be performed by a local accountant. The Financial/Accounting Advisor position should be extended through September, 1993. (A decision on combining these positions should await the outcome and the recommendations of the ongoing audit of the SRMP.)

- Shop Superintendent: Extend through September 1993 to ensure that the management systems introduced recently are firmly established and to assist during the July-September 1993 equipment repair program.

- Engine Foreman: Extend through September 1992; i.e., the end of the 1992 intensive equipment repair period (July-September).

- Field Operations Advisor and Field Mechanic Advisor: Extend both positions through June 1993; i.e., the end of the 1992-1993 road maintenance program.

Short-term Positions

- Private Sector Specialist: To prepare a program for private sector participation in the SRMP, in coordination with the relevant service of OFNAR.

- Management Information Systems Specialist: To return to Chad in about October 1992, to examine how the systems introduced in December 1991 have performed and to provide follow-on training.

- Financial Specialist: To assist with the implementation of the SRMP audit recommendations (if the Financial Advisor and Accounting Advisor positions are combined)

- Procurement/Inventory Control Specialist: To assist with the development of a streamlined procurement system.

- Soils and Materials Engineer: To study methods to improve the effectiveness of road maintenance.

- Sociologist/Anthropologist: To study the Project's socio-economic impacts and the potential for participation of rural groups in road activities.

- Environmental Specialist: To study the Project's impacts on the environment.

- Labor Intensive Road Construction and Maintenance Specialist: To study the potential for participation of village groups in manual road maintenance and feeder road construction.

The TA Contractor should implement the recommendations presented in other sections of this report, as applicable, and should coordinate its activities with OFNAR, US^ID and technical assistance teams sponsored by other donors.

The TA Contractor's work plans should be more detailed. Tasks and sub-tasks should be assigned numerical values based on their importance. Progress would then be measured by comparing in a quantitative manner the value of tasks achieved and planned.

The TA Contractor's quarterly progress reports should follow a more consistent format from one period to the next to enable progress to be determined more easily. Progress reports should show actual and planned achievements during the reporting period and cumulatively from the beginning of the TA Contract, indicate the work planned for the following period and through the end of the Project, provide information on budgets and expenditures, and include a schedule of TA Contractor staff assignments (listing arrival and departure dates).

OFNAR INPUTS TO THE PROJECT

Findings

Financial Contributions

The Grant Agreement stipulated that OFNAR would finance 100 percent of its employees' salaries and an increasing share of the SRMP recurrent costs, with the remainder to be financed by USAID. Recurrent costs are defined as local currency budget line items for heavy equipment operations, light equipment operations, shop supplies, per diem for field personnel, road maintenance materials and administration and utilities, as well as depreciation of project purchased equipment. OFNAR's share of recurrent costs was to be 10 percent in 1985, increasing by 10 percent each year until it reached 50 percent in 1989.

Amendment No. 6 of the Grant Agreement revised the schedule of OFNAR's share in the financing of recurrent costs, to 30 percent for 1988, increasing by 10 percent a year until it reached 70 percent in 1992. With PIL No. 29, USAID agreed that OFNAR would finance only 50 percent of recurrent costs in 1991, instead of 60 percent.

OFNAR's share of SRMP recurrent cost contributions amounted to CFAF 1.6 million in 1986, CFAF 15.5 million in 1987, CFAF 111.4 million in 1988, CFAF 224.8 million in 1989 and CFAF 207.2 million in 1990 (complete figures for 1991 are not available yet). OFNAR's total recurrent cost budget for 1991 amounted to CFAF 2,038 million (including CFAF 365 million for ARN). Its total recurrent cost budget for 1992 amounts to CFAF 2,140 million of which CFAF 446 million is for ARN. (ARN's expenditures constitute about 80 to 90 percent of SRMP's recurrent costs).

OFNAR has been paying its share of recurrent costs in accordance with the amended Grant Agreement. OFNAR has often been late in paying the salaries of its personnel and its share of recurrent costs for fuel, parts, field per diems, etc. This situation was aggravated over the last two years, following a reduction of its revenues (i.e., a share of government taxes on imported petroleum products) as a result of civil disturbances and political instability. OFNAR has not been setting aside funds for equipment depreciation.

PIL No. 24, dated October 30, 1989, established a "blanket" purchase order for CFAF 7.5 million (financed entirely by USAID) over a period of six months, to streamline purchase of spare parts. USAID has also transferred US$200,000 from a recurrent cost budget line to a non-recurrent line to assist OFNAR during the recent financial crisis.

Other Inputs

OFNAR's current Director General held this position from 1985 to 1989 and from August 1991 to the present. He supports fully the SRMP and its goals. The Director General that had replaced him was reportedly not as effective as the present incumbent.

OFNAR has assigned counterpart personnel, Central Workshop personnel and ARN personnel in a timely manner overall. Some of the personnel assigned lack the educational qualifications required to perform their tasks properly and a large proportion of the most experienced and qualified personnel are approaching retirement age. It had been reported that during 1990-1991 OFNAR recruited a large number of unqualified and unproductive personnel. Following recommendations of USAID, other donors and the TA Contractor this situation was rectified in the last quarter of 1991 by a reduction in staff (for example, ARN staff was reduced by about 50). It appears, however, that the criteria used for dismissal were not entirely objective.

Overall, OFNAR's personnel have worked well with the TA teams and have been receptive to the advice, recommendations and guidance given. Many of OFNAR's procedures remain cumbersome, and the organization continues to operate on an administrative rather than commercial basis.

There have been incidences of ARN equipment being diverted to other Agencies or jurisdictions (for example the Municipality of N'Djamena); also of ARN brigades performing "courtesy works" (travaux de courtoisie).

Conclusions

OFNAR's financial contributions during the last year have fallen behind its original commitments. It appears doubtful that OFNAR will be able to finance a growing share of recurrent costs without additional sources of revenue. Furthermore the lack of funds set aside for equipment depreciation means that future equipment purchases will have to be financed entirely by donors.

OFNAR has supported the SRMP and has taken steps to become a more efficient organization.

Recommendations

OFNAR, USAID/Chad and other donors should closely monitor OFNAR's ability to meet its recurrent cost commitments as its road maintenance activities continue to grow. Additional

sources of OFNAR revenue should be investigated (such as road user fees). Arrangements should also be made for financing equipment replacements.

OFNAR should implement the road maintenance and equipment management systems introduced recently, continue its efforts towards becoming an organization operated on a commercial rather than administrative basis, and develop a results oriented and merit based personnel policy. Provisions should be made to recruit and train replacements for retiring staff.

AID INPUTS

Findings

AID/Washington has assisted in contracting for the SRMP, has monitored progress and has provided other assistance, as and when requested. USAID/Cameroon has provided support to the SRMP in contracting and procurement. USAID/REDSO/WCA (Abidjan) has assisted with legal issues.

USAID/Chad has supervised the Project and the TA contractors, has coordinated its activities with OFNAR and with other donors, has monitored progress, has examined and approved the budgets submitted by OFNAR, and has scrutinized the claims for reimbursement submitted by the TA contractors.

Procurement of goods such as road maintenance equipment, spare parts, and tools and equipment for the OFNAR Central Workshop, as well as local contracting have been handled by USAID/Chad. Delays have often been experienced due to the lack of a resident contracting officer.

At times, USAID/Chad has become too involved in the day-to-day management of project details. Reasons for USAID/Chad's very close involvement with the project have included OFNAR's inexperience with USAID procedures and requirements, and difficulties with the management of the TA contractors. (The original Project Paper and the first TA contract did not provide for a position of Chief of Party of the TA team.)

USAID/Chad prepares Project Implementation Reports showing the current status of the SRMP in terms of budgets and expenditures, progress in meeting the Project's objectives and outputs, and important issue problems. These reports cover six- month periods, the latest report covering the period April-September 1991.

USAID/Chad's participation in the SRMP has involved several levels of management. These include the USAID Representative, the Program Officer, the Project Development Officer, the Controller and the Project Manager. Several persons have filled these positions since the beginning of the project, which is normal for long-term USAID projects in locations such as Chad, a one tour, two-year post.

The USAID/Chad Project Manager is responsible for overseeing the SRMP and ensuring that the Project is attaining its objectives. There have been three Project Managers. The first Project Manager was involved with the project until October 1989. The second Project Manager took over around October 1989 and left in October 1991. He was replaced by the current Project

Manager. There was a period of overlap from July to October, 1991, when the Project Managers changed.

The first Project Manager was a professional engineer and actively managed the project and the technical assistance team. The second Project Manager was also an engineer. His management and administration of the SRMP was reportedly not effective (personality conflicts with the Chief of Party of the TA Contractor, insufficient project supervision and resolution of problems, and inadequate documentation of meetings).

The current USAID/Chad Project Manager has had considerable experience of overseeing several other projects in Chad and had participated in the design of the SRMP. He has shown a strong interest in the Project and has been actively coordinating activities with the TA Contractor, OFNAR and other donors and TA teams. He does not have an engineering background. He is assisted by a Chadian civil engineer recruited by USAID/Chad.

Conclusions

USAID has had a significant input into the SRMP and has supported it continually. USAID/Chad has involved itself at times in day-to-day management of SRMP and TA contractor activities.

Recommendations

USAID/Chad should continue to support the SRMP, with a focus on achieving the Project's objectives and a lesser involvement with project details.

USAID should ensure that regular monthly meetings with the TA Contractor and OFNAR take place and that they are documented. It should also continue coordinating its activities with those of other donors.

It would be beneficial to USAID/Chad if the Mission had a resident contracting officer specialized in procurement and contractual matters and an additional engineer experienced in highway maintenance.

IMPACT OF PROJECT ON PEOPLE

Findings

People affected by road improvement projects include transporters, consumers of transport services and farmers. Possible impacts of the SRMP, and of other road projects, on such groups and on women are discussed below.

Transport Services

Annual domestic transport of freight over Chad's road network is estimated at about 265,000 tons, of which 180,000 tons represents traffic in the relatively small cotton zone and 25,000 tons represents the distribution of petroleum products. The transport of food in normal nondrought years is estimated to be about 100,000 tons annually, but this is not reflected in official statistics.

A large part of trucking activity is conducted in the southern part of the country, the busiest period being from December through May. A large proportion of trucks are severely overloaded and most trucks carry both passengers and freight.

Traffic is generally less than 100 vehicles per day on any road except those in the vicinity of urban areas. Traffic counts undertaken in April-May 1991 and in October 1987 are shown in Appendix 11. Some of these counts are shown below:

Freight Traffic

Road Section	Vehicles Per Day / % Trucks	
	1991	1987
N'Djamena-Djermaya	407 / 24%	159 / 39%
Djermaya-Dandi (1)	237 / 56%	-
Djermaya-Massaguet (2)	212 / 23%	91 / 21%
Massaguet-Ngoura (2)	68 / 42%	53 / 25%
N'Djamena-Guelengdeng	199 / 25%	110 / 21%
Guelendeng-Bongor (2)	80 / 32%	39 / 23%

Notes:

(1) Rehabilitated/paved with USAID co-financing.
(2) Maintained under the SRMP.

Transporters

The size of Chad's truck fleet (the majority of which are truck/trailer combinations) is somewhere between 600 and 700 vehicles. Some transport operators in agricultural areas said they would expand their vehicle fleet if the roads improved, as they envisaged an increase in agricultural output.

The monopoly on trucking, the CTT (Cooperative des Transporteurs Tchadiens) was dismantled starting from 1988 as a result of the PASET. Competition between truck companies has increased and this has led to a fall in freight rates. The following freight tariffs were obtained from trucking companies:

Freight Tarrifs

Cargo Item	Tariff in 1988	Tariff in 1991
Cotton	CFAF 44/ton-km	CFAF 32/ton-km
Food	CFAF 38/ton-km	CFAF 29/ton-km

Road improvements are estimated to have lowered vehicle operating costs. The following approximate vehicle operating costs have been reported for Chad for different types of road surface:

Vehical Operating Economic Costs, 1989 (CFAF/km)

Vehicle Type	Road Surface Type		
	Bitumen (A)	Earth Good Condition (B)	Earth Poor Condition (C)
Passenger Car	90	117	155
Pick-up	96	125	163
Medium Truck	277	411	813
Truck-Trailer	536	816	1658

The savings in vehicle operating costs as a result of road improvements based on the above figures (expressed as a percentage) are shown in the following table:

Vehicle Operating Cost (VOC) Savings

Vehicle Type	Reduction in VOC (%)		
	A/B	A/C	B/C
Passenger Car	23	42	25
Pick-up	23	41	23
Medium Truck	33	66	49
Truck-Trailer	34	68	51

Similar magnitudes of savings in vehicle operating costs to those shown above would also be made in financial terms.

Farmers and Consumers

Approximately 83 percent of Chad's total workforce is employed in agriculture, with a large proportion of farming conducted on a subsistence level. Due to the lack of feeder roads, access to farms from the primary road network is often not adequate to enable farmers to reach markets readily.

In 1988, USAID/Chad sponsored a study to examine the social aspects of road use and maintenance. That study concentrated on the N'Djamena-Ngoura road corridor. It conducted numerous surveys to investigate the effect of roads on farmers and consumers and the possibility of using local labor to maintain roads. Since that study, there has been no monitoring or follow-on survey of these areas, nor any other studies of the Project's social and economic impacts.

The 1988 study found that rural residents would prefer to have low standard roads accessing many areas, rather than a high standard arterial without access to its hinterland. The study also noted that some farmers would be interested in working on road projects during periods of agricultural slack.

Traffic increases appear to have generated an increased roadside commercial activity, particularly within or near villages. Such commercial activities include the sale of wood and charcoal for cooking purposes, the sale of local agricultural produce, and the sale of food items to drivers and travelers.

As a result of road improvements, accessibility to various areas and to social service centers (health, education, etc.) has improved, but most consumers in rural areas do not have a high propensity to travel due to lack of income and lack of available transport. (In principle, improved road access coupled with ancillary investments should also facilitate the provision of social services and agricultural extension to rural areas. There have been no studies of such project impacts.)

Women

Most women in rural areas work on farms and are therefore not always available to do other work. On the other hand, a number of women are active in trade and in the production of items for sale. To the extent that improved roads and traffic increases have resulted in increased commercial activities, women engaged in trade and in the production of items for sale have also benefited.

The 1988 social study, to a certain extent, also examined the impact of road maintenance activities on women. It was found that some women would be willing to work in areas where there is ongoing road rehabilitation or maintenance in selling food and carrying water for the road crews. It was calculated in that study that if a woman could sell food to five people in the road crew, valued at CFAF 50 per person per day, (a total value of CFAF 250 per day), her monthly income would increase by approximately 240 percent.

Impacts of project activities on women who are farmers and consumers would be similar to the impacts on such groups as a whole.

Conclusions

There has been an increase in overall traffic and truck flows on rehabilitated and maintained roads. Freight transport rates have fallen as a result of deregulation, and because operating costs of trucking companies on improved roads are estimated to have fallen.

There is a lack of sufficient information on the socio-economic impacts and impact on women of road projects, including the need for feeder roads to access the primary network.

Recommendations

Current vehicle operating cost data need to be collected and new vehicle operating costs calculated by vehicle type and road type (possibly using the Highway Design and Maintenance (HDM) III Sub-Model developed by the World Bank). These need to be updated regularly to determine the magnitude of road user savings from road improvements.

Further studies should be conducted of the social and economic impacts of the Project on various groups (farmers and consumers, including women). Feeder road requirements to facilitate the marketing of agricultural products need to be investigated.

IMPACT OF PROJECT ON THE ENVIRONMENT

Findings

An Initial Environmental Examination for the SRMP was conducted in 1984. It concluded that no foreseeable significant adverse environmental impacts were likely to result from implementation of the Project. There have been no other environmental studies of the SRMP.

Road maintenance operations are generally confined within the right-of-way of existing roads and have limited impact on adjacent areas. Environmental impacts of SRMP road maintenance operations would include: excavation of ground near the roadside to obtain borrow materials for resurfacing (which leaves open pits); drilling of wells and drawing of groundwater used for compaction; air pollution caused by the operation of heavy equipment and trucks; and spillage of fuel and lubricants during refueling and maintenance of equipment.

The Djermaya-Dandi road was constructed on embankment on a new alignment, located near an existing track. The road's main purpose is to improve access to the quarry at Dandi. Environmental impacts during construction of the Djermaya-Dandi road included: excavation of borrow pits and quarrying at Dandi; clearing and grubbing of the road's right-of-way; air pollution from the operation of heavy equipment and trucks; spillage of fuel and lubricants during refueling and maintenance of equipment; and other expected effects of road construction operation.

Impacts on the environment resulting from the provision of new or improved roads would include soil erosion adjacent to the road, increase in quarrying activity at Dandi, increase in tree-cutting in the roads' area of influence (for sale as fuelwood), and pollution caused by increased traffic. (Traffic volumes are small, 50 to 400 vehicles per day.)

Conclusions

There is a lack of information on SRMP's environmental impacts. It appears that such impacts have not been significant. (Possible exceptions include the impact on trees and on groundwater resources.)

Recommendations

A study should be conducted of the Project's environmental impact. A baseline survey of key environmental indicators in the vicinity of road projects should be undertaken, and updated periodically to monitor significant impacts. The level of groundwater should be monitored in the areas where water for road uses is obtained from deep wells. The rate of water pumping should be such that it does not exceed the rate of groundwater recharge.

PRIVATE SECTOR ROAD MAINTENANCE ACTIVITIES

Findings

Maintenance of the Guelengdeng-Sahr road (financed by EDF) has been carried out by GER, a contractor registered in Chad but managed by expatriates. Road maintenance costs average about CFAF 1.3-1.4 million per km per year, approximately the same as the costs of road maintenance performed by ARN brigades.

The PASET includes provisions for the participation of small and medium contractors (SMC) in road maintenance activities. In response, the Service for SMC Administration has been established within OFNAR, with a PASET consultant assigned to advise on and oversee this activity.

A plan of action to promote SMC participation in OFNAR activities was prepared in October 1990, followed by a survey of Chadian SMC in April 1991. This survey revealed that there are some 10 medium-size local contractors and more than 30 small ones with experience in building construction. Almost none of these firms has had road experience, very few have equipment that could be used in roadway maintenance, and most have limited financial resources and management capabilities. Many contractors have expressed interest in performing road maintenance work.

In March-April 1991, OFNAR contracted out three pilot projects. These involved the construction of eight drainage culverts and two fords and manual routine maintenance work on some 30 km of the Massaguet-Ngoura road section, located in the ARN. The contracts were awarded to one medium-size firm having sufficient equipment to carry out the work; to one small firm, owning some equipment and having to rent the rest; and to one small firm possessing only manual tools.

An analysis of the pilot project results by the Service for SMC Administration concluded that the major problems encountered were poor work organization and lack of equipment, which resulted in delays. One reason for the lack of equipment on the site was the contractors' simultaneous engagement in building activities elsewhere. Nevertheless, the work was completed to an acceptable quality level.

The Service for SMC Administration has now proposed that OFNAR contract out: CFAF 200 million of mechanized routine maintenance to international contractors established in Chad, with the most of the work be subcontracted to Chadian firms; CFAF 80 million of drainage work to three Chadian SMC or groups of SMC; and CFAF 20 million of manual maintenance work to many small firms, with technical assistance provided by OFNAR.

Few studies of labor intensive road maintenance have been undertaken in Chad. These concluded that village groups could only have a limited participation in road maintenance, because of the long distances between villages, particularly in the north, their sparse population and the fact that the period of annual road maintenance coincides with increased farm activities.

Conclusions

Participation of local contractors in SRMP road maintenance activities has been limited, and their performance has been mixed.

Increasing private sector road maintenance could benefit OFNAR, by reducing the growing strains on its resources, contributing to the economic development of the country, and resulting in potentially lower costs of road maintenance.

The absence of road maintenance capability in Chad's private sector and the unstable economic and political environment (which inhibits investments in high risk enterprises like road contracting) suggest that an increase in road maintenance by the private sector should be a gradual and carefully planned process.

It appears that labor intensive road maintenance by rural groups has not been sufficiently studied.

Recommendations

The SRMP should gradually increase private sector participation in road maintenance. A short-term private sector specialist should be assigned to the Project as soon as possible to prepare a program for the participation of private firms in the SRMP. This effort should be coordinated with the Service for SMC Administration to avoid duplication.

Groups of local private contractors and transporters, under SRMP or other road maintenance projects, could participate in the routine maintenance of recently completed paved roads. This work could involve clearing ditches, cleaning and repairing drainage structures, embankment repairs and other tasks. These activities would require mainly manual labor, hand tools and transport vehicles.

On earth roads maintained by the SRMP, local contractors could perform the "passe rapide" (first grading and surface repair after the rainy season to reopen the road to traffic). The only heavy equipment involved in this activity would be graders and maybe rollers, which could be provided by OFNAR or rented from OFNAR and other sources. Other maintenance work contracted out could include repair of drainage structures.

For equipment intensive heavy road maintenance, the SRMP could consider contracting the services to locally established international firms, with the provision that a large part of the work is subcontracted to Chadian firms. One such contract could be for the maintenance of the Ngoura-Bokoro road.

Staff of the TA Contractor and the ARN should provide assistance to this initiative and supervise and monitor the work of small and medium contractors. Contractor personnel could also participate in OFNAR's training programs. USAID should consider contributing to a credit facility for small local contractors that would be involved in the SRMP.

USAID should sponsor a feasibility study for using rural groups in road activities. This would require the services of a specialist in labor intensive road construction and maintenance technologies and a sociologist/anthropologist. Work that could be performed by farmers includes construction and maintenance of agricultural feeder roads. The possibility of using PVO to provide technical or financial assistance to local contractors and village groups should also be investigated.

PRIVATE SECTOR EQUIPMENT MAINTENANCE ACTIVITIES

Findings

OFNAR's Central Workshop has been contracting some repair work to private firms, including SHO-Tchad (the Caterpillar and Mercedes dealer in Chad), Tchad Diesel, Salloum and other private workshops in N'Djamena. SHO-Tchad has had some of the more difficult work performed at its affiliates in Cameroon or France. The quality of equipment repairs performed by private firms has ranged from good to marginally satisfactory.

There is a proposal at the Central Workshop to eliminate its Light Vehicle Section and contract out all light vehicle repairs to private firms.

Private equipment and vehicle repair workshops are interested in performing work for OFNAR.

Conclusions

Private workshops and equipment dealers have been involved in some equipment repair work, and their performance has been mixed.

An increase of private sector equipment maintenance would benefit OFNAR, by reducing the growing strains on its resources, would contribute to the economic development of the country, and might result in higher efficiency and lower costs.

Recommendations

The SRMP should increase private sector participation in equipment maintenance and repair.

Local equipment dealers and workshops should participate increasingly in the repair and maintenance of OFNAR vehicles (as is currently planned) and in selected repair work currently undertaken by the Central Workshop.

Private sector mechanical personnel could participate in OFNAR's training programs to enhance their capabilities.

PROJECT OBJECTIVES AND TARGETS

Findings

Following USAID and OFNAR's decision in 1989 to concentrate the technical and financial assistance provided under the SRMP to the N'Djamena Regional Agency and the Central Workshop, the Project's objectives and targets were modified, mainly by reducing the targeted length of roads to be maintained by OFNAR from 1,600 km to 750 km.

At other times project objectives and targets have also been modified or new ones added, without adequate planning or consideration of their realism (for example, Chadian private contractors to maintain 200 km of roads by 1993). The SRMP goal and purpose have remained the same, which has created some confusion.

Conclusions

The Project's current objectives and targets need to be redefined to become more realistic, and to take into account the activities to be undertaken between now and September 1993.

Recommendations

Suggested redefinitions of SRMP objectives and targets are presented below. (These should be finalized by USAID and OFNAR in coordination with other donors, based on the 1992-1993 road maintenance program.)

Recommended Objectives:

- Increase ARN's capability to maintain roads;
- Increase Central Workshop and ARN Workshop capabilities to maintain ARN equipment;
- Assist in the development of private sector road and equipment maintenance capabilities in N'Djamena; and
- Increase OFNAR's capacity/sustainability to finance road maintenance in the ARN.

Recommended Targets (to be achieved by 1993):

- ARN brigades, with SRMP support, maintaining 600 km of road annually;
- Central and ARN workshops maintaining OFNAR's equipment with trained personnel, adequate shop equipment and tools, and established equipment maintenance management systems;
- Private firms performing 10 percent of ARN road and equipment maintenance work; and
- OFNAR financing 70 percent of ARN road and equipment maintenance activities.

Part III

LESSONS LEARNED

The main lessons learned from SRMP implementation activities undertaken since May 1988 (previous evaluation) are summarized below.

N'Djamena Regional Agency Activities

The activities of a regional road maintenance agency should take into account ongoing and planned construction activities within its geographic area.

A road maintenance agency should be accountable for its work. This requires that the agency be given a work program and budget and means to monitor its work performance and actual costs.

Central Workshop Activities

Maintaining obsolete equipment that experiences frequent breakdowns drains equipment maintenance resources, contributes very little to production, and hinders the productivity of other field equipment.

Systems for equipment management and maintenance should be introduced at an early stage, because currently operations are inefficient and institutional development is limited.

Inputs of Technical Assistance Teams

Institutional development through technical assistance is a slow process. Experience has indicated that it works best when technical assistants "work themselves out of job"; i.e. first they assume operational roles, then they become hands-on advisors to counterpart staff, and finally they withdraw from day-to-day operations, remaining available only to advise on special problems.

In seeking contractors for complex projects, such as the SRMP, it is advisable to allow more time for the preparation of proposals. This would encourage more firms to respond and might result in the selection of better qualified contractors.

As personal problems develop within a project's staff, immediate steps must be taken to resolve them. If not, the project will suffer.

When selecting a contractor to provide technical assistance on a long-term project it is important to consider:

- Availability of proposed personnel from the firm's own staff;
- Whether any of the staff have worked together on long-term projects;
- Willingness of the personnel proposed to be assigned to the project; and
- Experience of the firm on similar long-term projects.

When changing technical assistance contractors during the course of a long-term project, there should be sufficient overlap between key staff of the departing and arriving teams. An overlap of three months is recommended.

OFNAR Inputs to the Project

The requirement that OFNAR contribute a growing share of recurrent costs has been a well thought out institutional development component of the SRMP.

The ability of OFNAR or any road maintenance organization to keep pace with ever growing demands needs to be monitored carefully to allow for the timely provision of remedial assistance to respond to those demands.

AID Inputs

There must be continual coordination between TA contractor, host country government and financing institutions.

Overall project objectives should not be lost while managing a project.

Impact of Project on People and the Environment

In designing a road maintenance project, more attention needs to be given to the intended beneficiaries of the project; i.e., consumers, farmers, transporters, etc.

Baseline socioeconomic and environmental data should be obtained before the beginning of a project and updated periodically to monitor its effects.

Private Sector Road and Equipment Maintenance Activities

Private sector participation in road and equipment maintenance can reduce the need for public sector resources and enhance economic development.

Development of private sector road construction and maintenance capabilities should be carefully planned and implemented to avoid early failures and discouragement.

Project Objectives and Targets

When a project's original objectives and targets are modified, so should be its goal and purpose; otherwise, achieving the new objectives and targets might be compromised.

Part IV

SUGGESTED STRATEGIES FOR A FOLLOW-ON PROJECT

INTRODUCTION

USAID/Chad is currently considering a SRMP follow-on project (SRMP II), to be implemented over the period 1993-1997. In planning this project, it is assumed that there will be no sustained armed conflict in Chad, that efforts towards national unity and democratization will continue, and that economic activity will continue to grow. It is also assumed that the present organization and activities of OFNAR and of its Regional Agencies will not change significantly.

This section of the report discusses issues to be considered in developing this follow-on project, presents several options for such a project and suggests a course of action. The prospects for sustainability of this project and its possible socio-economic impacts are also reviewed.

ROAD MAINTENANCE CONSTRAINTS

Several constraints hinder the establishment of an effective road maintenance system in Chad. The most important of these constraints are discussed below.

Weak Administrative and Managerial Capabilities

Although ARN (and OFNAR as a whole) has made progress towards developing operational capabilities, weaknesses remain in the areas of planning, budgeting, management and control. Recently initiated management systems addressing these constraints are still in a fragile stage and will require several years until they are firmly established. OFNAR's procedures are still more administrative than commercial-based. Withdrawal of technical assistance until further improvements are made would weaken ARN's technical capabilities to maintain roads.

Insufficient Local Financial Resources for Road Maintenance

OFNAR's inability to self-finance all road maintenance costs is expected to continue in the near future, until additional sources of revenue are brought to bear. In the meantime, a complete and sudden withdrawal of USAID's financial support would severely affect the financial capability of OFNAR to continue maintaining roads in the N'Djamena Regional Agency.

Aging Equipment Fleet

Most ARN equipment will reach the end of its useful life in two to three years or has already exceeded it. This situation, coupled with OFNAR's policy to continue repairing old unproductive equipment instead of scrapping it, results in low equipment utilization rates, low productivity, poor work quality and higher costs. Addressing these problems will require a coordinated effort to retire old equipment and procure replacement units. Given OFNAR's inability to fund equipment purchases, USAID or other donor support will be needed.

Lack of Private Sector Road Maintenance Capability

The lack of private sector road maintenance capability has resulted in the need to undertake almost all road maintenance work by force account, which is generally acknowledged to be an inefficient undertaking. Given the current economic and political environment in Chad, development of private road contractors will require a coordinated effort and commitment on the part of the Government and donor agencies.

Lack of Agricultural Feeder Roads

The necessity to concentrate Chad's limited resources on the rehabilitation and maintenance of the priority road network has hindered realization of the full benefits of road investments. Rehabilitation and maintenance of feeder roads to support agricultural development will require additional local resources (for example labor from rural areas) with government and donor assistance.

CRITERIA FOR A FOLLOW-ON PROJECT

In designing the SRMP II, the following criteria should be considered:

- The follow-on project should build upon the achievements of the SRMP, to leverage the new undertaking and ensure that development already achieved is safeguarded;
- The SRMP II should be developed by USAID in coordination with the Government of Chad and other donors to avoid duplication and to ensure that all basic constraints would be addressed;
- Resources and inputs to be provided under a follow-on project should not be "spread too thin";
- The goal, objectives and targets of the follow-on project should be clear, realistic and commensurate with the level of assistance provided; and
- Time-schedules for implementation, including contracting for technical assistance services and equipment procurement, should be realistic and based on the experience gained under the SRMP.

OPTIONS FOR A FOLLOW-ON PROJECT

Strategies for follow-on road maintenance assistance should take into account the constraints of the system and be based on sound criteria. Various strategies for a SRMP II are presented below, considering the above constraints and criteria. Advantages and disadvantages of each option are also reviewed.

Option 1a. Continue the provision of technical assistance to the N'Djamena Regional Agency, and continue USAID financing of a (decreasing) share of ARN recurrent costs.

This option would essentially be a continuation of the SRMP. Technical assistance to the ARN would cover programming and management, field operations, preventative equipment maintenance, workshop operations, cost accounting and control. Selected assistance would be

provided to the Central Workshop for repairing ARN equipment. The role of technical assistants would be decreasingly operational and increasingly advisory, until they are phased out. New equipment would be procured by USAID to replace retiring units and provide the capability to maintain paved roads. USAID would finance a decreasing share of ARN recurrent costs, reaching zero percent by the end of the project.

Advantages: This project would address ARN's weak management capabilities, insufficient funding for road maintenance and aging equipment. It would build upon the achievements of the SRMP and concentrate resources on a clearly defined organizational entity and geographic area (ARN).

Disadvantages: Financing a share of recurrent costs would require continual scrutiny of ARN expenditures by the TA contractor and USAID, diverting attention from more important tasks. Paying a share of ARN actual costs regardless of work performed (e.g., number of km maintained and quality of work) would not contribute to the development of a more efficient ARN, operated on a commercial basis. The lack of private sector road maintenance capabilities and lack of agricultural feeder roads would not be addressed.

Option 1b. Continue the provision of technical assistance to the ARN and, instead of financing a share of ARN recurrent costs, pay for a (decreasing) share of work actually completed.

This option is similar to Option No. 1a, with the exception that USAID would pay for a portion of road maintenance costs based on quantities of work actually performed in the field (as verified by the TA contractor) and on agreed unit prices. This approach is different than the current project which reimburses OFNAR for expenditures incurred by the ARN regardless of work performed. This new method of payment would alleviate USAID's need to scrutinize actual ARN expenditures and would provide incentives for ARN to become a more efficient and effective organization.

Option 2. Provide technical assistance and financial support to other regional agencies of OFNAR.

This option would be an add-on to Option No. 1. In addition to the ARN, SRMP II would support one or more other OFNAR Agencies; for example, Mongo. This option would be relevant only if the donor currently assisting the other agency (for example, the World Bank in the case of Mongo) does not continue its assistance.

Advantages (vis-a-vis Option No. 1): Ensuring that road maintenance constraints in other regions are addressed.

Disadvantages (vis-a-vis Option No. 1): Commitment of substantial additional USAID resources for technical assistance, equipment procurement and road maintenance financing. Project expansion might dilute the effectiveness of assistance provided to the ARN.

Option 3. Provide technical assistance to OFNAR and Ministry of Public Works and Transport entities responsible for road maintenance planning and control, equipment management, research on construction methods and materials and other functions.

This option would be an add-on to Option No. 1. This option would be relevant if other donors do not continue providing such assistance.

Advantages: Ensuring that constraints in other areas of the road maintenance system are addressed.

Disadvantages: Commitment of substantial additional USAID resources for technical assistance, which might dilute the effectiveness of assistance provided to the ARN (as was the case with the SRMP until it was modified to focus on the ARN). Lack of continuity in the development of systems for these other functions, which have already been initiated by others.

Option 4. Provide technical assistance and financing for the establishment of an "autonomous" road maintenance brigade.

This project would provide technical and financial assistance for the establishment and initial operation of a brigade responsible for maintaining selected roads within the ARN. It would be composed of personnel recruited from ARN and other sources plus equipment in good condition leased from OFNAR or procured under SRMP II. This brigade would be operated on a commercial basis. Equipment maintenance could be performed by OFNAR's Central/ARN workshops or by private workshops, based on competitively awarded contracts. USAID would pay a decreasing share of costs based on work actually performed by the brigade, with the remainder paid by OFNAR.

Advantages: Better USAID control over project personnel and equipment. Financing a share of road maintenance costs based on work actually performed in the field (as verified by the TA contractor) would alleviate the need to scrutinize actual expenditures. This brigade could be privatized two to three years later, thus contributing to the development of a private sector road maintenance capability.

Disadvantages: Such a project would have to be designed and implemented using a new set of parameters, drastically different from SRMP's. This might result in start-up and implementation difficulties. Creating an "autonomous" brigade would weaken the ARN, thus negating much of SRMP's achievements. OFNAR would have to finance the operations of the (reduced) ARN and a growing share of the autonomous brigade's costs, a burden it might be unable to sustain.

Option 5. Promote the participation of private firms in road maintenance activities by providing technical and other assistance and paying for work performed on the basis of unit rates.

This option would be an add-on to Option No. 1. Private contractors would participate in road maintenance activities under contract with OFNAR (or the ARN). USAID would pay a portion of contract costs. Technical assistance to private contractors would be provided by TA contractor and ARN staff for work programming, budgeting and pricing, project management, work execution and quality control. Equipment, with their operators and mechanics, would be provided or rented to contractors by OFNAR, or would be rented from other sources.

Advantages: Development of private sector contractor capability would augment the national resources available for road maintenance, would reduce the burden on OFNAR's resources, and might result in lower maintenance costs.

Disadvantages: OFNAR and the TA contractor would have to commit resources for preparing designs and bid documents, prequalifying contractors, evaluating bids, contracting, supervising field work and approving payments. USAID/Chad would have to commit additional resources to oversee contracting, review contractor progress and approve payments.

Option 6. Provide assistance for the rehabilitation and maintenance of agricultural feeder roads.

This option would be an added road activity to one of the above options. Feeder roads could be rehabilitated and maintained by ARN brigades, by private contractors, or by village groups. In the latter case, assistance could be provided by ARN, the TA contractor or private voluntary organizations (PVO).

Advantages: Facilitation of agricultural produce marketing. Creation of additional employment opportunities among the rural poor. Improved access to social services.

Disadvantages: Additional requirements for technical and other assistance.

Option 7. Transfer project resources to the World Bank or another donor to permit them to implement a follow-on road maintenance project.

Under this option, USAID would participate in the design of the follow-on project and then transfer funds to the other donor(s) who would be responsible for providing technical assistance, equipment procurement and other inputs.

Advantages: Minimization of USAID/Chad's contracting, supervision and control requirements, allowing it to focus on other sectors and mission priorities.

Disadvantages: Limited USAID control of project activities and reduced ability to promote US policies and to ensure the participation of US firms in the follow-on project. Loss of USA visibility in Chad.

Option 8. Withdraw from road maintenance activities (i.e. do not undertake a follow-on road maintenance project).

Advantages: Resources currently intended for a follow-on project could be used for other projects.

Disadvantages: The achievements of the SRMP would be compromised. Road maintenance system constraints would be intensified.

Option 9. Provide co-financing for road rehabilitation or construction.

In addition to a follow-on road maintenance project, OFNAR and USAID/Chad have been discussing the possibility of USAID's co-financing a road rehabilitation project. Another donor (for example the World Bank) would undertake the design, implementation and supervision of such a project. USAID would participate in the project's design. Such an undertaking would be similar to the Djermaya-Dandi road rehabilitation and paving, which was implemented under a World Bank project with USAID co-financing in the amount of US$5.6 million.

Advantages: Facilitation and acceleration of Chad's priority road rehabilitation program.

Disadvantages: Commitment of substantial USAID financial resources. If the road rehabilitation project is incorporated into the follow-on road maintenance project, it could dilute the latter's focus and effectiveness.

SUGGESTED FOLLOW-ON PROJECT

Considering the advantages and disadvantages of the various road maintenance project options discussed above, it is recommended that a follow-on road maintenance project, the SRMP II, be undertaken. Its preparation should be coordinated with that of PASET II and with other donor activities. We recommend the follow-on project be a combination of Option No. 1b, No. 5 and No. 6, as outlined below. (If road rehabilitation is also undertaken--Option No. 9--it should be implemented under a separate project, to prevent dilution of SRMP II efforts.)

Project Goal, Objectives and Targets

The goal of the project should be to maintain the priority road network and rehabilitate and maintain feeder roads in the ARN region.

Project objectives should be to:

- Develop the ARN into a technically competent regional road maintenance organization;
- Develop private sector road and equipment maintenance capabilities; and
- Increase the capacity of OFNAR to self-finance road maintenance and feeder road rehabilitation activities in the ARN.

Suggested project targets and verifiable indicators are as follows:

- Annual routine maintenance of 600 km of paved roads, annual routine and periodic maintenance of 650 km of priority earth roads, and rehabilitation and maintenance of some 200 km of feeder roads in the ARN region;
- ARN implementing 75 percent of project activities with its own personnel, equipment and facilities, with the remainder 25 percent contracted out to private firms; and
- OFNAR contributions reach 100 percent of project costs one year before the project ends (assistance phaseout year).

Project Inputs

The main inputs to the project would consist of technical assistance, equipment procurement and financial resources.

Technical Assistance. Technical assistance should be provided to the N'Djamena Regional Agency and to the Central Workshop (to the extent needed to ensure the repair of ARN equipment). Assistance should also be given to private contractors involved in SRMP II activities, as needed. Key persons of SRMP I and SRMP II technical assistance teams should overlap for about three months to ensure continuity. Technical assistance positions could include:

Long-term Positions

Chief of Party
Road Maintenance Engineer (ARN/private contractor operations)
Field Engineer/Superintendent (ARN operations)
Field Engineer/Inspector (private contractor operations)
Workshop Superintendent (ARN/Central Workshop)
Field Mechanic
Financial/Administration Advisor

Short-term Positions

Management Information Systems Specialist
Training/Institutional Development Specialist
Private Sector Development Specialist
Contracts/Specifications Engineer
Soils and Materials Engineer
Procurement/Inventory Control Specialist
Equipment Specialist (Engines)
Equipment Specialist (Electrical)
Labor Intensive Road Construction/Maintenance Specialist
Sociologist/Anthropologist
Development/Transport Economist
Financial Specialist (Road Maintenance Financing Methods)
Environmental Specialist

Equipment Procurement. Equipment should be procured for ARN brigades and for rental to private sector contractors involved in road maintenance. Such equipment could include:

bulldozers (4)
graders (4)
loaders (4)
rollers (4)
dump trucks (12)
water trucks (4)
fuel trucks (2)
field service trucks (2)
field maintenance trucks (2)
transport trucks (3)
transport trailers (3)
asphalt repair equipment (2)
office trailers (3)
tractors (3)

pick-up and field vehicles (12)
passenger vehicles (4)
support and other equipment (to be specified)
workshop equipment, tools and supplies (to be specified)

Financial Resources. Funds would be required for technical assistance services, equipment procurement, and financing of a decreasing share of ARN operations (with a shift from paying for recurrent costs to paying for work actually completed in the field, on the basis of agreed unit prices).

SUSTAINABILITY OF FOLLOW-ON PROJECT

The key constraint that could affect the sustainability of the road maintenance system established under the SRMP II, following the end of USAID assistance, is lack of sufficient funding. Considering Chad's needs and low level of government revenues it is evident that other sources of revenue would have to be developed to fund road maintenance.

As a general rule, road maintenance costs should primarily be borne by road users and beneficiaries. Sources of revenue could include license fees, import taxes on vehicles, annual vehicle inspection fees, taxes on truck axles, penalties on overloaded trucks, and tolls on paved roads and bridges. Revenue collection programs should be such that collection expenses do not exceed the revenues collected.

Before initiating programs to increase revenues, it would be important to undertake a campaign to sensitize local authorities, transporters, vehicle owners, shippers and the general public of the importance and need to collect such revenues to ensure that roads are properly maintained.

ANTICIPATED IMPACT OF FOLLOW-ON PROJECT ON LOW INCOME GROUPS

Impacts of a road maintenance project on people can be subdivided into two broad groups, namely economic impacts and social impacts. These are discussed in the following sections.

Economic Impacts

The major economic benefits of a follow-on road project would be reduced transport costs and developmental benefits.

Reduced Transport Costs. Better roads reduce the costs of transport for both passengers and freight. The benefits realized might be distributed between transporters, consumers, farmers and other groups, including women.

Development Benefits. Road transport projects are very important for agricultural development. Benefits not only arise from reductions in transport costs but also from development of areas that were not easily accessible to markets before the project. The link between transport projects and agricultural development arises most often in the case of rural roads.

Social Impacts

Road projects usually have impacts beyond those that are simply financial and economic, including effects on income distribution, employment, internal migration, nutrition and health, and other aspects of the quality of life.

Income Distribution. The follow-on project could have an impact on income distribution. To determine the extent to which the income of the poorest sector of the rural population has improved as a result of the follow-on project, it would be necessary to examine the relative improvement in comparison with other groups in the country.

Employment. The extent to which the follow-on project reduces underemployment and unemployment could be quantified in terms of work-years created by the project, with distinctions being made between permanent employment and employment during the project implementation phase. The number of jobs created can be compared with the expected increase in the labor force of the project area.

Internal Migration. The follow-on project might have an effect on rural-urban migration, although quantification of this effect would be extremely difficult.

Nutrition and Health. If the follow-on project is located in some areas where serious nutrition and health problems exist, the effects of the project would be expected to be beneficial. These effects could be quantified based on the number of disease incidences and the daily intake of calories or protein before and after project implementation.

Other Indicators of the Quality of Life. The follow-on project may have a significant effect on the quality of rural life by improving access to schools, cultural and infromation centers, domestic water supply sources and the like.

Conclusions

It is anticipated that a follow-on project would have beneficial impacts on low income groups, in both economic and social terms. To assess the magnitude of these impacts, a detailed analysis would be required of income distribution, employment opportunities, accessibility to services and agricultural potential in each area affected by the follow-on project. (Appendix 12 includes a discussion of other issues to be considered in performing the economic and social evaluations of projects.)

Appendices

Appendix 1

STRENGTHENING ROAD MAINTENANCE PROJECT EVALUATION STATEMENT OF WORK

BACKGROUND

The project was authorized June 24, 1985 at $27.5 million. The Project Agreement was signed June 29, 1985 with the Chadian Government (GOC). The project's purpose is to develop a technically competent and financially responsible organization for the maintenance of the road network in Chad. The National Roads Office (OFNAR) is the implementing agency and the object of the project's institutional strengthening efforts. Major elements of the project include: technical assistance in planning and administering a road maintenance program; training and equipping a road brigade providing operational support; rehabilitating and equipping workshop facilities and training in equipment maintenance; rehabilitating a 63-kilometer road. Technical assistance, equipment and other commodity procurement, road and facilities rehabilitation, and administrative support constitute the principal inputs for this project.

The project has been amended twice. The first amendment in July, 1989 focused AID assistance on OFNAR's N'Djamena subdivision given World Bank and other donor assistance to OFNAR. Projected end-of-project indicators were changed by this amendment. A second amendment in June, 1991 increased project funding by $3.345 million and extended the PACD 18 months to September 30, 1993.

The implementation progress to date has been mixed. While commodity procurement, training and construction activities have been implemented at satisfactory rate, the overall impact on developing OFNAR's institutional capabilities has seemingly fallen short. Difficulty in mobilizing and retaining long-term technical assistance personnel has been a contributing factor to delays in project implementation. The recent change in government has also adversely impacted on the project. Building rehabilitation has been carried out in a satisfactory manner. Rehabilitation of the Djermaya-Dandi road is nearly completed under a sub-grant to the World Bank.

ARTICLE I - TITLE

Strengthening Road Maintenance Project Evaluation

(PROJECT NUMBER: 677-0050)

ARTICLE II - OBJECTIVE

The dual purpose of the evaluation is (1) to assess progress to date in accomplishing project outputs purpose and (2) to indicate the most appropriate area(s) for a follow-on strengthening road maintenance project, taking into account, among other things, other donor activities in the transport sector (on-going and planned), OPNAR's absorptive capacity, and the potential for contracting road maintenance services from the private sector.

The results of the evaluation will be of interest to OFNAR, USAID/Chad and AID/Washington. All parties will want to know if the project is making satisfactory progress in meeting its objectives, particularly the verifiable indicators associated with the project's purpose. A.I.D. will also be interested in understanding the project's impact on low income groups and the projected sustainability of project activities following the termination of A.I.D.'s assistance. USAID/Chad will be particularly interested in the evaluator's assessment of the nature and scope of a follow-on road maintenance activity, currently planned for FY 1993, including the possibility of using the World Bank (or other suitable donor organization) to implement this activity.

Since there remain approximately two years to complete the project, the evaluation should recommend, as appropriate, changes in the current project to address problems blocking attainment of project objectives or creating inefficiencies in implementing the project.

ARTICLE III - STATEMENT OF WORK

The evaluation report will provide empirical findings to answer the questions set forth in this work statement. The report will also provide a discussion of lessons learned that may emerge from the analysis, such as:

1. To what degree has the project (in cooperation with other donors) developed a technically competent and financially responsible organization for maintaining Chad's road network?

2. How successful have the technical assistance teams, OFNAR and AID been in ensuring the timely provision of satisfactory inputs to accomplish the project's planned outputs?

3. What impact is the project having on people, such as farmers, consumers, transporters? What is the project's impact, if any, on the environment? On women?

4. Are the effects of the project being produced at an acceptable cost compared with alternative approaches for properly maintaining the Chadian road network?

5. Do project objectives and the strategy for their achievement remain valid within the context of current and planned donor/Government of Chad activities in the transport sector?

6. Assuming an AID follow-on activity addressing road maintenance concerns, what areas and related strategies are most appropriate in terms of achieving a viable, sustainable road maintenance system in Chad?

In responding to this element of the evaluation work plan, the contractor is expected to present sufficient information and analysis to permit USAID/Chad to develop a Project Identification Document (PID). The information and analysis should, at a minimum:

Indicate a comprehensive understanding of the Chadian road maintenance system, with particular attention to the major constraints blocking the establishment of an effective road maintenance system.

Reflect the plans and related strategies of other donors and the Government of Chad in developing the transport sector, particularly as such plans and strategies bear on road maintenance requirements.

Reveal that alternative strategies for addressing the identified constraints were given appropriate consideration and analysis in arriving at the proposed course of action. In this connection, indicate the feasibility of transferring project resources to the World Bank (or other suitable donor organization) to permit them to implement the project.

Indicate how the project would impact on low income groups and the general magnitude of such impact.

Indicate the degree to which the maintenance system established under the proposed project would be sustained in the post-project period through user fees, GOC budget support, voluntary military or civilian labor, etc.

7. Data Collection shall be done by means of:

A. A Review of:

Project Design documents (Project Paper and related amendments)

Mission Country Program Strategy Plan (CPSP) and Assessment of Program Impact (API)

USAID Project Implementation Reports

TA Contracts Monthly Progress Reports

TA Monthly Financial Reports

USAID's Monthly Financial Reports

Project Correspondence including Memos, Letters, Cables, PIO's,

PIL's, and Waivers

Contract Documents

Evaluation Report

Other Donor design and planning documents related to Chad's transport sector

B. Personal interviews, conferences and discussions with the project staff, mission Project Committee, TA contractor, OFNAR, other donors operating in the transport sector, farmers, consumers, transporters and by internal discussions within the team.

C. Site visits to:

OFNAR's Central Workshop;

Training Brigade site;

OFNAR's Maintenance Subdivisions.

World Bank Offices in Washington and N'Djamena

D. Other means deemed appropriate by the contractor.

9. Team Composition: The Evaluation Team will consist of the following recommended members unless changed following discussions with USAID/Chad, provided the changes do not result in an increase in the overall dollar value of the work order.

1	Economic Development/Evaluation Specialist (Team Leader)
1	Senior General Engineer
1	Senior Transport Economist
3	TOTAL

10. Preparatory Work in the U.S.: Prior to arriving in Chad, two days are authorized for the Team to review the project paper, project paper amendments, the 1988 project evaluation, the CPSP and API, and conduct interviews with World Bank Transport Sector staff.

ARTICLE IV - REPORTS

A. Draft Report

A draft of the report in French and English, including major findings & recommendations, must be provided to and discussed with OFNAR, A.I.D., and contractors at least six days prior to the evaluators departure.

B. Final Report

A final report should be prepared in French and English reporting all the findings. The report should reach USAID/Chad (via a world wide courier service such as DHL) within one month after evaluators depart N'Djamena and should comply with the following reporting requirements/guidelines:

- Executive Summary
- Project Identification Data
- Table of Contents
- Body of the Report
- Appendixes

The Executive Summary: States the development objectives of the activity evaluated; purpose of the evaluation; study method; findings, conclusions, and recommendations; and lessons learned about the design and implementation of this type of development activity.

The Body of the Report: Should include discussion of (1) the purpose and study questions of the evaluation; (2) the economic, political, and social context of the project; (3) team composition and study methods (one page maximum); (4) evidence/findings of the study concerning the evaluation questions; (5) conclusions drawn from the findings, stated in succinct language; (6) recommendations based on the study findings and conclusions, stated as actions to be taken to improve project performance and/or to design the planned follow-on project. This section of the report should not exceed 40 pages. More detailed discussions of methodological or technical issues should be included in the Appendixes.

Appendixes: Should include a copy of the evaluation scope of work, the most current logical framework as pertinent, a list of documents consulted, and individuals and agencies contacted. Additional appendixes may include a brief discussion of study methodology and technical topics if necessary.

ARTICLE V - TECHNICAL DIRECTIONS

Technical directions during the performance of this delivery order will be provided by the Project Manager, Samir Zoghby, pursuant to Section F.5 of the basic IQC contract.

Frequent meetings, at least weekly, will be held with these offices to monitor progress and to make any changes in the workplan, outline or the report itself. Approval of the deliverables rests with the Project Manager.

ARTICLE VI - TERM OF PERFORMANCE

A. The effective date of this delivery order is January 6, 1992 and the estimated completion date is April 6, 1992.

B. Subject to the ceiling price established in this delivery order and with prior written approval of the Project Manager (see block 5 of the Cover Page), Contractor is authorized to extend the estimated completion date, provided that such extension does not cause the elapsed time for completion of the work, including furnishing of all deliverables, to extend beyond 30 calendar days from the original estimated completion date. The contractor shall attach a copy of the Project Manager's approval for any extension of the term of this order to the final voucher submitted for payment.

C. It is the contractor's responsibility to ensure that Project Manager-approved adjustments to the original estimated completion date do not result in costs incurred which exceed the ceiling price of this delivery order. Under no circumstances shall such adjustments authorize the Contractor to be paid any sum in excess of the delivery order.

D. Adjustments which will cause the elapsed time for completion of the work to exceed the original estimated completion date by more than 30 days must be approved in advance by the Contracting Officer.

ARTICLE VII - WORK DAYS ORDERED

A. Functional Labor Specialist	Delivery Days Ordered
Project Manager Paul Couniotakis	39
Project Engineer Robert Kyriacos	37
Senior Planner Alan Bevis	36

Based on a multiplier of 3

B. Subject to the ceiling price established in this delivery order and prior written approval of the Project Manager, the contractor is authorized to adjust the number of work days actually employed in the performance of the work by each position specified in this order. The contractor shall attach a copy of the Project Manager's approval to the final voucher submitted for payment.

D. It is the contractor's responsibility to ensure that the Project Manager-approved adjustments to the work ordered for each functional labor specialist do not result in costs incurred which exceed the ceiling price of this delivery order. Under no circumstances shall such adjustments authorize the contractor to be paid any sum in excess of the ceiling price.

ARTICLE VIII - CEILING PRICE

For Work-Days Ordered
For Other Direct Costs
Ceiling Price

ARTICLE IX - USE OF GOVERNMENT FACILITIES AND PERSONNEL

The contractor and its employees or consultants will be provided office space in the USAID Annex. Office equipment, transportation in-country and official vehicles will be provided as available from the Mission.

The American Embassy N'Djamena will not grant health room access, American Club Privileges, or access to chancellery grounds unless the contractor can present proof of medical clearance issued by State MD. or personal Physician, and A.I.D./IG/SEC statement of security clearance status. The Mission must cable or fax specific authorization of each person to enter Chad with the planned date of arrival and departure. Contractors must have Chadian entry visas before they are authorized to travle as airport visas are not give to contractors. If a contractor desires written expediter assistance, the Mission must have received a written requiest three work days (M-F) in advance of arrival in Chad. If access to computers is essential to contractor work efficiency, contractors are advised to bring portable laptop computers with them.

ARTICLE X - DUTY POST

The Duty Post for this delivery order is N'Djamena, Chad.

ARTICLE XI - LANGUAGE REQUIREMENTS

The contractor's personnel shall have French language capability at the S-3, R-3 level.

ARTICLE XII - ACCESS TO CLASSIFIED INFORMATION

The contractor will not have access to classified information.

ARTICLE XIII - AID LOGISTIC SUPPORT

USAID/Chad, GOC, Louis Berger International and OFNAR will cooperate to facilitate the evaluation process and will provide the evaluators access to all records and documents necessary for the evaluation and will furnish adequate office space, office equipment and transportation. The evaluation team will be responsible for all other logistical support. This work order will cover the duty free entry of personal effects for the evaluation team, local tax exemptions on earned income, and as authorized by the U.S. Embassy, check cashing, health unit, and diplomatic pouch privileges.

ARTICLE XIV - WORK WEEK

The contractor is authorized up to a six day work week with no premium pay.

Appendix 2

LIST OF DOCUMENTS CONSULTED

Documents and items of correspondence consulted by the Project Evaluation Study Team are listed below.

SRMP Documents

Government of Chad Decree No 057/pr/MTPMP/84 concerning the Organization Functioning and Establishment of Resources for the Office National des Routes (OFNAR), February 5, 1984.

Project Identification Document, SRMP, AID, 1984

Project Design SRMP, Human Resources Needs Assessment, Issaac Tedambe, 1985

Project Paper, SRMP No. 677-0050, AID, June, 1985

Project Paper Supplement, SRMP, 677-0050, AID, May, 1989

Project Grant Approval Request, AID, 1985

Project Grant Agreement between the Republic of Chad and the United States of America for the SRMP, 1985, and Amendments

Procurement Implementation Orders/Technical (PIO/T) and Commodities (PIO/C)

Project Correspondence (memos, letters, cables, etc.) 1988-1992

Project Implementation Letters

Project Implementation Schedules

USAID Project Implementation Reports

Project Financial Matters

Project Recurrent Costs

Project Budgets

Budgets Provisionnels, OFNAR, 1988-1992

Bilans, Comptes Administratifs, Rapports Analytiques, OFNAR, 1988-1991

Minutes of Project Meetings

Travel Requests and Trip Reports

Program Rationale, Chad, USAID

Assessment of Program Impact, Chad, USAID

Evaluation Study Report, Strengthening Road Maintenance Project, Chad, Parsons Brinckerhoff International, Inc., May, 1988

Audit of the Strengthening Road Maintenance Project Chad No. 677-0050, Kooh et Mure (Coopers & Lybrand), May, 1988

System for Research on the Social Aspects of Road Use and Maintenance, Ellen P. Brown, 1988

Progress Reports - Gannett Fleming Transportation Engineers, 1988-1990

Phase I Final Report, Strengthening Road Maintenance Project, Chad, Gannett Fleming Engineers and Planners, October, 1990

Request for Proposals (SRMP), October, 1989

Technical Proposal for Technical Assistance Services for SRMP, submitted by Louis Berger International, Inc., November, 1989

Contract No. 677-0050-C-00-0010-00, USAID - Louis Berger International, Inc., April, 1990

Work Plans - Louis Berger International, Inc.

Project Progress Reports - Louis Berger International, Inc., 1990-1992

Notions Technique de Base, Systeme Hydraulique, Diagnostic et Depannage, Louis Berger International, Inc, Janvier, 1991

Guide d'Inventaire, d'Inspection et de Diagnostic de l' Atelier Central, Louis Berger International, Inc., Mars, 1991

Guide d'Inventaire, d'Inspection et de Diagnostic de la Direction du Materiel, Louis Berger International, Inc., Mai, 1991

Cours d'Electricite Automobile, Louis Berger International, Inc., 1991

Rapport de Mission, Section Electricite Automobile, Louis Berger International, Inc., Mai, 1991

Rapport de fin de Mission, Atelier Central OFNAR, Louis Berger International, Inc., Septembre, 1991

Expertise du Materiel de l'Agence OFNAR de N'Djamena, Louis Berger International, Inc., Octobre, 1991

Plan d'Action Informatique, Louis Berger International, Inc., Novembre, 1991

Systeme de Gestion du Materiel a l'Agence de N'Djamena, Actions Prioritaires, Louis Berger International, Inc., Novembre, 1991

Compte Rendu de l'Inspection du Materiel ARN, Louis Berger International, Inc., Decembre, 1991

Systeme de Gestion a l'Atelier Central, Actions Prioritaires, Louis Berger International, Inc., Decembre, 1991

Contrat-Programme entre la Direction des Routes et l'OFNAR pour l'annee 1991-1992

Other Documents

Report and Recommendation of the President to the Executive Directors on a Proposed Development Credit to the Republic of Chad for a Highway Maintenance Project, International Development Association (IDA), June, 1986

Development Credit Agreement (Highway Maintenance Project) between the Republic of Chad and the International Development Association, August, 1986

Rapport d'Evaluation, Projet de Rehabilitation et d'Entretien Routier, Republique du Tchad, Fonds Africain de Development, Septembre, 1987

Etude de Reorganization de l'Office National des Routes, Louis Berger International, Inc., Rapport de Premiere Phase, Janvier, 1988

Etude de Reorganization de l'Office National des Routes, Louis Berger International, Inc., Volume 2: Plan de Formation, Juillet, 1988

Staff Appraisal Report, Road Reconstruction Project, Republic of Chad, the World Bank, March, 1988

Report and Recommendation of the President to the Executive Directors on a Proposed Development Credit to the Republic of Chad for a Road Reconstruction Project, International Development Association (IDA), March, 1988

Development Credit Agreement (Road Reconstruction Project) between the Republic of Chad and the International Development Association, July, 1988

Follow-up Meeting on the Geneva Round Table of December 1985, Transport Sector, February, 1988:

Volume 1 Presentation of the Strategy and of the Development Program for 1988-1993

Volume 2 Appendices

Reunion de Suivi de la Conference de Geneve Sur le Secteur Transports, Process Verbal, 2 Mars, 1988

Projet Sectoriel des Transports, Mission de Pre-evaluation de l'IDA, Aide- Memoire, Fevrier, 1988

Projet d'Ajustement Sectoriel des Transports (PASET), Aide Memoire de la Mission d'Evaluation, Novembre, 1988

Report and Recommendation of the President of the International Development Association to the Executive Directors on a Proposed Development Credit to the Republic of Chad for a Transport Sector Adjustment/Investment Project, January, 1989

Proces Verbal des Negociations entre la Republique du Tchad et l'Association Internationale de Development, Concernant un Credit pour le Projet d'Ajustement Sectoriel des Transports (PASET), Mars, 1989

Development Credit Agreement (Transport Sector Credit) between the Republic of Chad and the International Development Association, 1989

Projet Entretien Routier, Republique du Tchad, Missions de Supervision de la Banque Mondiale, 1988-1990

Projet d'Ajustement Sectoriel des Transports du Tchad (PASET), Missions de Supervision de la Banque Mondiale, 1989-1991

The Role of Contractors in Maintenance of Highways in Developing Countries and Promotion of Medium-Size Contractors, January, 1989

Developing Domestic Contractors for Road Maintenance in Africa, The World Bank and the Economic Commission for Africa, December, 1990

Plan d'Action pour la Promotion des Petites et Moyennes Entreprises Tchadiennes du Secteur Prive pour l'Entretien Routier, PASET, OFNAR, Octobre, 1990

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Appendix 3

LIST OF PERSONS CONTACTED

The persons and agencies contacted by the SRMP Evaluation Study Team to obtain information include the following:

Ministry of Public Works and Transport

Mr. Nakoye Nana, Director General
Mr. Ahmed Nene Tassi, Coordinator, Transport Sector Projects
Mr. Bamboh Elvam, Director, Roads
Mr. Gnavourbe, Chief, Road Maintenance Division
Mr. Nade Ribar, Chief, Contracting Division
Mr. Michel Herve, Coordinating Engineer (PASET)
Mr. Henri-Jose Rendu, Training Coordinator (PASET)

Office National des Routes (OFNAR)

Mr. Daoussa Deby, Director General

Mr. Ndimangar Eloi, Director, Works
Mr. Jean-Louis Lepaysan, Advisor, Works Directorate (PASET)
Mr. Dakour Kadi, Chief, N'Djamena Regional Agency (ARN)
Mr. Ernest Ngaradrone, Chief, ARN Works Section
Mr. Asdongar Ngaoudarang, Chief, ARN Workshop Section
Mr. Dana Nandiguimbaye, ARN Storekeeper
Mr. Tordina Guidaossou, Chief, Programming & Control Service
Mr. Bernard Gennet, Advisor, Programming & Control Serv. (PASET)
Mr. Gossadina Djoinata, Chief, SMC Administration Service
Mr. Claude Blanchard, Advisor, SMC Administration Service (PASET)

Mr. George Rols, Director, Equipment (PASET)
Mr. Nang-Yadji Bouloidal, Chief, Central Workshop
Mr. Semgadi Abaram, Chief, Engine Section, Central Workshop
Mr. N. Djecole, Chief, Equipment Section, Central Workshop

Mr. Abouna Oumar, Director, Administration and Finance
Mr. Djimet Ahmat, Chief, Finance Service

Laboratoire National du Batiment et des Travaux Publics (LNBTP)

Mr. Jamal Ali, Director
Mr. Djibia Depitsa, Chief, Roads Service

United States Agency for International Development (USAID)/Chad

Mr. Bernard D. Wilder, AID Representative

Ms. Carole Palma, Assistant AID Representative
Ms. Susan Alexander, Project Development Officer
Mr. Samir Zoghby, General Development Officer/T
Mr. Paul Morris, Program Economist
Mr. Tridib Mukherjee, Agricultural Development Officer
Mr. Son Nguyen, Project Manager
Ms. Virginia Payne, Population Advisor
Mr. Rolland Deschambault, Controller (acting)
Ms. Jerry Penno, Executive Officer
Ms. Betty Morris, Personnel Officer
Ms. Debi Mukherjee, CR&S Director
Ms. Kim Skotzko, Operations Director
Mr. Jean Patrick Rene, Systems Manager
Mr. Bijan Yazdani, Budget and Fiscal Specialist

United States Embassy, Chad

Mr. Richard W. Bogosian, U.S. Ambassador to Chad
Mr. Jon R. Myers, Security Officer

Agency for International Development (AID)/Washington

Mr. William Saulters, Chad Desk Officer

The World Bank

Mr. Amadou Cisse, Chief Transport Engineer

United Nations Development Program (UNDP)

Mr. Emmanuel De Casterlay, Chad Representative

Louis Berger International, Inc.

Mr. Rene Cousin, Project Manager, SRMP (Home Office)
Mr. George Gendarme, Chief of Party, SRMP
Mr. Reginald Murphy, Financial and Procurement Advisor
Mr. Needham Herring, Road Maintenance Engineer
Mr. Maurice Noir, Field Operations Advisor
Mr. Christian Touzet, Field Mechanic Advisor
Mr. Rene Darries, Shop Superintendent
Mr. Bernard Rayer, Engine Foreman
Mr. Christian Evrard, Electrical Specialist
Mr. Robert Revel, Accounting Advisor to OFNAR

AIC Progetti

Mr. Alessandro Mucchino, Administrator, Chad

Groupement Professionnel des Transporteurs Routiers du Tchad

Mr. Djibangar Madjirebaye, Director General

Aziz Dieye s.a.r.l. (Coopers and Lybrand)

Mr. Abdoulaye Ndoye, Accountant
Ms. Monique Ndiaye, Accountant
Mr. Paul Ndiaye, Accountant
Mr. Abdel Kader Fall, Accountant

Agricultural Cooperative Development International

Mr. John W. Smith, Chief of Party, Chad

Volunteers for International Technical Assistance (VITA)

Mr. Iven L. Ose, Director, Chad
Mr. Ngarkiti, Loan Officer

Development Alternatives, Inc.

Mr. Rodger Poulin, Chief of Party, Agricultural Marketing Project
Mr. Giovani Caprio, Senior Economist
Mr. David Kingsbury, Agricultural Economist

Other Persons Contacted

Mr. Rolf-Dieter Muller, Economist, GTZ Consultant
Mr. E. Buttner, Engineer, GTZ Consultant
Ms. Kerry Pelzman, Health Consultant, USAID

Appendix 4

STRENGTHENING ROAD MAINTENANCE PROJECT EVALUATION STUDY

(May 1988)

EXECUTIVE SUMMARY

1. Introduction

The evaluation of the Strengthening Road Maintenance Project (SRMP) was initiated by the Mission of the United States Agency for International Development in Chad (USAID/Chad) and was performed by Parsons Brinckerhoff International, Inc. (PBI). The Evaluation Study Final Report was completed in May 1988.

2. Purpose and Objectives of the SRMP

The stated goal of the SRMP is to maintain the road network throughout Chad; the stated purpose of the SRMP is to assist the Government of Chad (GOC) in developing a technically competent and financially responsible organization for the maintenance of Chad's road network; the stated objectives of the SRMP are that, at the end of its five-year term, the Office National des Routes (OFNAR) will be capable of regularly maintaining, with its own personnel and equipment, 1,600 kilometers (km) of roads and of financing 50% of its recurrent costs.

The major elements of assistance in the Project are technical assistance of eleven expatriates for institutional development, rehabilitating and equipping workshop facilities and training personnel in equipment maintenance, equipping and training a road maintenance brigade, rehabilitating the 63 km Djermaya-Dandi Road, and operational support.

The technical assistance personnel provided under the SRMP includes a Senior Advisor to OFNAR's Director, under a personal services contract, and ten specialists provided under a contract with Gannett Fleming Transportation Engineers, Inc. (GFTE) (Planning Engineer, Field Engineer, Accountant Advisor, Brigade Foreman, Equipment Foreman, Shop Superintendent, Parts Specialist, Engine Foreman, Service Foreman.)

3. Purpose and Methodology of the Evaluation

The purpose of this mid-term evaluation is to determine the progress made towards developing a technically competent and financially responsible road maintenance organization in Chad, determine the effectiveness of the technical assistance (TA) contractor, determine whether the SRMP's purpose and objectives are still relevant, and recommend actions to be taken to improve project performance and achieve project objectives.

The evaluation study was conducted by a four-person team assigned by PBI, in collaboration with a financial management specialist assigned by USAID/Chad. The evaluation findings were based on reviews of some five thousand pages of documents, interviews and discussions with more than 60 persons, and dozens of visits to project sites.

4. Findings and Conclusions

The SRMP has assisted in the rehabilitation of some 49 units of heavy equipment and trucks, in the rehabilitation and equipping of OFNAR's central administrative buildings and workshops, and in the establishment of a road maintenance training brigade. These achievements have increased OFNAR's material resources for equipment and road maintenance.

In the area of institutional development, the technical assistance team has introduced certain systems and procedures for the operation and management of the Central Workshop, inventory control, road maintenance planning, and accounting and financial management. Moreover, the technical assistance team is training a staff of 56 in the Central Workshop, 33 persons assigned to the Training Brigade, and other managers and employees of OFNAR. Overall, however, progress toward institutional development has been limited, and the systems established are fragile.

Other international organizations, such as the World Bank, the European Development Fund (EDF), and the African Development Fund (ADF), are also financing (or will finance in the near future) road maintenance projects in Chad. The World Bank has also financed a reorganization study of OFNAR; the likely recommendations of this study would be that a separate organization should be established for the collection of fuel taxes, and that OFNAR should establish separate directorates for road maintenance and for equipment maintenance.

5. Recommendations

In order to improve the effectiveness of the technical assistance, accelerate institutional development, and take into account the operations of other donors, it is recommended that the SRMP:

- continues the technical assistance and support to the Central Workshop, emphasizing training and establishment of appropriate systems and procedures;
- increases the technical assistance provided to the N'Djamena Subdivision;
- continues and systematizes the training function of the Training Brigade until the training of at least two groups of field personnel; and
- streamlines the technical assistance provided to OFNAR's senior management and to the Programming and Financial Divisions to focus on project related aspects.

It is also recommended that the equipment of the Training Brigade and the last group of trained personnel remain in the N'Djamena Subdivision and form two road maintenance brigades. Finally, OFNAR should develop capabilities for the maintenance of paved roads and of bridges.

These recommendations will necessitate some changes in the technical assistance team, as follows:

- Senior Advisor to OFNAR's Director and Planning Engineer: Eliminate these two positions and create a position of Chief of Party/Project Manager. The responsibilities of this new position will include: Management of the technical assistance team; planning, budgeting and coordination of the SRMP; and advising OFNAR's senior management on Project matters. This position should continue through March or June 1990.

- Field Engineer: This existing position should be modified to emphasize advising the N'Djamena Subdivision on road maintenance, including work performed by the Subdivision's Brigades and the Training Brigade. This position should continue through December 1989 (and be renamed Road Maintenance Engineer).

- Accountant Advisor: Continue this position through December 1989, in order to establish a cost accounting and a double entry accounting system for the SRMP and improve its budgeting and payment procedures.

- Brigade Foreman and Equipment Foreman: Continue these two positions through August 1989. An experienced field mechanic should also be assigned to the Training Brigade to ensure the proper maintenance of its some 24 units of heavy equipment and trucks worth about US$3,000,000. He can be Chadian, if available, or an expatriate/third country national.

- Shop Superintendent Advisor: Continue this position through March 1990. His responsibilities should include establishment of efficient workshop management systems.

- Spare Parts Specialist: Continue this critical position through December 1989, in order to improve the efficiency and the accuracy of the inventory control system, and train personnel.

- Engine Foreman: Continue this position through December 1989, and increase his responsibilities to include the Heavy Equipment and possibly the Electrical Section. Rename this position Engine and Heavy Equipment Specialist.

- Machine Shop Foreman: Continue this position through March 1989, to train machinists in the use of the newly arrived machine shop equipment.

- Service Foreman: Modify this position. His responsibilities should be (a) to assist in the repair of heavy trucks and light vehicles in the Central Workshop (20% of time) and (b) to assist and train personnel in small repairs and preventative maintenance done at the N'Djamena Subdivision Workshop and in the field (80% of time). Continue this position through December 1989.

- Short-term Specialists: These will assist the technical assistance team and could include: a computer specialist to assist in the introduction of computer based systems; a training specialist to assist in the systematization of ongoing training programs; a procurement specialist to improve the SRMP supply and procurement system; an electrician to train the personnel of the Central Workshop's Electrical Section; and others. Total duration: about 12-18 person-months.

- The technical assistance team should also be supported by a qualified Chadian Procurement Assistant to expedite customs clearance and delivery of off-shore procured items, as well as parts and supplies procured locally, and by one or more qualified Chadian Administrative Assistant(s).

The above recommendations are based on the assumption that technical assistance to the Subdivisions of Sarh, Moundou and Mongo will continue to be provided by others; and that after completion of OFNAR's

Reorganization Study, others will provide technical assistance to implement the reorganization, institute planning of routine maintenance of the entire national road network, establish a country-wide program of preventative equipment maintenance improve the overall procurement system, and strengthen financial management.

If USAID and other donors decide to focus their assistance along functional areas rather than geographically, the SRMP could focus on equipment maintenance and could undertake the establishment of a country-wide equipment management and preventative maintenance system, while other donors would assist OFNAR with road maintenance. In this case, the SRMP should provide additional technical assistance for equipment maintenance in the other Subdivisions, and the position of Field Engineer would be eliminated.

6. Lessons Learned

The principal lessons learned from the mid-term evaluation of the SRMP are:

- Procurement of equipment and tools should be started well in advance of the arrival of technical assistance teams, to avoid project delays and waste of technical assistance time.
- Project implementation schedules should be realistic.
- Large, long-term technical assistance teams should be led by a Project Manager and be supported by short-term specialists.
- On institutional development projects, the main role of technical assistance personnel should be to develop systems and procedures and train national personnel, rather than assume operational roles.
- Key long-term technical assistance positions should preferably be staffed with a firm's permanent personnel.

Appendix 5

PROJECT SUMMARY - LOGICAL FRAMEWORK

Project Title & Number: STRENGTHENING ROAD MAINTENANCE 677-0050

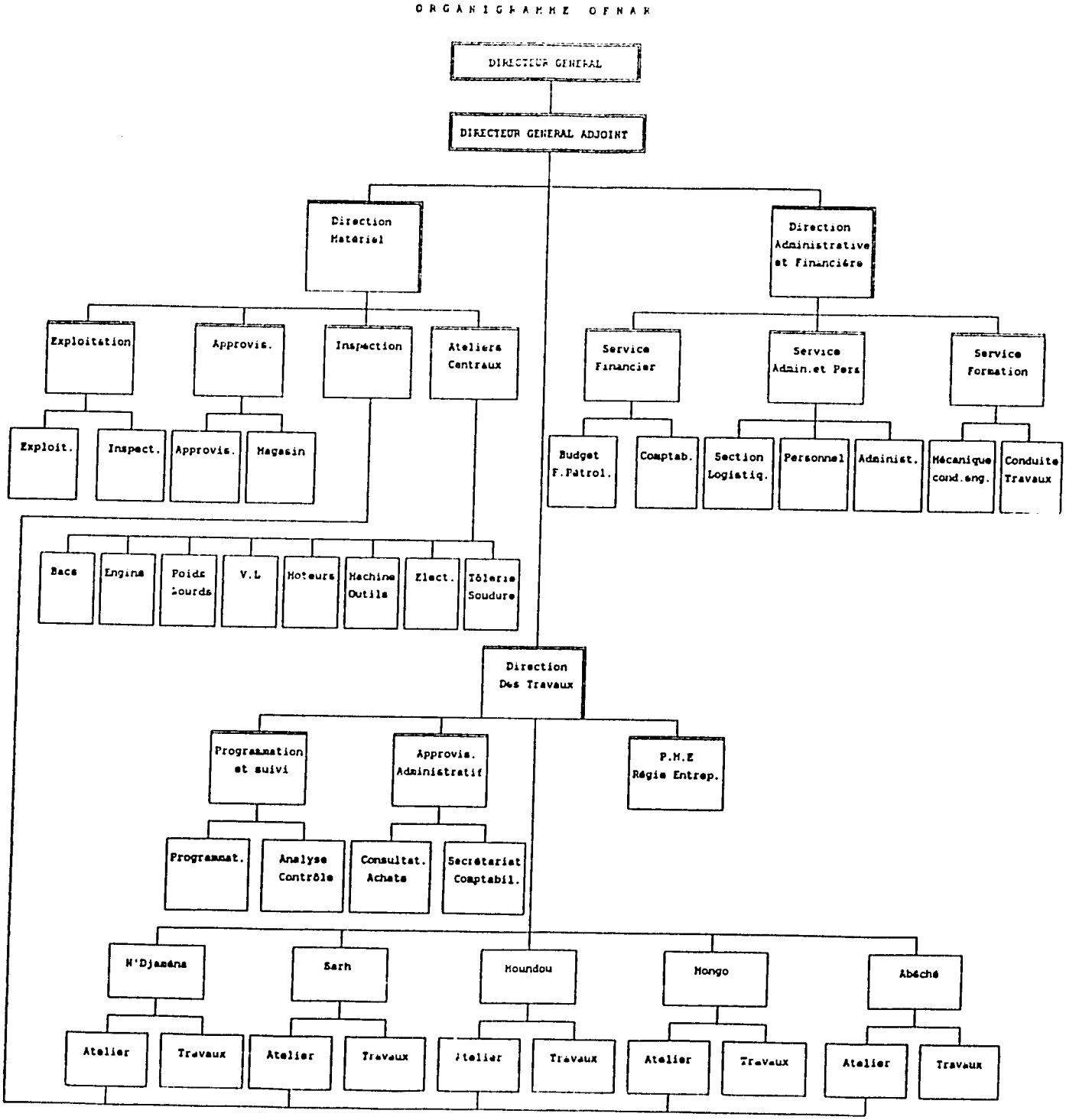
LOP from FY 85 through FY 93
Total US Funding $33.1 Million
Date prepared - February 1992

NARRATIVE SUMMARY	VERIFIABLE INDICATORS	MEANS OF VERIFICATION	ASSUMPTION
Program Goal: To maintain the road network throughout Chad	**Measures of Goal Achievement** 1. Increased total volume vehicular traffic on rehabilitated and maintained roads. 2. Increased volume of agricultural production and ag inputs carried on the road network. 3 Increased longevity of road network. 4. Reduced vehicle operating costs	1. Records of OFNAR and Ministry of Public Works. 2. Other published statistics of the GOC.	1. Absence of sustained armed conflicts. 2. Continuation of efforts toward national unity. 3. Increased economic activity generated over life of project
Project Purpose: To develop a technically competent and financially responsible organization for the maintenance of the road network in Chad	**Conditions that Indicate Purpose Has Been Achieved:** 1. OFNAR road maintenance crews regularly maintaining 750 km. of roads in ARN. 2. OFNAR central workshop regularly maintaining OFNAR equipment in good operating condition. 3 OFNAR assumes 70% of project-related recurrent costs	1. Project evaluations. 2. Ministry of Public Works and OFNAR records. 3. Project reports.	1. Resources allocated by the GOC, supplemented by donor contributions, are adequate to support the growing costs of road maintenance.
Outputs: 1 Fully trained local staff managing OFNAR. 2. Road maintenance crews functioning and supported by OFNAR capable of accomplishing road maintenance. 3. Central and ARN Workshops equipped and operating to repair and maintain equipment and vehicles. 4 Road between Djermaya and Dandi rehabilitated.	**Magnitude of Outputs:** 1. Trained personnel: - 50 Mechanics and Shop Technicians - 42 Operators - 18 Supervisors and Managers 2. Trained maintenance crews in field all year, maintaining 750 km of roads in ARN. 3 Central and ARN Workshops maintaining OFNAR equipment. 4. 66 km. of road.	1. Evaluations. 2. Site Inspections. 3. Contractor reports. 4. OFNAR records and reports.	**Technical Assistance:** 1. Contractor has operational responsibility for road maintenance training and for Central Workshop operations, under OFNAR direction. 2. Chad transport economy remains open to private sector initiatives. 3. Adequate staff in terms of quality and numbers is furnished to OFNAR.
Inputs; Activities and Types of Resources: 1. Technical Assistance 2. Commodities 3. Road and Facilities Rehab 4 OFNAR Operations 5 Audits and Evaluations	Level of Effort ($000): U.S. / GOC 11,191 / - 7,726 / - 6,990 / - 6,889 / 5,144 309 / - Total 33,105 / 5144	1. Contract quarterly reports. 2. Project quarterly reports. 3. USAID Controller records.	1. Suitable US personnel available with acceptable language capability. 2. GOC can furnish adequate candidates for training.

Note: ARN = N'Djamena Regional Agency of OFNAR
Source: USAID/Chad

Appendix 6

OFNAR ORGANIZATION



Appendix 7

ROAD MAINTENANCE PLANNING

Road maintenance planning is officially the responsibility of the Road Maintenance Division of the Directorate of Roads, Ministry of Public Works and Transport. The Maintenance Division consists of two Sub-Divisions: Contract Programming and Road Management.

The Contract Programming Sub-Division is nominally responsible for programming and contracting out the maintenance work (for example to OFNAR or private contractors). To date, this Sub-Division does not have the capability to prepare road maintenance programs; it only directs OFNAR to maintain the priority road sections agreed upon under the PASET.

The Road Management Sub-Division has initiated, with assistance from the PASET Consultant, a road inventory program. The inventory data base covers some 8,600 km of primary roads, indicating their main characteristics. For about 2,200 km of rehabilitated roads the data base also indicates their surface condition, based on visual inspections conducted twice a year, one before and one after the rainy season.

The Road Management Sub-Division is responsible for traffic counts and forecasts. In practice, traffic counts are performed by OFNAR, with this Sub-Division processing the collected traffic data. The most recent traffic counts were performed in April and December 1991, over one week periods. To date, the road inventory and traffic counts are not utilized for road maintenance planning. Apparently there are no data on truck axle weights.

The programs for the annual road maintenance are prepared by the Programming and Control Service of OFNAR's Works Directorate, in coordination with the its Regional Agencies. These programs stipulate the road sections to be maintained in each Agency, type of work to be performed, time schedule and resources to be employed. These programs form the basis for the preparation of OFNAR's budget for each Agency. These programs and budgets are then reviewed and approved by the Directorate of Roads. (See the 1991-1992 Work Program, at the end of this Appendix.)

Each year, an agreement (Contrat-Programme) is entered into between the Directorate of Roads and OFNAR for the execution of the annual road maintenance program, which is performed during the dry season from mid-September to the end of June. The agreement also provides for OFNAR to operate rain barriers, conduct traffic counts, provide logistical assistance to the Regional Delegations of the Directorate of Roads, and improve the cost accounting system. The road maintenance programs are executed by OFNAR's Regional Agencies under the direction of its Works Directorate.

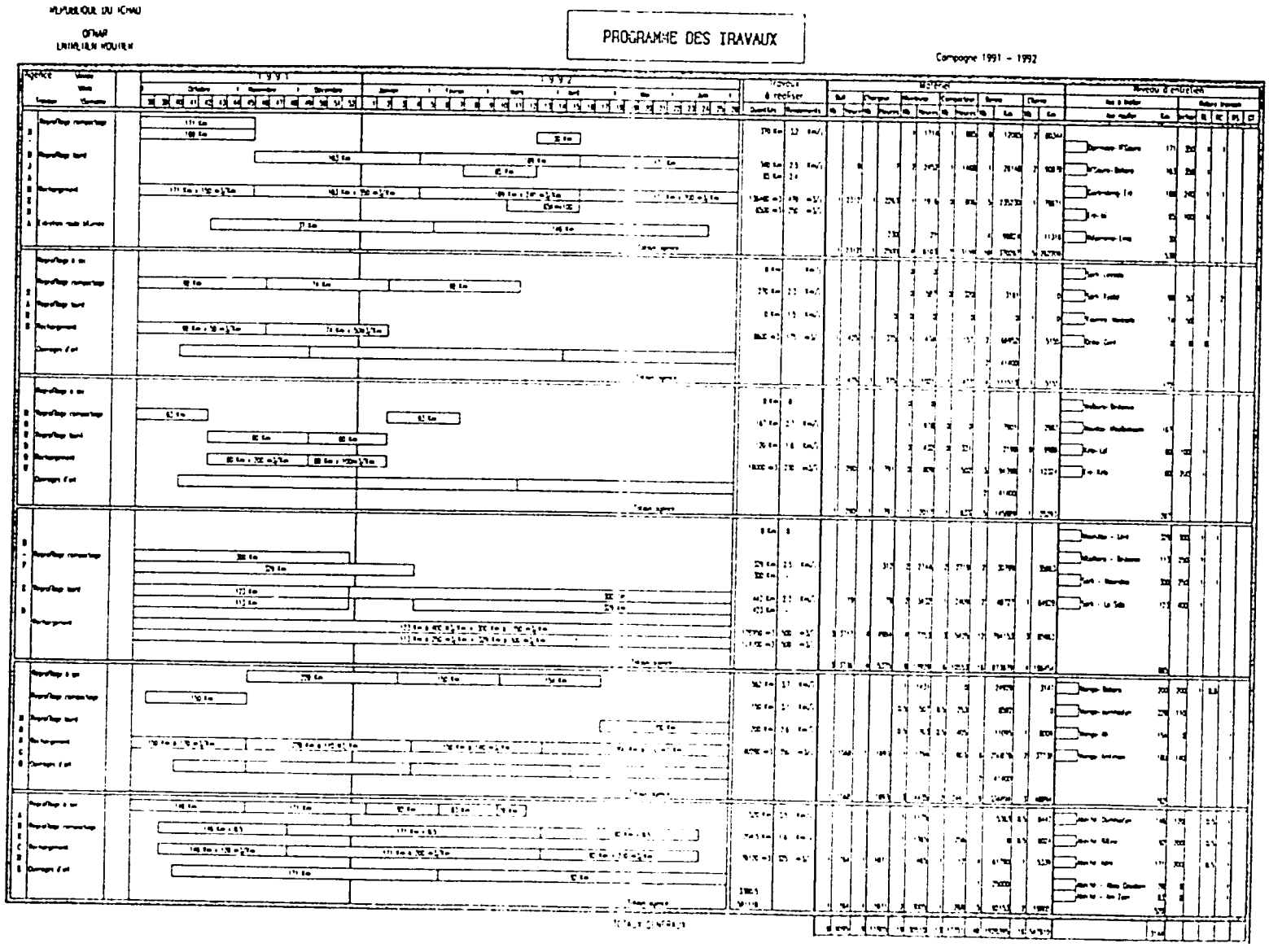
It is recommended that efforts to develop the road maintenance planning, programming and control capabilities of the Directorate of Roads and OFNAR should be continued and augmented.

Traffic surveys (24-hour, 7-day) should be conducted at least four times a year to determine seasonal variations. More frequent surveys should be conducted at selected locations on paved roads. An axle weighing program should be initiated to supplement traffic counts of heavy vehicles.

The road inventory, traffic survey and axle weighing programs of the Road Management Sub-Division should be geared towards development of a planning tool for determining optimum road investment and maintenance policies.

Appendix 7 (Continued)

1991-1992 WORK PROGRAM



Appendix 8

EQUIPMENT RELIABILITY INDEX

INDICE DE FIABILITE

Indice de Fiabilité	Etat du Matériel	Taux de Panne %	Action à Entreprendre	Niveau de Répa-ration	Niveau d'Inter-vention
5 Excellent	Matériel neuf	5 à 7	Ce matériel neuf nécessite un entretien préventif tel que décrit dans le manuel. C'est l'ensemble des opérations programmées dans l'entretien courant ou les petites réparations. La durée de ces opérations n'excède pas 3 hommes/heures.	1	En règle essentiellement (chantiers)
4 Bon	Matériel en très bon état	7 à 15	Aux opérations d'entretien préventif normales que doit subir ce matériel s'ajouteront des opérations de dépannage ou de petites réparations n'excédant pas 5 hommes/heures. Exemple : courroies, durites flexibles, petits travaux de soudure. La moitié du potentiel d'utilisation du matériel est atteint.	2	En règle essentiellement (chantiers)
3 Moyen	Matériel en état	15 à 20	L'intervention nécessite un arrêt de la machine pour une durée allant de 50 à 100 heures. Les opérations portent en général sur les échanges d'ensemble et sur les petites réparations des sous-ensembles. Par exemple : soudure, remplacement de pièce d'usure, électricité, dépannage... Moins de trois quart du potentiel d'utilisation a été atteint.	3	En règle essentiellement (Chantiers et concessionnel si nécessaire).
2 Pauvre	Matériel en mauvais état. Taux élevé de pannes	20 à 30	Le matériel a un taux élevé de pannes et nécessite de grosses réparations ou révision d'ensemble allant de 100 à 200 heures. Le matériel subit une grosse réparation impliquant un sous-ensemble (transmission, moteur, pont, système hydraulique). 3/4 du potentiel d'utilisation a été dépassé.	4	Essentiellement chez le Concessionnaire.
1 Très pauvre	Matériel en mauvais état	la panne	Le matériel est en panne et doit subir une révision générale, qui dépasse 500 hommes/heures. Ceci consiste en général en grosses réparations complètes démontage, inspection et reconditionnement de tous les ensembles importants. Le matériel a dépassé son potentiel d'utilisation.	5	Concessionnaire
0 Réforme	Matériel en très mauvais état	Non réparable	Proposé à la réforme sauf cas spéciaux (exemples matériel accidenté) ou récupération.		

Appendix 9

EQUIPMENT INVENTORY MANAGEMENT

OFNAR's Equipment Directorate is responsible for managing and maintaining an inventory of some 300 equipment units - 85 units of earthworks equipment, 105 trucks and other transport equipment, 4 units of asphalt pavement maintenance equipment, 76 units of miscellaneous production equipment and 30 units of field support equipment. A list of OFNAR's equipment inventory is shown at the end of this Appendix. (The inventory also includes obsolete or inoperable units, several of which have been "assigned" to the N'Djamena Regional Agency.)

The replacement value of OFNAR's equipment is estimated at about CFAF 5 billion. OFNAR, with donor financing, is in the process of receiving or plans to order some 70 equipment units in 1992, valued at about CFAF 860 million.

Most earthworks equipment is Caterpillar, and trucks are Mercedes and Renault, except for some old Berliet trucks.

The average age of OFNAR's existing equipment is estimated to be about seven years, out of an average useful life of eight years. At any one time, only about half of OFNAR's equipment is considered programmable (i.e. serviceable or operational), the other half requiring repairs or being beyond repair.

The prevailing approach at OFNAR appears to be to keep repairing aged equipment rather than scrapping it. This tendency is reinforced by an endemic lack of resources and a reluctance among managers to assume responsibility for ordering the removal of equipment from the inventory.

Very old equipment, subject to frequent breakdowns, contributes very little to production, while hindering the productivity of other units. Upkeeping it, is also a growing burden on OFNAR's equipment maintenance facilities, personnel and financial resources. The Equipment Directorate should start a program of retiring old or unserviceable equipment. It should also develop a plan of action for the acquisition of replacement or additional units, based on the requirements of anticipated road maintenance activities, including maintenance of paved roads.

Appendix 9 (Continued)

EQUIPMENT INVENTORY

OFNAR

*** REPARTITION DES MATERIELS PAR CENTRE D'AFFECTATION ***

RMREPPGD 24-nov-1991

NATURE DES MATERIELS	AFFECTATION ateliers centraux	agences NDJAMENA	ABECHE	MOKGO	SARH	MOUNDOU	FED	TOTAL
TRACTEURS A CHAINES	5	1	1	2	1	1	3	14
CHARGEURS SUR PNEUS	2	1	2	1	2	4	1	13
CHARGEURS SUR CHENILLES	0	0	0	1	1	0	0	2
TRACTOPELLE DE CHANTIER	1	2	0	1	0	1	0	5
NIVELEUSES AUTOMOTRICES	3	8	1	4	3	3	6	28
COMPACTEURS AUTOMOTEURS	1	4	1	2	1	2	4	15
COMPACT VIBRANTS A BILLE LISSE	0	2	0	0	0	0	0	2
PIEDS DE MOUTON VIB TRACTES	0	2	0	0	0	0	0	2
PIEDS DE MOUTON TRACTES	0	2	0	0	0	0	0	2
MALAXEURS DE CHAUSSEE AUTOMOTEUR	0	2	0	0	0	0	0	2
* * * MATERIEL DE TERRASSEMENT TOTAL * * *	12	24	5	11	8	11	14	85
CAMIONS BENNES DE 7 M3	1	10	4	8	0	0	12	35
CAMIONS BENNES DE 5 M3	0	6	2	1	6	6	0	21
CAMIONS CITERNE A EAU	0	8	2	4	2	3	4	23
CAMIONS TRACTEURS ROUTIER	1	3	1	1	1	0	2	9
REMORQUES PORTE-ENGINS	1	3	1	3	0	0	2	10
SEMI REMORQUES CITERNES	1	2	0	1	2	1	0	7
* * * MATERIEL DE TRANSPORT TOTAL * * *	4	32	10	18	11	10	20	105
CAMION EPANDEUR POINT A TEMPS	0	2	0	0	0	0	0	2
FONDOIR A LIANT TRACTE	0	1	0	0	0	0	0	1
MALAXEUR MOBILE DE BITUME	0	1	0	0	0	0	0	1
* * * MATERIEL DE NOIR TOTAL * * *	0	4	0	0	0	0	0	4
BETONNIERES	0	2	0	1	0	1	0	4
PENNES AUTOMOTRICES DE CHANTIER	1	0	0	0	0	0	0	1
PILONNEUSES VIBRANTES MANUELLES	1	0	0	0	0	0	0	1
ELEVATEUR AUTOMOTEUR	1	0	0	0	0	0	0	1
POMPES AUTOMOTRICES	0	12	4	3	2	7	5	33
GROUPES ELECTROGENES	4	9	0	4	0	1	0	18
BALAYEUSES TRACTEES	0	1	0	0	0	0	0	1
TRACTEURS AGRICOLES	0	3	1	0	0	0	0	4
COMPRESSEUR MOBILE DE CHANTIER	1	0	0	0	0	0	0	1
GRAVILLONNEUR	0	1	0	0	0	0	0	1
COMPACTEURS VIBRANTS MANUELS	3	3	1	1	1	1	0	10
MALAXEURS AUTOMOTEURS MANUELS	1	0	0	0	0	0	0	1
* * * MATERIEL DIVERS TOTAL * * *	12	31	6	9	3	10	5	76
CAMIONS D'ENTRETIEN	0	1	0	0	0	0	2	3
CAMIONS ATELIER	1	1	0	0	0	1	0	3
CAMIONS DE DEPANNAGE	1	0	0	0	0	1	0	2
CAMIONS CITERNES A GASOIL	0	1	0	0	0	0	0	1
[illegible]	.	.	.	.	.	.	.	.
CITERNE A EAU TRACTEE	0	1	3	1	2	1	1	12
CITERNES A CARBURANT TRACTEES	0	1	0	2	2	2	0	7
* * * MATERIEL DE SERVITUDE TOTAL * * *	3	6	3	3	4	8	3	30
** TOTAL GENERAL **	31	97	24	41	26	39	42	300

Appendix 10

PROCUREMENT PROCESS

The typical process for procuring spare parts for the SRMP involves the following steps:

1. The ARN/Central Workshop submit requests for the supply of spare parts to the Equipment Directorate.

2. The Equipment Directorate transmits the supply requests to the Central Warehouse.

3. If the spare parts are not in stock, the Central Warehouse transmits the request to the Procurement Service.

4. The Procurement Service requests bids from suppliers.

5. Suppliers submit closed-envelope bids to the Procurement Service.

6. A special commission, which meets about twice a month, opens the bids and awards the contract to the lowest bidder. This commission includes representatives of OFNAR (Director General's Office, Equipment Directorate, Works Directorate, Administration and Finance Directorate) and one or two TA team members.

7. A proforma of the accepted bid is transmitted to USAID for approval by the Project Manager.

8. The approved proforma is returned to OFNAR.

9. An order voucher is prepared by the Procurement Service and transmitted for signature to the Equipment Director, the TA Contractor Financial Advisor, the TA Contractor Shop Superintendent, the USAID Project Manager, the Director of Administration and Finance, and the Director General.

10. The order is given by the Procurement Service to the supplier for execution.

11. The supplier delivers the parts to the Central Warehouse, which checks the delivery.

12. The Central Warehouse delivers the parts to the Central Workshop or the ARN Workshop.

13. The supplier submits its invoice to the Procurement Service.

14. The Procurement Service checks the invoice for correctness, prepares the payment voucher and transmits it to the Director of Equipment.

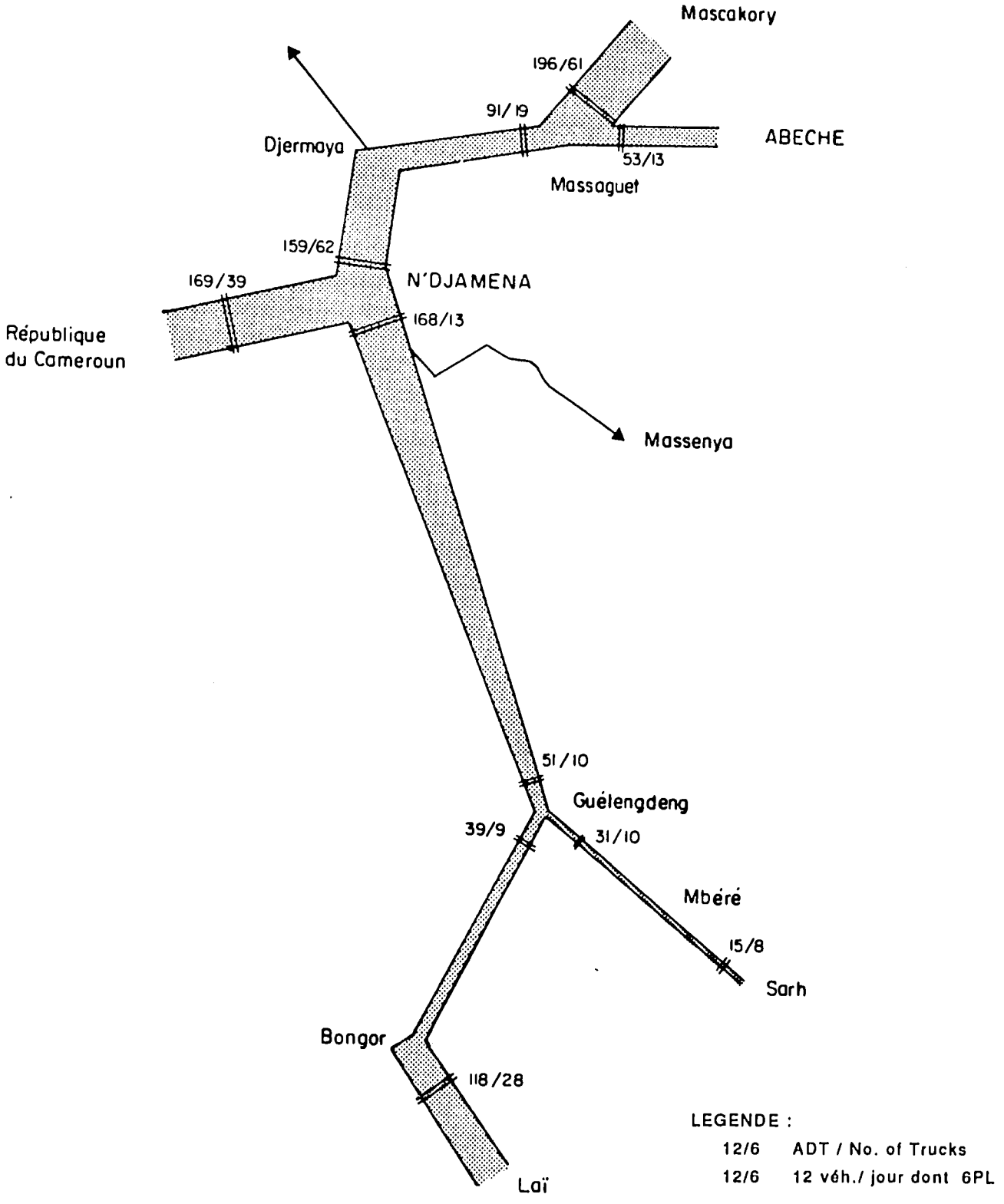
15. The Director of Equipment approves payment and transmits the payment voucher to the Directorate of Finance and Administration.

16. The Directorate of Finance and Administration processes the payment to the supplier.

APPENDIX 11 - TRAFFIC COUNTS, 1 OF 2

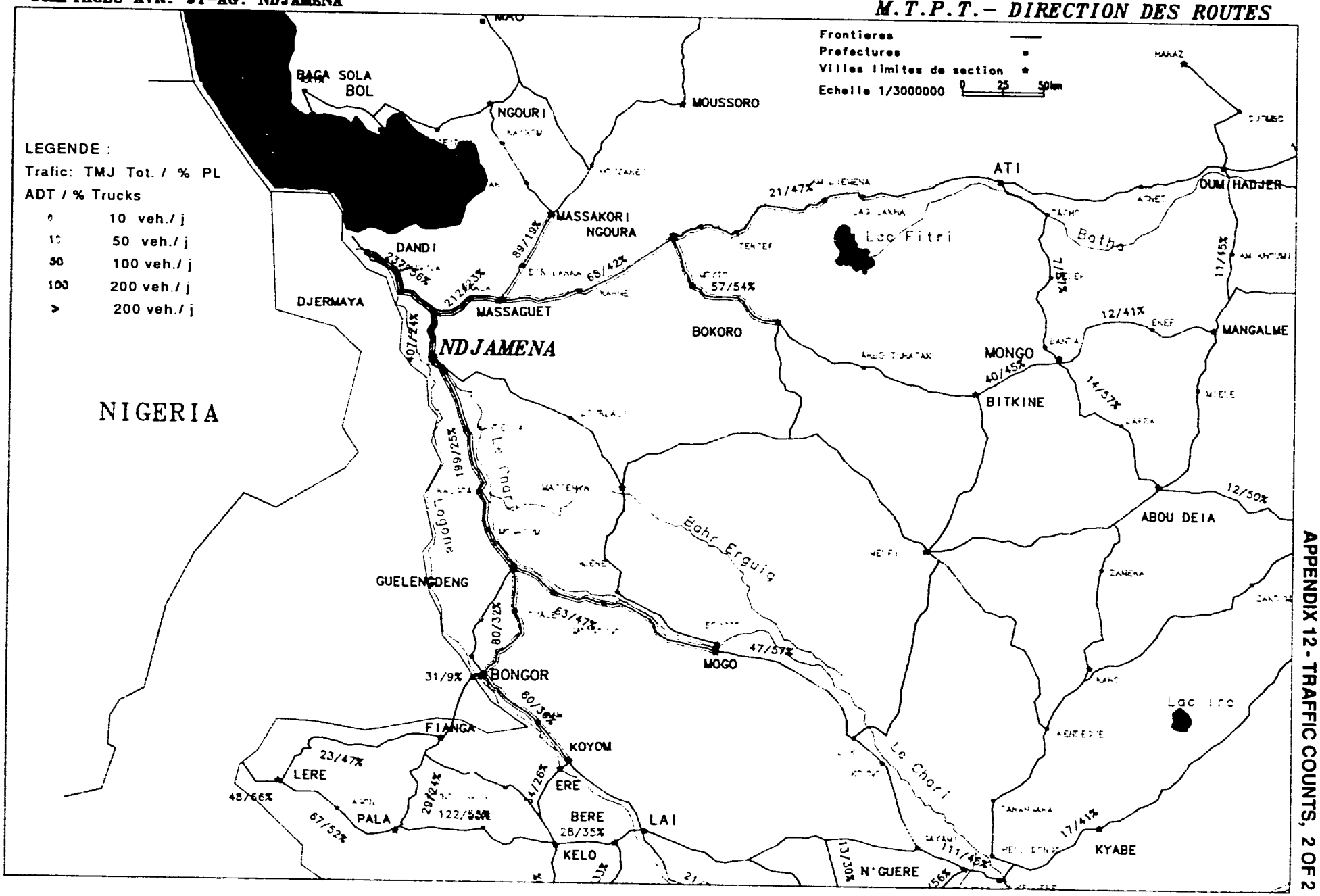
CAMPAGNE DE COMPTAGES ROUTIERS _ Octobre 1987

Trafic moyen journalier relevé



COMPTAGES AVR. 91-AG. NDJAMENA

M.T.P.T.- DIRECTION DES ROUTES



APPENDIX 12 - TRAFFIC COUNTS, 2 OF 2

Appendix 12

ECONOMIC AND SOCIAL PROJECT EVALUATIONS

It has been suggested that in addition to calculating a project's economic rates of return, which are limited to efficiency considerations and take the existing income distribution as given, social rates of return be calculated, which take account of the impact of the project on the distribution of income both between investment and consumption and between different income levels (Squire and Van der Tak, "Economic Analysis of Projects", 1975). This analysis involves assigning weights to costs and benefits of the project that accrue in different forms (consumption or investment) to different beneficiaries (rich or poor).

In practice, social rates of return have not been used on any significant scale in the appraisal of transport projects because of a number of political, economic, and technical considerations.

First it could be argued that a country's income distribution is essentially politically determined and can hardly be influenced by such technical devices as applying social rates of return. Second, there may be more effective tools, such as monetary and fiscal policies, to achieve income distribution goals. For example, the government might give priority to investments in the poorer regions of the country, to feeder roads, or to public transport and impose heavy taxes on private cars.

Third, the determination of the specific values for weights raises a host of issues. Fourth, determining the beneficiaries and their income level is particularly difficult in many transport projects. For example, if the transport costs of wheat are reduced, it would be extremely difficult to determine - over the life of the project - to what extent the benefits accrue to farmers, wholesalers, transporters, retailers or consumers, and for each of these groups, how they differ by income level.

Nevertheless, national objectives other than greater efficiency are clearly important, and where a project makes a significant contribution to achieving them, or to hindering their achievement, it should be noted. If assistance to certain income, ethnic, or other groups is an important social goal, priority may well be given to transport investments that benefit these groups or to specific transport modes (such as public bus service) that serve their needs.

Another type of benefit relates to changes in prices or competitive conditions or to the inducement of further investments that a project may cause. For example, it is sometimes pointed out that a developmental road will increase the income of the people in the area and that this will increase their consumption, which, in turn, will give rise to additional employment, income and consumption. This multiplier effect of the original project is not, however, an additional benefit unless the obstacle to expansion is inadequate demand, and this is rarely the case in most developing countries; moreover, other investments could also have a multiplier effect.

It is often pointed out that a project may give employment, which is regarded as an additional benefit. If, however, the labor involved would have been employed on other work, its employment on the project is a cost, not a benefit; if it would otherwise have remained unemployed, this is fully allowed for in the use of shadow wages, and no additional benefit is involved.