

Document of
The World Bank

FOR OFFICIAL USE ONLY

Report No. 11618-TUN

STAFF APPRAISAL REPORT

REPUBLIC OF TUNISIA

SECOND FORESTRY DEVELOPMENT PROJECT

APRIL 16, 1993

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

(January 1993)

Currency Unit	=	Tunisian Dinar (D)
US\$1.00	=	D 0.9
D 1.00	=	US\$1.11

WEIGHTS AND MEASURES

The metric system is used throughout this report

GLOSSARY OF ABBREVIATIONS

AFIC	-	Forestry Association of Collective Interest (Association Forestière d'Intérêt Collectif)
AFVA	-	Agricultural Extension and Training Agency (Agence de la Vulgarisation et de la Formation Agricoles)
CFPR	-	Professional Training Center of Remel (Centre de Formation Professionnelle de Remel)
CRDA	-	Regional Agricultural Development Commission (Commissariat Régional de Développement Agricole)
CRIP	-	Center of Pedagogic Research and Engineering (Centre de Recherche et d'Ingénierie Pédagogique)
CTS	-	Monitoring Technical Committee (Comité Technique de Suivi)
DGF	-	Directorate General of Forests (Direction Générale des Forêts)
DGFE	-	Directorate General of Financing and Promotion (Direction Générale du Financement et des Encouragements)
DREF	-	Directorate of Forest Exploitation (Régie d'Exploitation Forestière)
FC	-	Forestry Code (Code Forestier)
FCC	-	Forestry Coordination Committee (Comité de Coordination Forestière)
FSP	-	Sylvo-Pastoral Fund (Fonds Sylvo-Pastoral)
INRF	-	National Institute of Forestry Research (Institut National de Recherche Forestière)
IRESA	-	Institute of Agricultural Research and Higher Education (Institution de Recherche et de l'Enseignement Supérieur Agricoles)
MFPE	-	Ministry of Professional Training and Employment (Ministère de la Formation Professionnelle et de l'Emploi)
MOA	-	Ministry of Agriculture (Ministère de l'Agriculture)
MPRD	-	Ministry of Planning and Regional Development (Ministère du Plan et du Développement Régional)
NFE	-	National Forest Estate (Domaine Forestier de l'Etat)
NGO	-	Non-Governmental Agency (Organisation Non-Gouvernementale)
OEP	-	Livestock and Pasture Agency (Office de l'Elevage et du Pâturage)
PMU	-	Project Management Unit (Bureau de Gestion du Projet)
PDF1	-	First Forestry Development Project (Premier Project de Développement Forestier)
PDF2	-	Second Forestry Development Project (Deuxième Project de Développement Forestier)

GOVERNMENT OF REPUBLIC OF TUNISIA FISCAL YEAR

January 1 - December 31

REPUBLIC OF TUNISIA**SECOND FORESTRY DEVELOPMENT PROJECT****Loan Summary**

Borrower: Republic of Tunisia

Amount: US\$69 million equivalent

Terms: 17 years, including 5 years of grace, based on level repayment of principle

Project Description: To address growing demand for wood products in combination with acute environmental pressures, the Project promotes sustainable development and management of the Tunisian forests with active participation of forestry populations. To this end, the Project would include: (a) execution of infrastructure (firebreaks, housing, roads, observation towers), preparation of management plans covering 85,000 ha across sites selected for environmental services and production potential, silvicultural works for cork oak (5,000 ha) and of Aleppo pine (14,200 ha) regeneration, and thinning operations over 2,300 ha of cork oak coppices, 20,600 ha of young stands of natural aleppo pine, 7,900 ha of eucalyptus coppices, and 21,200 ha of pine plantation; (b) establishment of plantations (25,400 ha) on National Forest Estate, 4,100 ha of stream banks plantations for riparian protection, 500 ha of plantations on farmland, and establishment and improvement of nurseries; (c) establishment of prairies (1,550 ha), shrub plantations (7,150 ha), improved natural rangeland (2,350 ha), cactus plantations (1,550 ha), and rehabilitation of existing pastures (1,400 ha); a training and technical assistance program to help implement the component; (d) studies on fuel wood, wood processing, wood minor forest products, and provision of training programs in wood exploitation, treatment, and sawing; (e) strengthening the equipment of national parks and reserves and providing means to control and protect wildlife; (f) supporting the implementation of a research program focussing on testing forest bio-systems; (g) strengthening forest related institutions at central and regional levels to assist them in implementing the Project, including the carrying out of socio-economic studies and setting up integrated forest pilot operations with Non-Governmental agencies (NGOs) assistance.

Estimated Project Costs

	<i>Local</i>	<i>Foreign</i>	<i>Total</i>
	-----(<i>US\$ million</i>)-----		
Vehicles and equipment	2.0	2.8	4.8
Plantations and silvicultural works	57.1	32.6	89.7
Constructions and civil works	2.4	2.5	4.9
Training, technical assistance and pilot projects	5.9	4.0	9.9
Incremental operating costs	3.4	1.9	5.3
Total Base Costs	70.8	43.8	114.6
Physical contingencies	7.1	4.4	11.5
Price contingencies	16.3	5.7	22.0
Total Project Costs	94.2 /a	53.9	148.1

/a Including US\$25.4 million of taxes and duties

Financing Plan

	<i>Local</i>	<i>Foreign</i>	<i>Total</i>
	----- <i>US\$ million</i> -----		
World Bank	18.1	50.9	69.0
African Development Bank	-	0.7	0.7
Beneficiaries	4.2	-	4.2
Government	46.5	2.3	48.8
Net project Costs	68.8	53.9	122.7
Taxes and Duties	25.4	-	25.4
Total Project Costs	94.2	53.9	148.1

Estimated Disbursement

	<i>(US\$ million)</i>								
	<i>IBRD Fiscal Year</i>								
	<i>1994</i>	<i>1995</i>	<i>1996</i>	<i>1997</i>	<i>1998</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>
Annual	0.7	3.4	11.1	13.8	11.0	11.1	13.8	2.7	1.4
Cumulative	0.7	4.1	15.2	29.0	40.0	51.1	64.9	67.6	69.0

Economic Rate of Return: 13 percent
Staff Appraisal Report: No. 11618-TUN
Maps No.: IBRD 24535
 IBRD 24536

STAFF APPRAISAL REPORT

REPUBLIC OF TUNISIA

SECOND FORESTRY DEVELOPMENT PROJECT

Table of Contents

	<u>Page No.</u>
I. INTRODUCTION	1
II. THE FORESTRY SUB-SECTOR	2
A. Forestry in the Economy	2
B. Forest Resources	3
C. Forest, Environment, and Nature Protection	4
D. Forest Management and Exploitation	5
E. Research	6
F. Processing Forestry Products	6
G. Management and Institutional Framework	7
H. Development Objectives and Strategies	9
I. Investments in the Sub-sector	10
J. Constraints Relevant to the Project	11
III. BANK LENDING IN AGRICULTURE AND PAST PERFORMANCE	12
A. Past Lending in Agriculture	12
B. The Forestry Development Project (Loan 2870-TUN)	13
C. Lessons Learned	13
IV. THE PROJECT	14
A. Rationale for Bank Involvement	14
B. Concept and Objectives	14
C. Components	14
D. Detailed Features	15
E. Status of Design	18
F. Costs	18
G. Financing	20
H. Procurement	20
I. Disbursement	23
V. PROJECT IMPLEMENTATION	25
A. Organization, Management	25
B. Execution of Works; Purchase of Goods; Studies and Training	26
C. Monitoring and Evaluation	27
D. Accounts and Audit	27

This report is based on findings of an appraisal mission which visited Tunisia in December 1992, composed of Messrs. Carlos Góis (Task Manager), F. Wencelius, H. Stier and Ms. E. Kennedy (Bank), Messrs. El Adab, J. Gauthier, J. Marion, and B. Fabregues (Consultants)

Table of contents cont'd

	<u>Page No.</u>
VI. PRODUCTION, MARKETS, PRICES AND FINANCIAL RESULTS	28
A. Production	28
B. Markets	28
C. Prices	28
D. Impact on Government Budget and Cost Recovery	29
VII. BENEFITS AND JUSTIFICATION	30
A. Benefits and Beneficiaries	30
B. Economic Analysis	31
C. Project Impact	32
D. Risk and Sensitivity Analysis	33
E. Sustainability	34
F. Special Emphasis Programs	35
VIII. AGREEMENTS TO BE REACHED AND RECOMMENDATION	35

In-text Tables

Table 2.1: Wood Availability and Demand	3
Table 2.2: Forestry Development Objectives	10
Table 2.3: Investments in the Subsector	10
Table 4.1: Project Cost Summary	19
Table 4.2: Price Contingencies	20
Table 4.3: Project Financing	20
Table 4.4: Summary of Project Procurement Arrangements	22
Table 4.5: Disbursement Schedule	23
Table 4.6: Disbursement Categories	24
Table 6.1: Financial Prices for Selected Project Output	29
Table 6.2: Impact of Government Budget	29
Table 7.1: Economic Returns	31
Table 7.2: Sensitivity Analysis	34

Supporting Tables

Table 1: Project Components by Year	37
Table 2: Project Cost Summary	38
Table 3: Estimated Schedule of Disbursements	39
Table 4: Project Activities by Governorate	40
Table 5: Calculation of Stumpage Values for Pine Sawnwood	41
Table 6: Calculation of Stumpage Values for Pine Sawnwood	42
Table 7: Calculation of Stumpage Values for Pine Chipwood	43
Table 8: Calculation of Stumpage Values for Poplar Sawnwood	44
Table 9: Selected Documents and Data Available in the Project File	45
Table 10: Supervision Plan	46

Charts:	1. Implementation Schedule	47
	2. Organization Chart	48

Maps:	IBRD 24536 - Forest Cover and Project Activities
	IBRD 24535 - Bioclimatic Zones

Annexes in the Implementation Volume

- Annex 1: Cost Tables**
- Annex 2: Forest Management**
- Annex 3: Plantations**
- Annex 4: Forest Pasture and Range Improvement**
- Annex 5: Wood Exploitation and Value Enhancement**
- Annex 6: Nature Conservation**
- Annex 7: Forestry Research**
- Annex 8: Institutional Development**
- Annex 9: Financial and Economical Analysis**
- Annex 10: Project Monitoring**

STAFF APPRAISAL REPORT

REPUBLIC OF TUNISIA

SECOND FORESTRY DEVELOPMENT PROJECT

I. INTRODUCTION

1.01 In Tunisia, there are about 370,000 ha of natural forest and 290,000 ha of forest plantations. The total value of production of the sub-sector is estimated at about US\$110 million, 7 percent of the gross agriculture product or 1 percent of GNP. Along with increasing production, the Tunisian forestry strategy has supported development objectives of fighting erosion, conserving the nation's forest heritage, and improving the socio-economic conditions of population in forest areas. The production of industrial wood has increased significantly in recent years, but is only about 40 percent of the potential and only 50 percent of current demand. The deficit is met by imports worth about US\$110 million. Available fuel wood could meet demand regionally, but is not located where needed, which results in unbalanced use and threat to the environment. The Forestry Code (1988) focusses on measures to promote forest conservation, defines the national forest domain, specifies the rights of forestry users (about 800,000 people), promotes rangeland development and establishes rules for environment and wildlife protection. It is being implemented, but its impact on forest management is not yet significant. Indeed, some decrees necessary to the implementation of key Code provisions have still not been passed. Tunisia's diverse flora and fauna, including some globally threatened species, are benefitting from an increasing number of national parks and reserves. Efforts are being made to conserve natural habitats and to prevent deforestation and uncontrolled hunting. The forestry component of the 7th Development Plan (1987-1991) has mostly attained its physical goals; however, Tunisia still confronts forest loss in some areas. Government has embarked on an ambitious program (1990-2000) comprising reforestation, anti-desertification measures in the arid South, fodder plantation, range management, and soil and water conservation works. The 8th Development Plan (1992-1996) will finance a part of this program. The constraints hampering the development of the sector are more institutional and social rather than technical. Particular focus needs to be given to the participation of local population in planning, executing, and operating forestry development programs, for example to reduce human and cattle pressure on forest rangelands and to assist forest regeneration

1.02 In Tunisia, the only loan dealing exclusively with the forestry sector is the ongoing Forestry Development Project (PDF1). This project aims to establish the basis for the comprehensive conservation, development and use of Tunisia's forest resources and provides the technical and institutional basis for a larger operation in the future. It is being implemented satisfactorily. However, steps initiated with the PDF1 should be pursued and consolidated in particular concerning the integrated forestry development and active participation of the population. Also, measures to enhance the value of the Tunisian wood should be intensified and expanded.

1.03 The country assistance strategy identifies natural resource management and the environment as key development issues for Tunisia and on which the Bank will play a leadership role in helping the Government through lending, analytical work, and donor coordination. In view of the success of the PDF1, Government is strongly interested in continuing its relationship with the Bank and to benefit from its assistance in consolidating and expanding the sector, increasing the role of the private sector, strengthening users' associations, ensuring and strengthening the use of sound principles of environmental protection and conservation of natural resources.

1.04 In the light of the above, the Bank and the Government requested the FAO/CP to assist the Directorate General of Forests (DGF) in identifying and preparing the second Forestry Development Project (PDF2). The identification report (no. 77/91 CP-TUN) was issued on July 2, 1991. An FAO/CP preparation mission visited Tunisia in March 1992. Its final report (no. 114/92 CP-TUN) was issued on August 28, 1992 with the participation and subsequent review by the DGF. Government formally requested Bank financing of the PDF2 in March 1992 and has allocated funds to the Project in the 8th Development Plan. In October 1992, the Bank considered the Project ready for appraisal which took place in December 1992.

II. THE FORESTRY SUB-SECTOR

A. Forestry in the Economy¹

2.01 The national forest estate in Tunisia covers 900,000 ha, and comprises 368,400 ha of natural forest, 260,000 ha of plantations, and 271,600 ha of scrubs, esparto grass, and grazing land. In addition, there are about 30,000 ha of plantations on private or collective land, 1,683,000 ha of collective esparto grass and grazing land, and 1,232,000 ha of private scrubs and grazing land. Forest occupies about 4 percent of the total country area (8 percent if unproductive areas in the south are excluded).

2.02 The total value of wood and wood products in 1991 is estimated to be D 100 million (US\$110 million), equivalent to about 7 percent and 1 percent of agricultural and total production, respectively. This production consists of over 3 million m³ of wood, 92 percent of which is fuel wood, about 400-500 million forage units, 50,000 tons of esparto grass, and revenues from hunting and game of about D 7.5 million. Annual production of roundwood for industrial use has grown rapidly, doubling to 242,000 m³ between 1987 and 1991.

2.03 Domestic demand for wood and wood products (Table 2.1) is dominated by fuel wood, which accounts for 87 percent of the total demand of 7.3 million m³. Remaining demand consists of agricultural and mining timber (140,000 m³), chip wood (75,000 m³), and sawn wood (740,000 m³). Since most fuel wood is used directly in rural areas without entering formal markets, data on fuel wood supply and demand are imprecise. But it is estimated that sustainable yield of fuel wood from State forests, scrub, village wood lots, and tree crop prunings would only cover 44 percent of demand, implying a substantial unregulated decapitalization of forest resources. With four fifths of rural household energy use supplied by fuel wood, and with rural population continuing to grow, an accurate assessment of the fuelwood situation is critical. An ongoing forest inventory will clarify the resource base upon completion in 1994, and in the meantime, the Project will include a study of fuelwood supply and demand in Tunisia, with financing from the African Development Bank (para. 4.16).

^{1/} This report discusses the forestry subsector only. The Tunisian agricultural sector, its economic importance, performance, constraints, and policy reforms needed to reach sector objectives, are described in: (a) Agriculture Pricing, Marketing and Incentive Policies for Structural Change (Report No. 7640-TUN of 2/23/89); (b) Agricultural Expenditure Review (No. 9511-TUN of 5/91); (c) Second Agricultural Sector Adjustment Loan (Loan No. 3078) President's Report (No. P-5001-TUN) of 5/1/89); and (d) Agriculture Sector Assistance Strategy Brief (No. 11579-TUN).

Table 2.1: Estimates of Wood Availability and Demand
(expressed in m³ of round wood equivalent)

	<i>Fuel Wood</i>	<i>Agricultural</i>	<i>Chip Wood</i>	<i>Sawn Wood</i>	<i>Total</i>
Demand	6 300 000	140 000	75 000	740 000	7 255 000
Availability					
National Forest	113 000	65 000	70 000	72 000	320 000
Scrubs	650 000				650 000
Fruit Trees	2 010 000	20 000	5 000	5 000	2 040 000
Total Available	<u>2 774 000</u>	<u>85 000</u>	<u>75 000</u>	<u>77 000</u>	<u>3 010 000</u>
Surplus (Deficit)	(3 727 000)	(55 000)	0	(663 000)	(4 245 000)

2.04 Tunisia's forest resources make a significant indirect contribution to the economy, although this is not easily quantified. Most of the 800,000 people who live in or around forests are poor and dependent to varying degrees upon forestry, for employment, fuel wood, and grazing and other forest products. They also benefit from forest roads and related services in otherwise isolated rural areas. Forests also protect watersheds, providing benefits through the reduction of soil erosion and sedimentation of hydraulic infrastructure, regulation of water runoff, wildlife habitat and provision of recreation.

2.05 Domestic growth in demand for wood and wood products continues to outpace the recent improvements in production, resulting in import growth of 20 percent in volume, and from D 60 million to D 96 million between 1988 and 1990, or roughly 2 percent of the total value of merchandise imports. Imports are mostly of agricultural, mining, and sawn wood, for which local production only covers about 18 percent of domestic needs. Total demand for wood products is expected to continue to grow, as will imports unless Tunisia can improve management and exploitation of available resources. It is estimated that about 333,000 m³ of wood could potentially be exploited every year compared to a total of about 243,000 m³ harvested in 1991 and that larger quantities of high value sawn timber (which represents 87 percent of the total value of imports) could be produced if forestry services were provided with adequate means. The proposed Project will finance studies to identify existing supplies of the various types of wood and actions needed to be taken to optimize or valorize their production.

B. Forest Resources

2.06 In the northern and central Governorates, forests occupy high elevations. In these elevations, forests cover over 40 percent of the areas with population density (40 to 120 inhabitants per km²) exceeding the national average of 36 inhabitants per km². This population cultivates clearings and their livestock graze in the forest.

2.07 Two groups of natural forest exist in Tunisia. One is located in the northern Governorates (Jendouba, Beja, and Bizerte) on acid, clayey soils, humid or sub-humid climate with an annual rainfall between 550 mm and 1,500 mm. It comprises all cork oak forest (80,000 ha), of which some 25,000 ha are mixed with zeen oak, the zeen oak forest (10,000 ha), and the natural maritime pine forest (10,000 ha). The second group is formed by Aleppo pine forest (200,000 ha) and by forest stands of thuya, holm oak, and several other species (68,000 ha). It occupies calcareous and clayey-calcareous soils with surface calcareous crust, and marls. The annual precipitation is between 250 mm and 550 mm. In addition to these hard conditions, excessive deforestation of river banks threatens the aleppo pine forest which is further affected by excessive water runoff and leaching of fine soil elements. This second group comprises the Governorates of Kairouan, Zaghuan, Siliana, le Kef, and Kasserine.

2.08 In comparison with other Mediterranean countries, Tunisia has made a tremendous effort of afforestation. Forest plantations, mainly in the national forestry estate, cover about 44 percent of the total forest cover; they have focussed equally on production (wood and fodder), and on protection. Wood production has been essentially concentrated on the northern humid and sub-humid areas. The species selected are pinus and eucalyptus. Protection efforts refer to plantations on reservoir water basins, green belts of urbanized zones, and wind breaks for agricultural perimeters. Favored species are pinus, acacia and eucalyptus.

2.09 Except for zeen oak forest and some stands on very deep soils, forest stands are old with trees short trees (6 to 12 m). Diameters average 20 cm to 40 cm at 1,30 m of height. The standing volume of aleppo pine forest averages less than 40 m³/ha and the average annual growth rate is estimated at 0.5 m³/ha.year. Natural regeneration of these old stands has proven to be difficult even when assisted and no clear justification for this has yet been found.

2.10 Esparto grass occupies about 433,100 ha in the governorate of Kasserine, Gafsa, Sidi Bouzid, Kairouan and Gabes. Some 52 percent of this area is collectively owned. Esparto grass is used as fodder, for handcrafting, and to produce paper paste. Due to population and livestock pressure, there is an annual decrease of the total area of esparto grass of about 2 to 3 percent. Its exploitation and management is the responsibility of the DGF. Management plans are essentially based on closing certain areas to exploitation in accordance with traditional practice and local experience and with the objective of preserving the resources.

2.11 Fruit trees, and in particular olive trees, also contribute significantly to the national forestry resources. In fact thinning and pruning these trees produce about 2,010,000 m³ of wood annually. This represents a sizeable portion of national fuel wood needs.

2.12 Other forestry products are also a source of income and welfare for the population living in the forest. Among these products, myrtle, rosemary, caper are already exploited. In addition, pine nuts, *Briyere roots*, mushrooms, carob, bark, honey and wax as well as medical plants offer potential for income. Game, for both local and foreign hunting, is also a notable asset. Unfortunately, these resources are not sufficiently known. In view of the value they might have in contributing to the socio-economic situation of the forest users, the Project finances a study to examine developing those potential sources of income (para. 4.16).

C. Forest, Environment and Nature Protection

2.13 Biodiversity in forests and natural areas of Tunisia is highly significant both nationally and internationally. Tunisia has three main bio-geographical zones—i.e., humid and sub-humid in the north, semi-arid and arid in the center, and Saharian in the south. The few remaining wildlands are the habitat of about 5,500 species of plants and diversified wildlife including 75 species of mammals and 400 species of birds. These riches are under increasing threat; in particular, several species of mammals have already disappeared (e.g., Oryx and Addax) and others are disappearing (e.g., Barbary stag and diverse gazelle species). In addition to species diversity, Tunisia also has unique and fragile humid ecosystems, such as those of Lake Ichkeul which is the most important waterfowl wintering site in North Africa. A system of protected areas has been developed recently which includes Six National Parks covering 40,000 ha and several natural reserves including game reserves; two additional National Parks covering 150,000 ha are being proposed. This system of protected areas faces the following problems: (i) it does not yet cover the whole range of the country's biodiversity; and (ii) it faces increasing financial difficulties which affect infrastructure maintenance and development together with protection, educational and recreational activities.

2.14 Besides assisting in protecting biodiversity, natural forest cover and planted forests have an important role in soil and water conservation. Forests protect soils from erosion, which is a very important problem in Tunisia, and regulate water runoff and infiltration. Erosion threatens about 3 million ha of

which about half is already badly eroded. The most detrimental effects of erosion and excessive water runoff in Tunisia are siltation of reservoirs which can affect dramatically their capacity; destruction of infrastructure and threat to human life by torrents, earthslides and floods; and degradation of agriculture land, with subsequent loss of crop productivity, and total loss of an estimated 10,000 ha of agriculture land. In order to cope with this problem, the Ministry of Agriculture is carrying out an important soil and water conservation program including integrated watershed management, promotion of soil conservation techniques on farmland, and torrent control and water course management. Afforestation has only been a small part of this program so far.

2.15 The major stresses to forests and natural vegetation is grazing and deforestation for development of agricultural land. Tunisia has lost about a third of its forests over the last 60 years and suffers ongoing and steady degradation of remaining Aleppo pine forest and scrub forest (*garrigues*, and *maquis*). Forest fires in Tunisia are not as serious as in other Mediterranean countries; they have affected about 13,000 ha in the 1980s, which is less than 0.3 percent of total forest area, and have been kept under control thanks to dedicated forestry staff and efficient cooperation by people living in the forests. However, forest fires represent a potential growing stress to forests which needs careful attention.

D. Forest Management and Exploitation

2.16 Management of forests in Tunisia focusses on natural forests with the highest potential and on plantations. Since the early 1960s rather sophisticated management plans have been developed, mainly by consultants under contracts with the DGF, on about 320,000 ha, or slightly more than one third of the state-owned forest land. These plans deal with about 75 percent (275,000 ha) of natural forests, but only about 20 percent (45,000 ha) of the existing plantations; little or no planning deals with lower value natural forest cover, such as *garrigue*, *maquis*, and esparto grass areas. Also, there remains an important gap between planning and actual implementation. Most of the planned natural regeneration has been postponed by insufficient financial resources, inadequate harvesting capacity, the administration's inability to protect regenerated stands from grazing, and technical uncertainties for some species such as cork oak. This has resulted in aged stands with an estimated harvest backlog of about 500,000 m³. Most planned thinnings in young stands have also not been implemented, because of poor funding, lack of staff motivation, and technical uncertainties; this will affect future growth and health of these stands.

2.17 The conceptual capacity of the forestry administration regarding forest management has improved recently, with a shift from past emphasis on technical aspects towards a broader approach to integrated and participative management of all forest resources. This trend should be expanded and supported, both at the central level and in the field where forestry staff should be organized to better cope with forest management priorities. Since World War II, a significant effort has been made by Government to develop infrastructure related to forest management. However, housing for forest guards is still insufficient; and the road network—which is satisfactory for forests in the north—leaves the most threatened southern Aleppstateo pine forests with poor access. Even though forest fires control has been acceptable thanks to dedicated forestry staff and the cooperation of forest dwellers, more equipment and infrastructure are needed to prevent and combat large fires.

2.18 Exploitation of wood in state-owned forests is the responsibility of the Régie d'Exploitation Forestière (DREF) which is the only entity, within the Forestry Administration, that is authorized to market forest products. Currently the private sector harvests, about 60 percent of forests in Tunisia to sell as standing wood. DREF is harvesting the balance of 40 percent on force account, but aims to reduce this share to about 20 percent in the near future. It also plans to operate only in the most difficult areas and conditions. Both standing wood and wood harvested by DREF are sold by auction which ensures that prices reflect market value of wood; total sales reached D2,650,000 in 1991. There are about 50 wood harvesting entrepreneurs who actually buy from DREF and often sub-contract harvesting to others. Wood is generally harvested by traditional methods and with poor equipment. This results in significant waste of forest

resources. Exploitation of cork has remained steady over the past three decades, since increased individual yields are balanced with increased mortality in the mostly aging stands. This exploitation, under the sole responsibility of DREF, is not very efficient; collection techniques and marketing procedures should be improved; private entrepreneurship should be promoted. Other non-wood forest products are harvested by local people under specific authorization given by the Forestry Administration against payment of taxes.

E. Research

2.19 Forest research used to have an important role in Tunisian forestry; this role has weakened, however, since the late 1970s because of organizational and financial difficulties. Forest research is the responsibility of the *Institut National de la Recherche Forestière* (INRF) which is structured in five departments: forest and range ecology, silviculture and forest production, biometry and forest economics, soil and water conservation, and forest environment and nature protection. Research infrastructures—i.e., laboratories, arboreta, field research stations, and experimental forests—are well developed under the central station in Tunis and 4 regional centers. During the 1960s and the 1970s, INRF has focussed on solving the problems of the humid and sub-humid zones. Since the late 1970s, a decrease of staff and progressive isolation of INRF from other partners in the forestry sector have caused delays in research programs and field activities. In spite of a recent effort to strengthen the staff of INRF, forest research activities still face the following main problems: (i) many scientific positions are not yet filled; (ii) research programs are mostly designed by researchers with little partnership with public and private end users of research activities; research programs deal with a wide spectrum of topics and do not necessarily reflect sector priorities; and (iii) present budgetary allocations are insufficient. INRF programs desperately need to be focussed on sector priorities and to be supported by sufficient human and financial resources.

F. Processing Forestry Products

2.20 Available yield of round wood for industrial use in Tunisia is evaluated at 333,000 m³ annually. Since the PDF1 was initiated, wood harvesting has increased twofold to reach 243,000 m³ in 1991. Some 46 percent of it is fuelwood, 22 percent is utility wood and most of the rest is used to supply the particle board mills. The logs of quality for sawnwood are currently transformed into chip wood because of inadequate access roads and a lack of appropriate skidding and hauling equipment.

2.21 Nine sawmills which rely mainly on logs imported from Ivory Coast for their production, produce only 10 percent of the country's needs of lumber. The sawmills operate at less than 50 percent of their capacity, and are underequipped and underfinanced. In 1992, the country's four particle board mills operated at 80 percent of capacity. Their entire production is sold locally, mostly to furniture manufacturers. Demand for boards is ever increasing but local facilities have been able to satisfy the market without imports. The country's one veneer plant is closing down but there are six plywood plants operating at less than 45 percent of capacity. They use imported veneers to manufacture plywood or as faces for locally produced boards. The pulp and paper mill in Kasserine produces 15,000 tons of alfa pulp annually and in 1991, it exported about one half of its production. Current plans are to increase the pulp capacity of the mill to 24,000 tons annually. The country's industrial capacity for panels is adequate. Production costs are high and not competitive to permit export. The Project would study the cost of harvesting sawlogs and the feasibility of improving existing sawmills to accept these logs. In the Project, emphasis would be given to training of the forest industry labor force.

2.22 Tunisian cork oak forest—which is about 4 percent of world cork oak forest—, provides 8,000 to 10,000 tons of cork annually. The production is sold by the DREF to two privately owned plants which transform one third of the production. In addition, one state-owned enterprise is responsible for the rest of the production. This state owned enterprise is planning to privatize shortly. Exports of cork products amounted to US\$1,300,000 equivalent in 1992. Non-wood forest products make an important contribution to the revenues of local populations. The country has three briar pipes factories and two distillation plants which produce 120 tons of essential oils annually. In addition, harvesting rights for

capers, figs and myrtle amounted to some D50,000 in 1991. Bee keepers use 35,000 beehives to produce 200 tons of honey and 50 tons of wax annually. It is believed that Tunisia uses only 5 percent of its potential of non-wood forest products as compared to 25 percent in other Mediterranean countries. The Project will finance a study of this sector of forest utilization in order to direct its economic development.

G. Management and Institutional Framework

Forestry Institutions at Central Level

2.23 The Directorate General of Forests (DGF), within the Ministry of Agriculture (MOA) is the technical department in charge of managing the National Forest Estate (NFE) and the public, private and collective forest and grazing lands under forestry regime. It also assists, promotes and monitors private forestry development and manages the national parks and reserves. It is particularly in charge of (1) forest protection, conservation and surveillance (in accordance with the Forestry Code), (2) definition of the forestry and pasture strategy, (3) preparation and implementation of forestry projects, and (4) control, guidance and monitoring activities carried out by outside forestry-related agents and regional forestry departments.

2.24 The DGF was reorganized in 1990 (decree 90-670 of April 25, 1990). It comprises an inspection department in charge of the general control of DGF activities and two operational directorates—Sylvo-pastoral Development (DDSP) and Forest Conservation (DCF). The DDSP is subdivided in the Development Division (plantations, pastoralism, and desertification control) and the Management Division (inventory, studies and forestry economy). The DCF comprises the Protection Division and the Hunting and National Parks Division. The main innovative features of the new DGF organization were to concentrate in the DDSP all services in charge of projects and the creation of inventory and forestry economy services. This demonstrates Government's commitment to improve the management and exploitation of the national forest.

2.25 Of a total of some 500 technical staff in the sector, the DGF has about 55 technicians and about 49 professionals with a forestry education degree. The department remains mainly as an agency for police and surveillance and has only recently made its first steps towards planning and management. To better fulfil these tasks, the DGF needs to diversify the qualifications of its personnel.

2.26 In addition to the DGF, responsibility for soil erosion control and water catchment protection is vested in a Directorate of Soil and Water Conservation (DCES). For the exploitation of forest products, namely logging and timber sales, and in accordance with the Forestry Code (FC), the DGF relies on the Directorate of Forest Exploitation (DREF).

2.27 Forestry research (para. 2.19) is undertaken in Tunisia by the National Institute for Forestry Research (INRF) with headquarters in Tunis and four regional agencies. The INRF also operates 41 arboretum, six research centers and two pilot forests of Aleppo pine, cork, and zeen oak. From 1957 to 1976, forest research set up its infrastructure and addressed problems related to reforestation for production in the humid and sub-humid areas of the country. Between 1976 and 1982, research activities slowed down considerably because of lack of funding and staff. Subsequently, particularly after 1987, INRF has been revitalized with new recruitment but it is still far from being able to respond adequately to the needs of the sector. Other agencies like the University, the Tabarka Sylvo-Pastoral Institute, and the Institute for Arid Regions, play a minor role in forestry research.

Forest Institutions at Regional Level

2.28 At the regional level, DGF activities are coordinated by the provincial forestry services, *arrondissements forestiers* (AF). There is one AF per Governorate with the exception of Bizerte and Jendouba where there are two. There are altogether 24 AF in Tunisia. They are administratively under

the Regional Commission for Agriculture Development (CRDA) of the relevant Governorate which were recently restructured and provided with large administrative and financial autonomy. This means that AFs technically depend on the DGF and administratively on the Governorate through the CRDA. With an increasing workload resulting from the implementation of national and regional programs, AFs lack adequate qualified staff. In addition, the area under the control and management of forest agents (forest units) often exceeds their capacity to protect and administer. Government should review the situation and by December 31, 1994, establish for each AF, in accordance with its particular physical characteristics, maximum sizes for forest units. Assurances to this effect have been obtained at negotiations.

Institutional Implications of the Role of the Private Sector in Forest Management

2.29 The promulgation of the new Forestry Code (FC) approved by the law n. 88-20 of April 13, 1988 coincides with the effectiveness of the PDF1. Its basic principles focus on the important role of the forest in the socio-economic promotion of population living in the forest and which are still the less favored in Tunisia. The role of the DGF has been re-enforced to assist in organizing this population and in giving them the responsibility of managing forest exploitation by themselves. In spite of these noble principles, the DGF agents still keep a "police and autocratic" attitude when developing forest resources. A reconciliation with the forest population is needed. This can be achieved by the possibility given to the forest users by the FC to get together, form voluntary associations (AFIC), and become full partners in implementing protective and development programs for exploitation of forest resources. The relevant dispositions of the FC (Art. 43 and 44), however, cannot fully be executed until the implementation decrees are passed. The ongoing population census operations is a prior condition for the establishment of these AFICs. In addition, ongoing contacts and collaboration with NGOs are being sought in order to better define the objectives and operating procedures of the AFICs. The Project foresees the establishment and implementation of 10 pilot integrated operations aimed at defining the appropriate basis for the promulgation of implementation decrees referring to the AFICs, and testing how population, the DGF and the NGOs can work together in exploiting forestry resources in a sustainable way. Assurances have been obtained at negotiations that Government would take measures to ensure the conclusion, not later than June 30, 1994 of arrangements satisfactory to the Bank in respect of the pilot operations, such arrangements to include the participation and consultation with forestry population concerned, NGOs and the DGF. For the decrees regarding the execution of works by the AFICs, (Art 43 of the FC), constitution, organization, by-laws and operation of the AFICs (Art.44 of the FC), assurances have been obtained at negotiations that these decrees would be approved by December 31, 1997, or such later date as shall be agreed to by the Borrower and the Bank, following the recommendations of the mid-term Project review.

2.30 The FC defines the rights and obligations of forest users. It is innovative in the sense that it gives users the possibility of exploiting resources in the National Forest Estate (NFE) through integrating the population living in the NFE into forest activities. The decree foreseen in Art. 38 of the FC refers to the conditions for granting authorizations to exercise the right to use the NFE. This decree has not yet been passed but it is not an impediment to the forestry development programs. These rights are currently enjoyed on an *ad hoc* basis under the supervision and control of the AFs. However, for better organization of the population and its integration in the sylvo-pastoral development within the framework of the AFICs, the approval of this decree is necessary to give precision to the conditions for granting these authorizations. Assurances have been obtained at negotiations that this decree would be approved not later than December 31, 1996.

2.31 The balanced and sustainable development and exploitation of the sylvo-pastoral resources are in the national interest. Therefore the FC foresees measures to promote and encourage this development. The objective is to increase the private sector participation and to improve the socio-economic conditions of the forest population. Its Art. 70 creates the Sylvo-Pastoral Fund (FSP); the operating procedures should be fixed by decree. Art. 72 states that the nature of the actions eligible to Government aid under the FSP and the conditions and procedures to provide this aid should also be fixed by decree. None of this legislation has yet been approved. The FSP is an essential tool for the development of the

forestry sector and it expands similar measures already taken for agricultural development. It will contribute substantially to the integration of the forest population and to the participation of the private sector in the development of the forestry resources. However, the promulgation of these decrees foreseen in the Articles 70 and 72 of the FC must be preceded by a slight amendment of Article 70 of the FC. This amendment would define the origin of the FSP funds and who would manage it. This procedure is necessarily long, since it requires approval by the Chamber of Deputies. In addition, in view of the ongoing preparation of a Unified Investment Code, it is possible that this Code would incorporate provisions which would fulfill the same objectives as the FSP and therefore the above amendment or publication of the FSP decrees would not be necessary. What is important and urgent is to create the legal basis for financial assistance to the forestry sector in line with the objectives established for the FSP. Assurances have been obtained at negotiations that the Borrower would submit to its Chamber of Deputies legislation to ensure the establishment and operation of a system of financial assistance along the lines of the FSP before loan effectiveness and that the Borrower would take all necessary measures to ensure the prompt establishment and operation, in accordance with suitable policies and procedures, of the said system of financial assistance. To complement the FSP and within a coherent policy of promoting the sector, the advantages foreseen in the Agricultural and Fisheries Investment Code should be extended to the forestry activities and in particular to support forestry entrepreneurs. The decree no. 90-1252 of August 1, 1990 which modifies the list of the activities which are eligible to the benefits provided by the Agricultural and Fisheries Investment Code could be completed to extend the existing advantages to entrepreneurs in the forestry sector. As mentioned above, a Unified Investment Code is under preparation. The promulgation of this Code with a draft satisfactory to the Bank is a condition of third tranche release of the Economic and Financial Reforms Support Loan (loan 3424-TUN). This Code would provide adequate incentives to the private sector for related service activities in the forestry sector. The timely promulgation of this Code would preclude the need to amend the decree no. 90-1252 of August 1, 1990. Assurances have been obtained at negotiations that the Borrower would take the necessary measures to provide those adequate incentives, including the prompt publication of decrees, not later than December 31, 1994.

2.32 In a supportive relationship between the forestry Administration and the private sector, it would be possible to promote and expand private investment in the NFE as foreseen in Art.75 and 76 of the FC. In fact Art. 75 gives private entrepreneurs the legal basis to occupy temporarily the NFE for silvo-pastoral development purposes. The Director General of the DGF is entitled to give these occupancy authorizations but the decree foreseen in Art. 76 of the FC which would fix the conditions for granting these authorizations has not yet been passed. The uncertain and undefined character of the current situation should be eliminated and assurances have been obtained at negotiations that the decree foreseen in Art. 76 of the FC would be approved by December 31, 1995. However, this is only one of the aspects to materialize the Government policy to increasing involvement of the private sector in forestry development. The basis has been established in the FC but they have not yet been appropriately implemented. It is time that a plan of action be established and implemented to motivate and enhance the role of the private sector in the forestry development. In view of the importance of fuel wood demand and the direct implication of the private sector in its exploitation, this plan would take into account fuel wood as a major component. Assurances have been obtained at negotiations that, not later than December 31, 1995, the PMU would prepare such a plan of action satisfactory to the Bank and Government would implement it thereafter.

H. Development Objectives and Strategies

2.33 The recently updated country assistance strategy identifies natural resource management and the environment as key development issues for Tunisia and on which the Bank will play a leadership role in helping the Government through lending, analytical work, and donor coordination. In particular, the country assistance strategy, building on the Bank-supported National Environment Action Plan (1990), recognizes prevention of deforestation, soil erosion and watershed degradation of hydrological resources as critical needs, and the role of improved forest management and conservation in addressing them.

2.34 During the decade 1962-1971, priority was given to management of existing forests, to reforestation and to training of staff. Following the 1969 and 1973 floods, development programs focussed on water and soil conservation. Legislation published in 1974 put all collective rangeland under the forestry national estate. This led Government to especially address the creation of pastoral reserves and the improvement of range management. The social issue resulting from the presence of a population of some 800,000 people in the forest has traditionally been addressed only through programs to reduce unemployment. This has hampered an appropriate management of the forestry resources. The Forestry Code of 1988 gives particular importance to the human factor and promotes the association of the forest users in the management and operation of the forestry programs. This is a new policy approach based on an integrated model of protection and production, aimed at improving the socio-economic conditions and revenues of the forest users.

2.35 The forestry component of the 7th Development Plan (1987-1991) appears to have been relatively successful in attaining physical goals. It achieved or surpassed eight of the fifteen goals set. In a number of cases, goals were very substantially exceeded (forestry plantation, forestry roads construction and maintenance, and parasite control). The poorest levels of implementation were for firebreak construction and forestry boundary marking.

2.36 Government has embarked on an ambitious ten-year (1990-2000) program comprising reforestation, anti-desertification measures in the arid South, fodder plantation, range management, and soil and water conservation works. The objectives of this program and its comparison with those fixed for the 8th Development Plan (1992-1996) are indicated in Table 2.2.

Table 2.2: Forestry Development Objectives

	<i>10 year program 1990-2000</i>	<i>8th Plan 1992-1996</i>
	<i>(ha)</i>	
Reforestation	320,000	90,000
Forest Regeneration	54,000	35,000
Fodder Plantation	400,000	100,000
Range Management	2,200,000	300,000

I. Investments in the Sub-sector

2.37 Total public investments of the forestry and of the soil and water conservation subsector and their comparison with the agriculture sector are indicated in Table 2.3.

**Table 2.3: Investments in the Subsector
(million D)**

<i>Period</i>	<i>1962-1971</i>		<i>1972-1976 4th Plan</i>		<i>1977-1981 5th Plan</i>		<i>1982-1986 6th Plan</i>		<i>1987-1991 7th Plan</i>		<i>1992-1996 8th Plan</i>	
	%		%		%		%		%		%	
Forest and SWC	68.8	25.3	22.3	9.5	43.8	7.5	100.0	6.5	146.6	8.1	483.4	17.5
Agriculture	272.0		235.1		584.0		1360.0		1799.0		2755.9	

SWC- Soil and Water Conservation

This table shows that, after a period of important efforts (1962-1974) during which the percentage of investments in the subsector was about 25 percent of the entire agriculture sector, this percentage dropped sharply about 6 percent. The reason for this decline was that Government considered that the forestry operations carried out under the Plans had been ineffective. Certainly, production of wood had not kept pace with the increasing demand; the added responsibility since 1974 of the DGF in protection of watersheds and of the vast rangelands of the country without a significant increase of staff and a reduced budget, contributed to this apparent poor performance.

2.38 In view of the satisfactory performance of the subsector during the 7th Plan (para. 2.35), Government became more ambitious in setting goals for the current Plan. It is likely that some of the proposed goals might be very difficult to achieve but the Plan shows Government's determination to support forestry programs and to protect national resources.

J. Constraints Relevant to the Project

2.39 The major constraints to developing the forestry sector are the following:

- (a) **Social**: The development of the forestry sector is hampered by the relatively high density of population. This continues to be a serious constraint, in spite of efforts to provide employment for forest users in Government programs. Livestock production is an important traditional activity in the forestry national estate. The resource pressure caused by livestock affects reforestation and regeneration programs. The integration of fodder crops in the agriculture exploitations to meet the livestock food requirements needs to be pursued to alleviate this pressure on the forest. In addition, increasing population leads to forest clearing for agriculture production for self consumption and for firewood. Temporary work provided by Government programs is only a partial solution. Besides, these programs tend to be concentrated on areas where the social problems exist and not necessarily where the forestry development should be done. The Project would address this constraint through promoting and implementing the participating approach in forest management. It will seek population involvement in designing sylvo-pastoral development programs (para. 5.06); it will promote the legal basis for their organization in associations (para. 2.29) and for financial support and incentives (para. 2.30); and it will test in the field procedures and methods in pilot operations with NGO's assistance (para. 4.21).
- (b) **Forest Management**: The implementation of the existing forest management and conservation plans are hampered by the lack of staff and equipment and also by insufficient funding. In addition, some plans need to be updated and new ones prepared. The Project would address this issue through financing the preparation of new management plans (para. 4.06) and by strengthening the DGF (para. 4.21).
- (c) **Utilization of Forest Resources**: Neither the DREF nor the private sector are equipped to develop the maximum value of the wood; in addition, technology is lacking for processing wood products, and financial incentives are insufficient for small entrepreneurs. This leads to a low volume of exploitation and to poor product quality. Little has been done so far to develop the economic role of non-wood forest products. The Project would address this issue by financing studies to identify constraints and recommend improvement in the fuel wood, sawn wood, and industrial wood sectors (para. 4.16). The Project would also finance training programs (paras. 4.17, 4.18) and applied research themes (para. 4.20) aimed at improving the value of wood and non-wood resources, and will promote the legal basis for financial support and incentives to entrepreneurs (para. 2.31).

III. BANK LENDING IN AGRICULTURE AND PAST PERFORMANCE

A. Past Lending in Agriculture

3.01 Bank group lending to Tunisia began in 1967. To date, 101 loans and credits have been made, supported by US\$4.4 billion Bank and IDA funds, net of cancellations. In agriculture, 16 projects have been completed and five are being implemented, totalling US\$573.4 million of Bank group lending. These include: two Fisheries projects, the First and Second Fisheries Projects (FY72 and 80), both completed; seven irrigation projects, of which four are completed—Irrigation Rehabilitation (FY75), Sidi Salem Multipurpose Irrigation (FY78), Southern Irrigation (FY79), Medjerda/Nebhana Irrigation Development (FY82), and Central Tunisia Irrigation (FY83)—and two are ongoing projects—Irrigation Management Improvement (FY86) and Gabes Irrigation (FY86); four agricultural credit projects (FY72, 77, 81 and 88), all completed), three area development projects, Cooperative Farm (FY67), Northwest Rural Development (FY82) and Northwest Agricultural Production (FY85); a Grain Storage and Distribution Project (FY82, completed); two Agricultural Sector Adjustment Loans (FY87 and 89) one of which has been satisfactorily completed; and an ongoing Forestry Development (FY88) and Agricultural Research and Extension Project (FY91). The Technical Assistance Project (FY83, completed) included an agriculture component. The Bank is also supervising the IFAD financed Sidi Bouzid Irrigation Project (FY84).

3.02 Performance of Bank-financed projects in agriculture has generally been satisfactory. The PCRs of the Irrigation Projects show that the economic rates of return of the projects are generally higher than at appraisal mainly due to the higher value of production and better use of existing land and infrastructure resulting from more reliable water supply. However, the establishment of water users' associations to take over the responsibility for O&M of irrigation schemes needs to be pursued more vigorously and proper monitoring and evaluation are important but often inadequate. The closing date of the Irrigation Management Improvement Project was recently extended by two years to make up for delays caused by a one year delay in loan effectiveness followed later by management problems, and in 1989 by the reorganization of the Ministry of Agriculture which had an important impact on the institutional component of the Project (the functions of the irrigation development agencies were merged with those of the CRDA in the field to create a unique structure at Governorate level called CRDA). The Project is, however, progressing well under new management since 1991. In contrast to the First Credit Project, the Second Credit Project provided investment credit to small/medium farmers who, up to 1976, had limited access to institutional credit. The PCRs of the First Three Credit Projects note that disbursements were affected by competition with Government credit schemes offering loans at lower interest rates, subsidized and by lack of profitability of agricultural operations. The PCR of the Fourth Credit Project underscores the need to continue institutional and financial improvements at the National Agricultural Bank (BNA) level through increased interest rates, the phasing-out of Government-subsidized credit schemes, recovery discipline and BNA reorganization on a decentralized basis to allow it to reach a larger number of farmers and gradually assume full responsibility for all credit decisions without Government interference.

3.03 Under the area development projects, the Cooperative Farm Project illustrated the difficulty of bringing or holding independent farmers together under any system of collective management (cooperatives) to which they give up some rights to land in return for inadequate economic incentives. The Northwest Rural Development Project mainly achieved its targets in construction of infrastructure. However, less than satisfactory progress was made under the nature conservation and agricultural production components. This was mainly due to organizational deficiencies, staff shortages, land tenure and use patterns, and lack of producer group promotion. The lessons of this project, particularly concerning the need for a participatory approach to involve the beneficiaries in sub-project selection, execution and maintenance, will be incorporated in the follow-on Development of the Mountainous North-West Region Project and in the proposed Forestry II Project (organization of AFICs). Only about 40

percent (\$5.8 m.) of the originally approved loan amount of the Northwest Agricultural Production Project was disbursed when the loan closed in May 1992. The Project suffered from a top-down management structure and frequent turnover of management and other staff. Experience with the Project has also shown that for extension programs to work and be sustainable, they need to be well-designed and tailored to the needs of the various categories of farmers who should actively participate in demonstrations of new technologies and training programs. The Agricultural Research and Extension Project has used the lessons of this Project to carry out a nationwide reorganization of research and extension services. The ASAL-I Loan was completed successfully and fully disbursed in October 1989. The second tranche of the ASAL-II was released in February 1993.

B. The Forestry Development Project - Loan 2870-TUN

3.04 The first Forestry Development Project (PDF1) (FY88 Loan 2870-TUN for US\$20 m.) is currently under implementation and scheduled to close on December 31, 1995. The main objectives of the PDF1 are to increase fuelwood and industrial wood production to meet domestic needs, to improve forest grasslands and range management and to preserve the environment. The Project components include thinning of some 5,000 ha of conifer plantations and exploitation of some 21,000 ha of natural forest together with a corresponding regeneration program, establishment of some 10,000 ha of fast growing plantations, improvement of integrated forest management of two degraded natural forests (6,000 ha), improvement of some 3,400 ha of pasture and rangeland adjacent to forest regeneration, preparation of a national inventory and development plan for forest resources, provision of technical assistance, training, and equipment to forestry-related departments, improvement of seed collection and forest nurseries, and distribution of selected trees; and provision of nature conservation measures.

3.05 The Project is designed as a pilot operation which would provide the basis for a larger investment program in forestry. By the end of 1992, the physical implementation of the Project was being completed with 84 percent of total investments costs committed and it is achieving its objectives for the exploitation, regeneration, plantation and pasture improvement components. The nature protection component is progressing well; however, its impact is difficult to evaluate. Research is implementing its program, but results readily applicable in the field are still missing. The forestry roads component has not yet been fully executed but it is expected to make up for delays after implementing a recently agreed solution, based on technical assistance followed by small regional contracts awarded after local competitive bidding. Completion of the forest inventory and Forest Development Plan have been delayed by two years to June 1994 due to difficulties with the consultant contract and with procurement of specialized equipment. The project has led to increased wood production, strengthened the DGF and the regional Forestry Departments (AF) and initiated the involvement of population in the rangeland operations associated with forest regeneration and plantations.

C. Lessons Learned

3.06 The PDF1, as the first forestry operation financed by the Bank in Tunisia, has been a testing ground to provide the technical and institutional basis for a larger operation in the future, and is being implemented satisfactorily. Execution techniques and methods have been tested, costs firmed up, price distortions and monopolistic situations have been eliminated, and implementation agencies and population have started to develop new awareness of the need for an environmentally sound exploitation of forest resources. However, steps initiated with the FDP should be pursued and consolidated, in particular concerning integrated forestry development and active participation of the population. Also, measures to enhance the value of Tunisian wood should be intensified and expanded. The difficulties experienced during the execution of the soil preparation for new plantations and of the rangeland development, the understanding of procurement procedures, the deep involvement of all sectors directly or indirectly participating in the forestry development through the Forestry Coordination Committee (FCC), and the experience gained by the Project Management Unit (PMU) are assets and lessons which have been incorporated in the design of the proposed Second Forestry Development Project (PDF2).

IV. THE PROJECT

A. Rationale for Bank Involvement

4.01 The recently updated country assistance strategy identifies natural resource management and the environment as key development issues for Tunisia and on which the Bank will play a leadership role in helping the Government through lending, analytical work, and donor coordination. In particular, the country assistance strategy, building on the Bank-supported National Environment Action Plan (1990), recognizes prevention of deforestation, soil erosion and watershed degradation of hydrological resources as critical needs, and the role of improved forest management and conservation in addressing them. In view of the success of the first Forestry Development Project (loan 2870-TUN), Government is strongly interested in continuing to build up a fruitful relationship with the Bank and to benefit from the Bank's assistance in consolidation and expansion of the sector, increasing the role of the private sector, strengthening users' associations, ensuring and strengthening the use of sound principles of environment protection and conservation of the natural resources. The Bank brings its experience in other Maghreb countries to the difficult endeavor of building popular participation in sector development such as through forest users' associations.

B. Concept and Objectives

4.02 In 1990 Government embarked in an ambitious forestry development program of reforestation, forest regeneration and rangeland management. It has also been decided that this program would be implemented with active participation of the users of the forestry resources. Since 1988, the FDP has initiated actions to attaining the targets of the program. By the time the FDP is completed in 1993-1994, it will have made an important contribution to the development of the sector and for a better management of the exploitation of Tunisian forestry resources. However, the expansion and consolidation of the initiated activities should follow to ensure and increase the implementation rhythm of the program and to contribute to the sustainability of the investments already made. The Project would take a slice of the 1990-2000 program; Government has earmarked the Project as part of the 8th Development Plan.

4.03 While augmenting production to meet a growing demand for wood products and addressing acute environmental pressures, the Project would promote sustainable integrated development and management of the Tunisian forest resources with an active involvement of the forestry population and the private sector. Specifically the Project would: (a) augment the environmental services provided by forests, including reduction of soil erosion and increased water retention; (b) improve social conditions of the poor population dependent on the forest; (c) intensify quality wood production when and where this is sustainable; (d) develop forest rangelands to relieve grazing pressure on the forests; and (e) preserve the country's nature and wildlife heritage.

C. Components

4.04 The Project would have seven components:

- (a) **Forest Management:** Preparation of management plans covering 85,000 ha across sites selected for environmental services and production potential, execution of forest infrastructure (roads, firebreaks, housing, observation towers), assisted regeneration of 19,200 ha of Aleppo pine and cork oak forest, and silvicultural works (thinning) over 52,000 ha of natural forest and plantations of pine, cypress, and eucalyptus;
- (b) **Plantations:** Establishment of new plantations (25,400 ha) in the National Forest Estate (NFE), 4,100 ha of stream bank plantations for riparian protection, 500 ha of plantations on private farmland, and establishment of nurseries;
- (c) **Forest Pasture and Range Improvement:** Reduction of grazing pressure on forest resources over about 14,000 ha, through the establishment of new prairies (1,550 ha),

- fodder plantations (7,150 ha), rangeland improvement (2,350 ha), cactus plantations (1,550 ha), and pasture rehabilitation (1,400 ha); a training and technical assistance program would help implementing the component;
- (d) Wood Exploitation and Value Enhancement: Studies on the wood processing, secondary forest products, and training in wood exploitation and processing;
 - (e) National Parks and Reserves: Improving management and strengthening equipment of national parks and reserves and providing means to control and protect wildlife;
 - (f) Forestry Research: Project related applied research programs;
 - (g) Institutional Development and Pilot Operations: Strengthening the Forestry Department (DGF) and the regional Government agencies (AF) and assist them in implementing the Project, including the setting up and operation of integrated forest pilot operations with Non-Governmental Agencies (NGO) assistance.

Three of the above components, Forest Management Plantations, Forest Pasture and Range Improvement are closely inter-related and are in reality part of a single, integrated component—forestry development. They have been split into separate components for clarity of presentation and to facilitate identification of activities during Project implementation.

D. Detailed Features

Forest Management

4.05 In the framework of the gradual execution of forestry management programs, the Project would finance preparation of new management plans, execution of forestry infrastructure, and silvicultural works in young plantations and natural forest.

4.06 Forest Management Plans: These plans would cover 85,000 ha. They would comprise 9,000 ha in cork oak natural forest and 35,000 ha already defined in plantations located in the AF of Ariana, Beja, Bizerte, Jendouba, Nabeul and Zaghouan. The balance of 41,000 ha would be identified during the Project implementation period. These new plans would be improved, compared to the existing plans. They would develop a broader approach to integrated sylvopastoral management, take social problems into account explicitly and be both simplified on the technical side and more operational. They would be prepared with the assistance of consultants but with close monitoring and participation of the DGF.

4.07 Forestry Infrastructure: The component comprises the construction of 100 km and the rehabilitation of 700 km of forestry roads, the opening of 240 km of firebreaks, the construction of 8 and the rehabilitation of 30 houses for foresters, the construction of 25 observation towers, and the supply of communication equipment and water tanks. The project would also include payment for incremental recurrent costs for maintaining roads, fire breaks, constructions, and operation of equipment.

4.08 Silvicultural Works: The component deals with both forest regeneration and thinning of natural forest stands and plantations. Regeneration works would include (i) a 5,000 ha program for cork oak, including mainly coppicing but also pilot seeding and plantation, in the AFs of Beja, Ain-Draham, Bizerte, and Jendouba; and (ii) assisted regeneration of 14,200 ha of Aleppo pine in the AFs of Beja, le Kef, Kasserine, Siliana, and Zaghouan. Thinning operations would deal with (i) 2,300 ha of cork oak coppices in the AFs of Ain Draham and Jendouba, and 20,600 ha of young stands of natural Aleppo pine in the AFs of Le Kef, Kasserine, Kairouan, Zaghouan, and Siliana; (ii) 7,900 ha of eucalyptus coppices in the AFs of Ariana, Ben-Arous, Beja, Ain-Draham, Nabeul, and Bizerte, and 21,200 ha of pine plantations in the AFs of Ariana, Ben-Arous, Beja, Ain Draham, Nabeul Bizerte, and Siliana.

Plantations

4.09 The component would include the plantation of about 25,400 ha of pine, eucalyptus, and acacia in the National Forestry Estate (NFE), 4,100 ha of poplar, eucalyptus, and acacia along stream banks, 500 ha in agricultural lands, and 500 ha of wind breaks in irrigated perimeters.

4.10 Plantations in the NFE. This program would comprise 8,200 ha of plantations in humid and sub-humid zones mainly for production of wood and non-wood products, and 17,250 ha of plantations in the semi-arid zones, mainly to rehabilitate degraded natural forest cover and enhance environment protection functions of the NFE. In the selection of plantations sites, priority has been given to those areas which would have a greater positive impact on environmental protection, in particular on soil erosion. Works would only start after a detailed ecological and social analysis of each site is carried out with the involvement of local population (para. 5.06). Species would include 70 percent of pines, mainly the native Aleppo pine, and 30 percent broadleaved species, mainly Eucalyptus. About 75 percent of these plantations would be established after mechanized soil preparation, when soil and topography permit, to ensure adequate water supply to young seedlings, and optimal survival and smooth initial growth of young stands. The other 25 percent would be established after manual soil preparation on steep slopes and/or more fragile soil conditions. Mechanized techniques were tested during the PDF1 and manual techniques have been developed since the early 1960s. Plantations would be established in the 12 AFs according to Table 4.

4.11 Plantations along stream banks. In view of the success of this program in the PDF1, the Project would finance 4,100 ha equivalent of line plantations along stream banks in the AFs of Beja, Kairouan, Jendouba, Ain Draham, and Nabeul. The areas would vary between 450 ha and 1,300 ha per AF.

4.12 Plantations in Private Land. In the framework of incentives to the private sector to participate in forest plantation and exploitation, the Project would finance pilot and demonstration plantations including about 500 ha of poplar on private agricultural land, over several AFs, and about 500 ha of windbreaks in irrigated perimeters in the AFs Ariana and Nabeul.

4.13 Nurseries. In addition to financing the improvement of 40 existing nurseries operating with traditional methodologies, the Project would finance the introduction and testing of new and improved technologies for the production of seedlings in two pilot nurseries. It would include provision for the purchase and installation of equipment and materials (containers, irrigation systems, shades, pumps, tractors). This program would be implemented in close collaboration and with the assistance of the INRF in the context of the research component (Annex 7).

Forest Pasture and Range Improvement

4.14 The Project would finance the improvement of about 14,000 ha of rangeland. This program aims to compensate temporary loss of grazing land by local population resulting from regeneration and plantation activities of the project; each element of this program will be designed as part of the above mentioned management plans and/or ecological and social analysis (para. 4.10). Pasture and range improvement would include: (i) about 550 ha of permanent prairies in humid and sub-humid zones of the AFs of Beja, Ain Draham, Le Kef, Zaghouan, Bizerte, and Siliana; (ii) about 1,000 ha of permanent prairies in the semi-arid zone of the AFs of Beja, Le Kef, Kasserine, Kairouan, Bizerte, and Siliana; (iii) about 350 ha of improved pastures in the humid and semi-humid zones of the AFs of Jendouba and Siliana; (iv) about 2,000 ha of improved pastures in the semi-arid zones of the AFs of Jendouba, Le Kef, and Siliana; (v) about 1,550 ha of cactus plantations in the semi-arid zones of the AFs of Le Kef, Siliana, and Kasserine; (vi) about 1,250 ha of acacia plantations in humid and semi-humid zones of the AFs of Ben Arous, Beja, Jendouba, Kasserine, Nabeul, Zaghouan, Bizerte, and Siliana; (vii) about 5,900 ha of acacia plantations in the semi-arid zones of the AFs of Ariana, Beja, Jendouba, Le Kef,

Kasserine, Kairouan, Nabeul, Zaghouan, Bizerte, and Siliana; (viii) about 1,400 ha of rehabilitation of pastures in the semi-arid zones of the AFs of Le Kef. The techniques and compensation criteria used are indicated in Annex 4.

4.15 The Project would also provide for a training program including study tours, training courses abroad, local training, and technical assistance to assist local training, and for specialized technical short term consultants.

Wood Exploitation and Value Enhancement

4.16 Existing information on the demand and availability of fuelwood is neither consistent nor reliable. However, fuelwood is the largest consumed forest product and its illegal exploitation may be very detrimental to the environment. The sawn wood sector is responsible for an important volume of imports. An improved exploitation of the Tunisian resources could replace part of these imported wood. The local industry of plywood and particle board meets internal consumption, but it utilizes not only the available chip wood but other wood which could be better valued as sawn wood. Finally, value enhancement of the secondary forest products may contribute to the socio-economic progress of the population living inside or in the forest borders and make them better understand the role of the forest, therefore helping to preserve natural resources. Studies carried out under the PDF1 are of specialized nature and do not give an overall perspective of the issues at national level. To clarify the situation and propose a plan of action to correct distortions, the Project would support the preparation of studies covering fuel, sawn, and industrial wood, and secondary products of the forest. Terms of reference for these studies are contained in Annex 5.

4.17 In order to improve wood exploitation, the Project would expand training provided under the PDF1 and would finance a comprehensive program on improved exploitation techniques. This training would also take place in the Professional Training Center of Remel (CFPR). The Project would finance technical assistance to help the CFPR to set up and monitor the program, and the purchase of demonstration equipment (terms of reference for this assistance are indicated in Annex 5). The program would aim to train about 750 forest workers of the private sector. It would also include training of the CFPR staff (12 MM). Assurances have been obtained at negotiations that the CFPR would ensure preparation and implementation of the training programs no later than December 31, 1994.

4.18 In the framework of improving the way wood is processed, the Project would focus on improving secondary forest industries, such as those related to sawing, drying, and particle boards. The forestry industry is not yet included in the Tunisian professional training program. However, the Center of Pedagogic Resources and Engineering (CRIP) of the Ministry of Professional Training and Employment (MFPE) is capable and ready to provide this training. The Project would finance a program for training in secondary industries including the services of a consultant to identify and set up a training program in the CRIP (terms of reference for this assistance are also indicated in Annex 5). On a starting phase the Project would finance the rehabilitation of a small sawing plant already existing in CFPR to complement the training program on exploitation.

National Parks and Reserves

4.19 This component would include: (i) materials and equipment to complete the equipment of the National Parks of Bou-Hedma, Chambi, El Feidja, and Sidi Toui (5 four-wheel drive vehicles, 5 tractors, two trucks, 21 motorcycles, fences, electrification, and miscellaneous equipment); (ii) training of staff (training courses abroad, study tours, technical assistance); and (iii) operation and maintenance costs of vehicles and equipment.

Forestry Research

4.20 In order to identify technical solutions to be used in the Project but essentially as background information for the preparation of the future Socio-Economic Development Plans, the Project proposes eleven research themes (Annex 7). These themes would deal namely with improvement of Tunisian wood, ecological demands of forest species, growth and yield tables, thinning systems for pine plantations, artificial regeneration and intensified management of cork oak, forest protection, and environment impact of forest development. The INRF would carry out the necessary research activities for these themes which would require financing additional investment and operating costs including: (i) materials and equipment (laboratory equipment for wood technology, a neutron probe, camping equipment, and four vehicles); (ii) recruitment of specialized services of consultants; (iii) training (study tours, documentation and technical assistance); and (iv) operating costs of vehicles and equipment. One of these themes is related to new technologies on nurseries (para. 4.13). Assurances have been obtained at negotiations that beginning 1994 the INRF would implement the research program foreseen and detailed in Annex 7 and prepare semi-annual progress reports in respect thereof.

Institutional Development and Pilot Operations

4.21 Re-enforcing the institutional assistance provided under the PDF1, and in order to implement a larger scale Project, the DGF and the regional agencies (CRDA/AF) need additional strengthening through the provision of staff, vehicles and equipment, training, and increased annual operating budget allocations. The Project would include: (i) 19 additional technical staff (7 engineer, economist, agro-forester, sociologist, accountant and personnel manager, for the PMU and 12 engineers for the AFs); (ii) training of about 100 agents, of which 20 representatives of the population (training courses abroad, study tours, local training) for a total of 50 m-m ; (iii) technical assistance (12 m-m) based on short term consultants in extension, sociology, and monitoring techniques; (iv) vehicles and equipment (6 light vehicles, 31 four-wheel drive vehicles, computers); (v) implementation of about 10 pilot operations of integrated rural development to consolidate the role and the socio-economic situation of the forest users' associations; these pilot operations which would be implemented in close collaboration with NGOs would emphasize sub-programs on women's development and would determine practical basis for the promulgation of the AFIC legal instruments; and (vii) related operating costs of vehicles and equipment.

E. Status of Design

4.22 With the exception of the integrated pilot operations and the pilot plantations on private land, areas for Project works have been identified. All but the plantations on private land are located in the NFE and availability of required land is assured. Standard architectural plans and specifications are available for most of Project buildings and constructions. With the execution of the PDF1, the DGF has become familiar and knowledgeable about Bank procedures for execution of works, supply of goods and recruitment of consultants. Reference tender documents have been prepared and approved by the Bank for the PDF1 and they can be used for the Project. The precise location of the 10 integrated pilot operations has not yet been done. During negotiations assurances have been obtained that this identification would be completed prior to loan effectiveness.

F. Costs

4.23 Over the six year implementation period (1994-1999), the total cost of the Project is estimated at US\$148.1 million (D125.9 million) with an estimated foreign exchange component of US\$53.9 million (D45.9 million) or 36 percent of the total Project cost. The cost estimate includes taxes and duties, totaling US\$25.4 million (D21.6 million) or 17.2 percent of total Project cost. Costs are summarized in Table 4.1 and shown by year in Table 1 and by summary account in Table 2.

Table 4.1: Project Cost Summary

	<i>(D million)</i>			<i>(US\$ million)</i>			<i>% For. Exc.</i>	<i>% Base Costs</i>
	<i>Local</i>	<i>Foreign</i>	<i>Total</i>	<i>Local</i>	<i>Foreign</i>	<i>Total</i>		
A. FOREST MANAGEMENT								
Equipment	0.2	0.2	0.4	0.3	0.2	0.5	43	0
Forest Works	11.9	2.1	14.0	14.0	2.5	16.5	15	14
Constructions	1.8	1.7	3.5	2.1	2.0	4.1	51	4
Studies	0.7	0.2	0.9	0.9	0.2	1.1	20	1
Recurrent Costs	0.2	0.1	0.3	0.3	0.1	0.4	53	0
Subtotal	14.8	4.3	19.1	17.4	5.1	22.5	23	20
B. PLANTATIONS								0
Vehicles and Equipment	0.2	0.4	0.6	0.2	0.5	0.7	70	1
Plantations	30.6	21.7	52.3	36.0	25.5	61.5	42	54
Constructions	0.2	0.3	0.5	0.2	0.4	0.6	45	1
Maintenance	0.1	0.1	0.2	0.1	0.1	0.2	72	0
Subtotal	31.1	22.5	53.6	36.6	26.5	63.1	42	55
C. PASTURE AND RANGE IMPROVEMENT								0
Plantations	5.8	4.1	9.9	6.8	4.8	11.6	41	10
Train., Techn. Assist.	0.0	0.0	0.0	0.0	0.0	0.0	68	0
Maintenance	1.3	0.2	1.5	1.6	0.2	1.8	10	2
Subtotal	7.2	4.2	11.4	8.5	4.9	13.4	37	12
D. WOOD EXPLOITATION AND VALUE ENHANCEMENT								0
Vehicles and Equipment	0.2	0.2	0.4	0.3	0.2	0.5	64	0
Train., Techn. Assist.	0.1	1.1	1.2	0.1	1.3	1.4	92	1
Recurrent Costs	0.1	0.1	0.2	0.1	0.1	0.2	62	0
Subtotal	0.4	1.4	1.8	0.5	1.6	2.1	76	2
E. NATIONAL PARKS AND RESERVES								0
Vehicles and Equipment	0.3	0.3	0.6	0.3	0.4	0.7	54	1
Constructions	0.1	0.0	0.1	0.1	0.0	0.1	20	0
Train., Techn. Assist.	0.0	0.1	0.1	0.0	0.1	0.1	100	0
Recurrent Costs	0.2	0.3	0.5	0.2	0.4	0.6	54	1
Subtotal	0.6	0.7	1.3	0.7	0.8	1.5	53	1
F. FORESTRY RESEARCH								0
Vehicles and Equipment	0.5	0.2	0.7	0.6	0.2	0.8	29	1
Train., Techn. Assist.	0.0	0.9	0.9	0.0	1.1	1.1	100	1
Subtotal	0.2	1.4	1.6	0.3	1.6	1.9	85	2
G. INSTITUTIONAL DEVELOPMENT AND PILOT OPERATIONS								0
Vehicles and Equipment	0.8	0.6	1.4	0.9	0.7	1.6	41	1
Train., Techn. Assist.	0.1	0.2	0.3	0.2	0.2	0.4	67	0
Pilot Operations	4.1	1.0	5.1	4.8	1.2	6.0	20	5
Staff DGF	0.4	0.0	0.4	0.5	0.0	0.5	0	0
Staff AF	0.2	0.0	0.2	0.2	0.0	0.2	0	0
Other Operating Costs	0.3	0.9	1.2	0.3	1.1	1.4	31	1
Subtotal	5.9	2.7	8.6	6.9	3.2	10.1	31	9
Total BASE LINE COSTS	60.2	37.2	97.4	70.9	43.8	114.7	38	100
Physical Contingencies	6.0	3.7	9.7	7.1	4.4	11.5	38	10
Price Contingencies	13.8	4.9	18.7	16.2	5.8	22.0	26	19
Total PROJECT COSTS	80.0	45.8	125.8	94.2	53.9	148.1	36	129

4.24 Base costs expressed in January 1993 prices were derived from similar contracts either procured under the PDF1 or more recently signed, from market surveys, and best assessment of actual costs for works executed under force account by the DGF, DREF and other Government agencies. Physical contingencies have been allowed in general at the rate of 10 percent. Price contingencies have been calculated on the basis of the annual projected inflation rates applied to local and foreign costs, including physical contingencies as shown in Table 4.2.

**Table 4.2: Price Contingencies
(percent)**

	1993	1994	1995	1996	1997	1998	1999
Local costs	5.6	4.1	6.7	4.5	4.8	5.0	5.1
Foreign costs	3.8	1.9	2.7	3.4	3.6	3.6	3.6

Source: World Bank (Operational Directive 6.50 for foreign contingencies, Country Operations for local)

G. Financing

4.25 A Bank loan of US\$69 million to the Government of Tunisia is proposed to finance the foreign exchange component of the Project investment costs (excluding the cost of the firewood study financed by the African Development Bank) and the local investment costs corresponding to the mechanized soil preparation for the plantation component of the Project. The balance of funds required would be financed by Government and Project beneficiaries. Participation of Project beneficiaries, estimated at US\$4.2 million equivalent, corresponds to the cost of maintaining prairies, pastures, plantations in private agricultural land, and windbreaks established under the Project, and to the repayment of part of investment costs for these plantations and windbreaks. The Bank loan would cover 46.6 percent of Project costs (56.2 percent of Projects costs net of taxes and duties). Project costs would be shared in the amounts and proportions shown in Table 4.3.

Table 4.3: Project Financing

	<i>Local</i>	<i>Foreign US\$ M Equivalent</i>	<i>Total</i>	<i>% of Net Project Costs</i>
World Bank	18.1	50.9	69.0	56.2
African Development Bank	-	0.7	0.7	0.6
Beneficiaries	4.2	-	4.2	3.4
Government	46.5	2.3	48.8	39.8
Net project Costs	68.8	53.9	122.7	100.0
Taxes and Duties	25.4	-	25.4	20.7
Total Project Costs	94.2	53.9	148.1	120.7

4.26 The proposed Bank loan would be for 17 years, including 5 years of grace. The Government would earmark the loan proceeds to DGF through its annual budget to finance proposed project activities. In addition, to ensure the timely availability of funds to finance labor costs for activities carried out by force account, beginning with FY94 and before the end of each FY, Government should provide funds out of its own resources through regional revolving funds to cover at least the anticipated annual Project expenditures to finance such activities. Assurances to this effect have been obtained at negotiations.

H. Procurement

4.27 Table 4.4 summarizes the Project elements and their estimated costs and proposed methods of procurement.

4.28 Mechanized clearing and soil preparation for forest plantations and range improvement (US\$43.81 million) would be procured by ICB on a slice-and-package basis estimated to cost the equivalent of US\$1 million or more, to provide the opportunity for small domestic contractors to participate. It is

estimated that some of the contracts for soil preparation would include planting (US\$4.40 million). ICB would also be used for the purchase of vehicles, tractors and implements (US\$2.46 million), for machines and equipment (US\$1.06 million) and for miscellaneous equipment (US\$1.00 million). Qualifying domestic manufacturers would be granted a margin of preference of 15 percent of CIF bid price of the imported goods or the actual custom duties and import taxes whichever is lower. Planting not included in the contracts for soil preparation costing US\$1 million equivalent or less per contract, up to an aggregated amount of US\$20.25 million, silvicultural works (thinning, regeneration) (US\$15.00), roads, firebreaks (US\$3.89 million), buildings and minor works (US\$1.80 million) are dispersed and in remote locations. They are not expected to interest the international community of bidders and they would be procured by LCB acceptable to the Bank. The major international manufacturers of equipment are well represented in Tunisia and LCB is an adequate procedure for procuring minor machinery, tools, and miscellaneous equipment. Vehicles, machines, and equipment costing US\$200,000 equivalent or less per contract would also be procured by LCB, provided the aggregate cost of all vehicles and equipment so awarded would not exceed US\$1.00 million equivalent. Silvicultural works costing less than US\$100,000 per contract up to an aggregated amount of US\$3.70 million, roads and firebreaks costing US\$100,000 or less to an aggregated amount of US\$0.40 million located in remote areas, and tending operations included in the plantations component would preferably be executed by local shopping (LS). Also, manual clearing and soil preparation, soil preparation for plantations along banks of streams, on private land, or for windbreaks costing US\$100,000 or less per contract up to an aggregated amount of US\$13.12 million, would be procured preferably by LS. These operations do not interest traditionally established contractors of works. However, LS procured regionally by the AFs could serve as an additional means to involve the private sector in the forest development. FA would only be used instead of LS with prior approval of the Bank as a last resource when no response could be obtained under LS. Both DGF and CRDA/AF are experienced in executing works and constructions on Force Account. Accounting control of the execution of these works under standard Government procedures are acceptable to the Bank. The audit reports prepared during the implementation of the PDF1 show that these procedures are in compliance with the Bank SOE procedures requirements. It is anticipated that FA might be used for about 10 percent of this optional LS/FA procedure or US\$3.00 million. Training (US\$0.82 million) would be obtained by direct arrangement with organizations known to provide training on the required themes. Consultants for the preparation of studies (US\$2.87 million) and for technical assistance (US\$0.73 million) would be selected in accordance with Bank guidelines. Electrification connecting works to the eco-museum (US\$0.09 million) would be executed by the Société Tunisienne d'Electricité et du Gaz (STEG) through Direct Contracting; STEG is the public company solely authorized to execute rural electrification works. Tending and maintaining rangeland, pastures, and prairies (US\$3.50 million) will be the direct responsibility of beneficiaries therefore procurement is inapplicable. The 10 integrated pilot projects (US\$7.46 million) are expected to be procured with the assistance of NGO under special contract arrangements acceptable to the Bank.

4.29 The DGF through the Project Management Unit (PMU) is the principal agency responsible for carrying out Project ICB and LCB procurement procedures. During the implementation of the PDF1, the DGF staff was trained and became familiar with Bank procedures and with the method to implement Work Bank Guidelines for the purchase of goods, execution of works, and recruitment of consultants. Reference bidding documents and invitation letters have been prepared by the PMU and approved by the Bank. Under the PDF1, training was also provided to regional staff to supervise field works. Therefore, no particular training in procurement is anticipated for the Project, besides the assistance to be provided by Bank supervision missions. The regional agencies, CRDA/AF will particularly be dealing with LS/FA for silvicultural works, tending, and other minor works which they are sufficiently familiar with and which they also executed satisfactorily during the PDF1.

4.30 A Country Procurement Assessment Report is being prepared but has not yet been completed. Although Tunisian ICB and LCB procedures are generally acceptable to the Bank, there are

Table 4.4: Summary of Proposed Procurement Arrangements
(US\$ million equivalent)

Project Element	Procurement Method					Total
	ICB	LCB	LS/FA	Other	N.B.F	
						Cost
1. Works						
1.1 Land clearing and soil preparation	42.63 (38.65)		13.12 (2.10)			55.75 (40.75)
1.2 Planting	4.40 (0.88)	20.25 (4.05)				24.65 (3.94)
1.3 Tending			18.04 (4.09)	2.39 /a (-)		24.43 (2.88)
1.4 Sylvicultural Works		15.00 (3.00)	3.70 (0.74)			18.70 (2.99)
1.5 Buildings and minor works		1.80 (0.90)		0.09 /b (0.04)		1.89 (0.94)
1.6 Roads and firebreaks		3.89 (1.94)	0.40 (0.20)			4.29 (2.14)
1.7 Integrated Pilot Projects				7.27 /c (7.27)		7.27 (7.27)
2. Goods						
2.1 Vehicles, tractors and implements	2.46 (1.72)	0.60 (0.42)				3.06 (2.14)
2.2 Machines and equipment	1.06 (0.74)	0.20 (0.14)				1.26 (0.88)
2.3 Miscellaneous equipment	1.00 (0.68)	0.25 (0.20)				1.25 (0.88)
3. Consultants						
3.1 Training in Tunisia				0.42 (0.44)		0.42 (0.42)
3.2 Training abroad				0.37 (0.37)		0.37 (0.37)
3.3 Technical assistance				0.71 (0.71)		0.71 (0.71)
3.4 Studies				2.68 (2.68)	0.69 (-)	3.37 (2.68)
4. Incremental Staff and Operating Costs				4.66 (-)		4.66 (-)
Total	52.75 (39.39)	41.99 (10.71)	34.06 (7.41)	18.59 (11.49)	0.69 (-)	148.08 (69.00)

Note: Figures in parentheses are the respective amounts financed by the Bank loan. N.B.F: Not Bank-Financed Works and Goods should be procured in accordance with World Bank *Guidelines: Procurement under IBRD and IDA Credits* (Washington, D.C., May 1992) and Services should be procured in accordance with World Bank, *Guidelines: Use of Consultants by World Bank Borrowers and by World Bank as Executing Agency* (Washington, D.C., August 1981)

/a Maintaining rangeland, pastures and prairies would be the direct responsibility of beneficiaries;

/b To be executed by DC with STEG (*Société Tunisienne d'Electricité et du Gaz*);

/c Special contracts to be signed with NGOs.

some aspects which are inconsistent with Bank policy and/or could be improved to ensure better competition. Assurances have been obtained at negotiations that procurement under the Project would be carried out following procedures acceptable to the Bank, namely, bid opening should be public and no particular preference should be given to the public sector companies.

4.31 The Project Implementation Schedule is indicated in Chart 1, from which the Estimated Disbursement Schedule (see Table 4.5) has been derived.

4.32 During project supervision, Bank-financed works contracts above a threshold of US\$2.0 million equivalent and consultants contracts above US\$100,000 equivalent would be subject to the Bank's prior review procedures. The review process will cover 83 percent of the total works contracts value procured by ICB and LCB (92 percent ICB,; 68 percent LCB). The review would also cover 85 percent of the consultants contracts. Goods contracts or packages above US\$350,000 equivalent would also be subject to, prior review, covering about 44 percent of the total value of Bank-financed goods. These percentages are considered satisfactory, since PMU staff gained enough experience and there are reference bidding documents and letters of invitation to consultants already approved during the implementation of the PDF1.

4.33 Procurement information would be collected and recorded as follows:

- (a) prompt reporting of contract award information by borrower;
- (b) comprehensive semi-annual reports to the Bank by the borrower indicating
 - (i) revised cost estimates for individual contracts and the total project, including best estimates of allowances for physical and price contingencies;
 - (ii) revised timing of procurement actions, including advertising, bidding, contract award, and completion time for individual contracts;
 - (iii) compliance with aggregate limits on specific methods of procurement; and
 - (iv) a completion report by the borrower within six months of loan's closing date.

I. Disbursement

4.34 In accordance with the Bank standard disbursement profiles, the proposed Bank loan of US\$69 million is expected to be disbursed over nine fiscal years. The detailed schedule of disbursement is given in Table 3 and summarized in Table 4.5 below:

Table 4.5: Disbursement Schedule
(US\$ million)

	<i>IBRD Fiscal Year</i>								
	<i>1994</i>	<i>1995</i>	<i>1996</i>	<i>1997</i>	<i>1998</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>
<u>Disbursements</u>									
Annual	0.7	3.4	11.1	13.8	11.0	11.1	13.8	2.7	1.4
Cumulative	0.7	4.1	15.2	29.0	40.0	51.1	64.9	67.6	69.0

4.35 Disbursements would be made after receipt of full documentation, except for goods, civil works executed by force account, and services provided under contracts valued below US\$100,000 equivalent, for which disbursements would be made against certified statement of expenditures (SOE). The SOE would be certified by the Project implementation agency incurring the expenditure. Supporting documentation would be retained by the implementation agency and would be made available for inspection during Bank supervision missions and by external auditors. Disbursement categories, amounts allocated and share of expenditures to be financed would be as indicated in Table 4.6.

4.36 To ensure the efficient and timely implementation of the Project, the Bank would deposit after loan effectiveness an initial sum up to US\$4 million to set up a revolving fund to finance eligible

expenditures corresponding to the Bank's share of four months' project needs. Bank funds would be deposited in US dollars in a special account at the Central Bank of Tunisia (BCT) and would be channelled as needed to the Project. Government counterpart funds would be secured through appropriate budget allocations.

4.37 The Bank would replenish the revolving fund as requested upon receipt of satisfactory evidence that expenditures made from it were eligible for financing out of the fund. A replenishment request would normally be sent to the Bank when 50 percent of the revolving fund has been disbursed, i.e., about every two to three months. Should any disbursement made from the special account not be acceptable to the Bank, Government would be required to deposit the corresponding ineligible amount into the special account, or if the Bank so requests, refund to the Bank an amount equal to the amount not eligible.

Table 4.6: Disbursement Categories

<i>Category</i>	<i>Amount of loan allocated (US\$ million)</i>	<i>% of expenditure to be financed</i>
1. Civil works, buildings, roads, firebreaks	3.2	50 %
2. Forestry Works related to mechanized soil preparation for reforestation	36.2	100 %
3. Forestry works, including manual soil preparation, planting, thinning, and tending and excluding mechanized soil preparation for reforestation	13.5	20 % of local and 100% of foreign expenditures
4. Equipment, vehicles and materials	4.0	100 % of foreign expenditures, 100 % of local expenditures (ex-factory cost), and 70 % of local expenditures for items procured locally;
5. Consultants' services and training	4.8	100 %
6. Pilot operations	7.3	100 %
Total	69.0	

4.38 No further deposits into the special account would be made by the Bank when the total unwithdrawn amount of the part of the loan that is expected to be disbursed at loan closure would be equal to US\$8 million. If it is determined that any amount outstanding in the special account is not required to cover further payments for eligible expenditures, the Government would refund to the Bank such amount outstanding in the special account.

V. PROJECT IMPLEMENTATION

A. Organization, Management

5.01 The Project Management Unit (PMU) which was established under the PDF1 would be strengthened and its position in the DGF reinforced by having the primary responsibility for the coordination, management and monitoring of the Project (Chart 2). The Director General of the DGF would be the national director of the Project and he would delegate executive functions to the Director of the PMU. The PMU would be directly dependent from the Director General of the DGF and would have function relationship with the other DGF departments and, at the regional level, with the AFs which would be involved in the Project implementation.

5.02 The PMU would have five units (Annex 8): (i) Accounting and Financial Management Unit (AFU) to follow the financial execution of the Project, keep its accounts, and monitor the execution of contracts; the AFU would be strengthened with three technical staff, a financial expert, an accountant, and an administrative officer; (ii) Concept, Programming, and Promotion Unit (CPPU) in charge of preparing Project annual budgets, supervising extension activities, monitoring the use of the Sylvo- Pastoral Fund (FSP) and promoting forest users' associations activities and the private sector in general; it would be provided with a communications specialist, and an agro-economist; the CPPU would function under the responsibility of the Chief of the Forestry Economy Division of the DGF; (iii) Management and Exploitation Unit (MEU) to implement the Project forest management component; the MEU would function under the responsibility of Chief of the Studies and Management Monitoring Division of the DGF; (iv) the Reforestation and Rangeland Unit (RRU) to implement the Project forest pasture and range improvement component; the RRU which would function under the responsibility of the Chief of the Reforestation Division of the DGF, would be strengthened with an agro-forester and a range specialist; (v) the Environment Unit (EU) to implement the Project nature conservation component; the EU would be under the responsibility of the Chief of the National Parks Division of the DGF. The Director of the PMU would coordinate the activities of these five units and would establish the liaison with the other departments of DGF and AFs in the field. During negotiations assurances have been obtained that the setting up of these five units within the PMU and the provision of the 7 staff to strengthen its new five units would be completed prior to loan effectiveness.

5.03 The Forestry Coordination Committee (FCC), currently in operation for the PDF1, would be consolidated and enlarged. It would include representatives of the Ministry of Environment and Territorial Planning, Ministry of Planning, Ministry of International Cooperation, the private sector involved in forestry-related activities, and the *Union Tunisienne de l'Industrie, du Commerce, et de l'Artisanat*. The FCC would meet once a year to review, coordinate, and monitor the annual programs of forestry development in the country and in particular their relationship with the Project. Assurances to this consolidation and expansion before December 31, 1994 have been obtained at negotiations. The experience of the PDF1 has shown that the FCC is not the right forum to discuss and get guidance on common technical matters. Therefore, the Project would set up a Technical Monitoring Committee (TMC), before December 31, 1994, with representation of the DGF/PMU, the CRDA/AF, the DREF, and the INRF to examine, on a quarterly basis or when requested by the Director General of the DGF, technical issues related to the Project implementation and give practical guidelines. Assurances to this effect have been obtained at negotiations.

5.04 Whereas PMU has the mandate at the central level to plan, coordinate, manage, and monitor the Project implementation, the physical execution is essentially the responsibility of the regional agencies CRDA/AF. The Chief of each AF involved in the Project assisted by technical staff would supervise and monitor their execution of the project components in his Governorate. The CRDA/AF would be strengthened with staff (12 foresters) and the Project would finance a training program, vehicles and other equipment (para. 4.21) to assist them in implementing the Project.

5.05 All Project activities would be implemented under the responsibility and the coordination of the DGF, either directly, or through the AFs. However, research would be implemented by the INRF and training under the Wood Exploitation and Value Enhancement component by the CFPR (para. 4.17) and by the CRIP (para. 4.18). The DGF, in particular through the PMU, would be in charge of planning, management, and monitoring Project implementation, whereas the AFs would execute in the field under the technical supervision and guidance of the DGF. The strengthening in manpower, training and equipment and the provision of technical assistance financed under the Project (paras. 4.15, 4.17, 4.18, 4.20, and 4.21) would assist the DGF, AFs, the INRF, the CFPR and the CRIP in implementing Project programs.

5.06 The operation and management of the sylvo-pastoral programs included in the Pasture and Range Improvement component would be the task of the users through their village associations before the AFICs are formally established. However, the success of this operation and the sustainability of the investments involved is dependent on the open participation of those users. Therefore, they would be informed and requested to participate in the design and establishment of the areas in compensation for the closing to ranging due to plantation or regeneration programs. Assurances that the execution of these programs would be dependent on prior information, consultation, participation, and agreement of the population have been obtained at negotiations. Further, the pilot operations of integrated rural development (para. 4.21) would give an additional contribution to clarify and advise on the role of the future AFICs in the operation and management of more complex sylvo-pastoral systems.

B. Execution of Works; Purchase of Goods; Studies and Training

5.07 Execution of works included in the Forestry Infrastructure sub-component would be the responsibility of the AFs either through LCB or by LS/FA (para. 4.28). The PMU would centralize the preparation of bidding documents and procurement processing, when necessary. The PDF1 has provided the know-how and technical specifications exist to ensure that the PMU is in conditions to fulfil this task. The AFs have the expertise required to ensure adequate supervision of the execution by contract and the capacity to do it by force account for small jobs in case that LS procedure would have no response. Sylvicultural Works would be the responsibility of the AF and executed essentially by LCB; however LS, piece work, or force account would also be used; these last procedures have been traditionally practiced. Techniques and recommendations for the execution of these works are included in Annex 2. All large clearing and soil preparation works for Plantations in the NFE would be procured by the PMU and their execution would be followed and supervised by the AFs. The PDF1 has provided them with training and experience in this field. All other works related to Manual Plantations, Plantations along stream banks and in Private Land would also be executed by the AFs concerned by local shopping or force account as traditionally is being done. Plantation techniques which reflect the lessons learnt in the PDF1 are indicated in Annex 3. Minor works in Nurseries would also be executed by AFs by LS/FA. All soil preparation and clearing required by the Forest Pasture and Range Improvement component would be subject to ICB procured by the PMU and supervised by the AFs concerned. The AFs would execute by LS/FA all the remaining aspects of the Plantations and Range Improvement components, e.g., seeding, planting, tending. It is expected that forest users through their village associations or individually, when the program is located in private or collective land, would collaborate in these works. The pilot operations (para. 4.21) would assist in defining the modalities of this participation.

5.08 Purchase of Goods would be essentially the responsibility of the PMU which would prepare purchasing annual programs and would deal with all the necessary procurement arrangements. Packages would be prepared to group similar equipment and materials so that bidding would become attractive to international competitors. Minor equipment, materials, and goods could be purchased directly by the AFs in accordance with annual programs previously approved by the PMU. Bidding documents and specifications prepared during the PDF1 and approved by the Bank already exist in the DGF.

5.09 Studies comprising the preparation of letters of invitation, terms of reference and other documentation required for the recruitment of consultant services to carry out studies (forest management plans, wood processing) would be coordinated and implemented by the PMU which would also be responsible to deal with the recruitment of short term consultants required by some training activities (demonstration and pilot operations, nurseries, etc.). Organization of training including workshops, study tours and courses would also rest with the PMU, after agreement on annual programs to be discussed within the framework of the TMC (para. 5.03) and implemented by selected training institutions. The FAO Trust Fund set up during the PDF1 to implement the package of short term consultants and training programs has proved to be a satisfactory solution which could be followed in the Project.

C. Monitoring and Evaluation

5.10 The physical and financial monitoring of the Project would be the responsibility of the PMU and would be based on data collected and supplied by other departments of DGF, by the AFs at regional level, and by INRF, CRIP and CFPR for their part of the Project execution. Two semi-annual reports would be prepared by the PMU. Particular attention would be given to monitoring procurement operations (para. 4.33) including execution of contracts, control of force account works and loan disbursements. Studies of the impact and evaluation of the Pilot Operations for Integrated Rural Development would also rest with the PMU. The training and the experience obtained in these fields by the PMU during the implementation of the PDF1 would assist in setting up a similar system for the Project. The *Direction Générale du Financement et des Encouragements* (DGFE) of the Ministry of Agriculture would prepare the project completion report within six months of the loan closing date. Because of the nature of the Project's emphasis on social and institutional issues, the Government and the Bank would carry out a mid-term review of the Project implementation and prepare a report not later than May 31, 1997. Annex 10 contains guidelines for Project monitoring and evaluation.

5.11 Bank supervision input into key activities is indicated in Table 10—Supervision Plan. This is in addition to regular supervision needs for the review of progress reports, procurement, correspondence, etc., estimated at two staff-weeks in FY94, three staff-weeks thereafter till FY99, when it is not expected that more than two staff-weeks be needed. For the total Project implementation period, supervision needs are estimated at fifty-seven staff-weeks. The main lines of this supervision plan were discussed with the Borrower. In addition to the semi-annual reports, and prior to the arrival of Bank supervision missions, the PMU would prepare notes on Project progress and the main issues to be discussed during the mission. The PMU would also be in charge of coordinating arrangements for Bank supervision missions, and for providing information required. Mission briefings on arrival and wrap-up meetings will normally be held with the participation of representatives of the Ministries of Agriculture, Planning, and International Cooperation. Before departure, the Bank mission will leave in the field an Aide-Memoire with its conclusions and recommendations.

D. Accounts and Audit

5.12 The entities responsible for Project execution (DGF/PMU, AFs, INRF, and CFPR) will establish and maintain separate project-related accounts. Responsibility for consolidation at the central office (DGF) will rest with the PMU and it will begin with Project implementation. Such accounts shall be maintained in accordance with sound and internationally recognized accounting principles and practices satisfactory to the Bank. The PMU will provide interim and annual financial statements to reflect the financial performance of the Project. An auditor's opinion and report satisfactory to the Bank on such statements will be provided within nine months of the close of the fiscal year. The auditor's report will include a statement on the reliability of statement of expenditures as a basis for loan disbursements, on the Special Account, and on the compliance with financial covenants. The foregoing Project accounting, financial reporting, and auditing arrangements should provide adequate and timely information to the Bank

for supervision of the Project. Assurances to this effect have been obtained at negotiations. The accounts of the PDF1 and the respective audit reports have been prepared by the *Contrôle Général des Finances* of the Ministry of Finance in a satisfactory manner and usually on time.

VI. PRODUCTION, MARKETS, PRICES AND FINANCIAL RESULTS

A. Production

6.01 The annual yield of wood from the part of the natural forests and existing plantations that is dealt with under the forest management component would increase from about 180,000 m³ to 250,000 m³ as a result of the project. Most of this increase would come from thinning of pine plantations whose share in the production would grow from about 5 percent to one third. The quality and value of this production would also improve significantly in the long term since the respective share of sawlogs and fuel wood would change from about 10 percent and 35 percent to 20 percent and 25 percent, while the share of logs for other industrial or traditional uses would remain the same. Under the reforestation component in the NFE, annual yield for pine would range, according to climatic zones, from 2 to 6 m³/ha with mechanized soil preparation and from 1 to 3 m³/ha with manual soil preparation; similarly, annual yield for eucalyptus plantations would respectively range from 4 to 8 m³/ha and from 2 to 4 m³/ha. Plantations on river banks would have an average annual yield of 15 m³/ha. Total reforestation under the project would establish an annual production capacity of about 170,000 m³ of which 30 percent would be sawlogs, 60 percent logs for other industrial or traditional uses, and 10 percent fuelwood. Total output from the project would be 8.5 M m³ of wood to which could be added about 2,000 tons of Aleppo-pine seeds and nearly 4,000 tons of pine almonds.

B. Markets

6.02 As most forest products in Tunisia are in short supply, no difficulty is foreseen in marketing the project forest output. Incremental production of sawnwood will substitute for imports. The chipwood market is rapidly growing and project output would not be sufficient to keep up with population growth. Forage production under the project would substitute for production foregone due to project reforestation and forest management operations and although there would be some incremental production as the treated forest areas are again opened to livestock, this would represent less than one percent of the country's livestock feed requirements and would pose no problem in finding a market. Minor forest products (e.g., pine almonds and Aleppo-pine seeds) have a ready market and incremental fuelwood output would be negligible relative to the overall national deficit.

C. Prices

6.03 The 1992 prices used for the purpose of this report are listed in Table 6.1 below. Wood prices are based on the relatively stable auction prices for two major wood categories, namely pine and eucalyptus chipwood. Fuelwood prices are estimated average actual market prices. Prices for other project wood outputs, not currently frequently traded, have been based on estimated price mark-ups to chipwoods given the quality differences. Prices for minor forest products are estimated market prices. The forage unit (FU) value has been derived from the value of barley, the feed for which it substitutes.

Table 6.1: Financial Prices for Selected Project Output

<i>Output</i>	<i>Unit</i>	<i>Price (D)</i>
Chipwood		
pine	m ³	9.8
eucalypt	m ³	6.8
poplar	m ³	6.8
Sawlogs		
pine (construction)	m ³	49.0
(carpentry)	m ³	64.0
eucalypt	m ³	34.0
poplar	m ³	54.0
	m ³	5.0
Fuelwood		
Pine almonds	kg	40.0
Aleppo pine seeds	kg	5.0
Forage	FU	0.14

Note: Wood volumes are in roundwood under bark equivalents.

D. Impact on Government Budget and Cost Recovery

6.04 The overall budgetary impact of the project during the investment period is shown in Table 6.2. The revenues are from the forest management activities which provide immediate benefits.

**Table 6.2: Impact on Government Budget
(D Million)**

	<i>1994</i>	<i>1995</i>	<i>1996</i>	<i>1997</i>	<i>1998</i>	<i>1999</i>	<i>Total</i>
Project Costs	7.5	26.8	22.4	23.0	24.1	22.1	125.8
of which taxes	<u>1.3</u>	<u>4.6</u>	<u>3.8</u>	<u>4.0</u>	<u>4.1</u>	<u>3.8</u>	<u>21.6</u>
Net Project Costs	6.2	22.2	18.6	19.0	20.0	18.3	104.3
Project Revenues	<u>1.1</u>	<u>1.7</u>	<u>1.7</u>	<u>1.8</u>	<u>1.9</u>	<u>2.0</u>	<u>10.2</u>
Net cost to budget	5.1	20.5	16.9	17.2	18.1	16.3	94.1

6.05 Most project works are carried out on state land where cost recovery is not normally an issue. Nevertheless the reforestation component for production purposes (in the sub-humid zone) has a net present financial value (discounted at 10 percent, considered to be the opportunity cost of capital in real terms) of D3.8 million (cost recovery of 133 percent). The forest management component has a cost recovery of 250 percent with a net present value of D9.4 million. Cost recovery on plantations for protection purposes is 33 percent. For pilot plantations on private lands (IRR=13 percent) and windbreaks (IRR=7 percent) the financial returns are not sufficient (and much lower than social benefits - Table 7.1) to attract private investors given the long maturity (15 years) and risks involved. The FSP (para 2.31) provides for a 50 percent government subsidy for the establishment of such plantations, which is considered adequate to interest the private sector, but which rate could be adjusted if necessary as experience is gained. Finally, substitute ranges are improved under the project at Government cost but the herdsmen are responsible for their maintenance and protection.

VII. BENEFITS AND JUSTIFICATION

A. Benefits and Beneficiaries

Production and Foreign Exchange Savings

7.01 Although much of Project benefits are environmental, benefits also encompass important and more easily measurable increased forest production and productivity, income generation for poor communities, and more efficient public administration of forest resources. Over the life of the project it would provide an increased wood supply of 8.5 M m³. This, along with an upgraded average quality (from fuelwood to utility wood and from utility wood to sawnwood) through better forest management and better extraction technology, will provide raw materials to local industry and substitute for growing imports. Over the 50 year life of the project's productive plantations, 3.8 M m³ of sawlogs produced would substitute for imports of the order of D1 B and 3.9 M m³ of chipwood would save some D0.2 B in chipboard imports.

Environmental Benefits

7.02 The project will generate important environmental benefits but these are not easy to quantify. Tunisia's few remaining forests provide the enabling climatic and physical environment for the country's farming activities. It is well known that from having been the granary of the Roman empire, deforestation and removal of the vegetative cover followed by erosion, desertification and a deterioration in the microclimate have seriously reduced the North African region's, and Tunisia's, agricultural production potential, which is now compensated for by heavy artificial irrigation and input use. Not only does erosion and soil loss occur on the denuded and degenerated formerly forest-covered hills but their crests and slopes no more serve to retain precious water and gradually feed it to downstream agricultural areas but they now act as runways to accelerate water run-off creating floods and causing erosion in fertile lands down-stream. As a result 10,000 ha (0.2 percent) of agricultural land are lost each year. Project plantations will help protect delicate agricultural soils in the humid and semi-arid zones from erosion, flooding and loss of productivity. Sedimentation rates in North Africa may reach up to 40 m³ per ha and year and a reduced soil loss of only half of that due to project plantations would lead to annual reductions of 0.6 M m³ of silt in rivers leaving the project areas. By so doing sedimentation of the hydrological infrastructure will be reduced, giving a longer economic life to a large capital stock. Project plantations will also help prevent continued desertification and improve the country's micro-climate and land productivity. Degradation of forest resources resulting from the ever increasing pressure of traditional livestock grazing will be alleviated through working with herders' groups to establish and improve management of alternative feed resources. Intensive management will improve the vitality of existing forests and help regenerate "noble" natural oak and pine forests which are gradually aging and decaying due to heavy livestock grazing of new sprouts. Project plantations will also help in the fight against the "green-house effect" and act as a carbon "sink" for some additional 40,000 tons of carbon a year with a total carbon storage capacity at maturity of some 0.4 M tons. Project support for the expanding system of national parks and reserves, and for strengthening administration of hunting regulations, will improve Tunisia's management of its heritage of flora and fauna.

Employment Creation and other Benefits

7.03 On the social side, the project will generate employment and income in the poor communities that neighbor forests. An estimated 6 million work-days of direct employment will be created during project implementation. This corresponds to some 4 000 full time jobs during this period. Some 50,000 work-days will be required each year to maintain project plantations. Job creation is also expected from greater utilization of existing capacity in wood transformation and processing industries. The value of minor forest products harvested in project plantations corresponds to the income from about 2,500 full time jobs during the project period, mostly for women. Improved sector administration is expected to result

enabling environment for Tunisia's agricultural production (on 5.3 M ha), the average agricultural value added thus enabled per ha of forest may be calculated (D 2,800). On this basis the amount of the avoidance of yield loss due to project plantations (because of erosion, flooding and reduced soil moisture and deteriorating micro-climate without the project) necessary to justify the investment on economic grounds (i.e., ERR=10), may be calculated. Taking the plantations with the lowest estimated ERR in table 7.2 above (semi-arid, manual) an avoidance of a of loss of yields of as little as 0.3 percent p.a. would justify the investment. If the benefits of preventing premature dam siltation are added - based on replacement value of dam capacity and assuming 15 m³ silt per ha p.a. - would reduce the required yield gain from 0.3 percent to 0.2 percent (these figures also seem consistent with the estimated loss of 0.2 percent of farm land per year given in para 7.02). An avoidance of a yield loss of 0.5 percent p.a. combined with the benefits from reduced dam siltation, would give an economic rate of return of 17 percent. Other plantation models would have even higher returns. In fact, since project plantations are more erosion prone than average (which was basis for this calculation) the economic benefits are expected to be higher.

7.06 All values are in 1992 constant prices. The economic analysis has been made in border prices, with international prices converted to dinars at the exchange rate of US\$ 1 = D 0.9. Because of prevailing severe unemployment and under employment in Tunisia and particularly in the marginal areas where project plantations are made, the shadow wage rate has been taken as 80 percent of the wage rates actually paid (60 percent of the fixed minimum agricultural wage rate - SMAG). Traded goods and services have been valued at their CIF import- or FOB export price as appropriate. Non-traded goods and services have been adjusted by specific conversion factors and only minor items have been adjusted by a standard conversion factor, estimated at 0.9. Since Tunisia will face increasing shortages of fuelwood, its economic price has been calculated on the basis of the price of butane gas, a substitute household energy source, adjusted for calorific value differences. Economic prices are assumed to remain constant in real terms for all inputs and for some outputs, namely forage and minor forest products. For wood, a long term average price has been calculated on the basis of Bank projections for an annual increase in conifer prices of 0.8 percent, in real terms.

C. Project Impact

7.07 Environmental Impact. The Project has been placed in category "B" according to the classification of OD 4.01 on "Environment Assessment". The overall environmental impact of the project would be strongly positive. Indeed, the project includes a comprehensive package of measures and interventions which will conserve and enhance biodiversity, rehabilitate and expand the role of forests in protecting the environment, and alleviate stresses on and improve management of forest resources. As regards biodiversity conservation, the project would support comprehensive national policies of nature protection, improve protection of wildlife and fragile ecosystems by strengthening the system of protected areas and developing environment education, and increase biodiversity-related scientific knowledge through research activities. Improved forest and range management together with reforestation of degraded areas with mixed—including native—species by the project would also result in improved habitat for wildlife and increased biodiversity. As regards environment protection, the main contribution of the project would be improved soil and water conservation. Reforestation of degraded forest cover and pasture management, mostly on erodible soils in mountainous and hilly areas, and afforestation of river banks would reduce soil erosion and regulate water runoff and infiltration. This would decrease loss of land for agriculture and siltation of reservoirs, and enhance torrents, earthslides and floods control. Pilot windbreak plantations on private farmland would promote increased protection of crops from wind effects. As regards alleviation of stresses on forests, the project would strengthen forest fires and poaching control with improved equipment and infrastructures and strengthened institutions. Development of natural regeneration, reforestation with mixed and native species, and intensive care of young stands will also result in healthier and more pest resistant forests.

7.08 Construction of new roads, mechanized soil preparation before reforestation, and more intensive exploitation of forests have both positive and some negative effects; the project would mitigate the latter. New roads would help improved fire control but may cause erosion to start in sensitive areas. To avoid that, additional funds would be provided under the project to finance specific devices to control water runoff in these areas. Mechanized soil preparation ensures improved survival and initial growth of young stands but may result in soil erosion and nutrients leaching. Detailed ecological—and social—studies would be carried out to select the sites where these risks are minimal; erosion would also be controlled through windrowing, ploughing, and planting on contour lines and by preserving strips of natural vegetation between planted blocks. More intensive exploitation—mostly in overmature or very dense young stands—would be positive for forest health but may damage forest ecosystems. To mitigate this, the project would finance training and technical assistance to develop environment friendly methods, techniques, and equipment for forest exploitation.

7.09 Institutional Impact. The PDF1 has shown that beneficiary commitment to manage and maintain forage resources can only be obtained through active participation in the planning and execution of the programs. Building on this experience and that acquired by *Office de Développement Sylvo-Pastoral du Nord Ouest* under the NW Rural Development, the Project will foster a major change in conventional forest policy, from one of policing and enforced protection, to one of cooperation and joint venture with local communities. This change is not without difficulty for it requires a major reorientation of long established procedures, and the application of skills that have not been a conventional part of the forester's portfolio. Under the Project, training will be expanded and a communication unit will be created at the PMU to work with NGOs on introducing joint management of forestry resources. Improved extension service will also assist private farmers with tree planting.

7.10 Impact on Women. Women are the predominant collectors of fodder, fuelwood and non-wood products. Effective participation of women in joint management of forests would assist in reducing illicit removals. NGOs would be responsible for ensuring that the efforts to mobilize women have effective support in the initial years. The better management of forests and pastures would enhance the availability of the forest products which women collect to provide household subsistence and secondary income.

D. Risks and Sensitivity Analysis

7.11 No major or unusual technical risks threaten the success of the proposed Project. Plantations establishment technologies have been used successfully during the PDF1. However the Project objective of getting the private sector increasingly involved in forest management might be compromised by the possible slow reaction of entrepreneurs to participate in a program for better exploitation of the forestry resources and for enhancing the value of the wood production. The Project through training and demonstration and through particular emphasis of the applied research on the enhancement of the wood value would help to reduce this risk. Similarly, sustainability of forestry development programs is highly dependent on the receptiveness and active participation of population. The approach followed in the Project design to precede any investment program for forestry development (plantations, regeneration, rangeland) by consultation, participation, and agreement of interested population in the development programs would diminish this risk; in addition the Project would complete this action by seeking the full application of Forestry Code in its aspects of the users' participation in the management and exploitation of forest resources.

7.12 Table 7.1 above shows the values for which the net present value of the project, discounted at the estimated opportunity cost of capital of 10 percent, becomes negative (switching values). Table 7.2 below summarizes the analysis of the impacts various assumed adverse effects on project benefits, costs or timing. The tables illustrate that overall, the project including all investment costs (also those for which no benefits have been estimated), is reasonably robust with regard to assumptions on investment costs and benefits and that it will still have a substantial net present value if they, respectively, increase or decrease by 20 percent. Project plantations for production purposes (in the humid zone) are even more insensitive to changes and remain viable even with a 50 percent increase in costs or decrease in benefits, or with a

5-year delay in benefits. The total project is somewhat more sensitive to a delay in benefits because of the very profitable forest management component (Table 7.1); however the nature of the investments (essentially wood extraction) make the benefits almost instantaneous and any delay in this component is hypothetical only. Range management is a necessary complementary activity to project plantations (to produce substitute fodder) and cannot be evaluated in isolation, However the figures indicate the order of preference in selecting substitute ranges and that wherever possible prairies or other natural ranges should be preferred to cacti or forest shrub plantations. Where it is necessary to plant cacti or shrubs particular attention would have to be given to cost control.

Table 7.2: Sensitivity Analysis

			<i>Net present value at 10 percent (DM)</i>	<i>NPV as percent of present Costs at 10 percent</i>	<i>Economic Rate of return (percent)</i>	
Total Project						
Base case			21.7	43.2	13.2	
Total benefits,	prices or yields					
	down	10 %	14.5	28.9	12.1	
	down	20 %	7.3	14.5	11.1	
	lagged	1 year	15.2	30.2	12.1	
	lagged	3 years	3.8	7.6	10.5	
Total costs up			20 %	11.6	19.3	11.5
Production Plantations (humid zone)			7.9	108	14.2	
Base						
Total benefits,	prices or yields					
	down	10 %	6.4	86.8	13.5	
	down	50 %	0.3	3.8	10.2	
	lagged	1 year	6.6	88.7	13.4	
	lagged	5 years	2.1	28.9	11.1	
Total costs up			50 %	4.2	38.4	11.8

E. Sustainability

7.13 An important objective of the Project is to establish a firm knowledge base on the state of the forest resource and its use, including the extent of its degradation. Building on this knowledge, the DGF would be able to devise a sound development strategy incorporating both production and environmental objectives. The expanded use of management plans, the integration of local population in the management of forests and the strengthening of the DGF and the training of private sector in wood production, exploitation and processing would provide the essential tools to improve the institutional capacity to implement this strategy. In addition, the research component, including genetic improvement, new and improved technologies for the production of plants, would bring increases in productivity and quality of natural forests, plantations, and forest ranges. The nature conservation component will continue the efforts underway to protect national parks and preserve Tunisia's flora and fauna. As to the sustainability of the quantifiable benefits of improved yields and quality of wood, the DGF is an effective agency and is successfully implementing the PDF1. Under the Project, it will be strengthened and will become more diversified to carry out its multipurpose management. Increased importance will be given to monitoring and evaluation to ensure follow-up on various technologies being used and apply the lessons to future interventions. The Project will also expand management of forest resources (in particular pasture and range) by the local population through the consolidation of local user groups (AFIC). Thus, the responsibility and burden of undertaking many of the activities would be shifted from Government

to the beneficiaries. This would result in a more sustainable management system and budgetary savings for the Government.

F. Special Emphasis Programs

7.14 The increase of private sector involvement in sustainable and environmentally oriented forestry development, both of population living in the forest as primary users or of those entrepreneurs who might collaborate with Government in preserving and expanding the national forest patrimony is an objective of the proposed Project. The actions included in the Project refer namely to: (a) the approval of the decrees ruling the operation of the AFICs (para. 2.29); the operation and establishment of a system of financial assistance in line with the objectives established for the FSP (para. 2.31); (b) the availability of adequate investment incentives to the private sector for selected service activities in the forestry sector (para. 2.31); (c) the preparation and implementation of a plan of action to motivate and enhance the role of the private sector; (d) the integration approach adopted in the design and execution of the reforestation and regeneration programs financed under the Project (para. 5.06); (e) the training programs particularly oriented to the small private entrepreneurs (para. 4.17). Part of these activities are primarily directed to the poverty reduction in the forest areas when they refer to the AFICs. In addition, other Project activities would contribute to the socio-economic improvement in the forest areas such as, the manual reforestation component (para. 4.10) and the extensive use of local shopping to procure the execution of minor works for tending operations (para. 4.28). The majority of the Project components have a direct impact on the environment protection as detailed in para. 7.04.

7.15 Exercising rights of using some forest products (dead wood, natural pasture, non-wood products) is sometimes in conflict with forestry development. New reforestation or regeneration programs demand the closing of areas to such use. This obliges the forest population to look for those products at longer and longer distances. This drawback affects in particular the women who traditionally are in charge of supplying the household with water and firewood. The compensatory measures provided by the Project with improved pastures, by implementing the access to credit and to the advantages foreseen in the FSP will benefit the population in general. However some specific actions are foreseen for women development. This will be done in the context of the integrated pilot operations (para. 4.21). These operations, which will be implemented with the assistance of NGOs, would comprise promotion programs dealing with rural women and addressing themes such as, developing handicraft, promoting the use of more efficient and energy saving household equipment, and training in the exploitation of non-wood products (honey, mushrooms, essences, etc.)

VIII. AGREEMENTS REACHED AND RECOMMENDATION

8.01 At negotiations, assurances were obtained that Government would:

- (a) by December 31, 1994, review the area under the control and management by each forest agent (forest units) and establish for each AF and in accordance with its particular physical characteristics maximum sizes for these forest units (para. 2.28);
- (b) by December 31, 1996, approve the decree foreseen in art 38 of the FC referring to the conditions for granting authorizations to exercise the right to use the NFE (para. 2.30);
- (c) by December 31, 1997, or such later date as shall be agreed to between the Borrower and the Bank, following the recommendations of the mid-term Project review (para. 5.10), approve the decrees referring to the execution of works by the AFICs, (Art 43 of the FC), constitution, by-laws and operation of the AFICs (Art 44 of the FC) (para. 2.29); and not later than June 30, 1994, take measures necessary to ensure the conclusion of arrangements satisfactory to the Bank in respect of the pilot operations of integrated rural development (para. 2.29); such arrangements to include the participation and consultation with forestry population concerned, NGOs and the DGF;

- (d) ensure the prompt establishment and operation, in accordance with suitable policies and procedures, of the system of financial assistance envisioned under the FSP (para. 2.31);
- (e) not later than December 31, 1994, take all necessary measures to ensure the availability of adequate investment incentives to the private sector for selected activities in the forestry sector, including the prompt publication of decrees (para. 2.31);
- (f) not later than December 31, 1995, the PMU would prepare a plan of action to increase and enhance the role of the private sector in forestry development and Government would implement such plan thereafter (para. 2.32);
- (g) by December 31, 1995 approve the decree foreseen in Art 76 of the FC referring to the conditions for authorizations to occupy the NFE temporarily (para. 2.32);
- (h) not later than December 31, 1994 the CFPR would ensure preparation and implement training programs for forest exploitation workers on selected matters (para. 4.17);
- (i) beginning FY94, the INRF would implement the research program foreseen in the Project and detailed in Annex 7 and prepare semi-annual reports in respect thereof (para. 4.20);
- (j) beginning with FY94, and before the end of each FY, provide through regional revolving funds, the funds necessary to cover at least the anticipated annual Project expenditures to finance labor costs for operations executed by force account (para. 4.26);
- (k) procure goods and works in accordance with the Bank guidelines and procedures acceptable to the Bank, namely, the import of vehicles would not be subject to constraints, bid submission procedures should not be limited, bid opening should be public, and no particular preference should be given to national suppliers, contractors, or manufacturers besides the one mentioned in para. 4.28 (para. 4.30); and employment of consultants would follow the Bank guidelines;
- (l) expand and consolidate the Forestry Coordination Committee (FCC), to include representatives of the Ministry of the Environment and Territorial Planning, Ministry of Interior (local associations), Ministry of Planning, Ministry of International Cooperation, the private sector, and *l'Union Tunisienne de l'Industrie, du Commerce et de l'Artisanat*, not later than December 31, 1994 (para. 5.03);
- (m) set up a Technical Monitoring Committee (TMC) with representation of the DGF/PMU, the CRDA/AF, the DREF, and the INRF (para. 5.03), not later than December 31, 1994;
- (n) ensure that the execution of plantation or regeneration programs requiring closing to ranging would be dependent on prior information, consultation, participation, and agreement of the interested population (para. 5.06);
- (o) ensure that the auditors' annual reports, along with opinion on statements of Expenditures used for certain disbursements under the Bank loan, and on the revolving fund, and audited Project financial statements would be sent to the Bank within nine months after the end of each fiscal year (para. 5.12).

8.02 As conditions of effectiveness of the proposed loan Government would:

- (a) have submitted to its Chamber of Deputies proposed legislation necessary to ensure the establishment and operation of a system of financial assistance aimed to develop the country's sylvo-pastoral resources, encourage the private sector participation in activities of enhancement of forest and pasture value, and improve the social and economic conditions of forest population (para. 2.31);
- (b) reorganize the PMU by establishing five units (para. 5.02), and provide 7 additional staff to strengthen it (para. 5.02);
- (c) complete the identification for the location of the 10 integrated pilot operations (para. 4.22);

8.03 Based on the above agreements, the proposed Project is suitable for a Bank loan of US\$69 million to the Government of Tunisia for a term of 17 years including 5 years of grace. The Project is expected to be completed by December 31, 1999.

**STAFF APPRAISAL REPORT
TUNISIA
SECOND FORESTRY DEVELOPMENT PROJECT
Project Component by Year**

Table 1

	Base Cost (Dinar '000)						(US\$'000)	
	1994	1995	1996	1997	1998	1999	Total	Total
1. Forest Management	1,716	3,873	3,344	3,431	3,492	3,291	19,147	22,525
2. Plantations	612	9,746	10,037	10,960	11,167	11,109	53,631	63,096
3. Forest Pasture and Range Improvement	2,089	2,084	2,162	2,227	2,359	501	11,423	13,438
4. Wood Exploitation and Value Enhancement	-	1,178	329	105	85	85	1,783	2,097
5. National Parks and Reserves	5	740	138	134	134	128	1,279	1,505
6. Research	152	790	364	253	36	30	1,624	1,911
7. Institutional Development and Pilot Operations	1,864	4,003	1,476	455	393	383	8,573	10,086
Total BASELINE COSTS	6,437	22,414	17,849	17,565	17,667	15,528	97,460	114,659
Physical Contingencies	644	2,241	1,784	1,756	1,766	1,553	9,743	11,463
Price Contingencies	369	2,166	2,729	3,636	4,693	5,068	18,661	21,954
Total PROJECT COSTS	7,450	26,821	22,362	22,957	24,126	22,148	125,864	148,076
Taxes	1,245	5,080	3,803	3,812	3,980	3,698	21,618	25,433
Foreign Exchange	2,543	11,482	8,450	8,091	8,066	7,222	45,854	53,946

STAFF APPRAISAL REPORT
TUNISIA
SECOND FORESTRY DEVELOPMENT PROJECT
Project Cost Summary

Table 2

	(Dinar '000)			(US\$ '000)			% Foreign Exch.	% Total Base Costs
	Local	Foreign	Total	Local	Foreign	Total		
I. Investment Costs								
A. VEHICLES & EQUIPMENT								
Vehicles and Tractors	944	1,288	2,231	1,110	1,515	2,625	58	2
Machinery	348	571	919	409	671	1,081	62	1
Miscellaneous equipment	388	508	896	457	597	1,054	57	1
Subtotal VEHICLES & EQUIPMENT	1,680	2,366	4,046	1,976	2,784	4,760	58	4
B. PLANTATIONS & FOREST WORKS								
Soil preparation	18,585	18,396	36,981	21,865	21,643	43,507	50	38
Planting	9,039	7,300	16,338	10,634	8,588	19,222	45	17
Thinning (Pines)	4,594	508	5,103	5,405	598	6,003	10	5
Thinning (oak, eucalyptus)	475	53	527	558	62	620	10	1
Assisted regeneration	5,106	1,272	6,378	6,008	1,496	7,504	20	7
Maintenance	8,733	172	8,905	10,274	203	10,477	2	9
Protection, Forestation	2,033	-	2,033	2,392	-	2,392	-	2
Subtotal PLANTATIONS & FOREST WORKS	48,565	27,701	76,266	57,135	32,589	89,725	36	78
C. BUILDINGS & WORKS								
Roads and fire breaks	1,283	1,564	2,847	1,509	1,840	3,350	55	3
Buildings	760	590	1,351	895	694	1,589	44	1
Subtotal BUILDING & WORKS	2,043	2,154	4,198	2,404	2,535	4,939	51	4
D. TRAINING, TECHNICAL ASSISTANCE								
Training in Tunisia	260	11	271	306	12	318	4	-
Training abroad	-	259	259	-	305	305	100	-
Technical assistance	-	505	505	-	594	594	100	1
Studies	689	1,626	2,316	811	1,913	2,724	70	2
Pilot operations	4,056	1,010	5,066	4,771	1,188	5,959	20	5
Subtotal TRAINING, TECHNICAL ASSISTANCE	5,005	3,411	8,416	5,888	4,013	9,901	41	9
Total Investment Costs	57,293	35,632	92,925	67,404	41,920	109,324	38	95
II. Recurrent Costs								
A. DGF staff	346	-	346	407	-	407	-	-
B. AF staff	241	-	241	284	-	284	-	-
C. Operation & maintenance	1,024	1,476	2,500	1,204	1,737	2,941	59	3
D. Pastures & rangeland	875	97	971	1,029	114	1,143	10	1
E. Protection of pastures & rangeland	451	25	476	531	29	560	5	-
Total Recurrent Costs	2,937	1,598	4,535	3,456	1,880	5,335	35	5
Total BASELINE COSTS	60,230	37,230	97,460	70,859	43,800	114,659	38	100
Physical Contingencies	6,022	3,721	9,743	7,085	4,377	11,463	38	10
Price Contingencies	13,757	4,903	18,661	16,185	5,768	21,954	26	19
Total PROJECT COSTS	80,010	45,854	125,864	94,130	53,946	148,076	36	129

**STAFF APPRAISAL REPORT
TUNISIA**

SECOND FORESTRY DEVELOPMENT PROJECT

Estimated Schedule of Disbursements of Bank Loan

<i>Fiscal Year</i>		<i>Amount (US\$ Million)</i>	<i>Cumulative Amount (US\$ million)</i>	<i>Percent /a</i>	<i>Percent /b</i>
	June 93	0.0	0.0	0	0
FY94	Dec. 93	0.0	0.0	0	0
	June 94	0.7	0.7	1	0
FY95	Dec. 94	1.4	2.1	3	10
	June 95	2.0	4.1	6	12
FY96	Dec. 95	5.6	9.7	14	22
	June 96	5.5	15.2	22	24
FY97	Dec. 96	8.3	23.5	34	34
	June 97	5.5	29.0	42	45
FY98	Dec. 97	5.5	34.5	50	55
	June 98	5.5	40.0	58	64
FY99	Dec. 98	5.5	45.5	66	64
	June 99	5.6	51.1	74	
FY00	Dec. 99	8.2	59.3	86	
	June 00	5.6	64.9	94	
FY01	Dec. 00	1.3	66.2	96	
	June 01	1.4	67.6	98	
FY02	Dec. 01	1.4	69.0	100	

/a The standard disbursement profile for Tunisia agriculture sector (June 1992)

/b Actual disbursement for the first Forestry Development Project (loan 2870-TUN)

Expected date of: signing: June 30, 1993
 effectiveness: September 30, 1993
 completion: December 31, 1999
 closing: December 31, 2000

STAFF APPRAISAL REPORT
TUNISIA
SECOND FORESTRY DEVELOPMENT PROJECT
Project Activities by Governorate

Governorate	Manag. Plans	Thinning		Assist. Regener.	Mech. Plant.	Manual Plant.	Plant. along streams	Wind breaks	Prairies	Fodder Plant.	Range Improv.	Cactus Plant.	Pasture Rehabil.
		Pine	Coppices										
-----ha-----													
ARIANA	8,600	1,400	600	-	1,225	380	430	200	205	753	-	-	-
BEN-AROUS	-	600	400	-	-	950	-	-	-	200	-	-	-
BEJA	16,500	6,000	1,300	2,250	1,730	1,425	660	-	274	870	-	-	-
AIN-DRAHAM	-	2,600	1,800	1,250	640	-	-	-	-	-	-	-	-
JENDOUBA	1,500	-	1,100	1,250	495	140	1,200	-	18	134	322	175	-
LE KEF	-	3,000	-	5,000	3,040	475	-	-	150	350	875	-	1,400
KASSERINE	-	7,200	-	3,000	1,400	665	-	-	-	884	-	866	-
KAIROUAN	-	3,350	-	-	1,400	570	500	-	83	910	-	-	-
NABEUL	9,400	5,500	3,000	-	1,310	475	1,300	300	-	730	-	-	-
ZAGHOUAN	900	4,950	-	1,000	3,570	475	-	-	386	1,341	-	-	-
SILIANA	-	3,400	-	4,200	330	2040	-	-	241	557	1,130	525	-
BIZERTE	6,600	4,100	2,000	1,250	1,650	-	-	-	201	428	-	-	-
TOTAL	43,500	42,100	9,300	19,200	16,790	7,595	4,090	500	1,558	7,157	2,327	1,566	1,400

Table 5

TUNISIA
SECOND FORESTRY DEVELOPMENT PROJECT

Calculation of Stumpage Values for Pine Sawnwood

<i>Item</i>	<i>Financial DT/m³</i>	<i>cf</i>	<i>Economic DT/m³</i>
1992 CIF import price (US\$/m ³) (russian sylvester pine)	359.0	1.0	359.0
0.8% p.a. increase to 2020	89.7	1.0	89.7
2020 CIF import price (US\$/m ³)	448.7	1.0	448.7
2020 CIF import price (DT/m ³)	403.9	1.0	403.9
Import duty, 27% of CIF	109.0	0.0	0.0
Port charges, 27.17% of CIF	109.7	0.7	80.1
Ex Port	622.6	-	484.0
VAT 17%	105.8	0.0	0.0
Wholesale Tunis	728.5	-	484.0
Transport Tunis-mill	15.0	0.7	10.5
Ex mill price (gross)	713.5	-	473.5
Mill margin (15% on net)	93.1	0.7	65.1
Conversion cost	50.0	0.7	35.0
Arrived mill (sawnwood equiv.)	570.4	-	373.3
Log/sawnwood. cf = 0.56			
Arrived mill (log equivalent)	319.4	-	209.1
Adjustment for quality (20%)	255.5	-	167.2
Transport to mill, 50 km *.15D	7.5	0.7	5.3
Extraction cost	3.5	0.7	2.5
Long-term pine stumpage value	244.5		159.5

Table 6

TUNISIA
SECOND FORESTRY DEVELOPMENT PROJECT

Calculation of Stumpage Values for Pine Sawnwood

<i>Item</i>	<i>Financial DT/m³</i>	<i>cf</i>	<i>Economic DT/m³</i>
1992 CIF import price (US\$/m ³) (Chilean pine)	155.0	1.0	155.0
0.8% p.a. increase to 2020	38.7	1.0	38.7
2020 CIF import price (US\$/m ³)	193.7	1.0	193.7
2020 CIF import price (DT/m ³)	174.4	1.0	174.4
Import duty, 27% of CIF	47.1	0.0	0.0
Port charges, 27.17% of CIF	47.4	0.7	34.6
Ex Port	268.8	-	209.0
VAT 17%	45.7	0.0	0.0
Wholesale Tunis	314.5	-	209.0
Transport Tunis-mill	15.0	0.7	10.5
Ex mill price (gross)	299.5	-	198.5
Mill margin (15% on net)	39.1	0.7	27.3
Conversion cost	50.0	0.7	35.0
Arrived mill (sawnwood equiv.)	210.5	-	136.1
Log/sawnwood. cf = 0.56			
Arrived mill (log equivalent)	117.9	-	76.2
Transport to mill, 50 km *.15D	7.5	0.7	5.3
Extraction cost	3.5	0.7	2.5
Long-term pine stumpage value	106.9		68.5

Table 7

TUNISIA
SECOND FORESTRY DEVELOPMENT PROJECT

Calculation of Stumpage Values for Pine Chipwood

<i>Item</i>	<i>Financial DT/m³</i>	<i>cf</i>	<i>Economic DT/m³</i>
1992 CIF import price (US\$/m ³) (pine logs)	42.8	1.0	42.8
0.8% p.a. increase to 2020	10.7	1.0	10.7
2020 CIF import price (US\$/m ³)	53.5	1.0	53.5
2020 CIF import price (DT/m ³)	48.1	1.0	48.1
Import duty, 27% of CIF	8.2	0.0	0.0
Port charges, 27.17% of CIF	13.1	0.7	9.5
Ex Port	69.4	-	57.7
VAT 17%	11.8	0.0	0.0
At Factory Tunis	81.2	-	57.7
Adjustment for quality (25%)	60.9	-	43.3
Transport to mill, 200 km *.15D	30.0	0.7	21.0
Extraction cost	3.5	0.7	2.5
Long-term pine stumpage value	27.4		19.8

Table 8

TUNISIA
SECOND FORESTRY DEVELOPMENT PROJECT

Calculation of Stumpage Values for Poplar Sawnwood

(Construction Quality)

<i>Item</i>	<i>Financial DT/m³</i>	<i>cf</i>	<i>Economic DT/m³</i>
1992 CIF import price (US\$/m ³)	185.0	1.0	185.0
0.8 % p.a. increase to 2020	46.2	1.0	46.2
2020 CIF import price (US\$/m ³)	231.2	1.0	231.2
2020 CIF import price (DT/m ³)	208.1	1.0	208.1
Import duty, 27% of CIF	56.2	0.0	0.0
Port charges, 27.17% of CIF	56.5	0.7	41.3
Ex Port	320.9	-	249.4
VAT 17%	54.5	0.0	0.0
Wholesale Tunis	375.4	-	249.4
Transport Tunis-mill	15.0	0.7	10.5
Ex mill price (gross)	360.4	-	238.9
Mill margin (15% on net)	47.0	0.7	32.9
Conversion cost	50.0	0.7	35.0
Arrived mill (sawnwood equiv.)	263.4	-	171.0
Log/sawnwood. cf = 0.56			
Arrived mill (log equivalent)	147.5	-	95.8
Adjustment for quality (20%)	118.0	-	76.6
Transport to mill, 50 km *.15D	7.5	0.7	5.3
Extraction cost	3.5	0.7	2.5
Long-term eucalyptus stumpage value	107.0		68.9

STAFF APPRAISAL REPORT

TUNISIA

SECOND FORESTRY DEVELOPMENT PROJECT

Selected Documents and Data Available in the Project File

1. Stratégie de Reboisement, de la Lutte Contre la Désertification et de Protection des Sols; Ministère de l'Agriculture - Tunisia - October 1990.
2. VIII Plan de Développement Economique et Social 1992-1996 - Agriculture et Pêche- s/ Comité de Développement Forestier; Ministère de l'Agriculture - October 1990.
3. Tunisia - Second Projet Forestier - Rapport de Pré-Identification - FAO/CP Rapport n.77/91 CP-TUN 27 - July 2, 1991.
4. Tunisia - Energy Management Strategy in the Residential and Tertiary Sectors -ESMAP- Report n. 146/92 April 1992.
5. Tunisie - Deuxième Projet de Développement Forestier - Rapport de Préparation - FAO/CP report n. 114/92 CP-TUN 74 - August 28, 1992.

STAFF APPRAISAL REPORT

TUNISIA

SECOND FORESTRY DEVELOPMENT PROJECT

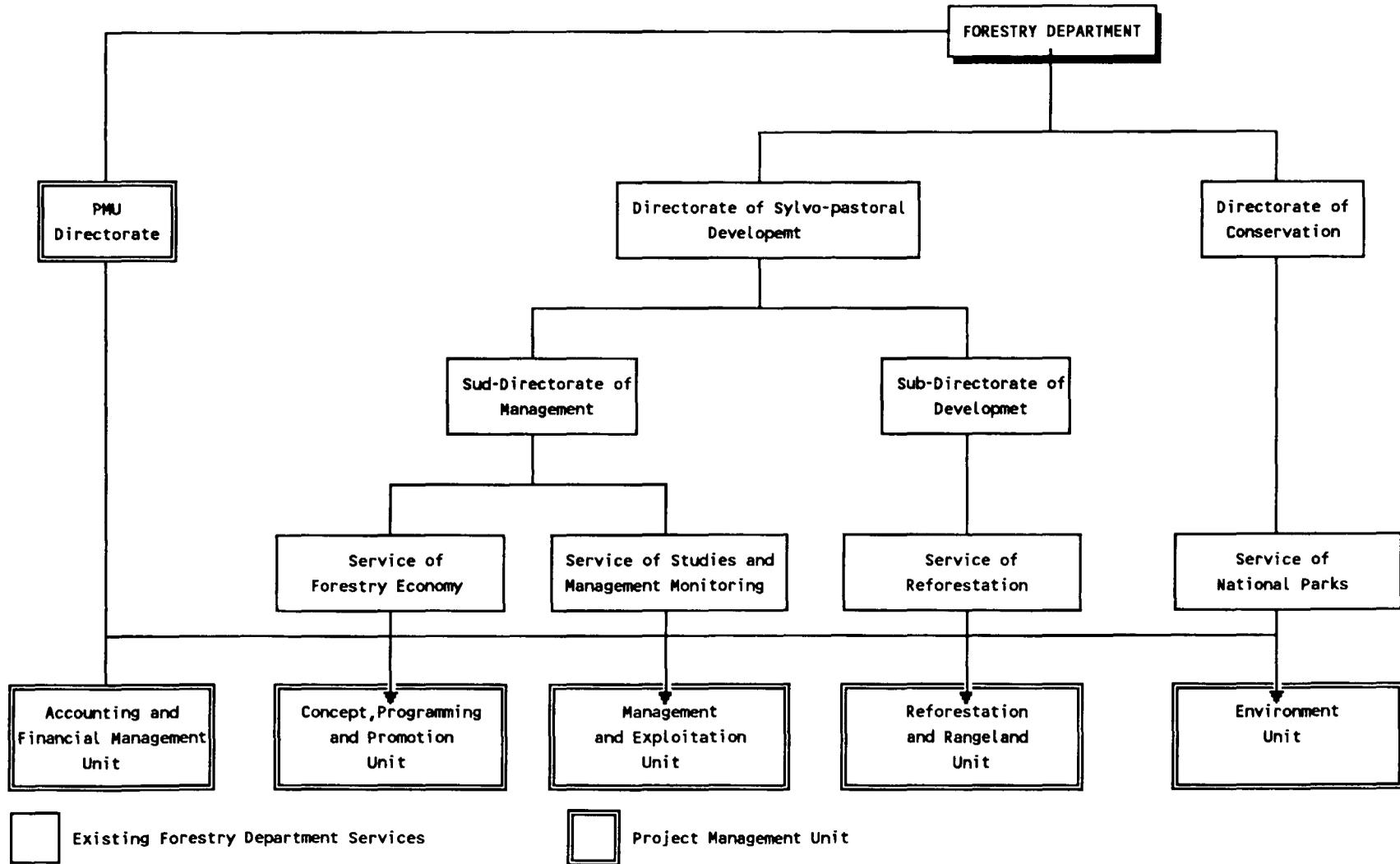
Supervision Plan

Supervision Input into Key Activities

<i>Approx. Dates</i>	<i>Activity</i>	<i>Expected Skill Requirements</i>	<i>Staff Input (SW)</i>
FY94 11/1993	-Supervision mission -Project launching -1994 work program	-Management	2
FY94 05/1994	-Supervision mission -Project monitoring -Research -Training -Procurement	-Procurement -Research	4
FY95 11/1994	-Supervision mission -Forest management -Range Improvement	-Forest management -Range specialist	4
FY95 05/1995	-Supervision mission -Plantations -Pilot operations -Procurement	-Sociologist -Reforestation	4
FY96 11/1996	-Supervision mission -Nature conservation -Wood exploitation	-Environment -Forest exploitation	4
FY97 05/1997	-Mid-Term review	-Management	8
FY98 11/1998	-Supervision mission -Research -Project impact -Pilot operations	-Research -Women development -Monitoring/evaluation	6
FY99 11/1999	-Supervision mission -Preparation of PCR	-Management	2

STAFF APPRAISAL REPORT
TUNISIA
SECOND FORESTRY DEVELOPEMET PROJECT

The Project Management Unit (PMU) within the Forestry Department
Organigram



MAP SECTION

TUNISIA

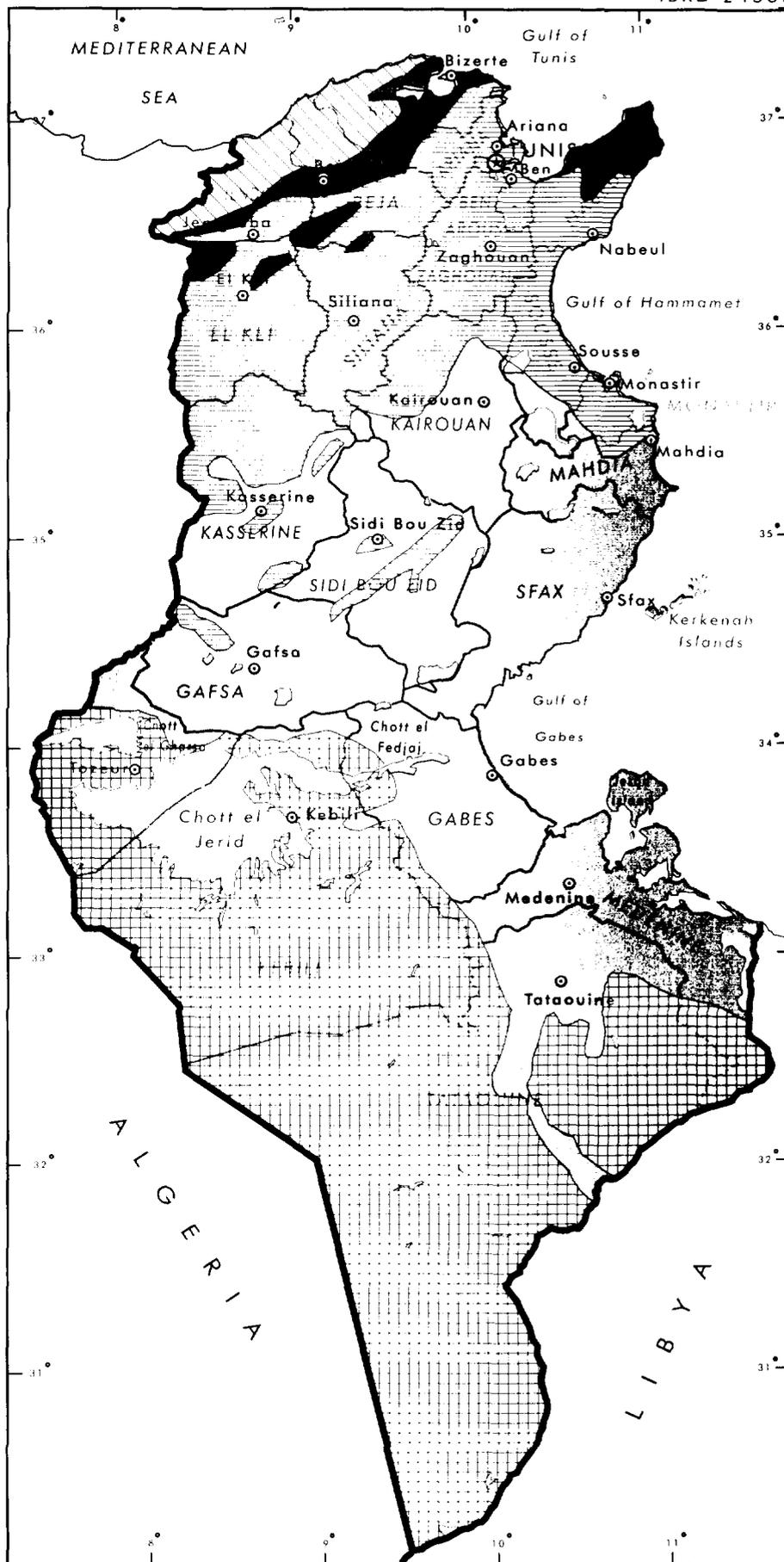
SECOND FORESTRY DEVELOPMENT PROJECT

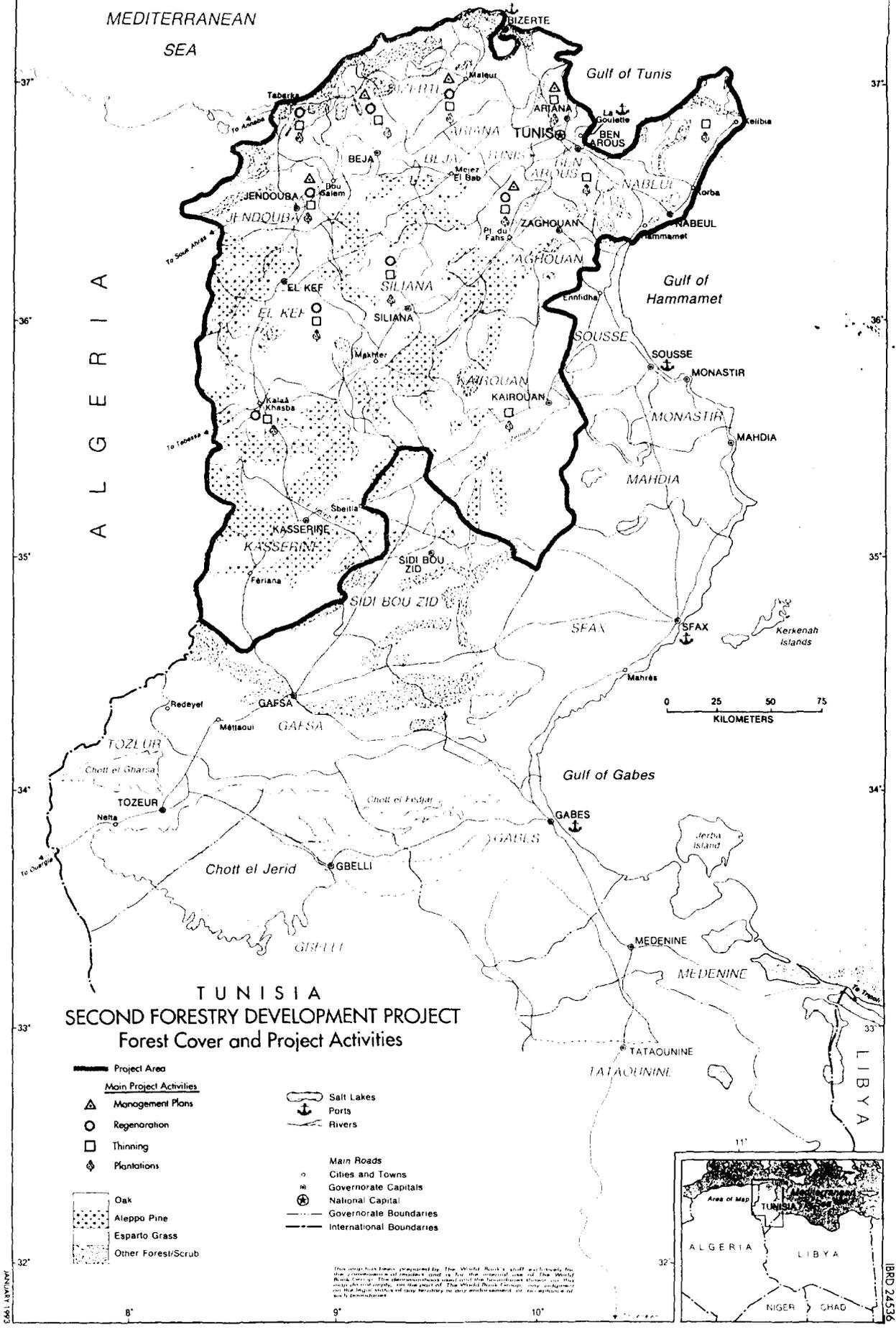
Bioclimatic Zones

-  SAHARIAN
-  ARID
-  SEMI - ARID
-  SUB - HUMID
-  HUMID
-  Salt Lakes
-  Governorate Capitals
-  Governorate Boundaries
-  National Capital
-  International Boundaries

0 25 50 75
K.ILOMETERS

This map has been prepared by The World Bank's staff exclusively for the convenience of readers and is for the internal use of The World Bank Group. The denominations used and the boundaries shown on this map do not imply, on the part of The World Bank Group, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.





This map has been prepared by the World Bank staff and is for the general use of the World Bank staff. The information contained in this map is not to be used for any other purpose without the prior written consent of the World Bank.

0641 14/1/1987

BRD 24536