

**AFRICAN DEVELOPMENT BANK GROUP**



**TUNISIA**

**RAS DJEBEL-GALAAT IRRIGATION DEVELOPMENT**

**Project Performance Evaluation Report (PPER)**

**OPERATIONS EVALUATION DEPARTMENT  
(OPEV)**

**12 October 1999**

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## CURRENCIES, ACRONYMS AND ABBREVIATIONS

### CURRENCY EQUIVALENTS

<b>Currency Unit</b>		<b>At Appraisal (Oct. 82)</b>	<b>PCR (Dec. 94)</b>	<b>PPER (Feb. 99)</b>
UA 1	=	TND 0.681526	TND 1.4382	TND 1.5176

### WEIGHTS AND MEASURES

1 metric tonne(t)	=	1000 kilogrammes (kg)	=	2204 pounds (lbs)
1 kilometre (km)	=	1000 metres (m)	=	0.62 miles (mi)
1 hectare (ha)	=	100 ares (a) = 0.384 sq. ml.	=	2.47 acres

### FINANCIAL YEAR

1 January to 31 December

### ACRONYMS AND ABBREVIATIONS

ADB	=	African Development Bank
CRDA	=	Commissariat régional de développement agricole (Regional Agricultural Development Commissioner's Office)
CTV	=	Cellule territoriale de vulgarisation (Regional Extension Unit)
CRA	=	Centre de rayonnement agricole (Agricultural Development Centre)
DGEH	=	Direction générale des études et de l'hydraulique (General Directorate for Engineering Designs and Water Management)
DGETH	=	Direction générale des études et des travaux hydraulique (General Directorate for Engineering Designs and Hydraulic Works)
TND	=	Tunisian Dinar
EGTH	=	Etudes et grands travaux hydrauliques (Engineering Designs and Large-scale Hydraulic Works)
ADF	=	African Development Fund
FAO	=	Food and Agriculture Organization of the United Nations
GUI	=	Groupement d'utilisateurs d'irrigation (Irrigation Users Association)
KFW	=	Kreditanstalt für Wiederaufbau
LC	=	Local Currency
OMVVM	=	Office de mise en valeur de la vallée de la Medjerdha (Medjerdha Valley Development Board)
PDEN	=	Plan directeur des eaux du nord (North Water Master Plan)
GDP	=	Gross Domestic Product
PIA	=	Public Irrigated Area
PCR	=	Project Completion Report
SECADENORD	=	Société d'exploitation du canal et des adductions des eaux du nord (Company for the Operation of the North Canals and Water Supply System)
STEG	=	Société tunisienne d'électricité et du gaz
EIRR	=	Economic Internal Rate of Return
UA	=	ADB Unit of Account

## PREFACE

1. This Project Performance Evaluation Report (PPER) concerns the Ras Djebel-Galaat Irrigation Development Project in Tunisia, for which the Bank granted a loan of UA 9.89 million in January 1983, and which was cofinanced by KFW (UA 13.22 million). This project, which was in keeping with the objectives of the VIth to IXth Five-Year Plans and the North Water Master Plan (PAEN), aimed to promote agricultural and livestock development with a view to reducing the food deficits and improving farmers' productivity and incomes.
2. The Bank loan, which represents about 27% of the investments, made it possible to build the dams and irrigation channels, and develop over 7,000 hectares of normally hydromorphic land, build feeder roads, carry out agricultural development activities, as well as works monitoring and supervision studies. The project was completed in 1994 and the Project Completion Report prepared by the Bank following a mission to the country in 1995.
3. Some major changes occurred during implementation of the project regarding the technical design of the water and irrigation facilities and the irrigation plan, as well as the organization of the social environment for the agricultural development operations. These changes, effected with the authorization of the Bank following the preparation of detailed engineering designs, made it possible to make substantial savings by reducing the volume of civil works. They also made it possible to increase the irrigated areas by approximately 20%.
4. Overall, the agricultural production objectives were attained, even exceeded, owing to water control, new trickle irrigation techniques and agricultural intensification. Animal production was so successful that milk self-sufficiency was attained in 1998, three years ahead of the 2001 target.
5. The overall performances are satisfactory. However, serious problems are still being encountered related to the salinity of irrigation water, the impact of which on tree growing, for example, has been disastrous (loss of around 50% of the planted areas caused by excess water salinity). German (KFW) funded studies recently conducted by the Government identified several possible solutions, the most sustainable of which focus on the diversion of the Mejerdah waters and the construction of new structures, but are rather expensive. The Government wishes to obtain the participation of the project's traditional donors in the financing of this operation, which is pivotal for the sustainability of the project.
6. This Project Performance Evaluation Report (PPER), prepared following a Bank mission to Tunisia from 29 January to 14 February 1999, refers to the appraisal and completion reports, as well as to the relevant bank policy documents. The PPER complements the findings and conclusions of the Project Completion Report (PCR), and contains an evaluation of the performances, outcomes and sustainability of the impacts of the project. It draws conclusions and lessons and formulates recommendations for the Borrower and the Bank for the consolidation of the project benefits and the adoption of a better approach for future similar operations.
7. The PPER has taken into consideration comments received from the Borrower and the Bank's operations departments.

## BASIC PROJECT DATA

### A. PRELIMINARY DATA

- |    |                  |   |   |
|----|------------------|---|---|
| 1. | Country          | : | Tunisia   |
| 2. | Project          | : | Ras Djebel – Galaat Irrigation Development  |
| 3. | Loan Number      | : | CS/TN/AGR/82/018  |
| 4. | Borrower         | : | Government of Tunisia (Ministry of Finance)                                       |
| 5. | Beneficiary      | : | Government of Tunisia (Ministry of Agriculture)                                   |
| 6. | Executing Agency | : | Direction Générale des Etudes et Travaux<br>Hydrauliques, Ministry of Agriculture |

### B. BASIC LOAN DATA

		At Appraisal	Actual	Difference
1.	Request			
2.	Amount (million UA)	23.6	9.89	13.71
3.	Service Charge	1%	1%	
4.	Repayment Period	14 years	14 years	
5.	Grace Period	6 years	6 years	
6.	Negotiation Date	1982	22-24 Nov. 1982	-
7.	Approval Date	1982	14 Dec. 1982	-
8.	Signature Date	1983	07 January 1983	-
9.	Effectiveness Date	1983	31 Dec. 1984	2 years

### C. PROJECT DATA

		At Appraisal	Actual	Difference
1.	Total Cost (in million UA)	83.19	36.92	46.27
2.	Implementation Period	5 years	8 years	3 years
3.	Financing Plan			

Source	At Appraisal			Actual		
	F.E.	L.C.	Total	F.E.	L.C.	Total
ADB	23.60	-	23.60	9.89	-	9.89
KFW	16.38	-	16.38	13.22	-	13.22
Government	-	43.21	43.21	-	13.81	13.81
<b>TOTAL</b>	<b>39.98</b>	<b>43.21</b>	<b>83.19</b>	<b>23.11</b>	<b>13.81</b>	<b>36.92</b>

		At Appraisal	Actual	Difference
4.	Deadline for First Disbursement	1983		
5.	Effective Date of First Disbursement		20 February 1986	
6.	Start-up of Implementation Activities	1983	1986	4 years
7.	Works Completion Date	1987	1994	8 years
8.	Deadline for Final Disbursement	31 Dec. 1987		
9.	Effective Date of Final Disbursement		30 June 1994	

**D. PERFORMANCE INDICATORS**

1. Cost Overrun	:	None
2. Unused Balance	:	None
3. No. of Extensions to Deadline for Final Disbursement	:	Not Available
4. Implementation Status	:	Completed
5. Overall Project Performance	:	Satisfactory
6. Implementation Performance	:	Satisfactory
7. Bank Performance	:	Satisfactory

	<b>At Appraisal</b>	<b>On Completion</b>	<b>At Evaluation</b>
Economic Internal Rate of Return	12%	10.6%	22.83%

**E. MISSIONS**

<b>Type</b>	<b>Date</b>	<b>N° of Persons</b>	<b>Composition</b>	<b>S/W.</b>
Identification	1974	Min. Agri	N/A	
Preparation	July 1982	FAO	N/A	
Appraisal	October 1982	3	Irrig. Eng./Agron./Agro-Econ	6
Monitoring	Nov. 1990/ Jan. 1992	1 1		2 2
Supervision	Sept. 1987 Sept. 1988	1 1		1 1
PCR	14/11-4/12/1994	2	Irrig. Eng/Agronomist	4
PPER	01-13/02/99	2	Agro-Econom./	4

**F. DISBURSEMENTS (in million UA)**

	:	9.89	
1. Total Disbursed	:	13.71	
2. Amount Cancelled	:	0	
3. Unused Balance	:	1.10	
4. Average Annual Disbursements	:		
5. Disbursements Profile		Estimated	Actual
1983		680.0	
1984		6100.0	
1985		9660.0	
1986		4840.0	96.6
1987		2320.0	170.7
1988			3183.8
1989			1849.5
1990			1906.0
1991			1022.2
1992			566.2
1993			742.6
1994			348.0
Total			9883,6

## G. BANK OPERATIONS IN THE AGRICULTURAL SECTOR

The following table gives the list of Bank-financed projects in the agricultural sector and their implementation status.

### Bank Operations in the Agricultural Sector

<b>PROJECTS</b>	<b>Amount (million UA)</b>	<b>% Disbursed</b>	<b>Implementation Status</b>
Medjerdah Valley Development	2.75	100	Completed / PCR prepared
Ras Djebel-Galaat Andalous Irrigation Development	23.6	100	Completed / PCR prepared
Ghezala Agricultural Complex Development	14.95	99.92	Completed / PCR prepared
Line of Credit to BNA	18	100	Completed / PCR prepared
Mahdia Rural Development I	19.8	99.91	Completed / PCR prepared
IRDP for the Most Underprivileged Areas Phase I	53.1	88.98	Completed / PCR planned
Agricultural Sector Adjustment Programme	90	100	Completed / PCR prepared
2 <sup>nd</sup> Line of Credit to BNA	50	73.50	Implementation satisfactory
Barbra Wadi Development	62.3	24.36	Ongoing
Sidi El Barrak Dam Development	54.2	7.30	Ongoing
IRDP for the Most Underprivileged Areas Phase II	63.5	25.12	Implementation satisfactory
Mahdia RDP II	9.45	1.59	Ongoing
Extension of Cap Bon Protection Area	8.14		Ongoing
Jendjouba Irrigation Development Project	17.2		Ongoing
<b>TOTAL</b>	<b>486.99</b>		

Source : 98 Portfolio Review. PCR (1995).

## **1. EVALUATION SUMMARY**

### **1.1 Objectives and Scope**

This project, financed by the Bank to the tune of UA 9.89 million, was intended to contribute to the attainment of food security. The project's specific objective was to raise agricultural output and farmers' incomes through irrigation control on previously dry farmed land, land improvements and the modernization of farms.

In particular, the Bank's loan was intended to support irrigation and agricultural development activities, as well as the development of farming operations, in keeping with the principal objectives of the North Water Master Plan (PDEN).

### **1.2 Implementation Performance**

Project performance in respect of the implementation of its activities was considered satisfactory although the implementation schedule was not adhered to, and total investment was 55% below target. The irrigation and sanitation infrastructure was established in conformity with the detailed engineering designs, and made it possible to safeguard thousands of hectares of hydromorphic land. The agrarian reform permitted rational use of the irrigation system and better land use.

### **1.3 Institutional Performance**

Overall, the institutional performance is considered satisfactory. The structures of the executing agency efficiently ensured the establishment and maintenance of the project facilities. The common interest groupings, established under the project to ensure improved water distribution in the grouped plots, developed so rapidly that the agricultural authorities encouraged them to gradually take over the maintenance of the secondary irrigation network and repairs to small items of equipment.

### **1.4 Project Impact**

The project impact is highly evident from the economic, social and environmental standpoints. Indeed, the project has contributed to the earlier than expected attainment of self-sufficiency in milk, which is a mass consumption food product in Tunisia. The value of the land developed has increased tenfold, and supervised farmers' incomes have quadrupled. In the project area, 200 permanent jobs (including 120 to 150 jobs for women) and 5,000 casual jobs have been created.

The main social impact was on women who have access to land ownership and now fill 3,000 temporary positions, i.e. over 60% of the total workforce of the Galaat Andalous irrigation area, and 75% on the other irrigation areas.

The environmental objectives were partially attained. While the irrigation structures made it possible to significantly curb the overtapping of surface waters and the water table, the problem of salinity of irrigation water remains unsolved with a salt content in summer of approximately 2.5 to 3 g/l.. It should, however, be noted that the quality of water is regularly monitored by SOCADENORD services which are taking the necessary measures to guarantee the yields of the developed irrigation areas.

### 1.5 Sustainability

The prospects for the sustainability of the project outputs are good since the water and irrigation facilities are sound and regularly maintained by the beneficiaries themselves. However, from the operations standpoint, major problems have been encountered related to water salinity, and to address which appropriate technical and financial environmental measures have been taken to mitigate the negative impacts of the project and guarantee the availability of high quality water for irrigation and domestic purposes.

### 1.6 Conclusion

In light of its economic, financial, social and environmental outcomes, the project is considered to be satisfactory overall. However, despite those achievements, sustainable measures will have to be found to ensure the supply of high quality water both for irrigation and domestic purposes, for farm productivity depends on it.

#### Feedback

### 1.7 Lessons

The principal lessons drawn from the post evaluation concern primarily: i) the need for the Borrower to become more involved in the project from the early stages of its preparation in order to incorporate its concerns with regard to macroeconomic and sectoral policy. To that end, it should be pointed out that this project represented a first experience in the area of pressure irrigation, and consequently, not all of the impacts of such a technique could be assessed; ii) the detailed engineering designs to be prepared prior to project appraisal; iii) the strengthening of the CRDA design services; iv) pursuit of agrarian reform-related activities; v) pursuit of the programme to monitor and control water salinity; vi) improvement and widespread use of the adapted and incentive water billing system on all the irrigation areas; and vii) the role which could be played by the Bank's private sector in stimulating downstream activities, in particular, the large-scale commercial production of milk.

### 1.8 Recommendations

It is recommended

#### **to the Borrower, to:**

- (i) become much more involved in project preparation to ensure that its project development and management policy is properly taken into consideration, and, therefore, in future projects, to systematically apply the participatory approach method from the project preparation stage;
- (ii) strengthen the CRDA design services in personnel and management tools to ensure better monitoring and evaluation, as well as a thorough analysis of economic and financial outcomes, in order to draw relevant lessons to improve the quality of future projects in the same sector;
- (iii) to pursue the land reparation policy as rapidly as possible, especially in the Tobias irrigation area, in order to improve the land intensification and use rates, in keeping with the estimates at appraisal;

- (iv) pursue the water and soil salinity monitoring programme, as well as monitoring of the water table and drainage water; these activities are intended to reduce irrigation water salinity as quickly as possible;
- (v) continue to equip plots (in respect of GUIs, sprinkler and micro-irrigation), as well as the establishment and training of CIGs to step up their involvement in maintenance work as quickly as possible;
- (vi) improve and ensure the widespread effective implementation of the “water billing” programme to all the irrigation areas, and apply two-tier tariffing in the PIAs to improve the utilization rate;
- (vii) assess the entire water metering system upstream (SOCADENORD) and downstream in order to improve the efficiency of the networks and prevent water wastage, with the ultimate objective of recording all the water supplied to farmers;
- (viii) encourage the transformation of the CIGs into Agricultural Development Associations, with the active participation of women; and
- (ix) strengthen and pursue the incentive systems for manufacturers in order to encourage dairy processing, in order to prevent any discouragement of upstream production ;

**to the Bank**

It is recommended to:

- (i) conduct the appraisal of similar projects following preparation of the detailed engineering designs in order to ensure tighter control of project costs;
- (ii) step up the number of project supervision and monitoring missions. Such missions will have to ensure that the project is implemented in conformity with the estimates at appraisal ;
- (iii) assist the CRDAs with training, and setting up efficient management tools for the CIGs and Monitoring and Evaluation Units; and
- (iv) involve the Private Sector Unit more closely in financing activities related to the induced effects of the project.

**1.9 Follow-up Action**

The follow-up action relating to the above-listed recommendations is summarized in Appendix 1.

## **2. BACKGROUND**

### **2.1 Country Economic Context**

2.1.1 With a total area of 164,000 km<sup>2</sup>, Tunisia has only around 5 million hectares of arable land. Despite the progress made in the agricultural sector and the Government's determination to diversify, agricultural exports remain limited to a very small group of products. This is due to the scarcity of land and its degradation from erosion, the aridness of the climate and a shortage of water. Two thirds of the agricultural areas are to be found in arid zones. Water is the second scarcest and most precious resource in Tunisia. Total water resources are estimated at 4.355 billion m<sup>3</sup> per year, comprising 2.7 billion m<sup>3</sup> of surface water and 1.655 billion m<sup>3</sup> in underground water (water tables: 0.645 billion m<sup>3</sup>, deep aquifers: 1.01 billion m<sup>3</sup>). With a potential supply of 545 m<sup>3</sup> per inhabitant per year, Tunisia is ranked among the most disadvantaged countries of the Mediterranean region (1,100 m<sup>3</sup> per inhabitant per year). Efficient, rational and dynamic management of water resources in Tunisia is, therefore, urgent and vital.

2.1.2 The contribution of agricultural sector value added to real GDP during the 1992-1996 period was 14.3% per year compared with 17.2% for manufacturing industries. Over the period, the contributions of the agricultural and fisheries sectors fell from 16.8% of GDP in 1992 to 11.3% in 1995, before rising to 14.2% in 1996. This trend is partially due to the rising share of other sectors in GDP while reflecting the vulnerability of the agricultural sector, which is subject to the vagaries of the weather.

2.1.3 Food security constitutes a concern of the Tunisian Government. Such security first of all requires minimal coverage of demand through the local production of some staples such as cereals, oil, milk, tomatoes and potatoes. These products account for 75% of human food consumption.

2.1.4 The Ras Djebel-Galaat Irrigation Development Project was designed in the context of the Vth and VIth Plans which targeted agricultural development and water control to; (i) achieve food self-sufficiency in staples ; (ii) improve the trade balance for food products and (iii) lower unemployment. The strategy adopted at that time involved water control and implementation of the Agrarian Reform. The same policy was pursued in the following years until the performance evaluation phase of this project.. Indeed, the XIth plan, which pursues the original objectives, specifies that food security should be attained in 2001.

2.1.5 In this regard, measures were taken by the Government to provide entrepreneurs investing in the agricultural sector, as well as farmers, with financial and tax incentives. Moreover, budgetary appropriations were made to continue the building of dams, reservoirs and canals in order to achieve total water control by 2001.

### **2.2 History of Bank Operations in the Agricultural Sector**

2.2.1 Fourteen (14) projects, seven (7) of which have been completed, have been financed by the Bank in the agricultural sector from the ADB window for a total amount of UA 486.99 million. The table in section G of the basic data summarizes the status of Bank-financed operations in that sector.

2.2.2 The overall performance of the projects implemented is satisfactory. The ongoing projects are being implemented without any particular problems.

### **2.3 Formulation**

2.3.1 The project preparation process, from design to appraisal, was comprehensively covered in the PCR (ref. paragraphs 3.1 & 3.2). Identified in 1982 by the FAO, and prepared by the Government, the project initially concerned two irrigation areas where irrigated cropping was carried out from shallow wells, and was not preceded by detailed engineering designs and socioeconomic studies. In June/July 1982, the Bank conducted further preparation on the basis of the available preliminary designs.

2.3.2 The project originated from the implementation of the programmes of action defined in the Vth and VIth Five-Year Plans, especially with regard to the diversification of agricultural production, food self-sufficiency by 2001, a reduction in food imports and higher export earnings. This project is a major component of the agricultural policy defined in the North Water Master Plan (PDEN), which focuses on control and tapping of surface water with a view to meeting, by the year 2007, the bulk of the demand for water for various uses (drinking water, irrigation and industry), the second phase of which includes the building of the Joumine dam and the development of 20,000 hectares, including the 7,185 hectares of the project under consideration.

2.3.3 The project was prepared by the Tunisian Government following identification by the FAO Investment Centre in 1982 under the title «Ras-Djebel and Aouaja Protection». It initially concerned two irrigation areas where irrigated cropping was carried out from shallow wells. The preliminary designs made no mention of the need to prepare detailed engineering designs of the system of irrigation and location of farms. However, on the basis of the FAO report, the Bank Group and the Kreditanstalt für Wiederaufbau (KfW) responded positively to the requests of the Tunisian Government to consider the possibility of financing the project. ADB and KfW preparation missions were, therefore, fielded in June and July 1982 respectively, and limited the size of the project to 7,185 hectares.

2.3.4 Since the Bank preparation mission did not include an environment expert or social economist, no comprehensive environmental assessment was carried out. Nor was mention made of procedural aspects and the socio-professional organization of the project beneficiaries. In addition, at the time of project appraisal (1982), the Bank's operational procedures did not provide for the preparation of the logical framework matrix. Consequently, as a result of the absence of this matrix, the appraisal mission did not clearly bring out in its report all the expected outcomes, apart from those relating to agriculture and livestock breeding, nor the risks and assumptions relating to the implementation of the project.

2.3.5 As designed in the ADB appraisal report, the project did not address a number of concerns, which now appear as weaknesses to be corrected if optimal utilization of the irrigation areas is to be attained. These shortcomings may be summarized as follows (i) the failure to prepare detailed engineering designs prior to the preparation of the appraisal report ; (ii) the absence of an environmental impact assessment, which would have permitted the proposal of appropriate mitigative measures to control salinity, the removal and treatment of drainage water discharged into the Medjerdha Wadi, which is also used as a channel for the water used on the irrigation areas; (iii) the absence of performance indicators for the social and poverty reduction aspects; (iv) failure to involve farmers in the design and scheduling of project priorities; and (v) the absence of mechanisms for the management and maintenance of economic infrastructure by the beneficiaries. Those shortcomings are now the subject of corrective measures.

## **2.4 Project Rationale**

2.4.1 The project originated from the implementation of the programmes of action defined in the Vth and VIth Five-Year Plans, especially with regard to the diversification of agricultural production, food self-sufficiency by 2001, a reduction in food imports and higher export earnings. This project is a major component of the agricultural policy defined in the North Water Master Plan (PDEN), which focuses on control and tapping of surface water with a view to meeting, by the year 2007, the bulk of the demand for water for various uses (drinking water, irrigation and industry), the second phase of which includes the building of the Joumine dam and the development of 20,000 hectares, including the 7,185 hectares of the project under consideration.

2.4.2 Implementation of the project, therefore, addresses the constraints on the agricultural sector characterized by unfavorable conditions which curb the growth of agricultural production, especially irregular rainfall, a shortage of water resources, the poor quality of water, soil degradation and inadequate socio-economic organization. Implementation of the project has made it possible to resolve problems related to the type of land (marshy and hydromorphic and of poor quality). The pressure irrigation system used has also made it possible to solve problems concerning the overutilization of well water reserves that had led to a fall in the level of the water tables and an increase in their salt content from sea water. This salinization and dwindling reserves would have gradually led to a fall in agricultural production in the area if no corrective measures had been taken.

2.4.3 As a result of the project, appropriate solutions were found to all the problems identified, in keeping with the objectives of Tunisia's different Five-Year Plans, from the Vth to the IXth, and with the objectives of the North Water Master Plan (PDEN).

## **2.5 Objectives and Scope at Appraisal (logical framework)**

2.5.1 The project sector goal was to contribute to the country's food self-sufficiency through agricultural and livestock breeding development activities. The specific project objective was to increase agricultural production and farmers' incomes by the irrigation of dry farmed land, land improvement and the modernization of farms.

2.5.2 The above objectives, in conformity with the country's macroeconomic and sectoral policy documents (ref. paragraph 2.3.1 above), and also in keeping with the CSP (1996/1998), are relevant. They address the macro-economic and sectoral issues, as well as the expectations of the project beneficiaries. The expected outcomes concern both food self-sufficiency and higher incomes which both help to reduce poverty. The performance indicators are defined on the logical framework matrix which has been reconstituted (Appendix 2).

## **2.6 Financial Arrangements (Bank and Others)**

The project was financed jointly by the ADB, KFW, and the Tunisian Government, in conformity with the provisions of the Loan Agreement. ADB covered the foreign exchange costs of all components. All the cofinanciers released their contributions during the implementation of the project, which did not, therefore, experience any financial difficulties. The following table shows the breakdown of financing according to the Completion Report:

Table 2.1  
Breakdown of Financing  
(million UA)

Source	At Appraisal			Actual		
	F.E.	L.C.	Total	F.E.	L.C.	Total
ADB	23.60	-	23.60	9.89	-	9.89
KFW	16.38	-	16.38	13.22	-	13.22
Government	-	43.21	43.21	-	13.81	13.81
TOTAL	39.98	43.21	83.19	23.11	13.81	36.92

Source : Bank Project Completion Report.

## **2.7 Evaluation Methodology and Approach**

2.7.1 The methodology used for post-evaluation consists of comparing outcomes with objectives, and analyzing the trends up to the time of post-evaluation in order to assess the relevance of the project and evaluate its performance.

2.7.2 In the absence of a logical framework matrix, the post evaluation mission, therefore, reconstituted it on the basis of information contained in the appraisal report. This logical framework approach provides a systemic view of the project, and makes it possible to identify the responsibilities of each actor, and determine the conditions to be fulfilled to ensure its efficient implementation.

## **3. PROJECT IMPLEMENTATION**

### **3.1 Loan Effectiveness**

All the conditions set out in the Loan Agreement were fulfilled in a reasonable time despite the somewhat late signing of the KFW Loan Agreement.

### **3.2 Changes to the Scope of the Project**

3.2.1 The scope of the project was changed considerably after its approval by the Bank and the signing of the Loan Agreement. The failure to prepare detailed project designs at the time of appraisal led the team responsible for the preparation of the report to overestimate the project costs. Furthermore, the changes also concerned institutional changes following the State's decision to carry out a more integrated supervision of its operations in the field, by disengaging from commercial activities. Thus, those activities originally implemented by the Development Boards (state-owned companies), which included those relating to the implementation of the project, were transferred to the Offices of the Bizerte and Ariana Regional Agricultural Commissioners (CRDA).

3.2.2 Other changes were made with regard to the physical outputs as a result of the detailed engineering designs. However, they did not impact negatively on the project objectives, but did, on the other hand, permit: (i) the achievement of significant savings on the total project cost; (ii) increases of approximately 13% in the irrigated areas; and (iii) more effective agricultural supervision. They also made it possible to reduce the number of pumping stations and increase the area of developed and irrigated land from 7,185 hectares to 8,163 hectares on the four planned irrigation areas.

### **3.3 Implementation Schedule**

3.3.1 Changes were made to the project duration and implementation schedule; works start-up was 4 years behind schedule in relation to the appraisal report.; the implementation period was 8, instead of the initially planned 5 years: 6 years for the establishment of infrastructure (1987 to 1992), and 2 years to build feeder roads, which only began in 1992. The implementation schedule had not taken this constraint into consideration, namely the building of feeder roads at the end of the development works to prevent damage from heavy duty vehicles.

3.3.2 In addition to the time required to implement the works, there were two other delays relating to: (i) the time required to position the KFW cofinancing signed in June 1985; and (ii) the two-year period required to prepare the detailed engineering designs (1985-1987). Those delays had little impact on the cost of the works, most of which were in Tunisian dinars which had been devalued several times during implementation of the project.

### **3.4 Reporting**

The PCR satisfactorily covered this section (ref paragraph 4.4.1). It will be recalled that works status reports were not submitted regularly to the Bank, and that a completion report was not prepared by the Executing Agency. One of the reasons for this shortcoming was that the appraisal report had not specified the type or frequency of the documents to be prepared and submitted to the Bank by the Borrower.

### **3.5 Procurement of Goods and Services**

3.5.1 The PCR (ref. section 4.5) satisfactorily described the methods of procuring goods and services. The relevant Bank procedures were complied with, with the exception of the electrification work, which, instead of through local shopping, was awarded by negotiated contract to the Société tunisienne d'électricité et du gaz (STEG) which has a monopoly on those installations. With regard to that aspect, it should be noted that the appraisal report had not mentioned that type of procurement (negotiated contract) in its report, though it had no negative impact on the project.

3.5.2 Nevertheless, despite compliance with those procedures by the Executing Agency, it should be noted that the contract award periods were fairly long because of the relatively long process of approval of bidding documents by the Bank (submission of documents prior to, and after, the issue of invitations to bid, as well as delays in delivering mail). The Tunisian authorities expressed a wish to shorten certain phases (publication periods for local competitive bidding, for example) because of the fairly large network of local small and medium-size enterprises, and the speed of replies. In the opinion of the Ministry of Agriculture, the removal of some of the procedures would make it possible to speed up project implementation..

3.5.3 The new procedures established by the Bank's Procurement Unit (FPRU) have led to a significant improvement in the evaluation of the methods of procurement of project goods and services, as well as the correction of the shortcomings of this project.

### **3.6 Project Cost**

3.6.1 The project costs were satisfactorily analyzed in the PCR (ref. Section 4.6). The details of those costs in Tunisian Dinars, and in units of account, in conformity with the exchange rates in force are as follows :

Table 3.1  
Comparative Project Costs at Appraisal and on Completion

Components	-----Appraisal-----		-----Actual-----		% Increase in TNDs
	TND (millions)	UA (millions)	TND (millions)	UA (millions)	
<b>A. Irrigation Development Work</b>					
A1. General Infrastructure	14.48	21.25	22.22	19.69	153.5
A1. Development of Irrigation Areas	33.99	49.88	16.39	14.52	48.2
B. Agricultural Development	7.07	10.37	0.20	0.18	2.9
C. Designs, Monitoring and Supervision.	1.15	1.69	2.89	2.53	248.3
<b>TOTAL</b>	<b>56.69</b>	<b>83.19</b>	<b>41.67</b>	<b>36.92</b>	<b>75.5</b>
Actual/appraisal variance as a %			- 26.5	- 55.6	

Source : Completion Report; Disbursement Sheet

3.6.2 The changes to the scope of the project in 1992 and 1993 following the tripartite ADB/KFW/State meeting, led to the partial cancellation of UA 10.5 million in 1989, UA 3.5 million in 1992 and UA 0.53 million in 1993. The total project cost in UA declined by 55.6%; however, in Tunisian dinars, it only fell by 26%. The reasons for those variances were (i) the shifting of expenditure categories from one sub-component to another; (ii) the institutional reorganization, especially in respect of the operation of the executing agency (maintenance of facilities); (iii) application of the procurement rules leading to a considerable reduction in costs; (iv) a considerably below forecast inflation rate; (ii) a sharp depreciation of the Dinar against the Bank's unit of account over the project implementation period (UA 1 = TND 0.68 in 1982 compared with UA 1 = TND 1.4382 in 1994).

3.6.3 The partial cancellations in February 1989 and May 1992, followed by partial reactivation to honour expenditure made, show the lack of cost control over the period. Indeed, the differences between costs at appraisal and those recorded at works completion are due to an overestimation of provisions for physical and price contingencies. The appraisal mission had made protective upward provisions to cover the cost of the works in the absence of detailed engineering designs on the one hand, and on the other, was unable to anticipate the scale of the devaluation of the Tunisian Dinar over the project implementation period. A mid-term review would undoubtedly have made it possible to better identify the factors related to the revision of the list of goods and services and the corresponding costs.

### **3.7 Disbursements and Sources of Financing**

3.7.1 The analysis of disbursements by source of financing was satisfactorily presented in the PCR. Nevertheless, the post-evaluation mission was unable to give a reasonable opinion regarding the deadlines for disbursement; this was due to the fact that, following the restructuring of the services of the Bank in 1995, some project files could not be found. Significant changes were made to the disbursements schedule during the implementation of the project. Disbursements were released over 9, instead of 5 years, as initially estimated. However, the average annual disbursement was UA 1.09 million as against UA 4.72 million at appraisal, owing to a reduction in project costs and the extension of the implementation period.

3.7.2 The estimated amounts by source of financing were changed on implementation, with the following table:

**Table 3.3**  
**Sources of Financing** (in million UA)

Components	Appraisal				Actual			
	ADB	KFW	GVT	Total	ADB	KFW	GVT	Total
<b>A. Irrigation Development</b>								
A1. General Infrastructure	6.60	4.59	10.06	<b>21.25</b>	3.27	10.43	5.99	<b>19.69</b>
A2. Development of Irrigation Areas	13.67	9.46	25.75	<b>49.88</b>	5.15	2.00	7.37	<b>14.52</b>
<b>B. Agricultural Development</b>								
B.1. Agricultural Development	3.16	2.21	5.00	<b>10.37</b>	0.14	0.00	0.04	<b>0.18</b>
<b>C. Designs, Monitoring and Supervision</b>								
C.1. Designs, Monitoring and Supervision	0.17	0.12	1.40	<b>1.69</b>	1.33	0.79	0.41	<b>2.53</b>
<b>TOTAL</b>	<b>23.60</b>	<b>16.38</b>	<b>43.21</b>	<b>83.19</b>	<b>9.89</b>	<b>13.22</b>	<b>13.81</b>	<b>36.92</b>
Percentage Total	28.4	19.7	51.19	<b>100.0</b>	26.8	35.8	37.4	<b>100.0</b>
Variance: actual/appraisal (%)					-58.1	-19.3	-68.0	<b>-55.6</b>

Source : ADB PCR, 1994

3.7.3 The reduction in the total project cost led to a fall in the participation of each of the cofinanciers. Nevertheless, it will be noted that, while ADB's contribution remained within the original range (25.8% compared with 28.4% at appraisal), the KFW contribution virtually doubled (82%), whereas the Government's contribution fell by 37% in comparison with the original amount. The increase and fall in the relative shares of those two institutions was due to the fact that KFW bore a large part of the local project costs, net of taxes and customs duties, initially scheduled for payment by the Government. The Bank's procedures for the financing of local costs, adopted at the time of its establishment, were too inflexible in that area. This explains why the Bank did not increase its relative share in the breakdown of financing.

### **3.8 Compliance with Loan Conditions and Covenants**

3.8.1 The conditions and covenants precedent to loan effectiveness were fulfilled by the Borrower, within reasonable time frames, with the exception of the delay in submitting evidence of the cofinancing agreement. This delay reflects the lack of coordination of activities between the Bank and the other financing institutions. In fact, the Bank should have coordinated that aspect with the cofinancier before preparing the implementation schedule.

3.8.2 With regard to the other conditions, only the provisions concerning agrarian reform were not fulfilled by the Government. The sociological aspects, which slowed down the fulfillment of this condition, could have been identified at appraisal if the Bank appraisal and preparation team had contained a sociologist or a social economist. Studies are being conducted to determine the practical modalities of land reparation, based on local social and cultural conditions.

3.8.3 Detailed reporting was unable to be carried out correctly and regularly in the absence of accurate information on the type of report to be submitted. This could have been avoided if a launching seminar had been held, as is now the case.

## 4. PERFORMANCE EVALUATION

### 4.1 Operating Performance

4.1.1 The project was fully implemented in conformity with the detailed studies, which permitted the attainment of the set objectives, especially with regard to general infrastructure (dam, canals, pumping stations, etc) and development of the irrigation areas (ref. Appendix 4 for details). This infrastructure made it possible to protect the hydromorphic and marshy land in the Galaat Andalous area, to improve the texture of the soil as a result of the drainage and sanitation system established, and to recharge the water tables and restore the quality of the well water in the Ras-Djebel and Aousja areas. The project also made it possible to gradually introduce irrigated cropping to the Tobia area, which had been dominated by large dry cropping farms.

4.1.2 As a result of the project, the farms which were scattered before priming, were grouped together in homogeneous plots of approximately 2 to 50 hectares in areas with the same quality of soil. There are 500 farms in the Ariana area, and 245 in the Bizerte area, with the exception of the Tobias irrigation area, which is being re-parcelled. This approach permits optimal use of the irrigation hydrants for the groups of farms, greater intensification and better land use: integration of fodder crops and livestock (dairy and meat), cereal crops and winter market garden crops, tree-growing and summer market garden crops. The cropping systems vary according to the size of the farm.

4.1.3 The project adopted a new approach to the management of irrigation areas at farm level by the CRDAs, based on a pressure irrigation system which enables each of the beneficiaries to adopt the irrigation system most suited to his crops (sprinkler, trickle, improved gravity, etc), each farm being equipped with individual water meters. With regard to the distribution of water and the maintenance of secondary irrigation networks, the CRDAs have encouraged the establishment of Common Interest Groupings (CIGs), whose functions are currently limited to the management and redistribution of water to their members, and the gradual assumption of responsibility for the maintenance of the secondary network and repairs to the equipment installed on their plots (hydrants/water meters, irrigation pipes, sprinklers, etc).

4.1.4 The total area of irrigated crops rose sharply as a result of intensification, to almost 3,547 hectares in 1998, i.e. 128% for all the irrigation areas in comparison with the situation before priming. The irrigated areas rose as follows: 1,018 hectares, i.e. 23 % for tree growing, 1,018 hectares, i.e. 428% for the principal cereal and fodder crops; 2,379 hectares, i.e. 126% for market garden crops. There are, however, variations depending on the type of crop, the use of dry or irrigated cropping, and from one irrigation area to another. The rate of intensification, which is the ratio between the area of irrigated crops and the irrigable area (therefore equipped), varies on the basis of the equipment, rainfall and the quality of the water. Measures intended to lower water salinity and speed up the re-parcelation process will make it possible to increase the irrigated cropping areas. Data provided by the CRDA supervisors has made it possible to establish the following intensification levels per irrigated area.

Table 4.3 : Intensification Rates

<b>Irrigation Areas</b>	<b>Occupancy Rates</b>	<b>Intensification Rates</b>
Tobias	101%	68%
Ras-Djebel	130.2%	113.2%
Aousja	153.9%	138.2%
Galaat Andalous	102%	66%

Source : Project Activity Reports

4.1.5 The project also produced a positive trend in areas and production, as follows:

- (i) on the Ras Djebel (2,000 ha) irrigation area, after priming, the cultivated area rose to 2,317 hectares; tree growing fell by 76 hectares (9%) and market garden crops by 425 hectares;
- (ii) in Aousja (1,800 ha), tree-growing and the principal crops fell by 64 hectares and 300 hectares respectively, whereas market gardening rose by 99%;
- (iii) in Tobias (1,450 ha), tree-growing rose by 201 ha, the principal crops fell by 133 hectares, and market garden crops by 99 hectares. This irrigation area groups together for the most part large farms (over 50 hectares) and, until 1997, had adopted mainly dry cropping, had unevenly distributed irrigation hydrants, and had not implemented the agrarian reform. Absenteeism concerns the large landowners whose land represents around 60% of the irrigation area. To that end, the CRDAs took measures concerning the application of the reform by dividing the farms into 50 hectare plots and introducing water rates which would encourage irrigation.

4.1.6 The rural landscape in the project area was altered with the introduction of large-scale cattle raising. The project beneficiaries built many cattle sheds, especially on the Galaat Andalous irrigation area.

4.1.7 Farm yields in 1998 are presented in Appendix 8. Since priming, these yields have risen by an average of 15%. The expected additional output was estimated at appraisal at: 2,170 tonnes of cereals (durum wheat); 63,220 tonnes of market garden crops; 4,700 tonnes of fruit; 11.5 million litres of milk, 1,135 tonnes of meat and 445 heifers. In 1998, the additional production for those different items was as follows: 32,697 tonnes of cereals, 130,869 tonnes of market garden crops, 15,193 tonnes of fruit; 58.8 million litres of milk; and 3,345 tonnes of meat. An analysis of these outputs reveals the following:

- (i) the yields obtained are higher than those estimated at appraisal owing to the rational use of irrigation and new cropping methods. It is noted that yields rise sharply when irrigation is effective from the network. The major differences in yields between the estimates at appraisal and those actually achieved are mainly due to a lack of reliable data at the time of the appraisal on the impact of irrigation and those cropping methods on the quality of soil known to be hydromorphic and of poor quality.
- (ii) actual production is higher than the estimate at appraisal for standard farm models;
- (iii) milk production and animal fattening were much more successful than expected at appraisal. There are 9,000 cattle, 1,050 local breed heifers and 4,905 pure bred heifers (piebald) on the Galaat Andalous irrigation area alone, whereas 445 pure bred heifers were planned for the entire project area at appraisal.

4.1.8 The accompanying measures concern the action taken by the Government to optimize the project outcomes. The impact of feeder roads on the marketing of agricultural and livestock produce is undeniable. The quality of the works and the high level of maintenance carried out by the CRDAs have made it possible for farmers to receive traders throughout the year, or to transport their produce themselves to the markets in all seasons.

4.1.9 Dairy and meat production figures were above the estimates at appraisal, with milk production rising to 58.8 million litres per year in 1998. The project contributed to the attainment of the objective of self-sufficiency in 1998, with output representing 8.5% of national production. This performance was made possible by the dynamic policy of the Government which provided aid and subsidies for the purchase of pure bred heifers, milk collection and the storage of surpluses in factories during periods of high production (ref. Appendix 6). Since priming, and as a result of the incentive policy, the number of heifers rose from 2,300 in 1992 to 4,905 in 1998. Over the same period, the number of collection centres rose to 24 from 4, collecting 44.8 million litres of milk. Meat production rose to 1,196 tonnes, 1,025 of which was beef.

4.1.10 The project also made it possible to modernize agricultural and livestock farming on the former Ras Djebel, Aousja, Tobias and Galaat Andalous irrigation areas. Although the average rate of intensification is still below target (an average of 80% on the irrigation areas compared with 130% at appraisal), there has been a considerable improvement since priming. There has been a livestock “revolution” in the project area, especially in Galaat Andalous, where dairy and sheep production have exceeded forecast, resulting in greater demand for the establishment of additional milk collection centres.

4.1.11 Despite such performances, the project encountered problems related to water salinity, which was around 3g in summer. This was mainly due to the drainage water disposal system and the initial quality of the soil. Indeed, it should be recalled that, when the project was initiated, the soil in the area had a very high salt content owing to overlapping of the water table, the salinity of which was 5g/litre. The drainage water disposal system involved discharging the same water back into Medjerdah Wadi which was used to supply irrigation water. It was not, therefore, possible to lower or eliminate the salt content of irrigation water because of the type of irrigation system adopted.

4.1.12 To resolve this difficulty, in addition to the action taken in cooperation with SOCADENORD in respect of quality control, the CRDA supervisors introduced trickle irrigation to the irrigation areas, and new, more resistant crops, and the practice of late autumn irrigation. Despite those measures, it was noted that the Ras Djebel area had lost 50% of its citrus growing area. In other areas, especially Galaat Andalous, the estimated tree growing areas were not attained, not only owing to the cost of production and the 7 to 10 year gestation period, but also because of the salinity risk.

4.1.13 Consequently, the economic choices made by farmers were determining in the implementation of cropping programmes defined at appraisal. Thus, in view of the rapid revenue expected from raising dairy cattle compared to the risks and long gestation periods for fruit crops, implementation of the tree growing programme slowed down.

4.1.14 The project also encountered problems related to the presence of algae in the bed of the Medjerdah Wadi. They caused, and continue to cause, serious damage to the siphon tubes of the pumping stations and the water meters. The CRDAs took appropriate measures to resolve those problems, especially by installing filters in the pumping stations and replacing the existing metres with new models.

4.1.15 Ever since the project’s commissioning, there have been water losses, especially at farm level. Those losses are determined by the difference between the quantities of water (in m<sup>3</sup>) billed by SOCADENORD and those billed by the CRDAs to farmers installed on the project area. Several scenarios were formulated to explain this difference: (i) the reliability of SOCADENORD’s equipment, the performance of which is partially disputed by the CRDAs;

(ii) the lack of maintenance of the water intake pipes on the plots leading to heavy water losses before the farmers' meters; (iii) the absence of systematic data on all the meters installed on the project area.

4.1.16 Thus, for the Bizerte area (Ras Djebel, Aousja and Tobias), it was noted in 1998 that water purchased from SOCADENORD was approximately 5.83 million m<sup>3</sup>, whereas sales to farmers, on the basis of meter readings, was 4.11 million m<sup>3</sup>, i.e. a water loss of approximately 1.72 million m<sup>3</sup> representing 30% of the quantity of water bought from SOCADENORD. Consequently, corrective measures are being considered, and a financing request was submitted to KFW for the purchase of more reliable control equipment, both at the level of SOCADENORD and the plots. KFW's agreement in principle has been obtained for the use of the unused balances to finance the second phase of the project. In this respect, a single water billing system and the improvement of the metering system upstream and downstream will help to improve the efficiency of the irrigation networks.

## 4.2 Financial Performance

4.2.1 The project financial performance was evaluated on the basis of the reconstitution of operating accounts of some farms from actual information obtained and production statistics, as well as financial prices obtained from CRDA. Details of the data are provided in Appendixes 7 and 8.

4.2.2 Furthermore, an analysis of the incomes of standard farms, on the basis of actual field data, shows a significant improvement in income as follows:

Tableau 4.5 : Farm Incomes  
(in constant dinars)

Type of Farm	Gross Income		Increase in Income	
	Without Project	With Project	TNDs	%
1 ha Farm	89	2164	2075	2331%
10 ha Farm	1590	13160	11570	728%
20 ha Farm	3936	19455	15519	394%

Source : Project Activity Reports

4.2.3 Incomes rise much more as a percentage for small irrigated farms. On average, income depends on the increase in yields and the intensification of crops far more than on price movements. The mission obtained the schedule of prices over time and noted that they had only risen slightly over the past ten years.

4.2.4 The dairy sector price subsidization policy permitted a significant increase in output compared with the estimates made at appraisal and the attainment of food self-sufficiency in that area by 1998, i.e. three years ahead of the 2001 target.

4.2.5 Despite those results, some unpaid water bills remain, which, according to CRDA, represent under 10% of outstanding invoices. The CRDAs have taken various measures to recover those funds (around TND 300,000 from Galaat Andalou), from the rescheduling of arrears to cutting water supplies, and including cash payments for water.

## 4.3 Economic Performance

4.3.1 The PCR covered the economic aspects of the project and showed that the rate of return had slipped from 12% at appraisal to 10.6% at completion. At post-evaluation, the economic rate of return was 19.8%. The calculation of the costs and benefits is given in Appendix 9.

4.3.2 This rate was calculated in conformity with the following assumptions:

- (i) 1992 is considered as the benchmark year for 'without project' production; it corresponds to the priming period;
- (ii) the benchmark year for calculating the project benefits is 1994, the year of works completion ;
- (iii) the additional output was, therefore, determined on the basis of the operating results over the 1993-1994 period , on the one hand, and forecasts for 1998-2014, on the other;
- (iv) the economic prices were determined on the basis of financial prices (market prices), adjusted according to the same ratios as at appraisal in agreement with the CRDA economists;
- (v) investment costs, as well as those concerning the renewal of infrastructure and the improvement of the network, (solution to be found for the problem of salinity), have been taken into consideration on the basis of investment made by the Government since priming, plus the expenditure forecasts for the improvement of the existing network; and
- (vi) costs were calculated in 1994 constant dinars.

4.3.3 With regard to project benefits, the following positive aspects were noted:

- (i) the improved economic situation with regard to milk, production of which attained 690 million litres in 1998 permitting the attainment of self-sufficiency in dairy products 3 years prior to the target of the IXth Plan;
- (ii) the improved financial situation of farmers, whose total annual income rose from TND 190 million in 1993 to TND 729 million in 1998; and
- (iii) higher land values which rose tenfold from priming (over a 7 year period) from TND 2,500/ha to 25,00 TND/ha;

#### **4.4 Institutional and Social Performance**

##### **Organization and Management**

4.4.1 The project is organized around the CRDAs, SOCADENORD and the farmers organized in Common Interest Groupings (CIGs).

4.4.2 SOCADENORD is a parastatal company which operates the canals and water supply system to the north of Tunis. It provides irrigation water and maintains the primary infrastructure of the developed irrigation areas in the North. The specificity of its technical and operations structures, as well as the skills of its management team, have contributed to the efficient management of SOCADENORD, whose financial performance is highly satisfactory.

4.4.3 The CRDAs (Ariana and Bizerte) are responsible for the management of the project irrigation areas. Their CTVs and CRAs carry out farmer supervision, water distribution and management, systematic and preventive maintenance and repairs to infrastructure and irrigation equipment (water pipes, drains, meters, etc) and the pumping stations. The financing made available will enable the CRDAs to operate either on force-account, or by subcontracting to private enterprises.

4.4.4 With the establishment of CIGs (5 in the Ariana area and 4 in the Bizerte area) and the Irrigation User Groups (GUIs), the members of which are limited to 5 per irrigation hydrant, for an area of 5 hectares, the CRDAs will gradually withdraw from the management and distribution

of water and the maintenance of secondary infrastructure. In addition to those activities, the Government wishes to make the management of the irrigation areas more autonomous by making farmers accountable, and by broadening the scope of their activities. In this respect, the public authorities are presently engaged in preparing new legislation intended to turn those associations (CIGs) into agricultural development associations, which will become full-fledged partners in all land development activities. Consequently, they will play an active role in the process of planning, implementing and evaluating those activities.

4.4.5 Under the project, the milk collection cooperatives developed rapidly from 1 in 1992 to 4 in 1998, by increasing their capacity. Future developments include the establishment of associations which will make the beneficiaries even more involved in the management of their farms, with, as a more long-term objective, their participation in development project costs, which were previously entirely borne by the State.

4.4.6 With regard to training, resources have been made available by the Government through the CRDAs to train the project beneficiaries so that the latter may themselves maintain the secondary networks. But the level of training at present is insufficient, and additional financing is being sought from international organizations. There is also training for CRDA employees, to ensure that they meet the requirements of more efficient management. This training will also concern monitoring and evaluation tools by the economists, whose reports will permit a better assessment of the operating performance.

4.4.7 The Government took the decision to broaden the scope of the CIGs activities by through appropriate legislation. Those CIGs could assume the form of Development Associations (DAs), which would operate in the industrial and commercial areas. Studies are being conducted which should lead to the issuing of decrees concerning the establishment of the DAs. These DAs will enable the project beneficiaries to award subcontracts for the maintenance of the network and to participate financially in the processing and marketing of their produce.

4.4.8 From the socioeconomic standpoint, the project contributed to the early attainment of the objective of self-sufficiency in milk, which is a mass consumption product in Tunisia. It should be noted that the Government has, in the past, provided institutional support to enable the development of dairy processing units in rural areas in order not to discourage production. The value of the developed land has increased tenfold and the incomes of supervised farmers have quadrupled. Furthermore, the project has made it possible to develop income-generating economic activities, which have, in particular, contributed to higher incomes for small farmers (ref. paragraph 4.2.2.). In addition 200 permanent jobs and 5000 temporary jobs have been created.

## **4.5 Impact on Women**

4.5.1 Women's living conditions of women have considerably improved as a result of the measures to intensify market garden crops, and the development of the women's cooperative movement for the collection and marketing of their products. With regard to land ownership, there are 78 women farm owners on the project area, 80% of whom farm them directly, or in collaboration with their spouses. With regard to labour, women work mainly in the area of market garden corps, small livestock breeding and harvesting. The project has permitted the creation of 3,000 temporary jobs for women. According to CRDA sources, the female workforce represents 60% of the total workforce on the Galaat Andalous irrigation area where traditional values are the strongest, compared with 75% on the other areas.

4.5.2 The satisfactory socioeconomic outcomes in general and the positive impact on women are signs of reassuring prospects regarding poverty reduction in a rural region where there are facilities for access to health care, education and drinking water, which are rationally managed.

4.5.3 Concerning the supervision of women, the CRDAs have carried out a training programme covering the following areas: milking; tomato picking; irrigation methods; the manufacture of soap from leftover cooking oil (product enhancement and pollution control), soap manufacture, small livestock breeding (rabbits, laying hens and meat poultry), and the utilization of by-products for cattle feed and manure, etc. The Ariana CRDA has provided means of transport (bus).

#### **4.6 Environmental Performance**

4.6.1 Although no environmental assessment was conducted at appraisal, it will be recalled that one of the project objectives concerning the environment was to curb the overtapping of the water tables in the project area, which was speeding up the depletion of natural resources and, consequently, the impoverishment of farmers. This objective was attained through the quality of the infrastructure.

4.6.2 However, it was noted at the start-up of the drainage system that the water drained off had a higher salt content than sea water. Despite the gradual lowering of the salinity of the drainage water as the irrigation system was used, the problem of the quality of water in the irrigation network remains unsolved. Indeed, in view of the topographic features and operating conditions, all the drainage water, which has a high salt content, is discharged into the Medjerdha Wadi. But the water which supplies the system, released from the Arousia dam in the Medjerdha Wadi, with a salt content of approximately 1.8 to 2 grams, reaches the first pumping station with a salt content of 2.5 to 3 grams, especially in summer. This problem, which is keenly felt, is slowing down the development of some crops, and has led to changes in the production system. This situation has jeopardized the results of intensification.

4.6.3 In order to lower the salinity of the water in the Medjerdha Wadi, towns situated along it with populations of over 5,000 inhabitants, have wastewater treatment equipment and treatment works. There are now 25 treatment works; for smaller towns and villages, equipment will be installed with bilateral assistance from Germany and Japan.

4.6.4 The project was well provided with windbreaks which were erected by the farmers themselves under the supervision of the CRDAs.

#### **4.7 Performance of Consultants, Contractors, Suppliers, the Borrower and Executing Agency**

##### Consultants

4.7.1 The detailed engineering designs prepared by Agrar und Hydrotechnik (AHT) were of a very high standard. Despite a slight delay on the design of the Tobias canal (9km.), the consultant's services were satisfactory in terms of works control and supervision.

##### Contractors and Suppliers

4.7.2 There were no major problems regarding the services of the different contractors and suppliers. Overall, the services were provided in conformity with the terms of the related contracts, both with regard to deadlines and technical specifications. All the irrigation infrastructure established is satisfactory. Cost management by the contractors is the reason for the fall in the cost of implementing the project.

### Borrower and Executing Agency

4.7.3 The Tunisian Government satisfactorily fulfilled all of its financial obligations in respect of the project. The PCR accurately describes the performances of the Borrower and the Executing Agency which were satisfactory (ref. paragraph 6.3.2). Indeed, the effectiveness of the loan two years after the signing of the Loan Agreement was not the fault of the Borrower, but was primarily due to a lack of coordination among the cofinanciers. The regularly released disbursements prevented any interruption to supplies for the sites. Consequently, the physical infrastructure was completed over an actual period of 6 years instead of 5 according to the estimates at appraisal. The Government fulfilled all its commitments regarding the recruitment of project staff, and the positioning of its financial counterpart, which represented 38.2% of the total project cost.

4.7.4 The performance of the executing agency is satisfactory, although the quarterly activity reports were not regularly submitted to the Bank. It successfully complied with the procedures of the Bank, KFW and the Tunisian Government, and implemented the work within the required deadlines, and in conformity with standard practices (ref. PCR, paragraphs 12.2.1 and 12.2.2). In addition to the regional development of agricultural and livestock activities in the Governorate, the CRDAs effectively carried out the training of beneficiaries grouped together within CIGs, as well as the management and control of the subsidization policy for irrigation equipment and the production and processing of milk (ref.5.0.7 and 5.0.8). These subsidies are managed from the CRDAs annual activities budget which contains details of the costs of the operations to be carried out, expected production, and the proportions of the costs to be borne by the beneficiaries and by the State.

### **4.8 Bank Performance**

4.8.1 Paragraph 12.2.1 of the PCR clearly showed that the Bank's performance in the formulation and monitoring of the implementation of the project was mixed. It fielded three technical supervision missions between 1987 and 1989, and two monitoring missions. These missions were insufficient, but made it possible, however, to ensure the technical and physical monitoring of the project outputs, the breakdown of financial allocations by contract and component, updating of the list of goods and services taking into consideration the cancellation of UA 10.7 million of the original loan. Nevertheless, there were no supervision missions with a financial expert, which would have made it possible to resolve problems relating to Bank disbursements and contract awards. After 1990, the Bank did not field any supervision missions, whereas priming took place in 1992, and the work on feeder roads continued until 1994.

4.8.2 Those shortcomings did not, however, significantly affect the implementation of the project, or the Bank's financial interests. Indeed, the competence of the Tunisian managers of the project and the effective support of, and close collaboration with, KFW made it possible to achieve the expected results.

## **5. PROJECT SUSTAINABILITY**

5.1 The Ras Djebel–Galaat Andalous Irrigation Development Project is a long-term project since the project infrastructure has a life of over 50 years. The detailed engineering designs permitted accurate estimates of the quantities, and the rational use of the water of the Sidi Salem dam. The irrigation infrastructure is of reinforced concrete and, despite very flat topographical features in places, the planned drainage system was effective. The maintenance of the principal structures (dams, canals and trunk mains) is carried out by SOCADENORD. This company

obtains its funds from the sale of water to different projects located in the area to the North of Tunis.

5.2 With regard to the branch canals from the pumping stations to the plots, the drains and tracks, the Ariana and Bizerte CRDAs have adequate human, material and financial resources to ensure the operation, maintenance and repair of the infrastructure. The financial resources positioned by the Government amounted to TND 473,000 over the last three years for the Ariana CRDA and TND 850,000 for the Bizerte CRDA (including TND 200,000 on force account). The Tunisian Government has made the necessary operating and investment budget appropriations to ensure the sustainability of the infrastructure. In this context, the cost of purchasing mechanical scythes for the maintenance of the drains was negotiated with KFW; this equipment will complement that already procured for the project.

5.3 The Government has decided to gradually transfer to the project beneficiaries the maintenance of part of the infrastructure, especially the irrigation channels located on their plots. In this respect, farmers organized in CIGs, already obtain a fairly large discount on the cost of water (Ref. Appendix 5). This discount should enable the CIGs to carry out directly, or by subcontracting, works for which they are responsible. The high farmers' incomes, the discounts on water prices, as well as the training activities carried out by the CRDA supervisors on management, maintenance and repair work, should enable the CIGs to meet those obligations.

5.4 From the environmental standpoint, the quality of water is regularly controlled by the Société d'exploitation du canal et des adductions des eaux du nord (SOCADENORD) and appropriate measures have been taken to guarantee the expected farm yields. Furthermore, studies are being conducted to secure financing to find long-term solutions to problems related to the quality of water and wastewater drainage. Measures have already been taken to use the unused KFW balances to: (i) solve the problem of algae by introducing a filtering system at pumping station level; (ii) purchase two mechanical scythes to clean the drains. This will be complemented by short- and medium-term activities aimed at pumping the Barbra Dam water as from 1999, with a salt content of approximately 0.5 g/l, to the Sidi Salem dam, then to the irrigation areas. In the medium-term, the construction of a 4 km canal from Bejaoua to the Medjerdha Wadi, at a total cost of TND 4/5 million, will provide a solution to the problem of the quality of water, pending the construction of a longer canal, which will avoid the use of the Medjerdha Wadi for irrigation water. Under present circumstances, the cost of such a structure, estimated at TND 60 million, is prohibitive. Already, permanent monitoring and control of the water salinity are planned to guarantee the productivity of the irrigation areas.

5.5 In most farms, the windbreaks were erected by the farmers themselves, on the recommendation and advice of the CRDA supervisors. These developments make it possible to protect the environment and crops in a very windswept area.

5.6 The State has adopted an incentive policy for production in the form of subsidies, targeting so-called 'strategic' production, which does not yet meet domestic demand. Thus, the irrigation equipment (sprinklers, pipes for trickle irrigation, etc), and heifers benefit from a subsidization scheme, with the amount of the subsidy varying according to the size of the farm. Subsidies represent 25% to 60% of the value of investments. The subsidies cease when production permits food self-sufficiency.

5.7 The State also applies another form of incentive concerning the use of irrigation through an adapted water tariff policy. The price billed to the farmer only represents part of the real cost. Nevertheless, this subsidy is gradually reduced through a readjustment mechanism of 15% per year until the real price is reached. At present, one m<sup>3</sup> is billed at 120 millimes, whereas the cost price is approximately 300 millimes. Furthermore, the water tariff policy adopted by

the CIGs should, in the short and medium term, enable them to gradually transfer part of the maintenance of the network to the beneficiaries of the project, depending on their location and management capacity. The long-term objective is to establish a single water billing system for all the irrigation areas, within the CIGs, in order to transfer the maintenance of the irrigation network to the beneficiaries.

5.8 The marketing of agricultural and livestock production does not raise any problems owing to the proximity of the urban areas of Tunis and Bizerte which are centres of high consumption, with wholesale markets. There are, therefore, no problems of outlets; the agricultural products are sold by the farmers themselves, either at farm-gate prices or on the wholesale markets, where they transport their products on pick-up trucks. The prices applied are profit-making and are presented in detailed in Appendix 8. The marketing of dairy products is either carried out through the official channel of collection centres, or informally through the parallel circuit of traders. In the first case, the collection centres purchase milk at 345 millimes from producers and receive 10 millimes from the State for control and refrigeration and 10 millimes for delivery to manufacturers. The traders buy milk from producers at a higher price of approximately 380 millimes and resell it on the market in the form of whole milk at around 500 millimes.

5.9 The first phase of this project, cofinanced by the Bank and KFW, led on to a second phase, which was completed in April 1998, and which concerns, in the area of Bizerte, the El-Alia (1,553ha), Menzel Jemil (819ha) and Zouaouine Ouest (132ha) irrigation areas with a total area of 2,543 hectares. In light of the initial outcomes of Phase I and Phase II, the Government wishes to extend its experience of pressure irrigation and farm developments to the Basse Vallee irrigation areas. The Bank has been asked to finance the related feasibility studies.

## **6. PERFORMANCE RATINGS**

The tables in Appendix 3 present details of the implementation performance (RP1), the Bank's performance (PB1) and that of the project outcomes (PO1). Overall, it appears that the project performance is satisfactory. However, some aspects related to the project design regarding the disposal of drainage water and the supply of high quality water for irrigation will have to be improved upon if conclusive results are to be obtained over the next few years.

## **7. CONCLUSION AND RECOMMENDATIONS**

### **7.1 Overall Assessment**

7.1.1 The overall performance, as well as the project design, are considered satisfactory; however, the quality of water for irrigation purposes ought to be improved. On the other hand, the Government's sectoral goals are in keeping with the Bank's sectoral and macroeconomic strategies, as defined in its Country Strategy Paper for Tunisia for the period, and the production targets are fully in keeping with the country's agricultural programmes.

7.1.2 The operating performances achieved exceed the objectives at appraisal for the period of maximum output, although they were improved due to the processing of some products, especially dairy and market garden produce. The economic performances are satisfactory and the prospects for sustainability promising, as a result of the pursuit of a policy of supervision and training of the project beneficiaries.

7.1.3 From the institutional standpoint, the transformation of the CIGs into Agricultural Development Associations will make it possible to substantially increase the induced effects of

the project. Women have been harmoniously integrated into the project and play an active role in production and processing activities.

## **7.2 Feedback and Recommendations**

### **7.2.1 Lessons**

In addition to the lessons of the PCR, the evaluation has identified the following:

- i) the quality of project preparation is related, inter alia, to the level of the borrower's involvement in the project design process (ref paragraph 2.3.5);
- ii) the strengthening of the 'design' services of the CRDAs is an asset which will improve the quality of monitoring and evaluation of outcomes (ref. paragraph 4.4.4);
- iii) the widespread application of the parcelation policy will make it possible to effectively raise the intensification rate in the country (ref paragraph 4.1.2);
- iv) the permanent monitoring and control of soil and water salinity will guarantee the quality of irrigation water and, therefore, the productivity of farms (ref. paragraph 4.1.12);
- v) the application of a single billing system for water on all the irrigation areas and the assessment of the upstream and downstream metering system, will improve the efficiency of the irrigation networks (ref. paragraphs 4.1.18 and 5.7);
- vi) the transformation of CIGs into Agricultural Development Associations is an efficient method of involving farmers in the management of irrigation networks and covering recurrent costs relating to irrigation infrastructure (ref. paragraph 4.4.5); and
- vii) support to the development of processing units in rural areas will guarantee the outlets for agricultural and animal production from the developed areas (ref paragraph 4.4.6).

### **7.2.2 Recommendations**

It is recommended

#### **to the Borrower, to:**

- (i) become much more involved in project preparation to ensure that its project development and management policy is properly taken into consideration, and, therefore, in future projects, to systematically apply the participatory approach method from the project preparation stage;
- (ii) strengthen the CRDA design services in personnel and management tools to ensure better monitoring and evaluation, as well as a thorough analysis of economic and financial outcomes, in order to draw relevant lessons to improve the quality of future projects in the same sector;
- (iii) to pursue the land reparcelation policy as rapidly as possible, especially in the Tobias irrigation area, in order to improve the land intensification and use rates, in keeping with the estimates at appraisal;

- (iv) pursue the water and soil salinity monitoring programme, as well as monitoring of the water table and drainage water; these activities are intended to reduce irrigation water salinity as quickly as possible;
- (v) continue to equip plots (in respect of GUIs, sprinkler and micro-irrigation), as well as the establishment and training of CIGs to step up their involvement in maintenance work as quickly as possible;
- (vi) improve and ensure the widespread effective implementation of the “water billing” programme to all the irrigation areas,
- (vii) apply two-tier tariffing in the PIAs to improve the utilization rate;
- (viii) improve the efficiency of the water metering system upstream at the level of the Société d’exploitation du canal et des adductions des eaux du nord (SOCADENORD) and downstream in order to improve the efficiency of the networks, with the ultimate objective of recording all the water supplied to farmers; and
- (ix) strengthen and pursue the incentive systems for manufacturers in order to encourage dairy processing, in order to prevent any discouragement of upstream production ;

**to the Bank**

It is recommended to:

- (i) conduct the appraisal of similar projects following preparation of the detailed engineering designs in order to ensure tighter control of project costs;
- (v) support the CRDA programme in respect of training, and setting up efficient management tools for the CIGs and their Monitoring and Evaluation Units; and
- (vi) support commercial production efforts in rural areas through the Bank’s Private sector activities in order to encourage dairy processing, which would lead to an increase in domestic value added and reassure the small-scale producer.

### **7.3 Follow-up Action**

- 7.3.1 In order to consolidate the project achievements and ensure the sustainability of its benefits, the Bank and Borrower shall have to agree to implement the above-defined recommendations. The most important activities concern control of salinity, both of irrigation water and soil, through the identification of plots at risk from salinization, monitoring of the water table and the smooth operation of the drainage system, and finally the establishment of a follow-up data bank.
- 7.3.2 The principal follow up actions concerning those recommendations are consolidated in a matrix in Appendix 1.

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**MATRIX OF RECOMMENDATIONS AND FOLLOW-UP ACTION**

<b>PRINCIPAL FINDINGS AND CONCLUSIONS</b>	<b>RECOMMENDATIONS</b>	<b>FOLLOW-UP ACTION</b>	<b>RESPONSIBILITIES</b>
<p><b><u>1-Project Design</u></b>            1.1 The project costs were not mastered at appraisal because of the absence of detailed engineering designs.             1.2 The non-involvement of the beneficiaries in the formulation of the project prevented the identification of the real priorities of farmers in particular the selection of crops.</p>	<p>1.1.1 Require detailed engineering designs before considering the appraisal of irrigation and land use projects.             1.2.1 Involve the beneficiaries in the project design and identification phases.</p>	<p>1.1.2 Prepare a check-list of documents required to appraise irrigation development projects.             1.2.2 Apply the participatory approach to project design and implementation.</p>	<p>1.1.3 OCDN             1.2.3 Gov./OCDN</p>
<p><b><u>2- Project Implementation</u></b>            2.1 Ongoing monitoring and control of water salinity ensuring the productivity of the irrigated areas.             2.2 Application of a single water billing system improves the efficiency of the irrigation systems.</p>	<p>2.1.1 Pursue the efforts to monitor and control water salinity.             2.2.1 Standardize water tariffing throughout the developed irrigation areas.</p>	<p>2.1.2 Regularly disseminate the salinity levels.             2.2.2 Cover the Tobias irrigation area the other, as yet unaffected areas</p>	<p>2.1.3 Gov.             2.2.3 Gov.</p>

<p><b><u>3- Institutional Development</u></b></p> <p>3.1 Insufficient human and material resources limit the CRDAs analytical and evaluation capacities.</p> <p>3.2 The transformation of the CIGs into Development Associations (DAs) constitutes a major challenge with a view to the future involvement of the beneficiaries in farm costs.</p>	<p>3.1.1 Strengthen the capacity of CRDA design services.</p> <p>3.1.1 Support the CRDA managers training programme.</p> <p>3.2.1 Consider the transformation of CIGs into DAs with a view to improving their efficiency in the management and operation of irrigation areas.</p> <p>3.2.2 Support DA promotion activities.</p>	<p>3.1.2 Make appropriations in the budget for future investments for strengthening the CRDAs in respect of performance analysis and evaluation.</p> <p>3.1.2 Make provision in future projects for the strengthening of the capacity of the CRDA Design Units.</p> <p>3.2.2 (a) Prepare TORS for the study on the conversion of CIGs into DAs.</p> <p>3.2.2 (b) Require preparatory documents on the conversion of CIGs into DAs.</p>	<p>3.1.3 Gov.</p> <p>3.1.3 OCDN</p> <p>3.2.3 GOV.</p> <p>3.2.3 OCDN</p>
<p><b><u>4- Socioeconomic Impact</u></b></p> <p>4.1 Improvement of the land intensification and use rates requires an active reparation policy.</p> <p>4.2 The industrialisation of agricultural products in rural areas is an asset for the revitalization of rural development.</p>	<p>4.1.1 Widespread reparation of land in the developed irrigation areas.</p> <p>4.2.1 Encourage the processing of agricultural products in rural areas.</p> <p>4.2.1 Consider supporting industrialization efforts in rural areas.</p>	<p>4.1.2 Pursue the land reparation policy.</p> <p>4.2.2 Prepare policy documents and legislative enactment (orders in council) to encourage rural commercial production.</p> <p>4.2.2 Include rural commercial production in the programme of dialogue with the country.</p>	<p>4.1.3 Gov.</p> <p>4.2.3 Gov.</p> <p>4.2.3 OCDN</p>
<p><b><u>5- Project Sustainability</u></b></p> <p>The poor design of the drainage water disposal and sanitation network increases the salinity of the irrigation water.</p>	<p>Improve the drainage water disposal and sanitation system.</p>	<p>Submit a plan to the donors for the protection of the irrigation areas.</p>	<p>Gov.</p>

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**RETROSPECTIVE PROJECT LOGICAL FRAMEWORK**

HIERARCHY OF OBJECTIVES	OBJECTIVELY VERIFIABLE INDICATORS		MEANS OF VERIFICATION	ASSUMPTIONS/ RISKS
	APPRAISAL	POST-EVALUATION		
<p><b>1. Sector Goals (formulated on completion)</b> Contribute to food self-sufficiency through agricultural and livestock development activities.</p>	<p>Contribution to the coverage of the country's food requirements:</p> <ul style="list-style-type: none"> <li>- milk: 3%</li> <li>- cereals: 0.2%</li> </ul>	<p>Contribution to the country's food requirements:</p> <ul style="list-style-type: none"> <li>- milk: 8.5%</li> <li>- cereals: 0.3%</li> </ul>	Five-year Plans	
<p><b>2. Project Objectives</b></p> <p>a) Increase agricultural production through the irrigation of dry farmed land, land improvement, and the modernization of farms;</p> <p>b) Increase farmers' incomes.</p>	<p>2.1 Development of 7,185 hectares. Land use rate of between 1.25 and 1.46.</p> <p>2.2 Average annual increase in farmers' incomes of approximately 50%</p> <p>2.3 Increase in production as %</p> <ul style="list-style-type: none"> <li>- milk: 80</li> <li>- meat: 75</li> <li>- cereals: 90</li> <li>- market garden products: 40</li> <li>- tree-growing: 80</li> </ul>	<p>2.1 Development of 7,185 hectares Land use rate of between 1.25 and 1.46</p> <p>2.2 Average annual increase in farmers' incomes of approximately 283%</p> <p>2.3 Increase in production as a %</p> <ul style="list-style-type: none"> <li>- milk: 500</li> <li>- meat: 320</li> <li>- cereals: 70</li> <li>- market garden products: 60</li> <li>- tree-growing: 300</li> </ul>	Five-year Plans Programme of Action of the Ministry of Agriculture	

<p><b>3. Outputs</b> The project will permit:</p> <p>i) the development of irrigated areas by sprinkler irrigation;</p> <p>ii) land development;</p> <p>iii) the development of dairy cattle raising;</p> <p>iv) increased agricultural production</p> <p>v) the creation of infrastructure</p>	<p>1. 4 irrigation areas:</p> <p>2. Ras Djebel : 1 354 ha ; Aousja : 1 791 ha ; Henchir Tobias : 1 750 ha ; Galaat Andalous : 2 290 ha.</p> <p>3. Purchase of 445 pure bred heifers; 11.5 million litres of milk; 1,135 t of beef</p> <p>4. 2.170 t of cereals; 63,220 t of market garden produce; 4,700 t of fruit production;</p> <p>5. A gate-structure dam; an irrigation complex at Tobias; an 11.5 km. canal; 4 pumping stations; a 13,400 m3 reservoir ; a lifting station and a 17,000 m3 storage reservoir.</p>	<p>1. 4 irrigation areas:</p> <p>2. Ras Djebel : 2 040 ha ; Aousja : 1 791 ha ; Henchir Tobias : 1 428 ha ; Galaat Andalous : 2 905 ha.</p> <p>3. Purchase of 4,905 pure bred heifers ; 58.8 million litres of milk ; 3,354 tonnes of beef.</p> <p>4. 32,697 tonnes of cereals; 130,869 t of market garden produce; 15,193 t of fruit production;</p> <p>5. A gate-structure dam, an irrigation complex at Tobias; an 11.5 km. canal ; 4 pumping stations ; a 13,400 m3 reservoir ; a lifting station and a 17,000 m3 storage reservoir</p>	<p>CRDA reports; monthly</p> <p>DGETH reports monthly</p> <p>Agricultural and livestock production statistics</p> <p>DGEH Reports</p>	<p>1. The work is correctly implemented</p> <p>2. The quality of the soil and water is controlled</p> <p>Marketing raises no problems</p> <p>4. Farmers adhere to cropping methods;</p> <p>5. The detailed engineering designs are correctly prepared.</p>																																				
<p><b>4. Activities</b></p> <p>A. Irrigation development</p> <p>A1. General Infrastructure</p> <p>A2. Development of Irrigation Areas</p> <p>B. Agricultural Development</p> <p>C. Designs, monitoring and supervision.</p> <p>Total</p>	<table border="1"> <thead> <tr> <th><u>ADB</u></th> <th><u>KFW</u></th> <th><u>GVT</u></th> </tr> </thead> <tbody> <tr> <td>6.60</td> <td>4.59</td> <td>10.06</td> </tr> <tr> <td>13.67</td> <td>9.46</td> <td>26.75</td> </tr> <tr> <td>3.16</td> <td>2.21</td> <td>5.00</td> </tr> <tr> <td>0.17</td> <td>0.12</td> <td>1.40</td> </tr> <tr> <td><b>23.60</b></td> <td><b>16.38</b></td> <td><b>43.21</b></td> </tr> </tbody> </table>	<u>ADB</u>	<u>KFW</u>	<u>GVT</u>	6.60	4.59	10.06	13.67	9.46	26.75	3.16	2.21	5.00	0.17	0.12	1.40	<b>23.60</b>	<b>16.38</b>	<b>43.21</b>	<table border="1"> <thead> <tr> <th><u>ADB</u></th> <th><u>KFW</u></th> <th><u>GVT</u></th> </tr> </thead> <tbody> <tr> <td>3.27</td> <td>10.43</td> <td>5.99</td> </tr> <tr> <td>5.15</td> <td>2.00</td> <td>7.37</td> </tr> <tr> <td>0.14</td> <td>0.00</td> <td>0.04</td> </tr> <tr> <td>1.33</td> <td>0.79</td> <td>0.41</td> </tr> <tr> <td><b>9.89</b></td> <td><b>13.22</b></td> <td><b>13.81</b></td> </tr> </tbody> </table>	<u>ADB</u>	<u>KFW</u>	<u>GVT</u>	3.27	10.43	5.99	5.15	2.00	7.37	0.14	0.00	0.04	1.33	0.79	0.41	<b>9.89</b>	<b>13.22</b>	<b>13.81</b>	<p>Project Activity Report (DGETH)</p> <p>ADB Summary Ledger</p>	<p>The Government counterpart funds are positioned and released in time.</p>
<u>ADB</u>	<u>KFW</u>	<u>GVT</u>																																						
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**IMPLEMENTATION PERFORMANCE**

INDICATORS	SCORE (1 to 4)	COMMENTS
<b>1. Adherence to Implementation Schedule</b>	<b>3</b>	The implementation schedule was not adhered to for the following reasons: (i) lack of coordination with KFW, the project cofinancier; (ii) absence of detailed engineering designs of the project; (iii) underestimation of works duration: (iv) poor works programming (feeder roads). However, the works were completed within a reasonable time frame following fulfillment of the conditions precedent
<b>2. Cost Overrun/Underrun</b>	<b>2</b>	The total project cost was reduced by approximately 55.6%, and 58.1% concerning the participation of the Bank. This poor performance was due to the absence of detailed engineering designs and the failure to foresee the devaluation of the TND, as well as to a fall in the inflation rate over the project period. However, compliance with the Bank's procurement procedures made it possible to make savings.
<b>3. Compliance with Loan Conditions</b>	<b>3</b>	All the conditions were fulfilled with the exception of the condition concerning agrarian reform. Nevertheless it should be mentioned that this was due to the failure to include a sociologist and/or social economist in the appraisal team.
<b>4. Adequacy of Monitoring-Evaluation and Quarterly Status Reports</b>	<b>2</b>	The work was well implemented despite the failure to submit periodic works implementation reports. However, it should be mentioned that this was due to the fact that the appraisal report made no mention of the frequency of such reports.
<b>Overall Assessment of Implementation Performance</b>	<b>2.25</b>	<b>Satisfactory</b>

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**BANK PERFORMANCE**

INDICATORS	SCORE (1 to 4)	COMMENTS
<b>1. At Identification</b>	N/A	The Bank did not participate in the identification of the project.
<b>2. At Preparation</b>	2	The preparation team did not include sociologists or social economists, or an environmentalist. The most keenly felt constraints on the implementation of the project were in the following areas: organization of farmers; problem of irrigation water salinity owing to the discharge of drainage water into the Medjerdha Wadi bed which serves as a channel for water from the Sidi Salem dam.
<b>3. At Appraisal</b>	2	The appraisal team identified the irrigation problems to be solved in the context of Tunisia's sectoral policy. The objectives and type of works could have been improved, for the programming and implementation schedule for the project were inadequate; indeed, the detailed engineering designs were not ready, there was no co-ordination with the donor regarding approval of the KFW loan and the likely works start up date for the initial phase of the road works.
<b>4. At Supervision</b>	3	The number of supervision missions was insufficient in view of the project implementation period (3 in all). Nevertheless, those missions made it possible to solve the problems raised as they occurred.
<b>Overall Assessment of Bank Performance</b>	<b>2.5</b>	<b>Satisfactory</b>

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**PROJET OUTCOMES**

N°	Indicators	Score (1 to 4)	Comments
<b>1</b>	<b>Relevance and Attainment of Objectives</b>		
i)	Macroeconomic Policy	3	The project is in keeping with the macroeconomic framework. the water subsidization and milk processing policy takes into consideration the recommendations of the ASAP.
ii)	Sectoral Policy	3	The implementation of the policy is in keeping with the sectoral policy, and the preliminary results confirm this.
iii)	Physical Outputs (including production)	3	The project was fully completed in conformity with the engineering designs. The additional requirements for materials identified on operation will be met in the short-term. The production objectives have been attained in some areas, and will be over the medium-term for other products.
iv)	Financial Outcomes	3	The project financial outcomes are satisfactory. They could be improved owing to cost cutting and productivity improvement measures.
v)	Poverty Reduction, Social Aspects and Women in Development	3	The prospects for poverty reduction are encouraging. The social aspects and the integration of women are fait accomplis. The training measures underway should improve women's status.
vi)	Environment	1	The project did not clearly identify environment-related factors, especially with regard to the disposal of drainage water and waste water of some riparian communities. The problem is being seriously considered and mitigative measures should be taken to guarantee the sustainability of the outcomes.
vii)	Private Sector Development	3	The role of the private sector is satisfactory with regard to the collection and processing of dairy and meat products, as well as the marketing of agricultural produce. Efforts must be continued to establish locally small and medium-size enterprises in the areas of maintenance, processing and services.
<b>2.</b>	<b>Institutional Development</b>		
i)	Institutional Framework, including restructuring	3	The institutional changes during the project were beneficial for its integration into the body of regional structures. The establishment of the CIGs and in time the DAs will make management of farmers more autonomous. However, the public authorities retain considerable powers despite the measures taken to make infrastructure and production management more autonomous (CIGs and DAs)
N°	Indicators	Score (1to 4)	Comments
ii)	Financial Information and Management Systems, including audit systems	2	CRDA management is automated, and makes it possible to monitor the overall project performances. Efforts should be made, however, in the field of the financial information system for farms and performance monitoring.
iii)	Transfer of Technology	3	The new irrigation technologies have been well accepted by the farmers, as have crop intensification methods.

iv)	Staffing by Qualified Persons (incl. turnover), training and counterpart staff	3	CRDA staff are well qualified, and their training has enabled them, and enables them, to implement the works and ensure the supervision of farmers and livestock breeders in the project area.
<b>3.</b>	<b>Sustainability</b>		
i)	Continued Borrower Commitment	3	The Borrower has made available, and continues to make available, through annual capital and operating budgets, the financial resources required to ensure the smooth management of the irrigation areas.
ii)	Political Environment	3	The political environment is conducive to project sustainability. The stability of the regime permits the long-term implementation of agricultural and livestock sectoral policies and guidelines.
iii)	Institutional Framework	3	The institutional framework of the CRDAs and the Ministry of the Environment is adapted to project activities. However, project monitoring and evaluation should be strengthened at CRDA level.
iv)	Technical Viability and Staffing	3	The quality of the works has made it possible to improve the quality of the land, whose value has increased tenfold since priming. The project technical staff is sufficiently well qualified to cope with the different situations which may arise in an irrigated area.
v)	Financial Viability, including cost recovery systems	3	The additional revenue from the project enables the beneficiaries to cover operating costs (water, inputs, repairs, etc) and to make considerable investments without resorting to bank financing.
vi)	Economic Viability	3	The project has made it possible to improve the land use and crop intensification rates. They have improved the production environment and have a significant impact on the beneficiaries.
vii)	Environmental Viability	1	Water salinity remains one of the project's main concerns. The method of disposal of drainage water must be changed, and supplementary works carried out to improve the supply of irrigation water.
viii)	Operating and Maintenance Facilitation (availability of recurrent funding, foreign exchange, spare parts, workshop facilities, etc.)	3	The CRDAs are well provided with equipment, materials and spare parts to carry out the infrastructure maintenance. In this respect, financial resources are positioned in time by the Government. Nevertheless, investments must be made to enable weed cutting in drainage channels, and install filters at the entrances to pumping stations.
<b>4.</b>	<b>Internal Rate of Return</b>	<b>3</b>	<b>Satisfactory</b>
	<b>Overall Assessment of Outcomes</b>		<b>Satisfactory. However, effective and sustainable solutions will have to be found to environmental problems related to water salinity.</b>

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**RAS DJEBEL – GALAAT IRRIGATION DEVELOPMENT PROJECT**  
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**COMPARISON BETWEEN ESTIMATES AT APPRAISAL AND ACTUAL**  
**ACHIEVEMENTS IN RESPECT OF INFRASTRUCTURE AND**  
**DEVELOPMENT WORK**

HEADINGS	Unit	Estimates	Actual
<b>General Infrastructure</b>			
Gate-structure Dam	U	1	1
Pumping Station	U	1	1
Tobias – Utique Canal			
- length	Km	11.7	9
- Capacity	M3/s	6	4.5
Pumping Stations on the Canal			
- Towards Aousja + Ras Djebel	U	1	
- Discharge towards Ras Djebel	U	1	1
- Towards Tobias	U	1	
- Towards Galaat Andalous	U	1	
- Towards Henchir Tobias + Phase 2	U		1
- Towards Galaat Andalous + Aousja + Ras Djebel	U		1
<b>Development of Irrigation Areas</b>			
Equipped Areas			
- Ras Djebel	ha	1,354	2,000
- Aousja	ha	1,791	1,800
- Henchir Tobias	ha	1,750	1,805
- Galaat Andalous	ha	2,290	2,500
- Total	ha	7,185	8,105
Feeder Roads	Km	116	218

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**BREAKDOWN OF WATER TARIFFS AND SUBSIDIZATION POLICY**

1. The irrigation water tariff is broken down as follows:
  - 35 millimes : selling price by SOCADENORD to the P0 pumping station
  - X millimes : to that amount are added operating and distribution costs net of depreciation
  - 200/300 mi : Cost price of m3 of water supplied to farm
2. The selling price of m3 for agriculture is set by order in council and in 1998 was 120 millimes, up 15% on the previous year.
3. The difference between the cost price of m3 supplied to the plot and the 120 millimes selling price corresponds to the amount of the State subsidy, through the CRDA budget..
4. **Trend of Selling Price of a m3 of Water since Priming:**

In millimes

1992	1993	1994	1995	1996	1997	1998	1999
44	51	60	69	79	91	105	120

**5. Water Consumption (in m3) Trend in Galaat Andalous**

1993	1994	1995	1996	1997	1998
2 597 173	6 764 462	3 719 469 *	3 500 087	4 442 954	7 627 044

\* Year of severe drought in Tunisia.

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**STOCK RAISING TRENDS**

**1. DAIRY CATTLE BREEDING ON THE GALAAT ANDALOUS IRRIGATION AREA**

<b>HEADINGS</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
Cattle (beef)	5,920	6,889	7,074	7,350	8,485	9,369	9,000
Heifers (local breed)	1,400	1,300	1,359	800	1,070	760	1,050
Pure bred Heifers	2,300	2,630	3,357	4,400	3,810	4,445	4,900
Milk ('000 litres)	7,560	9,456	12,345	17,932	16,125	19,275	20,650

The number of local bred heifers declined whereas the number of pure bred heifers rose over the period.

**2. MILK COLLECTION TREND IN ARIANA**

<b>HEADINGS</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
Milk Collection Centres	5	5	8	14	14	20	24
Capacity in tonnes	65	65	88	164	170	200	248
Quantity Collected (x 000 litres)	26,103	25,185	27,657	36,233	37,381	43,415	44,812

Including 4 centres in Galaat Andalous with a daily capacity of 41 T with 4x34 T lorries.

**3. RED MEAT PRODUCTION IN GALAAT ANDALOUS AND COUNTRYWIDE (1998)**

<b>HEADINGS</b>	<b>GALAAT ANDALOUS (tonnes)</b>	<b>COUNTRYWIDE (tonnes)</b>
Beef	1,025	47,800
Mutton	156	40,100
Goat Meat	15	6,500
<b>TOTAL</b>	<b>1,196</b>	<b>94,400</b>

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**TREND OF AGRICULTURAL AND LIVESTOCK PRODUCTION PRICES**

PRODUCTION	TND/T			
	1996	1997	1998	1999
<b>CEREALS</b>				
Common Wheat	250	250	250	250
Durum Wheat	285	285	285	285
Barley	170	170	170	170
Straw and other By-products	30	35	40	45
<b>LEGUMES</b>				
Beans	370	380	400	420
Peas and Chick Peas	1150	1180	1200	1220
Other Legumes	1450	1500	1550	1600
<b>FODDER</b>				
Hay	100	105	110	115
<b>FRUIT</b>				
Oil Olives	350	336.6	304	242
Eating Olives	750	760	780	800
Citrus Fruit	370	380	400	420
Almonds	1750	1800	1850	1900
Apricots	700	720	740	760
<b>VEGETABLES</b>				
Potatoes	250	270	280	290
Tomatoes	115	120	125	130
Chilli Peppers	460	470	480	490
Melons and Water Melons	190	200	220	240
Artichokes	540	550	50	580
Onions	260	270	290	300
Other Vegetables	280	290	300	310
<b>LIVESTOCK PRODUCTS</b>				
Cattle	2200	2250	2260	2270
Sheep	2400	2500	2550	2600
Goats	2400	2420	2500	2550
Fresh Milk	340	350	350	360
Poultry	1650	1700	1750	1780
Eggs	82	90	92	94

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AVERAGE AGRICULTURAL PRODUCTION YIELDS

Products	Average Yield Estimated at Appraisal Tonne/ha	Average Yield Recorded at Post-Evaluation (T/ha)	Additional Production in 1998/99 (T)
Wheat	1.16	2.5	
Barley	1.8	3	
Hay	3	6	
Tomatoes and Chilli	12.9	30	
Peppers			
Artichokes	4	20	
Melons	8		
Potatoes	14	23	
Garlic and Onions	9.5	25-30	
Citrus Fruit	9	15	
Apple and Pear Trees	7.2	10	
Pomegranate Trees	9		
Olive Trees	1,4	6	
Eating Grapes	4	12	

Source :Ariana and Bizerte CRDAs

FINANCIAL AND ECONOMIC PRICES

Headings	At Appraisal			At Post-Evaluation	
	Financial Prices	Economic Prices	Ratios	Financial Prices	Economic Prices
Wheat	90	135	1.50	285	428
Tomatoes	52	56	1.07	130	140
Artichokes	142	149	1.05	580	609
Melons	104	110	1.05	240	254
Potatoes	94	99	1.05	290	305
Garlic and Onions	153	163	1.06	300	320
Peas	188	198	1.05		0
Water Melons and Squashes	73	80	1.09	240	263
Citrus Fruit	117	122	1.04	420	438
Apple Trees	250	327	1.30		0
Pomegranate Trees	179	189	1.05		0
Olive Trees	117	117	1	800	800
Eating Grapes	259	259	1	680	680
Milk	140	200	1.42	360	514
Meat	629	805	1.28	2270	2 905

Source : Ariana and Bizerte CRDAs

**Appendix 9**

**TUNISIA  
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PROJECT PERFORMANCE EVALUATION REPORT**

**CALCULATION OF THE ECONOMIC RATE OF RETURN**

<b>N°</b>	<b>Year</b>	<b>Adjusted Project Cost</b>	<b>Replacement Cost</b>	<b>Production Cost</b>	<b>Total Costs</b>	<b>Operating Income</b>	<b>Cash Flow</b>
1	1985	976.7			976.7		-976.7
2	1986	977.5			977.5		-977.5
3	1987	13628.0			13628.0		-13628.0
4	1988	16050.2			16050.2		-16050.2
5	1989	8563.2			8563.2		-8563.2
6	1990	4048.0			4048.0		-4048.0
7	1991	4244.3			4 244.3		-4244.3
8	1992	1261.7		17 884.8	19 146.6	19 872.1	725.5
9	1993	2874.4		115 953.5	118 828.0	128 837.3	10 044.1
10	1994	2057.4		161 227.7	163 285.1	179 141.8	15 856.8
11	1995			184 896.8	184 896.8	205 440.9	20 544.1
12	1996		441.0	215 055.0	215 496.0	238 950.0	23 454.0
13	1997		441.0	218 753.3	219 194.3	243 059.2	23 864.9
14	1998		441.0	218 753.3	219 194.3	243 059.2	23 864.9
15	1999		479.3	218 753.3	219 232.6	243 059.2	23 826.6
16	2000			218 753.3	218 753.3	243 059.2	24 305.9
17	2001		479.3	218 753.3	219 232.6	243 059.2	23 826.6
18	2002		4.000.0	218 753.3	222 753.3	243 059.2	20 305.9
19	2003			218 753.3	218 753.3	243 059.2	24 305.9
20	2004		479.3	218 753.3	219 232.6	243 059.2	23 826.6
21	2005			218 753.3	218 753.3	243 059.2	24 305.9
22	2006		479.3	218 753.3	219 232.6	243 059.2	23 826.6
23	2007			218 753.3	218 753.3	243 059.2	24 305.9
24	2008		479.3	218 753.3	219 232.6	243 059.2	23 826.6
25	2009			218 753.3	218 753.3	243 059.2	24 305.9
26	2010		479.3	218 753.3	219 232.6	243 059.2	23 826.6
27	2011			218 753.3	218 753.3	243 059.2	24 305.9
28	2012		479.3	218 753.3	219 232.6	243 059.2	23 826.6
29	2013			218 753.3	218 753.3	243 059.2	24 305.9
30	2014			218 753.3	218 753.3	243 059.2	24 305.9
<b>ERR =</b>							<b>19.89%</b>