

## Ex-ante Evaluation

### **1. Name of the Project**

Country: The Republic of Tunisia

Project: Water-Saving Agriculture Project in Southern Oasis Area

(Loan Agreement: March 30, 2007; Loan Amount: 5,260 million yen; Borrower: The Government of the Republic of Tunisia)

### **2. Necessity and Relevance of JBIC's Assistance**

Southern Tunisia is an arid region with an annual precipitation of 200 mm, and the traditional oasis agriculture (the main product is date palm) using spring water has been performed since ancient times. In recent years, after the springs, the water source, dried up, water in the Continental Intercalaire (fossil ground water at a depth of two to three kilometers) is pumped up and used as irrigation water. Almost 100% of the cultivated land of this region is irrigated where small-scale agriculture is practiced. As the recharge of this fossil ground water is extremely difficult, periodical monitoring is conducted to watch over the volume of exploitation as an attempt to conserve water resources under joint management by Tunisia, Libya and Algeria.

However, the establishment of an efficient irrigation agriculture system that make the most of limited water resources is slow in progress for several reasons such as the leakage of water due to inadequate maintenance and repair of the terminal channels, inadequate control of water supply for irrigation due to a lack of awareness on water-saving, and inefficient water use due to the decrepit intake facilities. As the effective utilization of irrigation water is expected to increase agricultural productivity and conserve water resources, promoting agricultural development while economizing on water in the region is an urgent issue.

The 10th Five-Year Economic and Social Development Plan (2002–2006) of Tunisia set objectives for the agricultural sector to promote environmental protection and increase the yields of agricultural products by developing and maintaining available land and water resources and at the same time to increase the food self-sufficiency rate of the country. In order to achieve these objectives, the government planned to invest a fund of 4,850 million Tunisian dinar (TD)(approximately 420 billion yen: 10.3% of the total of the plan) in the agricultural sector. This fund is appropriated not only in physical aspects such as the maintenance of irrigation facilities but also in nonphysical aspects such as training for those who are engaged in agriculture. Also the country's water resource strategy (Eau 21) for the conservation of water resources aims to reduce the amount of water required per unit area by saving water and expanding the irrigation areas using the saved water while reducing the total amount of irrigation water. In the 11th Five-Year Economic and Social Development Plan (2007–2011), which in the final stage of preparation, this direction is to be followed.

JBIC implemented the project for "Improvement of Irrigation Perimeter in Oasis in the South," signed in 1996 to provide assistance in developing irrigation and drainage networks in some parts of irrigation areas where they were urgently needed at that time. Consequently, as an outcome of the project, the efficiency of irrigation water usage improved by about 30%. However, to execute more effective and efficient water-saving irrigation, it is necessary to improve the irrigation efficiency of this whole region by further repairing irrigation facilities. This project is to expand the area covered by terminal irrigation and drainage channels, and thus promote agricultural development in this

region with an efficient irrigation system.

In JBIC's Medium-Term Strategy for Overseas Economic Cooperation Operations (FY2005–2007), “a foundation for sustained growth,” “global issues” and “poverty reduction” are considered as priority areas and “development and management of limited water resources” is specifically mentioned as an important issue for development in Tunisia. Therefore, JBIC's assistance in this project is highly necessary and relevant.

### **3. Project Objectives**

This project aims to secure stable irrigation water, by developing terminal irrigation and drainage channels in the oases in South Tunisia; thereby, contributing to an increase in agricultural production and environmental protection through the efficient exploitation of water resources.

### **4. Project Description**

#### (1) Target Area

Southern Tunisia (Governorates of Gabes, Kebili, Tozeur)

#### (2) Project Outline

- (a) Construction of terminal irrigation and drainage channel facilities, procurement of vehicles, etc.
- (b) Consulting services

#### (3) Total Project Cost/Loan Amount

7,030 million yen (Yen Loan Amount: 5,260 million yen)

#### (4) Schedule

April 2007–December 2016 (117 months)

#### (5) Implementation Structure

- (a) Borrower: The Government of the Republic of Tunisia
- (b) Executing Agency: Direction Générale du Génie Rural et de l'Exploitation des Eaux, Ministry of Agriculture and Water Resources
- (c) Operation and Maintenance System: Same as (b)

#### (6) Environmental and Social Consideration

##### (a) Environmental Effects/Land Acquisition and Resident Relocation

###### (i) Category: B

###### (ii) Reason for Categorization

This project is not likely to have significant adverse impact on the environment due to the fact that the project sector and project characteristics are not likely to exert impact and the project is not located in a sensitive area under the “Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations” (established in April, 2002). Thus, this project is classified as Category B.

###### (iii) Environmental Permit

An Environmental Impact Assessment (EIA) report for this project is not required under the domestic laws of Tunisia.

(iv) Anti-Pollution Measures

This project involves the construction and repair of facilities in the existing irrigation areas and therefore no particular impact is foreseen.

(v) Natural Environment

The project site is not located in or around sensitive areas, such as national parks, and so adverse impact on the natural environment is assumed to be minimal.

(vi) Social Environment

This project involves the construction and repair of facilities in the existing irrigation areas and therefore land acquisition and resident relocation are not required.

(vii) Other/Monitoring

The executing agency will monitor water quality, etc., for this project.

(b) Promotion of Poverty Reduction

None

(c) Promotion of Social Development (e.g. Gender Perspective)

None

## 5. Outcome Targets

### (1) Evaluation Indicators (Operation and Effect Indicator)

Indicator	Baseline (2007)		Target (2018, 2 years after completion)	
	Irrigation area (ha)	9,265		9,265
Cropping intensity (%) <sup>*1</sup>	140		160	
Irrigation interval (day) <sup>*2</sup>	6–60		6–35	
Irrigation water-carrying efficiency (%) <sup>*3</sup>	46		68	
Production volume of major crops (ton)	Date palms	63,455	Date palms	83,817.5
	Feed crops	53,764	Feed crops	74,315
	Pomegranates (Gabes)	2,394	Pomegranates (Gabes)	3,843
Yield of major crops per unit area (ton/ha)	Date palms	8.9	Date palms	12.1
	Feed crops	37.9	Feed crops	55.0
	Pomegranates (Gabes)	3.8	Pomegranates (Gabes)	6.1

\*1 Farmland utilization ratio (total area under cultivation ÷ actual farmland area)

\*2 Interval between irrigations (amount of water supplied per irrigation ÷ amount of water consumed per pay)

\*3 Irrigation water delivered to farm fields (planned amount of intake ÷ actual amount of water delivered to farm fields)

### (2) Internal Rate of Return

Financial Internal Rate of Return (FIRR): 0.6%

- (a) Cost: Project cost, operation and maintenance expenses
- (b) Benefit: Revenue from services
- (c) Project Life: 25 years

Economic Internal Rate of Return (EIRR): 10.6%

- (a) Cost: Project cost (excluding tax), operation and maintenance expenses
- (b) Benefit: Increase in yields of agricultural products
- (c) Project Life: 25 years

## **6. External Risk Factors**

Substantial changes in the Tunisian government's water-saving policy for the agricultural sector in South Tunisia including the followings:

- Discontinuation of subsidiaries for construction and repair of facilities relating to the promotion of water-saving irrigation
- Relaxation of regulations on groundwater development
- Excessive agricultural development by oasis residents and competing private sectors

## **7. Lessons Learned from Findings of Similar Projects Undertaken in the Past**

In a similar project in the irrigation sector of Tunisia, a survey was conducted on the effects generated by the construction and repair of irrigation channels and the drainage network as well as the water-saving effect. The result shows that certain effect is generated in terms of the efficient use of irrigation water. At the same time, it was pointed out that in order to save water more effectively, it is necessary to control the amount of water pumped up during winter and provide guidance to CRDA and farmers on irrigation methods. In this project, further construction and repair of irrigation channels as well as the drainage network that have generated effects in the past project are planned along with technical guidance and educational activities concerning water-saving for local residents by the executing agency in an effort to increase the effects of the project and ensure sustainability of the project.

## **8. Plans for Future Evaluation**

(1) Indicators for Future Evaluation

- (a) Irrigation area (ha)
- (b) Cropping intensity (%)
- (c) Irrigation interval (day)
- (d) Irrigation water-carrying efficiency (%)
- (e) Production volume of major crops (ton)
- (f) Yield of major crops per unit area (ton/ha)
- (g) Financial internal rate of return (%)
- (h) Economic internal rate of return (%)

(2) Timing of Next Evaluation

After project completion