

Republic of Tunisia

Ex-post evaluation of JICA ODA loan project
“Integrated Reforestation Project”

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1. Project Description



Project areas



Forests rehabilitated by the Project (Béja)
(Cork oaks and pinyon pines)

1.1 Background

The forests in Tunisia have always been at risk of deforestation due to the dry climate and the pressure from human activities. Increased pressure such as excessive logging during the period of colonization in the 20th century accelerated deforestation: the national forest area decreased from 1.25 million hectares in the beginning of the 20th century to 368,000 hectares in the mid-1950s. While the forest area had recovered to 831,000 hectares by 1995 through reforestation, further efforts have been urged in order to prevent soil erosion and conserve natural environment.

People in the forest zones are authorized to access to the forests and collect resources such as fire woods and plants for self-consumption. Excessive exploitation of forest resources is one of the causes of deforestation. In the 1990s, the forestry sector of the Republic of Tunisia introduced a strategy to promote sustainable forest management through socio-economic development of the forest zones. The strategy aims at diversification of the livelihood of the community in the forest zones and then to reduce the pressure on the natural resources from human activities. The integrated approach, which combines both technical components (such as plantation) and socio-economic development components, has always been employed in the forestry projects in Tunisia since the Forestry Development Project financed by the World Bank

(20 million dollars in 1987 for the first phase and 69 million dollars in 1993 for the second phase). The integrated approach has been continuously improved from the experiences of the similar forestry projects, including the JICA project.

The Directorate General of Forestry (Direction Générale des Forêts: DGF) of the Ministry of Agriculture and Hydraulic Resources and the Forestry Departments (Arrondissement de Forêt) of the Regional Commissaries for Agriculture Development (Commissariat Régional au Développement Agricole: CRDA) are responsible for forest management. Unlike participatory forest management in some other countries, communities of the forest zones do not participate in forest management in Tunisia.

1.2 Project Outline

The objective of this project is to prevent soil erosion, increase forest area and improve economic and social living conditions at the target areas by reforestation and socio-economic development activities, thereby contributing to improvement of natural environment. The target areas were Oued Barbara (Governorate of Jendouba), Sidi El Barrak-Nefza, (Governorate of Béja), Oum Jédour (Governorate of Kasserine) and Southern region of Governorate of Le Kef. The target areas are indicated in Figure 1 below.

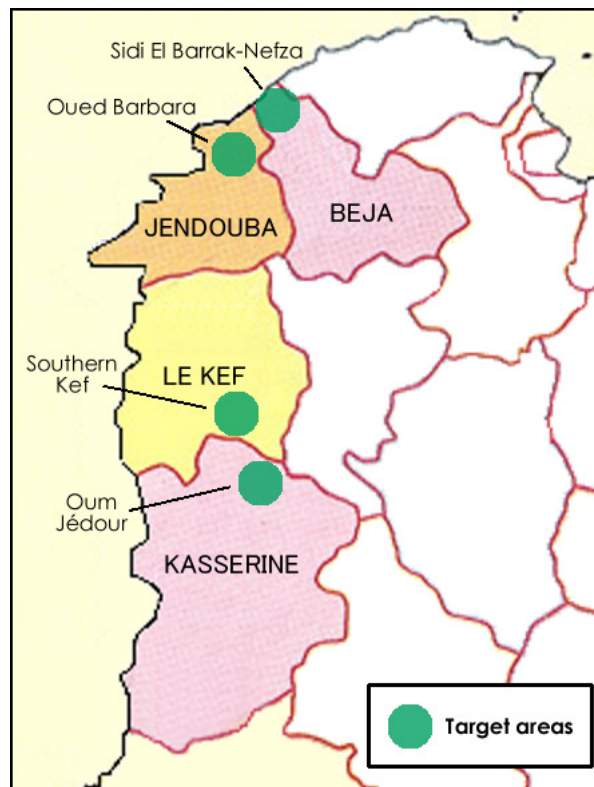


Figure 1 Project target areas

Approved Amount / Disbursed Amount	4,080 million yen / 3,999 million yen
Exchange of Notes Date / Loan Agreement Signing Date	4 February 2000 / 23 March 2000
Terms and Conditions	Interest Rate: 0.75 % p.a. Repayment Period: 40 years (Grace Period 10 years) Conditions for Procurement: Bilateral-tied
Borrower/Executing Agencies	Government of the Republic of Tunisia / Directorate General of Forestry, Ministry of Agriculture and Hydraulic Resources
Final Disbursement Date	13 July 2007
Main Contractor (Over 1 billion yen)	PCI (Japan) / EXA (Tunisia) / JAFTA (Japan)
Main Consultant (Over 100 million yen)	None
Feasibility studies, etc.	F/S by Directorate General of Forestry, Ministry of Agriculture and Hydraulic Resources, 1998
Related projects	JICA Expert (coordination with ODA loan) JICA Integrated Reforestation Project II (TS-P33) World Bank Forestry Development Project (I)(II) World Bank Climate Change Project AFD: Forestry project

2. Outline of the Evaluation Study

2.1 External Evaluator

Akemi Serizawa, Sanshu Engineering Consultant

2.2 Duration of Evaluation Study

Duration of the Study period: January 2010 – November 2010

Duration of the Field study: April 11– April 30, May30 – June 16, 2010

Beneficiary survey (Governorates of Béja and Le Kef): May 2010

2.3 Constraints during the Evaluation Study

In consultation with the DGF, the Governorates of Béja and Le Kef were selected for the beneficiary survey and site visits. Among the four target governorates, Béja and Jendouba are Mediterranean climatic regions where cork oaks and pinyon pines are among the typical vegetation. Le Kef and Kasserine are semi-arid climatic regions where Aleppo pines are found. The DGF suggested one from each group to represent different climate and vegetation. Accessibility and time constraints were also taken into account. Therefore, the results of the field study might not represent the situation of all target areas.

3. Results of the Evaluation (Overall Rating: A)

3.1 Relevance (Rating: a)

3.1.1 Relevance with the Development Plan of Tunisia

The objectives of the First Forestry Strategy of Tunisia (1990-2000) were prevention of deforestation, increase of forest area and socio-economic development of the forest zones. It targeted national forest cover¹ to achieve 15% by 2000 through the National Plan of reforestation, anti-desertification and soil conservation (Plan national de reboisement, de lutte contre la désertification et de protection de sol) (appraisal documents).

The objectives of the Second Forestry Strategy (2001-2011) are increase of forest area, protection of biodiversity and socio-economic development of the forest zones. It aims at increasing national forest cover to 13.5% by 2011 and 16% by 2020 (DGF).

At the times of both appraisal and ex-post evaluation, the objectives of the Project were in line with these national policies of Tunisia that aimed at increase of forest area and socio-economic development of the forest zones.

3.1.2 Relevance with Development Needs of Tunisia

At the time of appraisal of the Project (2000), the forest area of Tunisia was 959,000 hectares and the forest cover was 9.2% (FAO Forest Area Statistics). The forest cover was below the target (15% by 2000) that was set by the National Plan explained above, and therefore further reforestation was required. JICA project responded to these needs, and it also employed the integrated approach that combined the technical and socio-economic development components to improve living conditions in the forest zones in order to decrease the pressure from human activities on the natural resources.

By the time of the ex-post evaluation, the forest cover had increased to 13.04% (2009, DGF) thanks to the contribution of this Project and other programs supported by the World Bank and the French Development Agency (Agence Française de Développement) Yet, continued efforts are required to achieve the target (16% by 2020) set by the Second Forestry Strategy.

At the times of both appraisal and ex-post evaluation, the objectives and approach of the Project were in line with the development needs of the country.

3.1.3 Relevance with Japan's ODA Policy

At the time of appraisal, the Basic Strategy of Japan's ODA Loan (1999-2002) prioritized rural development in its development assistance for Tunisia in order to reduce the regional

¹ Denominator to calculate forest cover: the DGF seems to use 10,387 thousand hectares (land area excluding desert in the southern Tunisia) as the denominator (appraisal document), while FAO uses 15,536 thousand hectares (total land area excluding inland water).

disparity

The forest zones in the north-western region of Tunisia were selected as the target areas of the Project. Local industries are small and people earn income as small-scale farmers, seasonal workers and migrant workers in large cities. Forest resources are important means of livelihood. This Project aimed at improvement of living conditions through the integrated approach and therefore at reduction of the regional disparity and was in line with the Strategy.

This Project has been highly relevant with the country's development policies, development needs, as well as Japan's ODA policy, therefore its relevance is high.

3.2 Efficiency (Rating: b)

3.2.1 Project Outputs

The Project Outputs are composed of eight components (A-H) explained below. In view of the project objectives, Component B (forest management), Component C (rehabilitation of ecosystems) and Component D (soil and water conservation) as well as sub-component E2 (creation of Agriculture Development Groups (Groupement de Développement Agricole: GDA)) are the key components. These key components, except for some sub-components of Component B and sub-component D3 (construction of a hill dam), achieved the original targets and also the revised ones agreed in the mid-term evaluation that was conducted in July 2004 by JBIC Paris office as a part of project management. Therefore, the level of the achievement of the Project Outputs is high on the whole.

In the mid-term evaluation, the targets of many project components were revised upward and some activities were newly added, benefitting from the increase of the project budget by 7 million Tunisian dinars due to continuing rise of the value of yen and economization of the project cost by the tender process. The modification was also a response to the needs of the target communities that were identified in the Community Development Plans (Plan de Développement Communautaire: PDC), some of which were added as new sub-components of socio-economic development of the Project.

Some activities were cancelled or did not achieve the target due to the reasons mentioned below.

Component A: Infrastructure

All sub-components except for A2 (rehabilitation of forest roads) exceeded or almost achieved (80% or more) the original and/or revised targets. The reason of the underachievement of A2 was that some tenders failed as it was difficult to attract large competent companies to the remote areas and their bids were often beyond the target price. Local companies were not a

choice as their technical competence was not at a sufficient level.

Table 1 Output of Component A: Infrastructure

Sub-components	Target		Achievement (July 2007)	Degree of attainment	
	Original (March 2000)	Revised (July 2004)		compared to the original plan	compared to the revised plan
A1. Construction of forest roads	90km	116km	106km	118%	91%
A2. Rehabilitation of forest roads	200km	225km	155.5km	78%	69%
A3. Construction of firebreaks	140km	110km	91km	65%	83%
A4. Rehabilitation of firebreaks	210km	424km	1,111.5km	520%	262%
A5. Construction of foresters' offices	4	5	6	150%	120%
A6. Rehabilitation of foresters' offices	9	12	15	167%	125%
A7. Construction of observation towers	9	9	8	89%	89%
A8. Rehabilitation of observation towers	3	9	10	333%	111%
A9. Construction of water tanks	27	27	24	89%	89%
A10. Rehabilitation of compartments	51,000ha	51,000ha	51,929ha	102%	102%

Source: Project Completion Report (PCR)

Component B: Forest management (thinning)

Sub-components B1 (pine), B3 (acacia), B4 (regeneration of pine forests) and B6 (improvement of forest health) exceeded the original and revised targets. B2 (cork oaks) and B5 (regeneration of cork oak forests) did not reach the target, as the technicians were reluctant to cutting down cork oaks from their growing awareness of environmental conservation. B7 (plantation of eucalyptus) and B8 (study of forest management) were newly added in the mid-term evaluation, but the achievements were far below the target due to failure of some tenders from the same reasons as A2 explained above.

Table 2 Output of Component B: Forest management (thinning)

Sub-components	Target		Achievement (July 2007)	Degree of attainment	
	Original (March 2000)	Revised (July 2004)		compared to the original plan	compared to the revised plan
B1.Pine	6,400ha	6,842ha	9,002.5ha	141%	132%
B2. Cork oak	3,520ha	3,600ha	1,911ha	54%	53%
B3. Acacia	1,650ha	1,650ha	2,031ha	123%	123%
B4.Regeneration of pine forests	3,700ha	4,200ha	6,963ha	188%	166%
B5. Regeneration of cork oak forests					
B5.1 Natural regeneration	450ha	200ha	78.5ha	17%	39%
B5.2 Artificial regeneration	250ha	300ha	241ha	96%	80%
B6. Improvement of forest health	10,250ha	11,500ha	14,209.5ha	139%	124%
7. Eucalyptus	(not included)	200ha	58ha	N/A	29%
B8. Study on forest management	(not included)	35,000ha	8,550ha	N/A	24%

Source: PCR

Component C: Rehabilitation of ecosystems (plantation)

All sub-components achieved the original and revised targets.

Table 3 Output of Component C: Rehabilitation of ecosystems (plantation)

Sub-components	Target		Achievement (July 2007)	Degree of attainment	
	Original (March 2000)	Revised (July 2004)		compared to the original plan	compared to the revised plan
C1. Plantation in the forest	1,300ha	1,800ha	3,359ha	258%	187%
C2. Plantation in riverbank	550ha	700ha	807ha	147%	115%
C3. Plantation around dams	1,450ha	1,450ha	1,749ha	121%	121%
C4. Plantation in pasture	630ha	1,180ha	2,165ha	344%	183%
C5. Seed orchard	5	5	5	100%	100%
C61. Modernization of nursery	1	4	5	500%	125%
C62. Glasshouse	(not included)	2	2	N/A	100%
C7. Natural reserves	2	2	2	100%	100%

Source: PCR

Component D: Water and soil conservation

All sub-components except for D3 (construction of a hill dam) exceeded the original targets and also almost achieved the revised ones. The hill dam was to be constructed in Oum Jédour in the Governorate of Kasserine, but the land did not meet the hydro geologic requirements. As no alternative land was identified, sub-component D3 was cancelled in the mid-term evaluation.

Table 4 Output of Component D: Water and soil conservation

Sub-components	Target		Achievement (July 2007)	Degree of attainment	
	Original (March 2000)	Revised (July 2004)		compared to the original plan	compared to the revised plan
D1. Construction of water and soil conservation facilities	5,150ha	5,750ha	5,566ha	108%	97%
D2. Plantation of semi-forests	655ha	895ha	740ha	113%	83%
D3. Construction of a hill dam	1	Cancelled	0	0%	N/A

Source: PCR

Component E: Socio-economic development

Sob-component E2 (establishment of GDAs), which is the most important in this category as a basis for all other sub-components, achieved the target. Other sub-components showed the mixed level of attainment as shown in Table 5 below.

Table 5 Output of Component E: Socio-economic development

Sub-components	Target		Achievement (July 2007)	Degree of attainment	
	Original (March 2000)	Revised (July 2004)		compared to the original plan	compared to the revised plan
E1. Organization of community: recruitment of animators	25 animators	25 animators	21 animators	84%	84%
E2. Establishment of Agriculture development groups (GDAs)	13	13	13	100%	100%
E3. Water points	32	40	14	44%	35%
E4. Fence of family gardens	1,240ha	1,740ha	2,965ha	239%	170%
E5. Plantation of fruit trees	1,560ha	1,560ha	1,566ha	100%	100%
E6. Improvement of pasture	1,450ha	1,450ha	1,150ha	79%	79%
E7. Promotion of income generation activities					
E7-1. Construction of training centers	4	13	7	175%	54%
E7-2. Procurement of equipment and materials	4	14	3	75%	21%
E8. Establishment of forest workers units	25	22	7	28%	32%
E9. Construction of nurseries of fruit trees	11	7	2	18%	29%
E10. Saving of energy (improved stoves)	1	4	4	250%	250%
E11. Breeding					
Equipment of beekeeping	(not included)	1,700	3,735	N/A	220%
Equipment of poultry farming	(not included)	1,000	0	N/A	0%
Equipment for rabbit breeding	(not included)	750	0	N/A	0%
E12. Construction and maintenance of forest roads	(not included)	200km	30.2km	N/A	15%
E13. Purchase of fishery equipment	(not included)	60	30	N/A	50%

Source: PCR

The reasons of under-achievement are explained in Table 6.

Table 6 Reasons for under-achievement of some socio-economic components

Sub-components	Reasons for not attaining the target
E3 Construction of water points	Some candidate sites did not meet the technical requirements.
E7-1 Construction of community centers E7-2 Provision of equipment	Some tenders failed. When the construction of the centers was delayed, procurement of equipment was also delayed. Construction of the center in Kasserine was cancelled as there was already one.
E8 Establishment of forest workers groups	The original plan was to contract out some planting and construction work to GDAs for income generation of the community. However, direct contracts with GDAs became virtually impossible after the rule of public tender was revised in 2004.
E9 Creation of nurseries	The community was reluctant as potential market was not clearly identified.
E11 Poultry farming and rabbit breeding	These activities were cancelled due to fear of avian influenza. Beekeeping was taken up instead of these.
E12. Construction and maintenance of forest roads	The activity in the Governorate of Béja was added in the mid-term evaluation, but the tender failed.

Source: PCR

Component F: Promotion of forestry sector (research) and G: Institutional development (procurement of materials)

Component F achieved the target on the whole, while the number of workshops and seminars (F3) was slightly below the target. The themes of the four strategic researches (F1) were “the Study of participative and integrated development of forests in Jendouba” (“Etude d’aménagement intégré et participatif des forêts de Jendouba”), “the reforestation guide in Tunisia” (“Le guide de Reboisement en Tunisie”), “the strategic study for sustainable development of cork oak forests in Tunisia” (“Etude stratégique pour le Développement Durable de la Subéraie tunisienne”), and “the guide of development and implementation of community development plans in the forest zones” (“Un guide d’élaboration et de mise en oeuvre des PDC dans les zones forestières”). The manuals developed through F1 and F2 include “Practical guide of development and implementation of community development plans in the forest zones” (“Guide pratique d’élaboration et de mise en oeuvre des PDC dans les zones forestières”), “Practical guide of forestry work” (“Guide pratique des travaux sylvicoles”) and “the reforestation guide in Tunisia” (“Le guide de Reboisement en Tunisie”).

Component G achieved the target.

Table 7 Output of Components F and G

Sub-components	Target		Achievement (July 2007)	Degree of attainment	
	Original (March 2000)	Revised (July 2004)		compared to the original plan	compared to the revised plan
F. Promotion of forestry sector (research)					
F1. Strategic research (regional and national)	4 studies	4 studies	4 studies	100%	100%
F2. Research	9 studies	9 studies	9 studies	100%	100%
F3. Workshops and seminars	10 (twice a year)	10 (twice a year)	7	70%	70%
G. Institutional development (procurement of materials)					
G1. Materials	1 set	1 set	1 set	100%	100%

Source: PCR

Component H: Consulting services

Technical support (H1) was provided to assist project management and development and implementation of forest management plans, and it was conducted almost as the plan.

There was no detailed plan for the training (H2) at the time of appraisal. Ten training sessions were conducted in Tunisia, each of which lasted from two to ten days and had about 30 participants, and ten training sessions were conducted in other countries including France and Canada, each of which had from one to eight participants.

Table 8 Output of Component H: consulting services

Sub-components	Target		Achievement (July 2007)	Degree of attainment	
	Original (March 2000)	Revised (July 2004)		compared to the original plan	compared to the revised plan
H1. Technical support	200HM	200HM	172.6HM	86%	86%
H2. Training	-	-	20 sessions	N/A	N/A

Source: PCR



Forest road constructed by the Project
(Béja)



Observation tower rehabilitated by the
Project (Béja)

3.2.2 Project Inputs

3.2.2.1 Project Period

The actual project period was slightly longer than planned.

The Memorandum dated 26 October 2001 between JBIC and the DGF defined project completion as follows:

When the afforestation components and the (other²) components complete according to the definitions as follows:

(1) Afforestation components: when each subtotal area of afforestation by forest category that has passed the National Standard inspection reaches the respective figures as follows: (they correspond to the original targets of the components C1, C2, C3 and C4)

(i) Planting in Forest = C1	1,300ha
(ii) Planting in Riverbank = C2	550ha
(iii) Planting around the Dam = C3	1,450ha
(iv) Planting in Pasture = C4	630ha
Total	3,930ha

(2) Components other than afforestation: completion of commissioning of all the facilities for the Project.

(Source: Memorandum of the Integrated Reforestation Project)

The original project period was 70 months from March 2000 (L/A signing date) to December 2005 (project completion defined as above). In the mid-term evaluation in July 2004, the Project was extended one year to December 2006 (82 months in total) Most components were continued until March 2007 utilizing the fund disbursed in December 2006, except for the employment of animators (sub-component E1) that was continued until June 2007 just before the final disbursement date (13 July 2007).

Although it is not clear what the above definition of completion of “components other than afforestation” meant, it would be reasonable to interpret that it meant when the hard infrastructure was transferred to the parties responsible for operation and maintenance. According to this interpretation, the project was completed in March 2007 when all components other than E1 (employment of animators) were completed. Therefore, actual project period was from March 2000 to March 2007 (85 months), which was 121% of the original plan and 104% of the revised plan.

² This word “other” is not in the original sentence.

Some activities experienced delay, the reasons for which were as follows:

Preparation period	It took time for the executing agency to establish the project management structure, to familiarize themselves with the JICA loan administrative procedures and to recruit consultants.
Components A-D (technical components)	Some tenders failed and others took time to finalize because it was difficult to attract appropriate contractors to work in the remote areas. The targets of some components were too optimistic compared with the situation on the ground and the capacity of contractors. Some activities were delayed due to problems of financial arrangement and supervision of the contractors.
Component E (socio-economic development components)	Discussions with the target communities took time
Component F (research)	Contracts with the external research institutes were concluded later than planned.

3.2.2.2 Project Cost

The actual project cost was lower than planned.

In Japanese yen, the project cost estimate at the appraisal was 5,440 million yen (including 4,080 million yen to be financed by yen-loan). The actual cost was 5,047 million yen (including 3,999 million yen financed by yen-loan), which was 93% the plan. In Tunisian dinars, the project cost estimate at the appraisal was 51,953 thousand dinars (DT1=JPY104.71). The actual cost was 44,969 thousand dinars (DT1=JPY88.6), which was 6,984 thousand dinars less than the plan and its 86%.

In the mid-term evaluation in July 2004, some activities were added and some targets were upwardly revised to spend the increased project budget (seven million dinars) as explained in the section of Output above. Yet, the actual project cost in dinars was smaller than the plan because of the continued increase of value of Japanese yen and because some sub-components did not achieve the target.

Although the project period was slightly longer than planned, the project cost was lower than planned, therefore efficiency of the project is fair.

3.3 Effectiveness (Rating: a)

3.3.1 Quantitative Effects

3.3.1.1. Results from Operation and Effect Indicators

(1) Contribution to the national plan of reforestation, anti-desertification and soil conservation

The target of the National Plan of reforestation, anti-desertification and soil conservation and the contribution of this Project are shown in Table 9 below. Data to indicate the achievement by the original project completion date (December 2005) was not available. Achievement of the

Project by December 2007 and its contribution to the National Plan exceeded the target. According to the DGF, the contribution of the Project is important considering the fact that the Project was implemented only in the four governorates.

Table 9 Contribution of the Project to the national plan of reforestation, anti-desertification and soil-conservation

	Target of the national plan by 2000	Original target of this Project (by Dec .2005)		Achievement of this Project (July 2007)	
		Quantity	Share	Quantity	Share
1) Soil conservation	3,000,000 ha	5,805 ha	0.19%	6,306 ha	0.21%
D1. Soil conservation work		5,105 ha		5,566 ha	
D2. Plantation of semi-forests (sylvo-pastoral)		655 ha		740 ha	
2) Forest cover (15% by 2000)	Additional 635,000 ha	3,300 ha	0.52%	5,915 ha	0.93%
C1. Plantation		1,300 ha		3,359 ha	
C2. Plantation on Wadi banks		550 ha		807 ha	
C3. Plantation around dams		1,450 ha		1,749 ha	

Source: Appraisal document; PCR

(2) Prevention of soil erosion

There was no data available to indicate the direct effect of this Project on prevention of soil erosion. According to the DGF, however, the Directorate General of Planning and Agricultural Land Conservation of the Ministry of Agriculture estimates that one hectare of land loses 10.36 cubicle meters soil per year in Tunisia. As this Project implemented soil conservation work on 5,566 hectares (sub-component D1), it is estimated that the Project would have prevented 57,000 cubicle meters soil erosion per year.

(3) Forest area

The national forest area increased from 959,000 hectares in 2000 to 1,200,000 hectares in 2007 as shown in Table 10 below. The contribution of this Project (5,915 ha as in Table 9) is 2.5% of the increase (241,000 ha), which is not small considering the fact that the Project was implemented only in the four governorates.

(4) Forest cover

The national forest cover in 2009 was 13.04% (DGF) and it almost achieved the target of the Second Forestry Strategy (13.5% by 2011). The contribution of the Project to the increase of the forest cover is not negligible as explained in the section above.

Table 10 Forest area and forest cover in Tunisia

Year	Forest area	Forest cover	
		Achievement	Target
1900	1,250,000ha (*1)		
1956	368,000ha (*1)	3.5%	
1990	643,000ha (*2)	6.2%	
1995	831,000ha (*1)	8.0%	
2000	959,000ha (*2)	9.2%	15% (*3)
2005	1,056,000ha (*2)	10.1%	
2007	1,200,000ha (*1)	11.6%	
2009	1,304,000ha (*1)	13.04% (*1)	
2011	-	-	13.5% (*4)
2020	-	-	16% (*4)

Source: (*1) DGF, (*2) FAO Forest area statistics, (*3) First forest strategy 1990-2000, (*4) Second forest strategy 2002-11

3.3.1.2 Results of Calculations of Internal Rates of Return (IRR)

To calculate the economic IRR of the Project, the Cost was defined as the project cost and the Benefit was defined as the estimated additional value of the forest products increased by the Project. The project life is 74 years. The re-calculated EIRR is 14.9% and larger than that at the time of appraisal (8.3%). This is because the outputs of 11 out of 14 sub-components used for the EIRR calculation exceeded the original target and the estimated additional value from beekeeping, which was added as a new activity in the mid-term evaluation, was large. Beekeeping was excluded from the project scope at appraisal, but the estimated additional value from it had been calculated.

Due to the nature of the Project, a quantitative analysis of the financial internal rate of return was not possible.

3.3.2 Qualitative Effects

(1) Improvement of living conditions of the target communities

The Project assisted creation of 13 GDAs and developed PDCs for five-year period in a participatory manner. The PDCs included plans of small projects to respond to the needs identified by the community. Some of them were implemented within the scope of Component E (socio-economic development) of this Project and some of others have been funded by other development partners. The DGF and the forestry departments of the CRDAs needed to collaborate with other departments of their organizations, other governmental and local agencies and development partners because PDCs included activities that are not within their mandates³.

In the beneficiary survey of the ex-post evaluation study, 80 community members from seven

³ For example, if a PDC included construction of a school building or skill training for income generation activities, the DGF and the CRDA have to discuss with relevant organizations to explore possibilities of support.

project sites in two governorates (Béja and Le Kef) and 22 staff of CRDAs from the same areas were interviewed. Among the community members surveyed, 62 were men and 18 were women.

As indicated in Table 11 below, all community members and most CRDA staff confirmed that the living conditions in the community had been improved thanks to the Project.

Table 11 Improvement of living conditions

	Community members		CRDA staff	
	Number	%	Number	%
Living conditions of the community have improved.	80	100.0%	20	91%
<i>Details (multiple answers allowed)</i>				
<i>Increase of income</i>	64	80.0%	17	77.3%
<i>Improvement of access by forest roads</i>	62	77.5%	19	86.4%
<i>Better jobs / diversification of sources of income</i>	29	36.3%	10	45.5%
<i>Increased participation of women in decision-making⁴</i>	17	21.3%		
<i>Increase of availability of forest resources</i>	17	21.3%	12	54.5%
<i>Improvement of relationships between community members</i>	11	13.8%	8	36.4%

Source: Beneficiary survey

Seventy-two community members (90% of the surveyed community members) have started and still continue income generation activities. The details of their income generation activities are shown in Table 12. Beekeeping has been popular because it was relatively easy to start and the results can be obtained in the short term. Some people sold woods and other forest products, which are in fact illegal. Average increase of monthly income per person was 106 dinars (monthly income was increased from 216 dinars before the Project to 318 dinars at the time of ex-post evaluation), and average increase of household monthly income was 102 dinars.

Table 12 Income generation activities

	Number	%
Livestock breeding	31	38.8%
Beekeeping	18	22.5%
Vegetable farming	14	17.5%
Fruit growing	9	11.3%
Fishing	3	3.8%
Sales of forest resources (other than woods)	3	3.8%
Sales of woods	2	2.5%

Note. Multiple answers were allowed.

The answers include activities outside of the scope of this Project.

Source: Beneficiary survey

⁴ A GDA has around nine board members, about two of which are women (DGF).

From the above, the Project has contributed to the improvement of the living conditions of the target communities.



Grazing (Béja)



Beehive (Le Kef)

This Project has largely achieved its objectives, therefore its effectiveness is high.

3.4 Impact

3.4.1 Intended Impacts

(1) Improvement of natural environment

1-1) By the direct intervention of the Project

In addition to the increased forest areas and the estimated decrease of soil erosion described in the section of Effectiveness, 89% of the surveyed community members reported that the environmental condition had been improved. Among those, 76% reported decrease of soil erosion; 50% reported increased availability of river water; 19% reported improved condition of the forests; 11% reported increase of forest resources; and 11% reported return of wild animals, especially deer. The surveyed CRDA staff supported the responses of the community members: 96% reported decrease of soil erosion; 68% reported improved condition of the forests that had been brought about prevention of forest fire, protection from insects, reforestation and rehabilitation of forests; 46% reported return of wild animals; 41% reported increase of forest resources, and 32% reported increase of water in river and/or dams/lakes.

According to the DGF, forest fires in the whole country have decreased from 1,375 cases that damaged 159 hectares in 2000 to 98 cases that damaged 132 hectares in 2009. While there were no data available for the target areas, the DGF has an impression that forest fires in the target areas have also been decreased. Construction and rehabilitation of forest infrastructure such as observation towers and fire breaks (Component A), as well as the increased awareness of the

community on prevention of forest fires through the socio-economic development activities (Component E), might have contributed to the decrease of forest fires.

From the above, the technical components of the Project have contributed to improvement of natural conditions and decrease of forest fire to certain extent.

1-2) By the decreased pressure from human activities on the forests

The Project aimed at decreasing the pressure on the forests by human activities through awareness-raising on environmental conservation as well as diversification of livelihood by the socio-economic development components.

Community members are authorized to enter into the forests and collect forest resources for self consumption. Collection of forest resources for sales purposes is illegal. According to the beneficiary survey, however, 11% of the community members reported that they still collected forest resources such as fire woods, pine cones and herbs for sales purposes and the average monthly income from it was about 58 dinars. Yet, the DGF reported that illegal logging in the target areas had been decreased from 2,298 cases in 2002 to 1,703 cases in 2007. At the same time, 12.5% of the surveyed community members reported that they collected less fire woods and 7.5% reported that they collected less forest resources other than fire woods than before. Introduction of the energy saving cooking stoves (sub-component E10), respect of the regulations and increased awareness on environmental conservation among the community members might have contributed the reduction.

From the above, the socio-economic components of the Project have reduced the pressure from human activities on the forest resources to a certain extent.

3.4.2 Other Impacts

(1) Impacts on the natural environment

Improvement of the environmental conditions was the purpose of the Project. No negative impact was observed on the natural environment as necessary measures were taken, such as conformity to the technical standards of forest road construction (forest roads should be 2km or less per 100 hectares of forests and the width should be 6m) and construction of banks and drains on road shoulders to prevent soil erosion.

(2) Land Acquisition and Resettlement

In the Governorates of Béja and Jendouba, there was land acquisition to plant eucalyptus and acacia around hill dams (sub-component C3). Compensation money and fruit trees were provided to the ex-owners. Construction of a hill dam (sub-component D3) was cancelled and therefore there was no land acquisition. There was no resettlement of the population by the

Project.

(3) Unintended Positive/Negative Impact

Access to the forests by the community members was reduced to a certain extent for forest rehabilitation and prohibition of taking livestock into the forests. Some community members showed anxiety in the beginning of the Project. Through repeated discussions with the Project, community members consented to the reduced access to the forests.

The Project created public works of 1.5 million days during the project period that amounted to 8,220 thousand dinars in total (PCR). The CRDA of Le Kef created employment for about 4,000 people during the period between 2002 and 2007. To generate employment for the communities, the Project contracted out some planting and construction work to six GDAs (sub-component E8) for 278 thousand dinars. However, it did not continue because single tendering with GDAs became virtually impossible after the revision of the public tender rules in 2004.

From the above, the Project has realized the intended positive impact on natural environment. No negative impacts were observed.

3.5 Sustainability (Rating: a)

3.5.1 Structural Aspects of Operation and Maintenance

The DGF and the CRDAs are responsible for operation and maintenance. The DGF has three principal members (head, in charge of technical matters and in charge of socio-economic matters) who have managed forest management projects including JICA's and also its Phase II. Each forestry departments of the four CRDAs is composed of the head, some engineers and some animators. Béja, Jendouba, and Le Kef are also the target governorates of JICA project Phase II and manage it by the same structure.

The forestry departments of the four CRDAs have a plan to recruit 80 forestry technicians and 15 engineers by 2016.

The animators, who were in direct contact with the target communities on the socio-economic development components, were employed on the fixed-term basis by the Project budget. Some of them were recruited again in JICA project Phase II and some were absorbed in the governmental organizations through recruitment competitions.

The GDAs established in the Project are supported by the CRDAs after the Project came to the end. Some of them have been supported by other development partners to conduct small projects included in the PDCs, the coordination of which is in principle is made by the CRDAs. The DGF and the CRDAs have been improving the mechanism of collaboration with other

organizations, taking the lessons from this Project and others.

According to the DGF, most of 13 GDAs continue functioning successfully. Having been assisted by other organizations, their management capacity has been improved through implementation of small projects in the PDCs. Operation and maintenance of community infrastructure are GDAs' responsibility.

3.5.2 Technical Aspects of Operation and Maintenance

According to the self-evaluation of the DGF (PCR), the four CRDAs had good technical capacity in terms of number of staff and skill levels. Also at the time of ex-post evaluation, the technical capacity of the DGF and the CRDAs are satisfactory as they continue operation and maintenance of the outcomes of the Project as well as manage similar projects. Lessons from the Project and manuals developed in the Project have been utilized by them and their technical capacity has been improved in many aspects such as how to proceed with discussions with the communities and how to conduct tender process efficiently.

3.5.3 Financial Aspects of Operation and Maintenance

(1) Budget of the forestry sector

In the national budget of the forestry sector, about 10% is set aside for operation and maintenance.

Table 13 Expenditure of the forestry sector

(thousand DT)

Year	Expenditure of the forestry sector	Expenditure of operation and maintenance
2002	49,178	4,918
2003	52,755	5,276
2004	44,550	4,455
2005	41,380	4,138
2006	43,811	4,388
2007	46,031	4,603
2008	41,110	4,110
2009	57,400	5,740

Source: DGF

Also at the CRDA level, about 10% of the budget is used for operation and maintenance.

Table 14 Expenditure on operation and maintenance of the four CRDAs

(thousand DT)

Year	Béja	Jendouba	Le Kef	Kasserine
2007	220	229	198	309
2008	220	230	195	320
2009	234	293	226	365

Source: DGF

As the DGF and the CRDAs conduct operation and maintenance of the forests and infrastructure rehabilitated or constructed by the Project without problems as discussed in the section below, the amount of the budget for operation and maintenance is appropriate.

The GDAs conduct operation and maintenance of the community infrastructure at their own expenses. Details of GDAs' financial status were not available.

3.5.4 Current Status of Operation and Maintenance

During the site visits in the ex-post evaluation, it was observed that the forests and forest infrastructure (such as forest roads and observation towers) constructed or rehabilitated by the Project were in good condition, regularly maintained by the DGF and the CRDAs. The trees planted by the Project show good survival rate⁵.

Table 15 Survival rate of trees planted by the Project (as of September 2007)

Plantation	Béja: Pinyon pine 60% Le Kef: Aleppo pine 83% Kasserine: Aleppo pine 85%
Pastoral plantation	Béja: Acacia 65% Le Kef: Acacia 80% Kasserine: Acacia 77%
Plantation to fix the dunes	Béja: Acacia 70%
Plantation around the hill lakes	Béja: Eucalyptus and Acacia 70% Jendouba: Eucalyptus and Acacia 70%
Plantation to protect wadi banks	Jendouba: Eucalyptus and Acacia 73% Kasserine: Eucalyptus and Acacia 96%
Plantation for regeneration of forests	Le Kef: Aleppo pine 84% Kasserine: Aleppo pine 84%

Source: DGF

It was also observed during the site visits that GDA infrastructures such as community centers (sub-component E7) were in good condition, maintained by the GDAs. Items provided by the Project to the individuals such as beehives, wire nets and fruit trees were also in good condition.

⁵ Survival rate is considered good if it is around 80% or more one year after plantation (DGF).

No major problems have been observed in the operation and maintenance system, therefore sustainability of the Project is high.



Dune stabilization by plantation of trees
(Béja)



Aleppo pines planted by the Project (Le Kef)

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

In light of the above, this project is evaluated to be highly satisfactory. The relevance is high as they were in line with the development policies and needs of Tunisia as well as Japan's ODA policy. The efficiency is fair because the project period was longer than planned for all projects, while the project cost was lower than planned. The effectiveness is high as the projects produced the planned outcomes and impacts. The sustainability is high because there is no problem in the structural, technical and financial aspects of operation and maintenance.

4.2 Recommendations

4.2.1 Recommendations for the Executing Agencies

The animators were employed by the project budget on the fixed-term basis. Some of them were recruited again as animators for similar projects, and some were absorbed as permanent staff in the governmental organizations through the recruitment competitions. In order to institutionalize the know-how of integrated forestry management projects and maintain the motivation of the animators, it is recommended to regularize the position of animators by the national budget if possible.

4.2.2 Recommendations for JICA

There is no recommendation for JICA.

4.3 Lessons learned

The socio-economic development components included activities that were beyond the mandate of the DGF and the forestry departments of the CRDAs. Therefore, they had to coordinate with other sections of the Ministry of Agriculture and CRDAs, as well as other governmental and local authorities and development partners to seek for their cooperation. In planning and implementation of projects taking integrated approach, it is probable that some activities requested by communities could be beyond the mandate of relevant executing agencies. In such case, the system for coordinating with other organizations needs to be established to attain higher objective.

Comparison of the original and actual scope of the Project

Items	Original	Actual
1. Outputs (only key components)		
C1. Plantation in the forests	1,300ha	Higher than planed (3,359ha)
C2. Plantation on wadi banks	550ha	Higher than planed (807ha)
C3. Plantation around dams and fixation of dunes	1,450ha	Higher than planned (1,749ha)
C4. Pastoral plantation	630ha	Higher than planned (2,165ha)
D1 Water and soil conservation work	5,150ha	Higher than planned (5,566ha)
D2. Plantation of semi-forests	655ha	Higher than planned (740ha)
E2. Forest user groups	13 groups	As planned (13 groups)
2. Project period	March 2000 – December 2005 (70 months)	March 2000 –March 2007 (85 months)
3. Project cost		
Amount paid in Foreign currency	1,498 million yen	3,999 million yen
Amount paid in Local Currency	3,942 million yen (37,647 thousand DT)	1,048 million yen (12,000 thousand DT)
Total	5,440 million yen	5,047 million yen
Japanese Yen loan portion	4,080 million yen	3,999 million yen
Exchange rate	1DT = 104.71 yen (as of June 1999)	1DT = 88.00 yen (average between 2000 and 2007)

Third party opinion

Dr Noureddine Mejdoub

Ambassador, President of "Tunisia - Japan Friendship Association"

Relevance

Arriving in Tunisia, the sixth century Arab horsemen referred to the country as “Green Tunisia”. But climatic conditions, erosion and the human need for fuel and materials have, over the centuries, reduced the areas occupied by forests. By the first half of the 20th century, the damage inflicted was already substantial. The reforestation effort undertaken since independence (1956) had considerably improved the situation. Japanese-Tunisian cooperation in reforestation of the country falls within the country's national, social and environmental priorities.

Impact and Efficiency

The integrated approach advocated by the initiators of the project enabled the inclusion of aims, both for water and soil conservation, as well as for reforestation and pastoral plantation. In other words, the forestry situation was improved, soil erosion was reduced and more water flowed into rivers and holding dams. Nature and wildlife was revived and a new forestry economy grew in the four governorates. Overall, the outcome of the activities undertaken led to a clear improvement in the population's living conditions. Citizens confirmed that their activities had been diversified and that their incomes have increased.

As a whole, finally, the project costs were reasonably respected and sometimes enabled the planning of new activities, decided during the mid-term evaluation.

Sustainability

The integrated reforestation project is part of a long term undertaking to restore to Tunisia – despite climate and environmental change – a green vocation in an area designated by geographers as being a semi-arid zone.

We know that we can count for its success on the strong political will that is particularly marked for agricultural and environmental projects. It is based on a pyramidal and regional administrative organization that is able to ensure the sustainability of the project.