

Document of
The World Bank
FOR OFFICIAL USE ONLY

Report No. 15786

IMPLEMENTATION COMPLETION REPORT

TUNISIA

**FORESTRY DEVELOPMENT PROJECT
(LOAN 2870-TUN)**

JUNE 21, 1996

**Natural Resources and Environment Division
Magreb and Iran Department**

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.

CURRENCY EQUIVALENTS

| | | | |
|--------------------------|---|--------------------------|-----------------------|
| At Appraisal (Dec.1986) | : | Tunisian Dinar (D) 1.0 = | US\$1.23 |
| At Completion (Dec.1995) | : | Tunisian Dinar (D) 1.0 = | US\$1.02 |
| | | US\$1.00 | = 0.98 Tunisian Dinar |

WEIGHTS AND MEASURES

The metric system

FISCAL YEAR OF BORROWER

January 1 - December 31

ABBREVIATIONS AND ACRONYMS

| | |
|-------|---|
| AVFA | Agence de vulgarisation et de formation agricole |
| FAO | Food and Agriculture Organization of the United Nations |
| FD | Forestry Directorate/Directeur générale des forêts |
| FDP | Forestry Development Project |
| GOT | Government of Tunisia |
| ICR | Implementation Completion Report |
| INRF | National Forest Research Institute |
| M&F | Monitoring and Evaluation |
| NIFRL | National Inventory of Forest and Range Lands |
| PMU | Project Management Unit |
| REF | Régie d'exploitation forestière |
| SAR | Staff Appraisal Report |

TABLE OF CONTENTS

| | |
|---|----|
| PREFACE | i |
| EVALUATION SUMMARY | ii |
| PART I: PROJECT IMPLEMENTATION ASSESSMENT | 1 |
| A. STATEMENT/EVALUATION OF OBJECTIVES | 1 |
| B. ACHIEVEMENT OF OBJECTIVES | 2 |
| Sectoral Results | 2 |
| Physical Results | 2 |
| Institutional Development | 4 |
| Financial and Economic Results | 5 |
| Social and Environmental Impacts | 5 |
| Promotion of the Private Sector | 6 |
| C. MAJOR FACTORS AFFECTING THE PROJECT | 6 |
| Factors Not Generally Subject to Government Control | 6 |
| Factors Generally Subject to Government Control | 6 |
| Factors Generally Subject to Implementing Agency Control | 7 |
| D. PROJECT SUSTAINABILITY | 7 |
| E. BANK PERFORMANCE | 7 |
| F. BORROWER PERFORMANCE | 8 |
| G. ASSESSMENT OF OUTCOME | 8 |
| H. FUTURE OPERATIONS | 8 |
| I. KEY LESSONS LEARNT | 9 |
| PART II: STATISTICAL ANNEXES | |
| TABLES | |
| Table 1: Summary of Assessments | 11 |
| Table 2: Related Bank Loans/Credits | 13 |
| Table 3: Project Timetable | 14 |
| Table 4: Loan/Credit Disbursements: Cumulative Estimated and Actual | 14 |

| | |
|---|----|
| Table 5: Key Indicators for Project Implementation | 15 |
| Table 6: Key Indicators for Project Operation | 16 |
| Table 7: Studies Included in Project | 16 |
| Table 8A: Project Costs | 17 |
| Table 8B: Project Financing | 18 |
| Table 9: Economic Costs and Benefits | 19 |
| Table 10: Status of Legal Covenants | 20 |
| Table 11: Compliance with Operational Manual Statements | 21 |
| Table 12: Bank Resources: Staff Inputs | 21 |
| Table 13: Bank Resources: Missions | 22 |

APPENDICES

- A. Mission’s Aide Mémoire
- B. Financial and Economic Analysis
- C. Additional Tables on Physical Results

PROJECT DATA SHEET

IMPLEMENTATION COMPLETION REPORT

TUNISIA

FORESTRY DEVELOPMENT PROJECT (Ln. 2870-TUN)

PREFACE

1. This is an Implementation Completion Report (ICR) for the first Forestry Development Project in Tunisia, for which a loan in the amount of US\$ 20 million equivalent was approved on 28 September 1987. The loan became effective on 28 April 1988, and as scheduled in the Loan Agreement, the loan closed on 31 December 1995.

2. This report was prepared by a mission from FAO/World Bank Cooperative Programme^{1/} which visited Tunisia from 12 to 26 June 1995. It is based on material gathered from project files and supervision reports in the World Bank, Washington, and on substantive discussions with the Bank and GOT staff. The mission's preliminary findings were presented to the Government in an Aide Mémoire (see Appendix A). The report was discussed with the Government in December 1995 and comments received have been incorporated in this report. The report was reviewed by T.P.N. Sinha, Acting Division Chief, MN1NE, and by Ms. Laurie Effron, Acting Project Advisor.

^{1/} J.L. Blanchez (Forester - FONS, Mission Leader), J.M. Bisson (Economist, FAO/IC Staff), and D. Crespo (Pasture Specialist, Consultant).

IMPLEMENTATION COMPLETION REPORT

TUNISIA

FORESTRY DEVELOPMENT PROJECT (FDP) (Ln. 2870-TUN)

EVALUATION SUMMARY

A. Introduction

1. Tunisia's trade deficit in wood and wood products nearly doubled in the first part of the 1980s, but the country's potential to produce wood had been largely ignored. Since 1985, the Bank has been working closely with the Government to increase the production of wood and forest-related products, better safeguard the environment, and revitalize public involvement in forestry. The FDP was prepared in 1985/86^{1/}, appraised in December 1986 and represented the core of the Government's Seventh Development Plan in the forestry sector.

2. The project's objectives were to: (a) increase fuelwood and industrial wood production; (b) improve forest grasslands and range management to compensate for grazing areas lost to the closure of forest lands for natural forest regeneration and tree planting; (c) reduce soil erosion and increase water retention to protect the productivity of agricultural lands; and (d) preserve and expand the country's nature and wildlife heritage. The five main components of the project are as follows: (a) forest exploitation and regeneration (mainly thinning of conifer plantations, regeneration of natural forests, and promotion of private sector); (b) forest plantations and private tree planting, improvement of forest nurseries and seed collection; (c) intensified forest management (construction of infrastructure and provision of logistical facilities); (d) forest pasture and range improvement (establishment of permanent and improved natural pastures); and (e) institutional development/support (preparation of a national forest and range inventory, improvement of national park management, training and research).

B. Implementation Experiences

3. Thinning of pine plantations has been realized over 45,501 ha (91% of the target) and forest regeneration has covered 16,310 ha (76% of the target). On the other hand, the mechanized plantations programme has covered only 4,880 ha (as opposed to 8,100 ha foreseen in the SAR) mainly because of shortage of suitable areas for planting in the selected zones. Nevertheless, the survival rate is over 80% and initial growth is good. As planned, 2,608 ha (100% of the target) of poplar, eucalyptus and acacia have been planted along the "oueds" and the survival rates are reported to be excellent. New production techniques in nurseries (mainly

^{1/} A Forestry Sector Study (Projet de développement forestier et lutte contre la désertification - 2 volumes - March 1986) was carried out in 1985/86 by FAO through a Trust Fund Agreement and assistance under FAO's Technical Cooperative Programme.

the use of cement tanks) have been developed and thus has increased both the quality of the plants produced and the overall productive capability.

4. The provision of infrastructure and facilities for forest management has proceeded as envisaged. Around 3,000 ha of pastures have been established (82% of objective), although the quality is poor and no appropriate forage/range management systems have yet been put in place. A national inventory of forest and range lands has been carried out and plans for forest and pasture development have been prepared. A monitoring and evaluation system has been established, but its performance has been disappointing because of the poor quality of incoming information, the inadequacy of indicators for project performance assessment and the shortage of trained staff. The project implementation benefitted from the research, training and technical assistance components of the project. The population living in the project areas have benefited from the project through the provision of about 4.8 million person-days of labour. The objective of involving the private sector in forestry has been successful.

5. Actual project costs are estimated at US\$ 40.3 million, 20% less than in the SAR mainly due to the reduced expenditure of the plantations and road programmes. About US\$ 2.6 million, out of the US\$ 20 million loan, remained undisbursed and was cancelled. The Government has disbursed US\$ 22.2 million of counterpart funds compared to the US\$ 30.2 planned at appraisal. All major legal covenants have been fulfilled. The economic rate of return has been estimated at 9% excluding non quantifiable environmental and social benefits, which are substantial. Inclusion of such benefits are likely to raise the ERR to 11%. Although satisfactory the ERR is lower than the SAR estimate of 18%, mainly because the assumptions for incremental wood production were over optimistic.

6. **Key factors affecting project achievement.** The inadequate delimitation of suitable lands for mechanized plantations in the selected zones and the 1993-94 drought in Tunisia slowed down the plantations programme. In addition, the much delayed recruitment of forestry technicians in 1991 resulted in the postponement of tree marking operations and slowed down the thinning/regeneration programmes. The 1992 partial restructuring of the Ministry of Agriculture disturbed the project's institutional set-up and has had a negative impact on field operations. Finally, delays in selection of consultants created difficulties in executing forest inventory and mechanized plantation components of the project.

7. **Sustainability.** The sustainability of most project components is directly linked to the execution of the second phase of the FDP. The first phase has demonstrated that commercial operations, such as mechanized and riverine plantations, can be financially sustainable. On the other hand, the sustainability of the forest pastures and range improvement activities associated with the protection of the planted and regenerated areas appears doubtful mainly because the socio-economic conditions of the livestock owners are poorly understood.

8. **Bank and borrower's performance.** The project did not experience major problems and was regularly supervised. The supervision record is satisfactory. Some difficulties were created at the time of a restructuring in 1992. The Ministry of Agriculture could have been more sensitive to the institutional needs of the project at the time of its restructuring in 1992. The

Ministry should also have made more effort to provide better staffing for project monitoring and implementation.

C. Assessment of Outcome

9. Despite its pilot nature and the inherent risks and information gaps, the project has been successful. The evolution and progress made in managing the forestry sector have been significant. The project has accelerated technical improvements and institutional changes needed for the sector development. It has introduced more progressive (commercially-oriented) policies and managerial practices in forestry operations, with the increased involvement of the private sector. New techniques have also been adopted in soil preparation before planting, forest exploitation and seedling production. Furthermore, monopolistic situations have been practically eliminated by liberalizing cork sales, promoting auction systems and reducing wood price distortions.

D. Summary of Findings, Future Operations and Key Lessons Learned

10. **Findings.** The project was largely successful, especially in promoting sectoral reform. However, some activities failed to meet their targets. The mechanized plantation programme, for example, met limited success, mainly because of a lack of availability of lands suitable for mechanized land preparation. In addition, project monitoring and evaluation was not given sufficient importance and therefore some components - such as the establishment of pastures - were not successful as remedial action could not be taken in time. A further problem was that project management was concentrated in the Forestry Directorate, even though some of the components, particularly the establishment of pastures, required the close participation of other sectors, e.g. for livestock development. Unfortunately, the coordination committee set up to address this problem failed to develop the necessary appropriate multi-sectoral linkages.

11. **Future operations.** The management and protection of forests created under this project is adequate and is being handled by Provincial Forestry Services.

12. **Key lessons learnt.** The main lessons learnt are as follows: (a) forest plantation schemes are strongly influenced by socioeconomic, and topographic conditions which have to be carefully assessed when planning large programmes; (b) efficient project management requires an adequate performance monitoring and evaluation system (particularly early on); (c) complex multi-sectoral projects need special institutional arrangements to develop inter-sectoral linkages or the design needs to be simplified; (d) when consecutive projects overlap additional resources are needed to cater for the work required for the preparation of the follow on project.

IMPLEMENTATION COMPLETION REPORT

TUNISIA

FORESTRY DEVELOPMENT PROJECT (Ln. 2870-TUN)

PART I: PROJECT IMPLEMENTATION ASSESSMENT

A. STATEMENT/EVALUATION OF OBJECTIVES

1. In 1986, the strategy of the 7th Development Plan for the Agricultural Sector (including forestry), focused on increasing production and reducing the sector trade deficit. At that time, Tunisia's 900,000 ha of forest land (pine and oak) were poorly managed and degraded because of overgrazing and uncontrolled cutting for fuel. As a result Tunisia imported about 95% of industrial wood needs. To exacerbate matters, the investment budget for forestry and soil conservation was decreasing and managerial capacity weak. The consequences of this were serious. However, studies showed that the potential for increased wood production existed and the proposed project aimed at establishing the basis for the comprehensive development of forest resources and the conservation of the natural heritage.

2. The project's objectives (Staff Appraisal Report, July 1987), were to improve the cost effectiveness of a forest resources management by: (a) increasing fuelwood and industrial wood production; (b) improving forest grasslands and range management to compensate for grazing areas lost due to the closure of forest lands for natural regeneration and tree planting; (c) reducing soil erosion and increasing water retention to protect the productivity of agricultural lands; and (d) preserving and expanding the country's nature and wildlife heritage and improving the country's cultural and recreational facilities.

3. The project had five main components: (a) forest exploitation and regeneration; (b) forest plantations and private tree planting; (c) intensified forest management; (d) forest pasture and range management; (e) institutional development support, including a national forest inventory and development plans, nature conservation, technical assistance, training and provision for equipment.

4. The objectives of the project were valid. However, because of its pilot nature and the introduction of new technology the project was inherently risky. In view of this, some physical targets were also over-ambitious, like the 8,100 ha of mechanised plantations, the pasture improvement programme and the 21,500 ha of forest regeneration. The use of new techniques, an absence of information on social conditions, and the limited managerial capacity of the Tunisian forest institutions should have been taken more into account in setting project targets.

B. ACHIEVEMENT OF OBJECTIVES

5. Project achievements were difficult to assess because the monitoring and evaluation system did not provide comprehensive figures and data. Project results were therefore judged on the basis of supervision reports, the project's annual reports, and information provided by the Project Management Unit (PMU).

Sectoral Results

6. The sectoral achievements are significant. The project succeeded in promoting the development of new techniques such as the mechanisation of forest operations and the adoption of improved nursery techniques. The project was also successful in increasing private sector involvement in forest activities (thinning, exploitation) and made important advances in involving communities in the management and protection of forested areas.

7. In addition, the availability of forest inventory data, the preparation of strategies for forest and pasture resources development, the establishment of a computerised monitoring systems for all forest activities, and the adoption of commercially oriented policies in forest operations have improved considerably. The project has also initiated a development process inside the forestry sector and has enhanced relations between the headquarters and the regions in the Forestry Directorate (FD). Furthermore, the project has contributed to eliminating monopolistic situations by, for example, liberalizing cork sales, promoting timber auction system and has reduced the price distortions in wood sales through better price monitoring.

Physical Results

8. The achievement of the physical objectives varies with the type of activity. The lack of experience of the PMU and the FD staff in project management and new methodologies explain this. These are explained in more detail below.

9. **Forest exploitation and regeneration.** The thinning programme of pine plantations has been realised on 45,501 ha (91% of objective) in 10 Forest Arrondissements. These activities have had a positive effects on the forest stands, they have also had an important social impact by providing employment in rural areas.

10. The forest regeneration programme covered a total of 16,310 ha (76% of objective). The regeneration programme of the oak stands was unsuccessful because the techniques adopted under the project (direct seeding and coppice shoots) were not completely successful.

11. Wood sold by the Régie d'Exploitation Forestière (REF) reached 323,000 m³ in 1994 (objective 260,000 m³/year) of which 52% was sold by auction to the private sector and 48% was processed by FD. However, annual output varied greatly. This is attributed to the variation of access and quality of forest stands sold at auction. The 1994 Report of the REF shows that

the degree of mechanization was about 49 % (objective 70%) in the exploitation operations implemented by the FD (including the works done by the small enterprises). The shortfall was due mainly to the thinning operations.

12. **Forest plantations.** 4,880 ha of mechanized plantations (60% of objective) have been planted on a total area of 6,130 ha including access roads, swaths and fire breaks. The shortfall was due mainly to an inadequate delimitation of suitable zones for planting and delays in finding grazing areas in compensation for areas to be planted. The plantations have been realised on three main areas (Sedjenane, Nefza, Tegma) and main species planted are *Pinus pinea* (70%) and *Eucalyptus* spp. (30%). The rate of survival is satisfactory (80 to 90%) and the initial growth is good. Silvicultural techniques seem appropriate and well managed. The expected total wood production within the next 50 years will be around 1,300,000 m³.

13. 2,608 ha of riverine plantations have also been planted along the "oueds" (objective: 2,600 ha). This activity was successful, although some difficulties occurred at the beginning due to technical and land tenure problems. The rate of survival of the trees - poplar, eucalyptus and acacia - and their growth are reported to be excellent. The expected wood production within the next 24 years is estimated at 750,000 m³.

14. **Forest management.** All management activities of 6,600 ha in the forest districts of El Feidja (Jendouba) and Oum Djeddour (Kasserine) have been done. This component included the construction and rehabilitation of housing and forest stations (9), a research centre and a fire tower; a sociological study has also been started, as well as the preparation of forest management plans; the districts have been supplied with vehicles and equipment; the programme of roads construction (85 km) and rehabilitation (35 km) has only recently been achieved due to the difficulty of obtaining suitable contractors.

15. **Forest pasture and range improvement.** A total area of about 3,002 ha of pasture have been improved (82% of objective). Permanent pastures have been established on 973 ha (objective: 1100 ha); 1664 ha of natural range land have been rehabilitated (objective: 2,180 ha). Acacias and cactus have been planted on 365 ha. Pasture quality is reported to be currently poor because appropriate forage and range management systems have not been put in place. This partial success is attributed to: (a) a lack of technical capacity of forest staff in pasture and forest range improvement; and (b) local people did not fully understand the project objectives and were reluctant to accept the restrictions on grazing attached to the proper management of the pastures and ranges provided to them.

16. **Other activities.** The national inventory of forest and range lands covering about 110,000 km², was completed in 1994. Modern mapping and computerised equipment have been provided. Forest and pasture cover maps (1/50,000, 1/200,000, 1/500,000) are available. The inventory and the development plan for the pasture land were published in June 1995. The forest inventory is complete but the forest development plan has to be finalised and published. This

operation should have been completed in 1990 but was delayed mainly due to delays in consultant selection.

17. Nature conservation: proposed activities consisted mainly of support to the regular programme of activities, and this has been achieved. Hunting brigades in all forest arrondissements have been equipped to control poaching and to monitor bird migrations, etc. The premises of three national park have been improved. The proposed mobile extension unit has been placed under a specialised extension agency (AVFA), in accordance with the forest extension strategy.

18. Nurseries and tree seeds collection: some 11 nurseries near to the project plantation sites and urban centres (including two poplar nurseries) have been equipped. The techniques to raise seedlings have been improved, as has the quality of forest plants produced. The Tree Seed Centre has been provided with vehicles and adequate equipment (such as tree climbing sets) and the quality of technical operations (seed collection, sorting, storage and distribution to nurseries) has been improved.

Institutional Development

19. The project has provided 137 vehicles (cars, 4-WD, pick-up 4-WD and trucks), equipment and materials in support of forest management, silvicultural operations and nature conservation. Vehicles and equipment appear to be properly used and maintained.

20. The training of staff (46 m/m) and technical assistance (33 m/m) were provided by agreement with FAO. The agreement was amended and enlarged to recruit experts needed to do the forest and pasture land inventory, and to prepare the second forestry development project. The services provided were satisfactory. Training and expertise were generally appreciated and well organized. However, full advantage of training and technical assistance was not taken because follow-up action was inadequate. It is worth noting that FAO complemented the project technical assistance programme with a Technical Cooperative Project (TCP/TUN (A) 8852) which included priority activities such as forestry economics, wood technology, fire protection and forest education.

21. Under the project a Management Information System (GESFOR) has been established. The system should have been used as a tool for project management but, unfortunately, the project has not succeeded in establishing an efficient monitoring and evaluation (M&E) system. Accurate data and analysis of project activities are still lacking. For example, financial monitoring is weak. Project achievements are not accurately documented, the 1993 and 1994 annual reports were published only in mid-1995, and there is no evaluation done by the Government of the impact and quality of project activities. This shortcoming is attributed to: (a) the poor quality of incoming information from forest arrondissements; (b) the indicators of project activities were limited to physical performance, while the environmental and social impacts were not included; (c) the staff in charge of the M&E was insufficient and not

appropriately trained; and (d) at the end of the project, the first and the second projects overlapped, and this placed too much pressure on project staff.

22. An agreement was signed between the project and the National Forest Research Institute (INRF) to support project activities and appropriate forest research and results have been documented. However research programmes were too broad and the budgets too limited.

23. The FD has prepared a strategy for pasture and range development but the forest development strategy is still to be finalised, although these were discussed in a seminar in June 1995. These were prepared exclusively by FD staff but, to be effective, they also need to be discussed with other sectors interested in forestry development.

Financial and Economic Results

24. Total project costs are estimated at US\$ 40.3 million, 20% less than in the SAR. About US\$ 2.6 million, out of the US\$ 20 million loan, remained undisbursed and were cancelled. Although the project must be seen as a pilot exercise, whose main achievement has been to introduce more progressive (commercially-oriented) policies and managerial approaches to forestry operations, it has nevertheless demonstrated that managed plantation activities and particularly riverine plantations can (and will probably) be financially viable as the private sector becomes gradually more involved.

25. For now, the public nurseries are being managed more as a means of disseminating improved planting material than on a commercial basis, but the project has resulted in substantial cost savings through the introduction of improved production techniques. These savings, along with the adopted practice by the Forestry Directorate of charging to private entrepreneurs adequate fees and "redevances" for exploiting the state forests, have substantially improved the FD's budgetary situation.

26. The project's economic rate of return is estimated at 9% over 57 years and must be considered as a minimum since it does not include the less-easily-quantifiable social and environmental benefits (Appendix B). Inclusion of such externalities would raise the ERR to about 11%. This rate is somewhat lower than in the SAR (18%), mainly because the ICR assumptions for the production buildup are less optimistic¹⁷. On the other hand, about 4.8 million person-days of manual/field work were contracted under the project and close to US\$ 14 million were paid in daily salaries, generating even more jobs and incomes in the economy through a multiplier effect.

¹⁷ Although more in line with those used for the formulation of the Second Forestry Development Project.

Social and Environmental Impacts

27. The project's impact on the population living in the project area has been significant. The most obvious benefits - though very difficult to evaluate - are in terms of the positive impact on the environment by slowing/arresting soil erosion. This, in turn, will lead to increased agricultural production. Activities related to nature conservation have contributed to the protection of the national heritage and have heightened public awareness as to the importance of their environment. Project activities have also improved incomes through employment.

28. The social and environmental impacts of the project will be the subject of a specific study being carried out by a Tunisian firm.

Promotion of the Private Sector

29. The project has been successful in promoting the involvement of the private sector in forestry activities. For instance, some 50 enterprises are now involved and account for around 16% of national wood production. It is estimated that half these activities have been generated through the project, largely the result of the extensive training provided to the enterprises. In addition to increasing the efficiency/profitability of forestry operations, these enterprises are also generating jobs and incomes in rural areas.

C. MAJOR FACTORS AFFECTING THE PROJECT

Factors Not Generally Subject to Government Control

30. The drought which occurred in 1993/1994 slowed down the plantations programmes; although all soils were prepared for plantations in 1994, part of the area could only be planted in the first half of 1995.

Factors Generally Subject to Government Control

31. Difficulties in recruiting forestry technicians in 1991 considerably delayed forest tree marking operations needed for the thinning and regeneration works. However this backlog has since been done.

32. The reform of the Ministry of Agriculture in 1992, which involved numerous transfers of DF staff - particularly the chiefs of the forest arrondissements, had a negative effect on the project. The PMU staff were integrated into the administrative structure of the DF, thus adding to their responsibilities and reducing time available for the project. However, young professionals have since been recruited to augment the PMU and to mitigate the negative effects of this.

Factors Generally Subject to Implementing Agency Control

33. The delays in the selection of consultants for technical assistance in forest and range land inventory and for land preparation for the mechanised plantation programme have caused delays in project execution. Procurement procedures took long, and this created delays at the beginning of the project. The under-utilization of the Management Information System established at the PMU also weakened management effectiveness. The planting sites should have been more carefully selected in advance to provide sufficient and suitable area for mechanized plantation or the programme targets should have been reduced.

D. PROJECT SUSTAINABILITY

34. The sustainability of many project activities will depend largely on the implementation of the second project. The sustainability of commercially-oriented operations will, of course, depend on their financial profitability. This is likely to improve in the future for three reasons: (a) private enterprises involved in the thinning/cutting (and eventually planting) works are becoming more efficient; and (b) some of the indirect investment costs, especially technical assistance/training, will be proportionally lower in the next phases.

35. Concerning the new plantations, clean weeding is imperative during the first three years after planting until the young trees are able to compete with the natural vegetation. Management plans must be prepared indicating which stands need to be weeded and when. Pruning and first thinning will be done under the second project. Fire prevention and controls have to be particularly reinforced in mechanized plantations.

36. The sustainability of the forest pasture and range improvement operations will be assured by involving the beneficiaries in the maintenance of pastures and natural ranges. A better understanding of the socio-economic environment is also needed and institutional linkages between Forestry and Livestock need to be improved. Revised grazing fees also need to be introduced. Rules and conditions will be developed in the integrated development pilot operations of the Second Forestry Development project.

37. The NIFRL will need to be updated regularly. Financing this operation is justified if the results of the inventory are used intensively by the FD and others interested in improved management.

E. BANK PERFORMANCE

38. The project appraisal was satisfactory, and ambitious projections of yields were due to information gaps inherent in a pilot project. During project implementation, close supervision by the Bank ensured that the PMU and FD staff took appropriate action to resolve problems encountered by the project. Disbursements have occurred more-or-less as scheduled.

39. During the 7-years of project implementation, 19 supervision missions assisted by 9 visits of subject matter specialists monitored and guided project development. A full fledged mid-term review would have been beneficial.

F. BORROWER PERFORMANCE

40. Considering the weak condition of the DF at the beginning of the project, the complex and innovative nature of the project, borrower performance has been satisfactory. It is, however, unfortunate that no measures were taken to improve/strengthen the M&E, of the project. The project Coordination Committee met eight times during the project life and played an efficient role in evaluating and coordinating project management.

41. Many achievements of the project can be attributed to the dynamism and stability of the PMU team which remained intact throughout. Project management was able to adapt itself to any unexpected situation and to find appropriate solutions to problems encountered. However, the restructuring of the Ministry of Agriculture in 1992 and the start-up of the second Forestry Development Project slowed the progress over the last two years of the project.

G. ASSESSMENT OF OUTCOME

42. The project's outcome has been satisfactory, notwithstanding some shortcoming in field activities, the poor performance of the M&E system and certain social problems associated with pasture development. The progress made in improving the management of the forestry sector is considerable. The project has accelerated institutional changes needed for its development; price distortions and monopolistic situations have been removed; rural people have started to develop an awareness of sustainable use of forest resources; and the forest inventory has demonstrated the need for further investment and improved management. The project has also highlighted ways to exploit and sustainably regenerate the forests and ways to better involve rural populations in their management.

43. Under the second FDP, possibilities of replacing mechanized plantations with labour intensive operations should be explored during mid-term review to provide additional benefits such as employment. However, the case by case decision should be based on a pertinent analysis of the financial, socio-economical and environmental conditions.

H. FUTURE OPERATIONS

44. The second Forestry Development project was appraised (SAR n° 11618-TUN) in December 1992. The components of the new project are forest management, mechanised and riverine plantations, forest pasture and range improvement, wood exploitation, national park and reserves, forestry research and institutional development and integrated development pilot operations. Most activities developed during the first project will be continued and consolidated during the second project.

45. Specific activities not covered by the second project, but which should be included, are: (a) the clean weeding of plantations; (b) the determination of a plan and a budget to update the NIFRL; and (c) the finalisation of the forest development plan.

46. Although, the PMU has been strengthened for the day-to-day analysis of technical, financial and social information, project monitoring is still deficient. This situation should be addressed as a matter of urgency.

47. Institutional aspects which should be considered during the planned mid-term review of the second forestry project include:

- (a) the restructuring of the DF to enable it to take on those activities which the private sector cannot handle;
- (b) a review of institutional arrangements related to forest range and pasture management; better coordination is needed between Forestry and Livestock institutions to avoid disparities in taxation and incentives for livestock production.

I. KEY LESSONS LEARNT

48. The first Forestry Development Project has made important sectorial advances and has provided a valuable testing ground for new techniques and institutional development. Many technical lessons have been learnt. They relate principally to methods for improving natural and planted forest stands, preparing soil for tree planting and developing pasture and range land techniques. From the institutional point-of-view, the project has improved the managerial capacity of FD. It has also enabled the PMU to deal with procurement procedures, to monitor forest activities (although the operational performance needs to be improved) to plan and budget activities, and to develop collaboration with the private sector. These lessons and experiences have already been taken into account when designing the second project.

49. The key lessons are:

- (a) Before starting large-scale plantations' programmes, a detailed study providing a full description of the techniques to be applied, the land suitability for planting and the socio-economic conditions should be carried out. Possible compensations should be discussed and agreed with the concerned population as a prerequisite.
- (b) Where projects are broad in scope and operate in complex socio-economic environments, it is essential to have a strong and efficient project monitoring and evaluation system. However, this system has to be dimensioned in accordance with the existing institutional capability and project performance indicators should be limited in number, but carefully selected to be as meaningful as possible.
- (c) It is necessary to establish an adequate institutional set-up for the project in order to develop efficient inter-sectoral linkages to deal with the various sectoral issues under the project (livestock, land tenure, rural development and social affairs). Without these inter-sectoral linkages, there is a great risk that the project would be too narrowly focussed and would fail to adequately involve other sectors.
- (d) When two projects - a first phase followed immediately by a second phase - are overlapping, it is the first project to compensate the supplementary work requested for the preparation and the starting up of the second project.

PART II: STATISTICAL ANNEXES

Table 1: Summary of Assessments

| A. <u>Achievement of objectives</u> | <u>Substantial</u> | <u>Partial</u> | <u>Negligible</u> | <u>Not Applicable</u> |
|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Macro policies | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Sector policies | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Financial objectives | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Institutional development | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Physical objectives | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Poverty reduction | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Gender issues | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Other social objectives | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Environmental objectives | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Public sector management | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Private sector development | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Other (specify) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | | | | |
| B. <u>Project sustainability</u> | <u>Likely</u> | <u>Unlikely</u> | <u>Uncertain</u> | |
| | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| | | | | |
| C. <u>Bank performance</u> | <u>Highly satisfactory</u> | <u>Satisfactory</u> | <u>Deficient</u> | |
| | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | |
| Identification | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| Preparation assistance | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| Appraisal | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| Supervision | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |

| | <u>Highly satisfactory</u> | <u>Satisfactory</u> | <u>Deficient</u> |
|--------------------------------|-------------------------------------|--|---------------------------------|
| D. <u>Borrower performance</u> | (✓) <input type="checkbox"/> | (✓) <input checked="" type="checkbox"/> | (✓) <input type="checkbox"/> |
| Preparation | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Implementation | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Covenant compliance | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Operation (if applicable) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| | <u>Highly satisfactory</u> | <u>Satisfactory</u> | <u>Unsatisfactory</u> | <u>Highly unsatisfactory</u> |
|---------------------------------|---------------------------------|--|---------------------------------|----------------------------------|
| E. <u>Assessment of outcome</u> | (✓) <input type="checkbox"/> | (✓) <input checked="" type="checkbox"/> | (✓) <input type="checkbox"/> | (✓) <input type="checkbox"/> |

Table 2: Related Bank Loans/Credits

| Loan/credit title | Purpose | Year of approval | Status |
|---|---|------------------|----------------------------|
| Northwest Rural Development Project (LN 1997 - TN) | Poverty Alleviation | 1982 | Closed 01/02/90 |
| Grain Storage Project (LN 2052 - TN) | Storage and distribution of Grain | 1982 | Closed 12/31/88 |
| Medjerda/Nebhana Irrigation Project (LN 2157 - TN) | Irrigation | 1983 | Closed 06/30/1989 |
| Central Tunisia Irrigation Project (LN 2234 - TUN) | Irrigation | 1983 | Closed 12/31/1990 |
| New Agricultural Production Project (LN 2502 - TN) | Agriculture improvement | 1986 | Closed 12/31/1991 |
| Nat. Irrigation Management Implementation Project (LN 2573-TUN) | Irrigation | 1986 | Closed 06/30/95 |
| Gabes Irrigation Project (LN 2605-TUN) | Irrigation | 1986 | Closed 09/30/93 |
| Agricultural Credit BNT IV Project (LN 2865-TUN) | Credit | 1988 | Closed 12/31/1991 |
| Research and Extension (LN 3217-TUN) | Institution capacity building | 1991 | Closing Date 06/30/1996 |
| Second Forestry Development Project (LN 3601-TUN) | Forest Management and Plantations | 1994 | Closing Date 12/31/2000 |
| Agric. Sector Investment Project (LN 3661-TUN) | Agriculture Development | 1994 | Closing Date 06/30/1999 |
| Development of Mountainous Regions Project (LN 3691-TUN) | Northwest Mountainous areas development | 1994 | Closing Date 06/30/2000 |

Table 3: Project Timetable

| Steps in project cycle | Date planned | Date actual/ latest estimate |
|--|--------------|---------------------------------|
| Identification (Executive Project Summary) | | 18.07.86 |
| Preparation | | 29.09.86 |
| Appraisal | | 29.11.86 |
| Negotiations | | 15.06.87 |
| Board presentation | | 04.08.87 |
| Signing | | 28.09.87 |
| Effectiveness | 28.01.88 | 28.04.88 |
| Project completion | 31.12.94 | 31.12.94 |
| Loan closing | 31.12.95 | 31.12.95 |

Table 4: Cumulative Loan Disbursements

| | FY88 | FY89 | FY90 | FY91 | FY92 | FY93 | FY94 | FY95 | FY96 |
|--------------------|------|------|------|------|------|------|------|------|------|
| SAR Estimate | 1.6 | 4.5 | 7.6 | 11.3 | 14.6 | 17.1 | 18.9 | 19.8 | 20.0 |
| Actual | 0.0 | 2.4 | 4.9 | 8.9 | 12.8 | 14.1 | 16.6 | 17.4 | 17.4 |
| Actual as % of SAR | 0% | 52% | 65% | 78% | 87% | 83% | 88% | 88% | 87% |

Table 5: Key Indicators for Project Implementation

| SAR key implementation indicators | Planned | Actual |
|---|------------------------|--------------------------|
| 1. Forest Regeneration | | |
| - Thinning | 50,000 ha | 45,501 ha |
| - Regeneration | 21,500 ha | 16,310 ha |
| - Annual wood production | 260,000 m ³ | > 260,000 m ³ |
| 2. Forest Plantation | | |
| - Mechanized plantation | 8,100 ha | 4,880 ha |
| - Linear plantations | 2,600 ha | 2,608 ha |
| - Seed collection/nurseries/seedlings | various activities | 100 % |
| 3. Forest Management | | |
| - Building constr. or rehab./fire tower | 11 | 100 % |
| - Roads construction/rehabilitation | 85 km/35 km | 85 km/35 km |
| - Boundary marking and other works | various | 100 % |
| - Equipment | various | 100 % |
| 4. Forest Pasture Improvement | | |
| - Establishment in humid areas | 700 ha | 554 ha |
| - Establishment in semi-arid areas | 400 ha | 419 ha |
| - Establishment in arid areas | 2,180 ha | 1,664 ha |
| - Cactus and acacia plantations | 365 ha | 365 ha |
| 5. Institutional Development Support | | |
| - National inventory and development plans | - | 80 % |
| - Nature conservation/equipment | - | 90 % |
| - Technical assistance and training | | |
| - Consultant services | 43 man/month | Satisfactory |
| - Training abroad | 100 man/month | Satisfactory |
| - Training in Tunisia | 750 man/month | 810 man/month |
| - Forest Research | | Satisfactory |
| - Vehicles | 139 | 137 ^{1/} |
| - Other equipment | various | as needed |
| 6. Labour Employment | 12,300 man/year | 16,000 man/year |

^{1/} Motorcycles have been converted into vehicles. Cars have been converted into small 4-WD.

Table 6: Key Indicators for Project Operation

The second phase - Second Forestry Development Project - will take care of the operations needed to sustain the activities developed during the first phase.

However, two/three passages per year of clean weeding are needed in the young 1994 mechanised plantations in Tegma, Bizerte and Beja for the next three years. The river in plantations planted in 1992, 1993 and 1994 need maintenance and surveillance for the next three years.

A plan to update the forest and pasture/range inventory and the budget in accordance should be defined for end 1995 and included in the national programme and budget.

Table 7: Studies Included in Project

| Subjects | SAR Target | Status | Comments |
|------------------------------------|--|---|--|
| Project Management | Put in place the MIS | Completed | Good consultation but no updating. |
| Forestry Extension | Prepare a conservation and extension/education plan for the next 5 years. | Completed | The proposed strategy is used. |
| Tree seed collection and selection | Improve the tree seed selection program | Completed | Excellent contribution - progr. presently assisted by bilateral cooperation. |
| Seedlings production | Improve nurseries and seedlings production. | Completed | Good impact on nurseries management and techniques. |
| Forest Genetics | Review genetic studies and sources of selected seeds | Partially achieved | Final report not yet received. |
| Range Management | Assist the DF to improve and manage forest range and pasture | Completed | A manual has been produced but not used |
| Sociology | Analyse land use/human pressure on forest and reactions to forest management | Completed | Satisfactory |
| Biometry | Statistical design for silvicultural experiments | Partially achieved | Data collection done but no analysis |
| Forest Inventory | Full national forest and pasture land inventory, preparation of forest development plan. | Inventory completed in 1994. Pasture development plan achieved - forest plan to be finalised. | The first technical assistance failed. FAO took over and achieved the job with a set of specialists. |

Table 8A: Project Costs
(US\$ ' 000)

| | SAR Estimate | | | Actual Estimate ^{a/} | | |
|--------------------------------|----------------|----------------|----------------|-------------------------------|----------------|----------------|
| | Local | Foreign | Total | Local | Foreign | Total |
| Investment Costs | | | | | | |
| Vehicles and Equipment | | | | | | |
| pick-ups | 478.6 | 540.1 | 1018.7 | 301.7 | 775.5 | 1077.2 |
| implements | 84.8 | 79.7 | 164.5 | 258.6 | 831.8 | 1090.3 |
| tractors | 424.8 | 960.3 | 1385.1 | 465.8 | 1187.3 | 1653.2 |
| cars | 959.2 | 872.2 | 1831.4 | 426.9 | 1092.4 | 1519.3 |
| other equipment | 1332.3 | 1474.2 | 2806.5 | 220.4 | 681.8 | 902.3 |
| cartographic equip. | 17.5 | 33.8 | 51.3 | 280.1 | 1191.8 | 1471.9 |
| motos | 59.7 | 33.5 | 93.2 | 0.0 | 0.0 | 0.0 |
| consumables | 11.0 | 22.8 | 33.8 | 65.0 | 52.7 | 117.7 |
| spare parts | 243.7 | 271.9 | 515.6 | 50.7 | 35.4 | 86.1 |
| trucks | 61.4 | 87.4 | 148.8 | 26.3 | 110.8 | 137.2 |
| machinery | 95.5 | 127.1 | 222.6 | 113.4 | 98.4 | 211.8 |
| supplies | 468.2 | 913.0 | 1381.2 | 129.2 | 330.2 | 459.4 |
| laboratory equip. | 37.1 | 61.8 | 98.9 | 61.9 | 23.7 | 85.6 |
| Sub-total | 4273.8 | 5477.8 | 9751.6 | 2400.1 | 6411.9 | 8812.0 |
| Plantations | | | | | | |
| clearing | 30.9 | 27.8 | 58.7 | 2427.3 | 1990.0 | 4417.3 |
| seeding | 7596.4 | 4897.5 | 12493.9 | 2932.4 | 2635.9 | 5568.3 |
| soil prep./regener. | 2105.7 | 1681.6 | 3787.3 | 4860.9 | 2795.5 | 7656.4 |
| tending | 5081.0 | 909.2 | 5990.2 | 404.8 | 314.0 | 718.7 |
| Sub-total | 14814.0 | 7516.1 | 22330.1 | 10625.4 | 7735.4 | 18360.8 |
| Works | | | | | | |
| roads | 2817.0 | 2315.1 | 5132.1 | 758.0 | 835.9 | 1593.9 |
| fencing | 37.9 | 19.2 | 57.1 | 119.5 | 313.8 | 433.4 |
| other works | 55.5 | 48.6 | 104.1 | 79.0 | 68.5 | 147.6 |
| constructions | 213.1 | 147.1 | 360.2 | 668.2 | 403.0 | 1071.2 |
| Sub-total | 3123.5 | 2530.0 | 5653.5 | 1624.8 | 1621.3 | 3246.0 |
| Studies/training/techn.assist. | | | | | | |
| training abroad | 33.0 | 296.5 | 329.5 | 0.0 | 361.9 | 361.9 |
| consultants | 564.1 | 1118.1 | 1682.2 | 0.0 | 940.4 | 940.4 |
| Sub-total | 597.1 | 1414.6 | 2011.7 | 0.0 | 1302.2 | 1302.2 |
| Total Investment Costs | 22808.4 | 16938.5 | 39746.9 | 14650.3 | 17070.8 | 31721.0 |
| Recurrent Costs | | | | | | |
| Personnel | | | | | | |
| engineers | 115.9 | 0.0 | 115.9 | 562.0 | 0.0 | 562.0 |
| technical staff | 945.5 | 0.0 | 945.5 | 823.9 | 0.0 | 823.9 |
| support staff | 24.7 | 0.0 | 24.7 | 84.8 | 0.0 | 84.8 |
| laborers | 3281.4 | 0.0 | 3281.4 | 3463.3 | 0.0 | 3463.3 |
| Sub-total | 4367.5 | 0.0 | 4367.5 | 4933.9 | 0.0 | 4933.9 |
| Works | | | | | | |
| roads | 471.3 | 384.9 | 856.2 | 0.0 | 0.0 | 0.0 |
| construction | 27.9 | 20.6 | 48.5 | 0.0 | 0.0 | 0.0 |
| Sub-total | 499.2 | 405.5 | 904.7 | 0.0 | 0.0 | 0.0 |
| Range Improvement | | | | | | |
| pasture maintenance | 484.6 | 50.6 | 535.2 | 307.6 | 243.1 | 550.6 |
| tree maintenance | 29.2 | 2.1 | 31.3 | 460.0 | 364.3 | 824.3 |
| Sub-total | 513.8 | 52.7 | 566.5 | 767.6 | 607.4 | 1375.0 |
| Vehicles and equipment | | | | | | |
| vehicles | 1148.8 | 1390.6 | 2539.4 | 594.9 | 421.7 | 1016.7 |
| machinery | 840.3 | 1193.2 | 2033.5 | 1115.5 | 0.0 | 1115.5 |
| trucks | 20.0 | 28.8 | 48.8 | 156.2 | 0.0 | 156.2 |
| Sub-total | 2009.1 | 2612.6 | 4621.7 | 1866.6 | 421.7 | 2288.3 |
| Total Recurrent Costs | 7389.6 | 3070.8 | 10460.4 | 7568.1 | 1029.1 | 8597.2 |
| GRAND TOTAL | 30198.0 | 20009.3 | 50207.3 | 22218.4 | 18099.9 | 40318.3 |

^{a/} As of 13/6/95

**Table 8B: Project Financing
(US\$ million)**

| | SAR Estimate | | | Actual Estimate ^{1/} | | |
|----------------------------|--------------|-------------|-------------|-------------------------------|-------------|-------------|
| | Local | Foreign | Total | Local | Foreign | Total |
| World Bank | 0.0 | 20.0 | 20.0 | 0.0 | 17.4 | 17.4 |
| Government | 19.6 | 0.0 | 19.6 | 16.6 | 0.0 | 16.6 |
| Net Project Costs | 19.6 | 20.0 | 39.6 | 16.6 | 17.4 | 34.0 |
| Taxes and duties | 10.6 | 0.0 | 10.6 | 6.3 | 0.0 | 6.3 |
| TOTAL PROJECT COSTS | 30.2 | 20.0 | 50.2 | 22.9 | 17.4 | 40.3 |

^{1/} As of 13.6.95.

Table 9: Economic Costs and Benefits

The economic rate of return is 9% over 57 years (see Appendix C). This rate is satisfactory considering that the ERR calculation, based on a conventional use of present values, tends to underestimate the future value of wood products as well as of any remaining standing trees. Obviously, the rate does not include the project's beneficial impact on the environment, particularly in terms of slowing/stopping soil erosion. This, in turn, will eventually lead to a larger agricultural production than would be the case otherwise. The rate is relatively insensitive to revenue and cost variations. For instance, an increase of 25% in the revenues would bring the rate up to "only" 11%, the same level as with a decrease of 25% in the costs. It must be pointed out that 9% is half the ERR estimated in the SAR. The main reason for the lower economic (quantifiable) returns in the ICR is the assumptions made for the production buildup which are less optimistic than in the SAR but more in line with those used for the formulation of Phase II of the Forestry Development Project (see Table 5 of this appendix). Another important reason is the fact that only 60% of the 8,100 ha under the mechanized plantations program and 76% of the 21,500 ha under the forest regeneration program were covered. These shortcomings are not compensated by the 20% shortfall in the project costs (see Table 8B of Part 2).

In addition to the quantifiable economic revenues, there are other benefits which are much more difficult to evaluate. About 4.8 million person-days of manual/field work were contracted under the project, for various activities such as tree thinning and cutting (for regeneration). Close to D 13 million of daily salaries - equivalent to almost US\$ 14 million - was paid for the work, which must have generated even more jobs and incomes (through a multiplier effect) in the economy. Furthermore, the project has been successful at promoting the private sector in forestry. Some 50 small enterprises, with an average of ten employees each, are now involved in forestry activities such as thinning. These enterprises already account for 16% of the national wood production. It is estimated that roughly half of the 16% has been financed directly through the project since 1988. In addition to increasing the efficiency/profitability of forestry operations, these enterprises are also generating jobs and incomes in the country.

Table 10: Status of Legal Covenants

| Covenant Loan Agreement (Section) | Requirement | Status |
|-----------------------------------|---|---|
| 3.03 | Borrower to complete inventory of forest and pasture resources (by 12/31/90), and furnish to the Bank master plans for development of forest resources. | Inventory ready end 1994; pasture plan ready and presented in seminar in June 95; forest Plan to be finalized. |
| 3.04 | Borrower to sign a protocol with INRF for research purposes (by 12/31/88) and ensure that CFPF provides training provides training to DGF and DREF staff. | Done on 7/88 |
| 4.01 | Borrower to have project accounts audited and report sent to the Bank. | Done for 88 to 94. |
| 4.02 | PMU to prepare bi-annual progress reports. | Annual reports made for 88, 89, 90, 91, 92, 93, 94. |
| 4.03 | Borrower to furnish to the bank annual budgets and financial plans for the project | Done for 1994 |
| 5.01(a) | DF and DREF to have operational MIS and cost account system for the project (by 12/31/88). | System set upwith some delay by PMU but not fully and adequately used. |
| 5.01(b) | DF and DREF to identify (by 12/31/88) in their annual budgets the cost of nationally subsidized program. | Being done on a regular basis |
| 5.02 | New major investments in forestry to be selected according to criteria set forth in the program of action. | In compliance. Monitored by SPN missions. |
| 5.03(a) | Borrower to open auctions to all licensed wood buyers (by 12/88). | Done since 1988. |
| 5.03(b) | Borrower to sell cork through auction (by 12/88). | Done since 1990 campaign. |
| 5.03(c) | Borrower to determine reference prices and apply them to direct sales to wood users starting in 1989. | In compliance; required legislation published; implemented in January 1995. |
| 5.04 | Borrower to estimate O&M costs of pastures (by 12/31/91) and to devise procedures to recover them. | Costs have been estimated (note dated 02/28/92); tariffs are far from actual costs. Should be addressed during Second Forestry Project. |
| 6.01 | Conditions of loan effectiveness | Fully met. |

Table 11: Compliance with Operational Manual Statements

| |
|--|
| No significant lack of compliance with applicable Bank Operational Manual Statement. |
|--|

Table 12: Bank Resources: Staff Inputs

| Stage of project cycle | Planned | | Revised | | Actual | |
|------------------------|---------|------|---------|------|--------|------|
| | Weeks | US\$ | Weeks | US\$ | Weeks | US\$ |
| Through Appraisal | n.a. | n.a. | n.a. | n.a. | 48.7 | n.a. |
| Appraisal - Board | n.a. | n.a. | n.a. | n.a. | 51.3 | n.a. |
| Supervision | 61 | n.a. | 71.9 | n.a. | 56.2 | n.a. |
| Completion | 10 | n.a. | - | n.a. | 12 | n.a. |
| TOTAL | ... | ... | ... | ... | 156.2 | ... |

Table 13: Bank Resources: Missions

| Stage of Project cycle | Month/ year | Number of persons | Days in field | Specialized Staff Skills Represented | Implementation Status | Development Impact | Types of Problems |
|--------------------------------|----------------|----------------------|------------------|---|--------------------------|-----------------------|----------------------|
| Identification/ Preparation | March 1985 | 3 | NA | - | | | |
| | May 1986 | 3 | NA | - | | | |
| | Oct. 1986 | 6 | 17 | TM,Fo,Pa,Mec,Eco | | | |
| Appraisal | Dec. 1986 | 7 | 20 | TM, Fo, Pa, Mec, Eco, Cn. | | | |
| Supervision | Oct. 1987 | 3 | 17 | TM,Ex,Mec | 1 | 1 | T |
| | Apr. 1988 | 3 | 13 | TM,Ex,Pa. | 2 | 1 | M |
| | Jul. 1988 | 1 | 5 | TM | 1 | 1 | M |
| | Nov. 1988 | 1 | 19 | TM | 1 | 1 | T |
| | May 1989 | 1 | 7 | TM | 1 | 1 | T |
| | Dec. 1989 | 2 | 11 | TM,Cn | 1 | 1 | M |
| | May 1990 | 2 | 13 | TM,Ex | 1 | 1 | - |
| | Nov. 1990 | 3 | 12 | TM,Fo, Pa. | 2 | 1 | T |
| | Jun. 1991 | 1 | 10 | TM | 1 | 1 | M-T |
| | Dec. 1991 | 2 | 13 | TM,Fo | 2 | 2 | M |
| | May 1992 | 1 | 9 | TM | 1 | 1 | - |
| | Sept. 1992 | 1 | NA | TM | 1 | 1 | - |
| | March 1993 | 1 | NA | TM | 1 | 1 | - |
| | Aug. 1993 | 1 | NA | TM | 1 | 1 | - |
| | Oct. 1993 | 1 | 10 | TM | 1 | 1 | - |
| | Feb. 1994 | 1 | NA | TM | 1 | 1 | - |
| | June 1994 | 1 | NA | TM | 1 | 1 | - |
| Oct. 1994 | 1 | NA | TM | 1 | 1 | - | |
| Apr. 1995 | 1 | 11 | TM | 1 | 1 | - | |
| Completion | June 1995 | 3 | 12 | Fo,Eco,Pa. | - | - | - |

Note: Ex: Forest Exploitation; Mec: Forest Mechanisation; Pa: Pasture Management; Nc: Nature conservation; Fo: Forestry; TM: Project Task Manager.

Type of Problems: F: Financial; M: Management; T: Technical.

NA = Not available because the supervision mission was included in the supervision of the second forestry development project.

Appendice A Aide-mémoire

A. Introduction

Une mission du Centre d'investissement de la FAO constituée de Mrs. J.L. Blanchet (Forestier, chef de mission), J.M. Bisson (Economiste) et D. Crespo (Agrostologue) s'est rendue en Tunisie du 12 Juin au 23 Juin 1995 en vue de préparer le rapport d'achèvement du Premier Projet de Développement Forestier (PDF). La mission a discuté des objectifs du rapport d'achèvement avec le Directeur Général des Forêts et a travaillé en collaboration étroite avec les membres du Bureau de Gestion du Projet ainsi que l'Institut de Recherche Forestière. La mission a pu visiter différents sites du projet dans les arrondissements de Kasserine, El Kef, Béja et Bizerte.

La mission tient à remercier les agents de la Direction Générale des Forêts et autres personnes rencontrées, ainsi que la représentation de la FAO à Tunis, pour leur accueil et leur collaboration.

B. Le contexte

Le Premier Projet de Développement Forestier (PDF1) a été évalué en novembre 1986; l'Accord de Prêt a été signé le 28 septembre 1987 et mis en vigueur depuis le 28 avril 1988. Le coût total du projet était estimé à US\$ 50.2 millions dont la composante Prêt BIRD n° 2870 était de US\$ 20 millions. La durée du projet est de 7 ans avec la date de fin des opérations fixée au 31-12-1994 et la date de clôture du Prêt au 31-12-1995.

Un Deuxième Projet de Développement Forestier (PDF2) a été évalué en avril 1993. Il est signé depuis le mois de septembre 1993 et mis en vigueur à partir d'avril 1994. Le coût total du projet s'élève à US\$ 148,1 millions dont US\$ 69 millions sous forme de Prêt de la Banque Mondiale et la NIB-NDF.

C. Les objectifs et résultats du premier projet

Les objectifs généraux du projet définis par le Staff Appraisal Report sont: a) l'augmentation de la production de bois de chauffage et d'industrie; b) l'amélioration des pâturages forestiers et de leur gestion; c) la réduction de l'érosion et l'augmentation de la rétention en eau des sols; d) la conservation et la protection de la nature et de la faune sauvage.

D'une façon générale, les objectifs du projet ont été atteints: la production nationale de bois de chauffage et d'industrie est passée de 125.000 m³ à plus de 260.000 m³ et les plantations comme les travaux d'amélioration des peuplements devraient apporter à terme du bois d'oeuvre; les pâturages forestiers ont été améliorés sans toutefois apporter de solutions aux

problèmes de leur gestion; l'ensemble des interventions faites en forêt participent à la protection des sols; le projet a participé activement au contrôle et à la surveillance de la faune ainsi qu'à la sensibilisation de la population pour la conservation de la nature.

Les coûts totaux du projet s'élèvent à US\$ 40.3 millions dont US\$ 18.1 millions ont été déboursés sur le prêt.

Les aspects sectoriels

Les résultats sectoriels du projet sont remarquables. Le projet a introduit de nouvelles approches de travail en augmentant la participation du secteur privé dans les activités forestières. En outre, le projet a favorisé le développement de nouvelles techniques telles la préparation mécanique du sol, la réalisation d'un inventaire national et la préparation d'un Plan de Développement des Ressources Forestières et Pastorales, l'amélioration des pâturages, etc, et l'utilisation d'une approche commerciale aux activités forestières. Le projet a créé un dynamisme de développement à l'intérieur du secteur forestier.

Les aspects économiques et financiers

Les résultats économiques et financiers ne sont pas encore clairement établis. Les premières estimations montrent que les investissements ne pourront être économiquement rentables qu'à long terme; le Gouvernement se donne cependant les moyens d'avoir une forêt productive et en bon état.

En introduisant l'idée d'exploiter les bois sur une base plus commerciale et de réduire les coûts de production des travaux forestiers (éclaircie, production des plants en pépinière), le projet participe à la réduction du déficit budgétaire pour le secteur.

Le développement institutionnel

Le projet a fourni des moyens logistiques importants (véhicules, matériel) comme appui à l'aménagement, pour l'amélioration et l'intensification des opérations sylvicoles et la conservation de la nature. La formation ainsi que les expertises-assistances techniques ont été dans l'ensemble jugées satisfaisantes mais les résultats et recommandations données par certaines de celles-ci ne semblent pas avoir été exploitées à fond.

Le projet a développé un système de suivi-évaluation qu'il faut maintenant utiliser à plein. Il est nécessaire de se concentrer à présent sur le renforcement de la capacité de gestion du secteur plutôt que sur le développement technique.

Le projet a soutenu une recherche d'accompagnement dont le programme devra être renforcé et mieux précisé à l'avenir. Un inventaire sylvo-pastoral national a été réalisé; une stratégie de développement pastoral est prête; la stratégie forestière doit être finalisée sans

retard. Le cadre légal du secteur forestier a été modifié mais il demande encore des améliorations (voir point E).

Les réalisations physiques

Les réalisations physiques (opérations de terrain) ont des résultats mitigés pour les plantations mécanisées (4.880 ha réalisés pour 8.100 ha prévus), l'amélioration des parcours (3.002 ha pour 3.645 ha prévus) et les travaux de régénération (16.287 ha pour 21.500 ha prévus). Le taux d'exécution global est estimé à 60-70 %. Les écarts sont en partie justifiés par la nature pilote de ces opérations. Les programmes d'éclaircie (45.437 ha pour 50.000 ha prévus), de plantations de berges d'oueds (2.608 ha pour 2.600 ha prévus) sont satisfaisants.

Les aspects sociaux et environnementaux

Les impacts du projet sur les populations vivant autour des forêts, sur les exploitants et les industriels du bois ainsi que sur le personnel du département seront évalués en même temps que les effets sur l'environnement par une étude spécifique. Cette étude, commencée le 14 juin 1995, devrait remettre ses résultats en décembre 1995.

La promotion du secteur privé

Le projet a eu un impact significatif sur le développement du secteur privé dans le contexte forestier. Le volume exploité par le secteur privé par la vente de bois sur pied par adjudication représente 70% de la production totale et atteint les objectifs assignés par le projet tandis que 16% de la production est générée par environ 50 nouvelles unités d'exploitation créées dans le cadre du projet.

D. Les principaux facteurs qui ont affectés le projet

1) Facteurs non sujets au contrôle du Gouvernement

- La sécheresse qui a sévi en 1993 et 1994 a retardé les programmes de plantations mécanisées.

2) Facteurs sujets au contrôle du Gouvernement

- La restructuration en 1992 du Ministère de l'Agriculture accompagnée de mutations diverses du personnel de la DGF (chefs d'arrondissements forestiers et agents techniques) a eu des effets négatifs sur la réalisation des programmes d'activités dans les arrondissements.

- Le recrutement tardif de techniciens forestiers a retardé les opérations de martelage des arbres et par suite les travaux d'éclaircie et de régénération des peuplements.

3) Facteurs sujets au contrôle de l'agence d'exécution.

- La sélection malheureuse d'une société d'assistance technique pour l'inventaire et d'une société de travaux de terrain qui ont causés des problèmes importants dans l'exécution des composantes concernées.
- Une utilisation insuffisante du système de suivi-évaluation en place qui entraîné une perte d'efficacité de gestion. Cette situation est compliquée par le fait que la formulation du projet laisse à désirer sur certains points comme le montage institutionnel et les aspects sociaux qui n'ont pas été suffisamment analysés.

E. La "durabilité" du projet

La durabilité des activités d'amélioration des peuplements forestiers du premier projet dépend presque entièrement de la bonne exécution du deuxième projet. Cette première phase a un caractère pilote; elle a tenté de fixer ces conditions de durabilité. La deuxième phase devrait voir l'entreprise privée devenir de plus en plus efficace jusqu'à ce que le coût des opérations forestières soit couvert par les ventes de produits. La durabilité des opérations forestières sera d'autant mieux garantie que la rentabilité financière et économique de celles-ci sera grande. Un équilibre entre ces deux éléments assure la réalisation des travaux, l'opportunité d'emploi et le développement des entreprises privées.

Concernant les nouvelles plantations, il est impératif d'assurer les premiers entretiens durant une période suffisante (3 ans) pour assurer une reprise et une croissance optimum des plants. Ces plantations doivent être intégrées dans un plan d'aménagement. Les premiers dégagements et éclaircies devraient être réalisés durant la deuxième phase du projet. La protection anti-incendie doit être organisée ou renforcée dans les zones reboisées mécaniquement.

Les travaux d'amélioration des pâturages représentent un effort important mais il reste encore beaucoup à faire pour assurer la durabilité de cette opération. Il faudra étudier de façon approfondie les conditions socio-économiques des populations et repenser les relations institutionnelles entre l'élevage et la forêt. Egalement, la structure de tarification de l'usage des différents types de pâturages devra être reformulée. La participation d'organisations non-gouvernementales serait souhaitable dans ce domaine.

La durabilité de l'inventaire forestier sera assurée par son utilisation et son actualisation. Une planification nationale des exploitations et autres opérations forestières devrait faciliter les prévisions budgétaires. Une stratégie de mise à jour accompagnée d'une proposition budgétaire pour cette activité qui n'est pas financée par la deuxième phase doit être déterminée avant la fin 1995.

F. Les principales leçons du 1er projet

Une expérience importante a été accumulée durant le premier projet dans les domaines techniques (mécanisation des opérations sylvicoles, valorisation du bois), de gestion (appels d'offre, suivi-évaluation, nécessité d'une meilleure connaissance des conditions socio-économiques, petites entreprises), de l'organisation (BGP) et de la coordination entre secteurs (Comité de Coordination forestier). Les leçons acquises ont déjà été intégrées dans le deuxième projet.

La mission d'achèvement du premier projet confirme les leçons précédentes et ajoute les éléments suivants qui devraient être prises en compte lors de l'évaluation à mi-parcours du deuxième projet forestier:

- Le Bureau de Gestion du Projet doit être renforcé pour lui permettre de traiter régulièrement et pleinement les informations techniques et financières recues et de les utiliser comme outil de gestion. La mission s'inquiète du suivi-évaluation du PDF2 vu que ce projet est plus important que le premier et vu que le suivi-évaluation du PDF1 connaît déjà certaines difficultés.
- Le montage institutionnel de l'agence d'exécution devrait être reformulé afin de tenir compte de la vocation commerciale qui lui est attribuée et lui donner une plus grande autonomie opérationnelle et financière.
- Les aspects institutionnels relatifs à l'élevage et aux pâturages devraient être également analysés et reformulés afin de créer une articulation fonctionnelle entre toutes les parties intéressées dans ces domaines.

Les formations et les expertises ne sont pas valorisées pleinement. Les raisons sont nombreuses, difficiles à cerner. Ces raisons méritent cependant d'être étudiées sérieusement pour savoir comment améliorer cette situation lors de l'évaluation à mi-parcours du deuxième projet.

Les deux projets se concentrent sur des opérations à haute intensité de capital. Or l'expérience montre que ces opérations sont technologiquement et sociologiquement peu viables en certains endroits. La mission recommande que, dans le cadre du PDF2, les diverses

possibilités existant entre les extrêmes: opérations à haute intensité de main d'oeuvre et opérations à haute intensité de capital, soient étudiées.

G. Suite à donner

De retour à Rome, la mission va rédiger le rapport d'achèvement du premier projet de développement forestier. Ce rapport sera soumis à l'approbation de la Banque Mondiale. Les résultats de l'étude d'impact du projet actuellement en cours seront intégrés dans le rapport d'achèvement de la partie tunisienne.

Appendix B: Financial and Economic Analysis

A. Financial Analysis

1. The total project costs and their financing are given in Tables 8A and 8B of Part II^{1/}. The following is simply to give the main assumptions used in the calculations. FD never kept track of the project costs as laid out in Table 8A, mainly because of the absence of a proper monitoring/evaluation system. As a result, all the recurrent costs had to be reconstructed during the mission's visit, mainly on the basis of the staff's best estimates and recollections. The value of the Government's contribution in dinars has been converted into dollars at the average exchange rate of D 0.9413 = US\$ 1.00. This constitutes the average of the annual rates, weighted by the respective annual disbursements over the project implementation period.

2. Although the project must be seen as a pilot exercise whose main achievement has been to introduce more progressive (commercial-oriented) policies and managerial practices, it is still worthwhile to discuss briefly the financial viability of the main activities. As of now, the nurseries are not financially viable because: (a) FD sees them as a means of disseminating improved planting material and, to this end, distributes for free a non-negligible part of the production each year (about 1/3), and (b) the standard price for forestry plants has been D 0.050 per unit until recently, whereas the (direct) production cost was of the order of D 0.150 per unit. Therefore, plant production from the nurseries has constituted a net drain on FD's budget. The project, however, has resulted in reducing the operating deficit through specific investments (see para 4).

3. Table 1 illustrates the impact of the main commercial-type of activities on the FD's budget. The deficit generated by the thinning operations is gradually decreasing through the project's investment period, to D 117 thousand in 1994. This is due to the increasing involvement of the private enterprises which are also becoming more efficient with time. In accordance with one of the loan conditions for the project (Section 5.03c), FD revised upward, in January 1995 (one month after project completion), the official prices for the products originating from the state forests. Assuming that the quantities of wood thinned would be the same as in 1994, FD would then register a surplus of D 121 thousand in 1995. As a result, it is likely that the thinning operations will be profitable for FD in the future.

4. Much of the cutting operations (regeneration/maquis) are carried out under bidding ("adjudication"). Along with the sales of pine cones to individuals (for further processing by them into seeds), the "redevances" constitute revenues which did not take place before and are

^{1/} All the tables presented in this appendix are in French because they were constructed and discussed with the Tunisians during the mission's visit.

almost entirely due to the project; D 413 thousand (355 + 58) in 1994. The financial benefits (deficit reduction) from the nurseries come from the sales of the plants (which was not the normal practice before) and from the savings in the production costs (through the introduction of cement tanks which practically eliminates the need for weeding). These benefits were equivalent to D 256 thousand in 1994. The cumulative cash flow for all the activities covered in Table 1 is positive throughout the project's investment period.

5. Obviously, the project's overall impact on the public finance is negative since the Government's total contribution (net of taxes/duties) was almost D 15 million (US\$ 15.9 million). However, the commercial-type of activities, taken as a group, are self-financing and could be individually so if and when the nurseries are managed on a more commercial basis. The important point is that the financial sustainability of the activities is likely as long as FD is given back, through its annual budget allocations, the equivalent of the revenues generated. In the long term, the sustainability would be better assured if FD were given a legal status more in line with its commercial vocation (ie. status of a semi-autonomous entity).

6. Finally, as already mentioned in paragraph 3, the project has resulted in a 1995 upward revision of FD's official sales prices for the products originating from the state forests and ranging from nursery plants, to sawlog and pine cones. For illustrative purposes, the 1995 price raises applied to the product quantities given in Table 1 for 1994 would have resulted in a cash flow increase for 1995 of D 266 thousand (808 - 542). This brings the commercial value of the state products in line with the private market and will reinforce the financial sustainability of FD's future operations.

7. A limited financial analysis of the mechanized and riverain plantations was carried out and is briefly discussed in the Working Paper. The main observation is that the possible financial rates of return for both types of plantations will probably be attractive in the future - ie. well above 10%, considered to be the opportunity cost of capital in real terms - for the following reasons: (a) the private enterprises increasingly involved in the thinning/cutting (and eventually planting) works are gradually becoming more sophisticated/efficient, and (b) some of the (indirect) investment costs, specially concerning the technical assistance/training, will be substantially lower in next phases. Consequently, it is realistic to envisage a situation (relatively soon) where the establishment of plantations will be financially profitable, particularly in the case of riverain plantations where the production/revenues materialize earlier in the inflows stream, with a greater present value.

8. The establishment of improved and permanent pastures was part of the project. Because of the absence of proper monitoring, the information available on the progress achieved under this component is very sketchy. Nevertheless, a number of observations can be made concerning the financial viability of establishing pastures. With the 1995 revision of FD's official prices, the "redevances" for using the improved/permanent pastures are D2.5/head/month for cattle and D2/head/month for small ruminants. This seems to discriminate heavily against the owners of small ruminants since it takes around five heads of small ruminants to graze the

equivalent (per ha) of one head of cattle. Furthermore, the cost of maintaining such pastures is roughly estimated at D35/ha/year plus the cost of the fence amortized over 10 years (D10/year). The total maintenance cost would then be D45/ha/year (35 + 10) and could not be recovered with cattle which would bring only a maximum of D30 (2.5 for one head X 12 months) per ha. The financial gap is even larger for improved (non-permanent) pastures. In addition, the "redevances" are on a monthly basis, practically eliminating the possibility of removing the livestock during the month if the carrying capacity is found to be exceeded. These simple calculations suggest that the structure of the "redevances" must be totally reexamined if the establishment/maintenance of pastures are to become financially sustainable, if and when the many technical and institutional problems now being experienced are resolved.

B. Economic Analysis

9. Table 2 gives the estimated economic cash flows for the project as a whole, in thousands of dinars of 1995, and the resulting rate of return. The main assumptions are as follows. In the case of wood production; the production estimates are given in Table 3, the economic (import parity) prices used are shown in Table 4 and were calculated on the basis of current CIF prices in dinars as observed in Tunis^{1/}. In the case of almonds and bee-keeping products, the current market prices were used as reliable proxies of the economic values. The project revenues and costs, prior to 1995, were inflated using the composite indexes described in the Working Paper. To take into account the evident surplus of manual/daily labour on the free market, all such labour in the investment and maintenance costs was shadow-priced at the level of 70% of the officially paid salary, the latter being slightly more than 3 D/day. The operating costs, after the investment period, are estimated at 20% of those in 1994, the last year of investment. The replacement costs are estimated at 10% (per year) of the total investments (over the seven years) in vehicles and equipment.

10. The economic rate of return is 9% over 57 years. This rate is satisfactory considering that the ERR calculation, based on a conventional use of present values, tends to underestimate the future value of wood products as well as of any remaining standing trees. Obviously, the rate does not include the project's beneficial impact on the environment, particularly in terms of slowing/stopping soil erosion. This, in turn, will eventually lead to a larger agricultural production than would be the case otherwise. On the basis of the limited information available, it is practically impossible to estimate the opportunity costs of the yields losses due to erosion, flooding and reduced soil moisture, and which have been avoided with the project. However, a recent World Bank-financed study^{2/} demonstrated that rates of return of forestry projects can be substantially higher when all environmental/social benefits are taken into account. For example, in the case of the Bou Hertma region, which covers part of the project

^{1/} Tunisia is already importing forestry products. The foreign exchange rate is not shadow-priced.

^{2/} Analyse couts-avantages des projets de développement forestier et de conservation des eaux et des sols, Italeco, Décembre 1994.

area, the study estimated at 20% the overall economic rate of return of various selected forestry investments using the conventional method of calculation, and at 28% using the FORCES-MOD method to capture the non-directly quantifiable benefits (including environmental). The 9% base rate should therefore be considered as a minimum.

11. The base rate is relatively insensitive to revenue and cost variations. For instance, an increase of 25% in the revenues would bring the rate up to "only" 11%, the same level as with a decrease of 25% in the costs. Among the revenues, sales from wood production are the most important and there is a concern that future thinning operations might not be undertaken because of the low-quality/unattractiveness of the resulting wood. A sensitivity analysis was carried out assuming that all the wood from the first (next) production cycle of pine, eucalyptus and poplar for chipwood/poles is from thinning^{1/}. It is expected that all the project's wood production, afterwards, would decline due to tree stunting in the absence of thinning. Assuming that half the wood from thinning will not materialize and that all wood production will decline by 20% afterwards, the rate of return would still be at an acceptable level of 7%. Assuming that no thinning will take place and that all wood production will decline by 40% afterwards, the rate is 6%. The project's overall economic viability is therefore not greatly affected by future thinning operations, particularly when taking into account the non-directly quantifiable benefits.

12. It must be pointed out that the base rate of 9% is half the ERR estimated in the SAR. The main reason for the lower economic (directly quantifiable) returns in the ICR is the assumptions made for the production buildup which are less optimistic than in the SAR but more in line with those used for the formulation of Phase II of the Forestry Development Project. Another important reason is the fact that only 60% of the 8,100 ha under the mechanized plantations program and 76% of the 21,500 ha under the forest regeneration program were covered. These shortcomings are not compensated by the 20% shortfall in the project costs .

13. In addition to the economic revenues previously discussed, there are other benefits which are much more difficult to evaluate. About 4.8 million person-days of manual/field work were contracted under the project, for various activities such as tree thinning and cutting (for regeneration). Close to D 13 million of daily salaries - equivalent to almost US\$ 14 million - was paid for the work, which must have generated even more jobs and incomes (through a multiplier effect) in the economy. Furthermore, the project has been successful at promoting the private sector in forestry. Some 50 small enterprises, with an average of ten employees each, are now involved in forestry activities such as thinning. These enterprises already account for 16% of the national wood production. It is estimated that roughly half of the 16% has been financed directly through the project since 1988. In addition to increasing the efficiency/profitability of forestry operations, these enterprises are also generating jobs and incomes in the country.

^{1/} 1998-2003 for pine, 2000-6 for eucalyptus and 2004-9 for poplar (see Table 2).

APPENDIX C: ADDITIONAL TABLES ON PHYSICAL RESULTS

Table 1. Mechanized Plantation (ha)

| | Prévision (ha) | 88 | 89 | 90 | 91 | 92 | 93 | 94 | Total |
|---------------------|-------------------|----|--------------|----|--------------|----|----|---------------------|--------------|
| Tegma | 800 | | 343 | | 0 | | | 27 | 370 |
| Sedjenane (Bizerte) | 4,600 | | 794 | | 923 | | | 743 | 2,460 |
| Nefza (Beja) | 2,700 | | 320 | | 650 | | | 1,080 ^{1/} | 2,050 |
| Total: | 8,100 | | 1,457 | | 1,573 | | | 1,850 | 4,880 |

Table 2. Riverain Plantations (ha)

| | Prévision | 88 | 89 | 90 | 91 | 92 | 93 | 94 | Total |
|---------------|--------------|----|------------|------------|------------|------------|------------|------------|--------------|
| Jendouba | 1,900 | | 140 | 205 | 184 | 400 | 450 | 336 | 1,715 |
| Aïn Draham | 250 | | 37 | 158 | 55 | 64 | 103 | 0 | 417 |
| Beja | 450 | | 52 | 96 | 111 | 96 | 57 | 646 | 476 |
| Total: | 2,600 | | 229 | 459 | 350 | 560 | 610 | 400 | 2,608 |

Table 3. Forest Regeneration (ha)

| | Type | Prévision | 88 | 89 | 90 | 91 | 92 | 93 | 94 | Total |
|------------------------|--------------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|------------|---------------|
| OAK | Seeding | 4,950 | - | - | 623 | 823 | 81 | 268 | 342 | 2,137 |
| Arrondissement: | | | | | | | | | | |
| Aïn Draham | Coppice | 2,550 | - | - | 80 | 340 | 62 | 90 | 155 | 727 |
| Jendouba | | | | | | | | | | |
| PINE | Seeding | 3,300 | 1,063 | 2,957 | 3,053 | 1,729 | 1,597 | 2,161 | 250 | 12,810 |
| Arrondissement: | | | | | | | | | | |
| Le Kef | Plantation | 700 | 20 | 154 | 65 | 190 | 89 | 95 | 0 | 613 |
| Kasserine | | | | | | | | | | |
| | Total | 21,500 | 1,083 | 3,111 | 3,826 | 3,082 | 1,829 | 2,614 | 747 | 16,287 |

^{1/} 140 ha planted in 1995.

Table 4. Thinning Operations (in ha)

| Arrondissement | Prévisions | Annual Realizations | | | | | | | Total |
|----------------|------------------------|---------------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|
| | Quantités totales (ha) | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | |
| Tunis | 880 | | 65 | 220 | 290 | 250 | 500 | 250 | 1 575 |
| Ariana | 6 143 | | 998 | 1 153 | 1 032 | 1 273 | 1 059 | 1 112 | 6 627 |
| Béja | 3 746 | | 209 | 527 | 518 | 141 | 784 | 710 | 2 889 |
| Ben Arous | 1 324 | | 78 | 149 | 252 | 327 | 315 | 500 | 1 621 |
| Bizerte | 5 845 | | 153 | 1 573 | 1 381 | 1 223 | 404 | 300 | 5 034 |
| Nabeul | 3 586 | | 60 | 845 | 703 | 611 | 831 | 119 | 3 169 |
| Jendouba | 3 166 | | 114 | 898 | 646 | 458 | 376 | 407 | 2 899 |
| Aïn Draham | 7 929 | | 825 | 1 116 | 1 034 | 511 | 1 058 | 822 | 5 366 |
| Le Kef | 3 194 | | 0 | 530 | 755 | 486 | 1 413 | 749 | 3 933 |
| Kairouan | 2 287 | | 156 | 180 | 420 | 367 | 580 | 205 | 1 908 |
| Siliana | 8 855 | | 79 | 1 614 | 2 160 | 868 | 1 501 | 1 200 | 7 422 |
| Zaghouan | 3 045 | | 437 | 431 | 300 | 556 | 894 | 376 | 2 994 |
| Totaux | 50 000 | 0 | 3 174 | 9 236 | 9 491 | 7 071 | 9 715 | 6 750 | 45 437 |

Table 5. Project Supported Nurseries

A. Forest Nurseries: Total Seedlings Produced and Total Seedlings Sold in Nurseries Supported by the Project

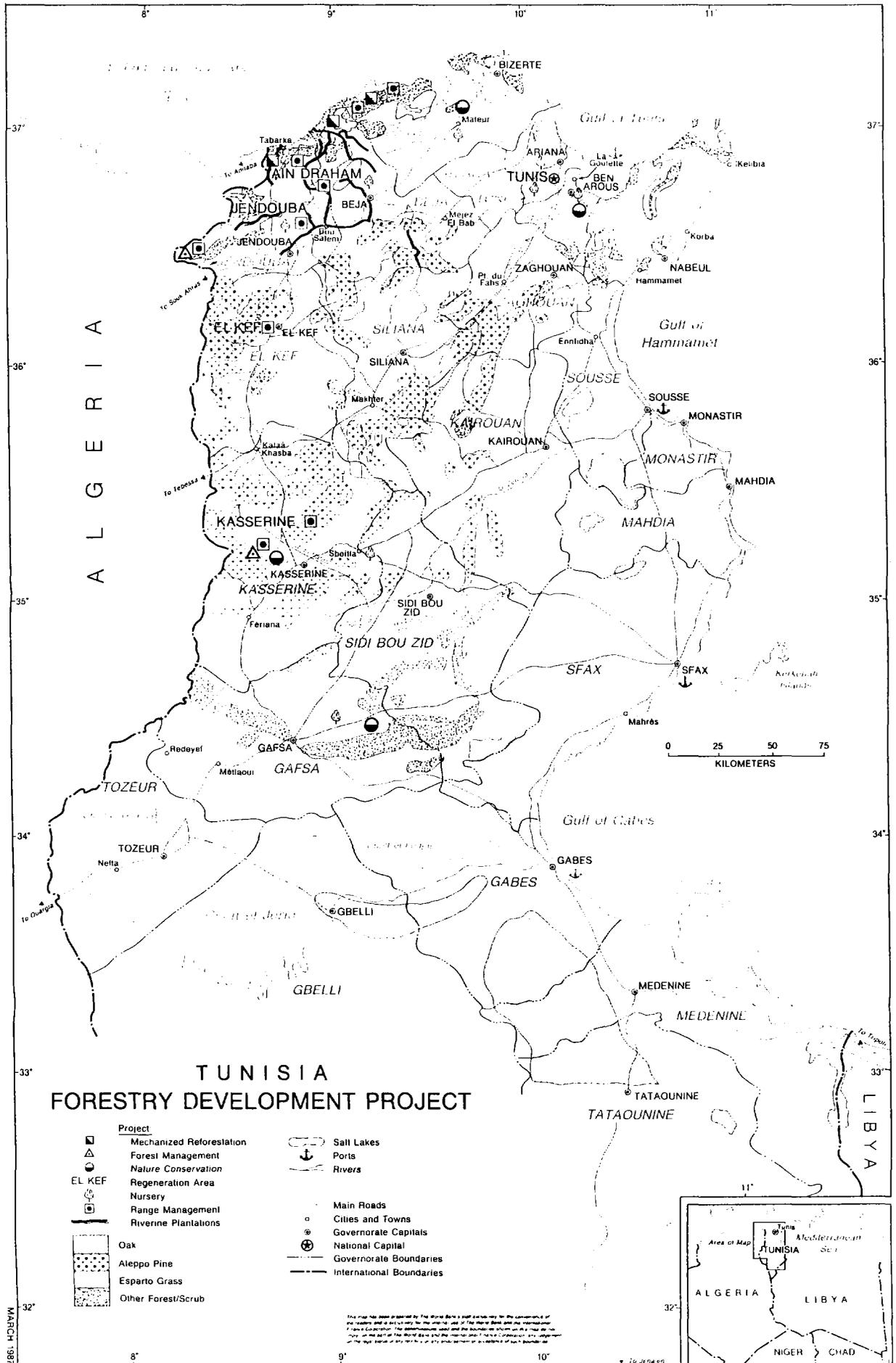
| Arrondissement | Pépinère | 1989 | | 1990 | | 1991 | | 1992 | | 1993 | | 1994 | |
|----------------|-------------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|-----------|--------|
| | | Total | Privés | Total | Privés |
| Kasserine | Kasserine | 360,000 | 30,000 | 720,000 | 55,000 | 755,000 | 50,000 | 685,000 | 65,000 | 930,000 | 70,000 | 650,000 | 80,000 |
| Gafsa | Gafsa | 360,000 | 30,000 | 800,000 | 35,000 | 680,000 | 40,000 | 545,000 | 35,000 | 560,000 | 40,000 | 360,000 | 40,000 |
| Tunis | El agba | 20,000 | 5,000 | 22,000 | 5,000 | 110,000 | 25,000 | 135,000 | 25,000 | 150,000 | 30,000 | 200,000 | 35,000 |
| Ben Arous | Mornag | 120,000 | 20,000 | 145,000 | 25,000 | 250,000 | 25,000 | 195,000 | 30,000 | 230,000 | 35,000 | 300,000 | 40,000 |
| Bizerte | Mateur | 200,000 | 25,000 | 255,000 | 25,000 | 570,000 | 30,000 | 600,000 | 25,000 | 920,000 | 40,000 | 1,230,000 | 45,000 |
| Ariana | Borj I amri | 680,000 | 50,000 | 800,000 | 55,000 | 830,000 | 60,000 | 690,000 | 65,000 | 790,000 | 60,000 | 555,000 | 45,000 |
| | Sadkia | | 0 | 0 | 0 | 11,000 | 11,000 | 25,000 | 25,000 | 18,000 | 18,000 | 70,000 | 70,000 |

B. Project Nurseries: Total Seedlings Produced

| Arrondissement | Pépinère | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 |
|----------------|--------------|-----------|-----------|-----------|-----------|---------|-----------|
| | | Total | Total | Total | Total | Total | Total |
| Bizerte | Tamera | 1,600,000 | 1,170,000 | 990,000 | 1,000,000 | 945,000 | 1,630,000 |
| | Béja | 450,000 | 485,000 | 600,000 | 730,000 | 680,000 | 730,000 |
| Beja | Ouechtata | 800,000 | 765,000 | 1,070,000 | 1,160,000 | 121,000 | 1,060,000 |
| | Dmaien | 250,000 | 255,000 | 360,000 | 435,000 | 675,000 | 455,000 |
| Aïn Draham | Guelta safra | 275,000 | 325,000 | 485,000 | 645,000 | 460,000 | 460,000 |
| | Majen essef | 237,000 | 51,000 | 215,000 | 140,000 | 190,000 | 240,000 |

Table 6. Pasture and Natural Range Improvements

| | Projection | Achievement | (%) |
|--|-------------|-------------|-------|
| 1. Permanent pasture of the humid and sub-humid area (before covered with dense shrubs, with a productivity of 100-400 FU/ha/year) | | | |
| . Area (ha) | 700 | 554 | 79 |
| . Yield (FU/ha/yr) | 2,000 | 1,500 | 75 |
| . Carrying capacity (cattle units/yr) | 1 | 0.75 | |
| . Duration of grazing (days/yr): Year 1 | 100 | 30 | |
| . Duration of grazing (days/yr): Year 2 | 300 | 60-90 | |
| . Duration of the pasture (years) | 15 | 8 | |
| 2. Permanent pasture of the semi arid area (before covered with a scarce vegetation of shrubs, with a productivity of 100-200 FU/ha/year) | | | |
| . Area (ha) | 400 | 419 | 105 |
| . Yield (FU/ha/yr) | 600-1,200 | 500-1,000 | 83 |
| . Carrying capacity (cattle units/yr) | 0.3-0.6 | 0.25-0.5 | |
| . Duration of grazing (days/yr): Year 1 | n.a. | 0-30 | |
| . Duration of grazing (days/yr): Year 2 | 200 | 30-90 | |
| . Duration of the pasture | 15 | 3-6 | |
| 3. Improved native pastures rehabilitation of poor pastures 950-200 FU/ha/yr) | | | |
| . Area (ha) | 2,180 | 1,664 | 76 |
| . Yield (FU/ha/yr) | 400-1,200 | 300-900 | 75 |
| . Carrying capacity (cattle units/yr) | 0.2-0.6 | 0.15-0.45 | |
| . Duration of grazing (days/yr) | 300 | 60-120 | |
| 4. Acacia Plantations | | | |
| . Area (ha) | 165 | 87 | 53 |
| . Yield (FU/ha/yr after Years 3-4) | 1,200-2,500 | 800-1,500 | 60-66 |
| 5. Cactus Plantations | | | |
| . Area (ha) | 200 | 278 | 139 |
| . Yield (FU/ha/yr after Years 3-4) | 1,200 | 600-1,000 | 50-83 |
| TOTAL: | | | |
| Area (ha) | 3,645 | 3,002 | 82 |
| T. Yield (1000 FU) | 4,049 | 2,466 | 61 |



MARCH 1987

IBRD 19893

This map has been prepared by The World Bank's staff exclusively for the convenience of the readers and is not to be used for any other purpose. The World Bank does not warrant the accuracy, completeness, or timeliness of the information shown on this map. It is not to be used as a basis for any legal or other action. The World Bank is not responsible for any damage or loss resulting from the use of this map.

IMAGING

Report No: 15786
Type: ICR