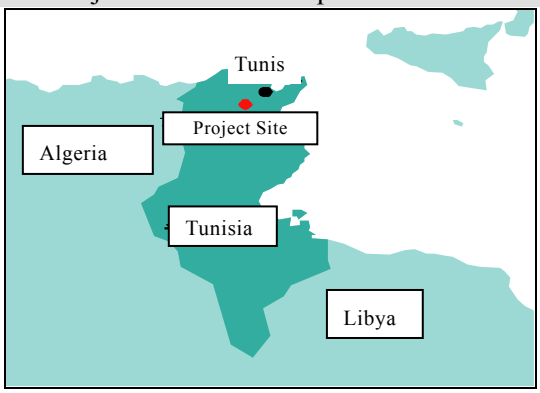
Tunisia

Goubellat Irrigation Perimeters Construction Project

External Evaluator: Koichiro Ishimori (Value Frontier Co., Ltd.)

Field Survey: November 2006 and January 2007

1. Project Profile and Japanese ODA Loan



Map of project area

Irrigation in Goubellat

1.1 Background

Approximately 33% of Tunisia's working population is employed in the agricultural sector, which accounts for around 14% of the GDP. The agricultural sector is an important sector in Tunisia, but agricultural production was influenced by the weather and unstable because the northern region of the country, which is the center of farming activities, conducted rain-fed agriculture by relying primarily on wintertime rainfall.

1.2 Objective

The objective of this project is to improve agricultural productivity and increase agricultural production by irrigating 2,900 ha of farmland (cf. half of the inner area of Tokyo Loop Line (the Yamanote Line) (approximately 6,300 ha)) in Goubellat in the Béja Governorate (population approximately 300,000) which is located about 70 km west of the capital of Tunis, thereby contributing to improvement of farmers' livelihoods and living standards.

1.3 Borrower/Executing Agency

Government of the Tunisian Republic/ Ministère de l'Agriculture et des Ressourrces Hydrauliques

1.4 Outline of Loan Agreement

Loan Amount/Loan Disbursed Amount	2,637 million yen/2,008 million yen
Exchange of Notes/Loan Agreement	October 1996/December 1996
Terms and Conditions -Interest Rate -Repayment Period (Grace Period) -Procurement	 2.7%(Consulting Service: 2.3%) 25 years (7 years) General Untied
Final Disbursement Date	December 2004
Main Contractors	—
Consultant Services	—
Feasibility Study (F/S), etc.	F/S: Ministère de l'Agriculture et des Ressourrces Hydrauliques（1986） D/D: Ministère de l'Agriculture et des Ressourrces Hydrauliques（1994）

2. Evaluation Result (Rating: A)

2.1 Relevance (Rating: a)

The relevance of the irrigation construction implemented by the project is analyzed from three perspectives, (1) the National 5-year Development Plan, (2) Water Resource Development Plan, and (3) the necessity of project implementation, considering each at the time of the loan agreement (1996) and at the time of the ex-post evaluation (2006).

2.1.1 National 5-year Development Plan

In the 8th National 5-year Development Plan (1992-1996), "increased productivity of agricultural crops in the northern region" including Goubellat is stated as a priority policy. Moreover in the 10th National 5-year Development Plan (2002-2006), "increased productivity and profitability of agricultural crops in the northern region" including Goubellat is stated as a priority. Given this, "increased production of agricultural crops" is recognized as possessing consistently high priority in the National 5-year Development Plans.

2.1.2 Water Resource Development Plan

In the Water Resource Development Plan (prepared in 1992) as of 1996, "implementation of irrigation in Goubellat" was mentioned as a priority issue. In the current Water Resource Development Plan (revised in 2000), "efficient usage of water for irrigation and agriculture in the Medjerda River basin, where Goubellat, etc., is located" continues to be mentioned as a priority issue. Given this, "implementation of irrigation in

Goubellat" is recognized as possessing consistently high priority in Tunisia's Water Resource Development Plan.

2.1.3 Necessity of Project Implementation

This project, which aims to expand productivity including agricultural productivity by installing irrigation facilities in Goubellat, is responsive to the demand for agricultural production, not only at the time of the project appraisal but also currently, and the necessity of implementing this project, both at the time of appraisal and currently, is recognized.

2.2 Efficiency (Rating: b)

2.2.1 Output

The project's installation of irrigation facilities was implemented basically according to plan. Table 1 below shows the details of the plan at the time of appraisal and the actual output at the time of the ex-post evaluation.

Table 1: Irrigation Facilities

Plan (appraisal)	Actual (ex-post evaluation)	Alterations
(1) Intake sluice gate, 1 site	(1) Intake sluice gate, same as left	As planned
(2) Water supply facility, 1 site (2 pumps)	(2)Water supply facility, same as left (3 pumps)	Pumps increased to allow fine adjustment of water volume
(3) Pump stations, 2 sites (3 pumps each)	(3) Pump stations, same as left (4 pumps each)	
(4) Reservoir, 1 site（15,000 m³）	(4) Reservoir, 1 site（20,000 m³）	Expanded to meet increased demand
(5) Primary and secondary canals (13.3km)	(5) Primary and secondary canals (33.2km)	Extended accompanying change in land to be irrigated by project
(6) Tertiary canals (93km)	(6) Tertiary canals (88.3km)	Basically as planned
(7) Drainage canals（900ha）	(7) Drainage canals, same as left	As planned
(8) Consulting services 56MM	(8) Consulting services 61.75MM	Increased due to extension of project period

source: Ministère de l' Agriculture et des Ressourrces Hydrauliques

2.2.2 Project Period

The project period planned at the time of appraisal was December 1996 to December 2000, or 48 months, but the actual project period was December 1996 to August 2004, or 92 months. The main reasons for the delay were the time required to select and contract with the consultant in charge of detailed design and project supervision (approximately 29

months) and the extension of pipe-laying work (from 24 months to 63 months) because, in addition to the time required to select and contract with the contractor who was to deliver the concrete pipes, there was an increase in domestic demand for concrete pipes from Tunisia's Société Nationale d'Exploitation et de Distribution des Eaux (SONEDE) and the Office National de l'Assainissement (ONAS), and the contractor who was awarded the contract to deliver the concrete pipes experienced a lack of manufacturing capacity.

2.2.3 Project Cost

The total project cost planned at the time of the appraisal was 3,516 million yen (Japanese ODA loan portion: 2,637 million yen). The actual cost, at 2,398 million yen (Japanese ODA loan portion: 2,008 million yen) was less than the planned cost. The reason for the reduction in cost was the efficient awarding of contracts through competitive bidding.

2.3 Effectiveness (Rating: a)

2.3.1 Area Benefited by Irrigation and Number of Persons Benefited by Irrigation

The area in which the above-mentioned irrigation facilities were installed and which benefited by irrigation was 2,907 ha, slightly above the planned area of 2,900 ha. However, rain-fed agriculture is currently being conducted on 810 ha (268 ha of private land and 542 ha of public land), which is approximately 20% of the area, because irrigation equipment such as sprinklers has not yet been introduced by the farmers (Table 2).

The number of persons benefited by irrigation, at 1,004 persons, was basically as planned. Furthermore, the number of potential irrigation beneficiaries, including the farmers of the above-mentioned 810 ha where irrigation has not yet started, is estimated 1,798 persons (Table 3).

Table 2: Area Benefited by Irrigation

	Area Benefited by Irrigation		
	Plan	Actual	Current (of the "Actual," farmland currently actually irrigated)
Private land	800 ha	905 ha	637 ha
Public land	2,100 ha	2,002 ha	1,460 ha
Total	2,900 ha	2,907 ha	2,097 ha

source: Ministère de l'Agriculture et des Ressourrces Hydrauliques

Table 3: Number of Persons Benefited by Irrigation

	Number of Persons Benefited by Irrigation		
	Plan	Actual	Current (of the "Actual," farm households currently actually irrigating)
Private land	800 ha containing 135 farm households (797 persons)	905 ha containing 170 farm households (867 persons)	637 ha containing 61 farm households (311 persons)
Public land	2,100 ha containing 5 village communities (217 persons)	1,155ha containing 37 farm households under 15 companies (178 persons)and 847 ha containing 202 farm households (753 persons)[1]	1,155ha containing 37 farm households under 15 companies (178 persons) and 305 ha containing 138 farm households (515 persons)
Total persons	1,014 persons	1,798 persons	1,004 persons

source: Ministère de l'Agriculture et des Ressourrces Hydrauliques

2.3.2 Cultivated Area and Yield per Unit Area by Major Crops

The cultivated area by major crops was overall according to plan or exceeded the plan. Plantings of potatoes and tomatoes are slightly behind schedule but are increasing rapidly and are expected to achieve the planned level within two to three years (Table 4).

Table 4: Cultivated Area Using Irrigation, by Major Crops

	Plan	Actual(2006)
Wheat	600 ha	620 ha
Potatoes	545 ha	363 ha
Pulses	185 ha	211 ha
Oats for animal feed	166 ha	155 ha
Barley	125 ha	150 ha
Tomatoes	95 ha	55 ha
Watermelon	45 ha	197 ha

source: Ministère de l'Agriculture et des Ressourrces Hydrauliques

[1] Due to alterations in the farmland policy in the 9th 5-year Development Plan, the five village communities were abolished and public land was loaned to 15 companies and neighboring farmers.

Regarding the yield per unit area, despite the fact that fields are still the build-up period to accustom them to cultivation (a period for new fields that are put into cultivation that ordinarily lasts 5 years from the completion of regular irrigation projects like this one), all crops except potatoes and watermelon have generally achieved the planned level (and potatoes and watermelon are expected to reach or exceed the planned level following the conclusion of the build-up period). Nearly all crops exceed the average yield in Tunisia (Table 5).

Table 5: Yield per Unit Area Using Irrigation, by Major Crops (t/ha)

	Plan	Actual(2006)	Average in Tunisia
Wheat	7	5	4
Potatoes	30	23	14
Pulses	4	4	NA
Oat for animal feed	8	7	NA
Barley	6	4	3
Tomatoes	40	38	38
Watermelon	30	19	17

source: Ministère de l'Agriculture et des Ressourrces Hydrauliques

2.3.3 Irrigation Fee Collection Rate

Table 6: Irrigation Fee Collection Rate

Irrigation Fee Collection Rate		
Plan	Actual (2005)	Actual (2006)
100%	93%	95%

source: Ministère de l' Agriculture et des Ressourrces Hydrauliques

It was planned to collect 100% of the irrigation fee in this project, but the actual collection rates in 2005 and 2006 were 93% and 95%, respectively. The reason why this figure did not reach 100% is that the farmers, who had not yet harvested their first year's crops (i.e., had not yet received cash for their crops) were unable to pay the irrigation fee. In view of this, the actual collection rates of 93% and 95% are extremely high.

2.3.4 Profit Increase due to Increased Production of Agricultural Crops

This project planned to increase profit by increasing production of agricultural crops in the amount of 5,681,000 dinars (approximately 511 million yen) in the second year

following completion. The actual increase was around 4,751,000 dinars (approximately 428 million yen).

2.3.5 Economic Internal Rate of Return（EIRR）

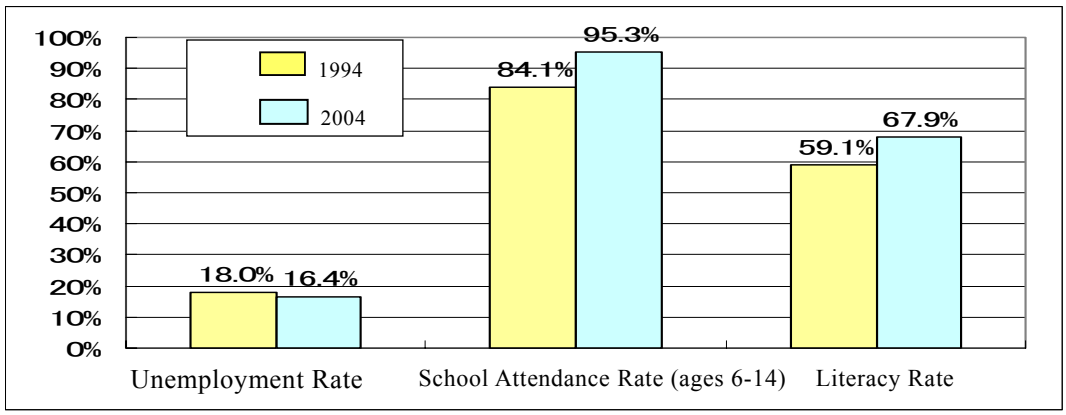
The project's economic internal rate of return (EIRR) planned at the time of appraisal was 14.9%, and when the EIRR was recalculated under the same conditions[2], it was 23.8% due to the striking effects of employment creation.

2.4 Impact

2.4.1 Improvement of Social Environment

In the Béja Governorate where the Goubellat irrigation project is located, improvements in the following social indicators (Figure 1) were visible between 1994 prior to the project and 2004, the year of project completion. However, a direct correlation with this project has not been confirmed.

Figure 1: Social Indicators in Béja Governorate



source: National Statistics Institute

2.4.2 Stability of Farming Population

The stability of the farming population in Goubellat was listed as one of the impacts of this project, and so the data were compared. It was ascertained that the population between 1995, prior to the project, and 2006, which was the year of the ex-post evaluation, was consistently stable at 16,000 persons, but a direct correlation with this project has not been confirmed.

[2] The benefits are assumed to be an increase in agricultural production and creation of new employment, and the costs are assumed to be the project cost and operation and maintenance expense.

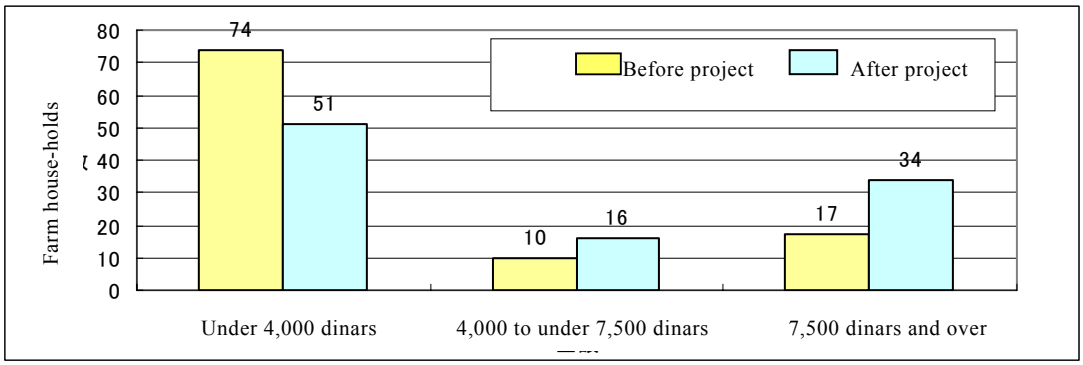
2.4.3 Results of Irrigation Beneficiary Study

The below-mentioned (1) through (3) were ascertained when a beneficiary study was conducted on 101 farm households out of the 236 farm households which benefited from the project.

(1) Employment creation: Through this project, a total of 52,917 days of employment (men, 6,605 days; women, 46,312 days) were created involving work related to irrigation and farming. Moreover, it is likely that the increase in employment for women had a positive impact on the social advancement of women.

(2) Annual farm income: It was ascertained that annual average farm income per farm household increased 679% following the project in comparison to before the project, from 4,734 dinars (about 420,000 yen) to 32,147 dinars (about 2,890,000 yen). The income of 32,147 dinars is four times the annual average farm income per farm household in Tunisia (7,875 dinars) at the time of the ex-post evaluation. Moreover, through analysis that divided 101 farm households into three groups (income less than 4,000 dinars, income from 4,000 to 7,499 dinars, and income 7,500 dinars and over), it was ascertained that approximately 34% of the total were farm households in which the annual average farm income per farm household was near the Tunisian average or above average (i.e., at or above the 7,500 dinars of Group 3); furthermore, although the increase of 679% was largely due to the uplifting effects of 34 farm households, it was also ascertained that there was a bottom-raising effect seen in improvements in Groups 1 and 2 (Figure 2).

Figure 2: Farm Households according to Annual Average Farm Income per Farm Household



source: Beneficiary Study

Photo 1

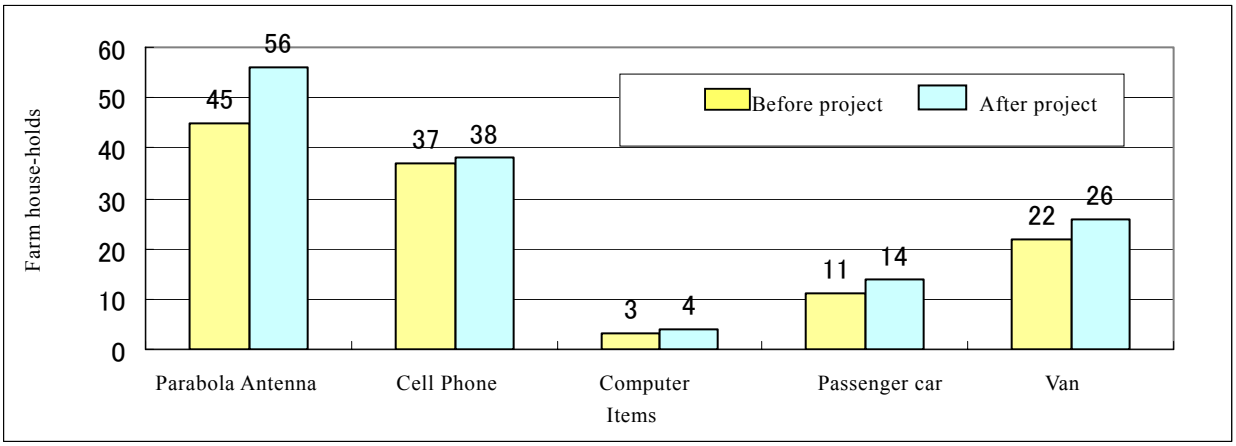
Irrigated land planted in potatoes

Photo 2

Farmer proudly displaying newly harvested carrots

(3) Farm households' asset ownership: There is a visible uptrend in asset ownership before and after project implementation, which suggests an improvement in farmers' standard of living (e.g., travel and transport became easier than prior to the project for seven farm households due to new purchases of passenger cars and vans) (Figure 3).

Figure 3: Farm Households' Asset Ownership



source: Beneficiary Study

2.4.4 Other Impact

There was no land acquisition or resident relocation involved in the implementation of this project. Moreover, no problems due to salt damage have occurred on the irrigated land following project completion.

2.5 Sustainability (Rating: a)

2.5.1 Operation and Maintenance Agency

Main Irrigation Facilities: Commissariat Régional au Développement Agricole (CRDA), Béja Governorate

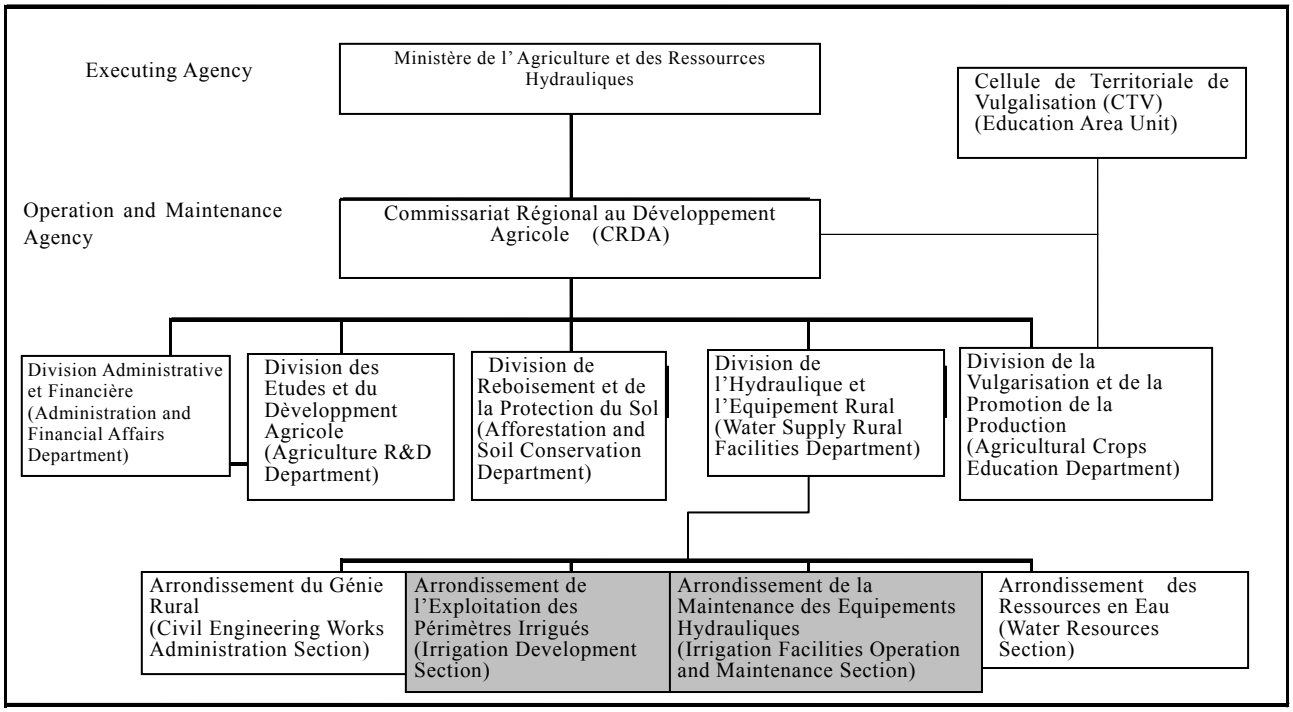
2.5.1.1 Technical Capacity

The CRDA provides almost no planting guidance to the GDA (the farmers' association), but as stated below, because the GDA possesses adequate knowledge and techniques related to planting, the lack of guidance was not a significant issue for the farmers. Meanwhile, there were no problems in CRDA's operation and maintenance of the intake sluice gates, pump stations, and reservoir for which it is responsible, but there is room for improvement in CRDA's guidance to GDA concerning operation and maintenance of equipment for tertiary and lower-ranked canals for which the GDA is responsible.

2.5.1.2 Operation and Maintenance System

The CRDA, a regional office of the Ministère de l' Agriculture et des Ressourrces Hydrauliques, has one office in each governorate. The operation and maintenance staff at the CRDA office in Béja Governorate consists of 12 persons assigned to the Irrigation Development Section (Arrondissement de l'Exploitation des Périmètres Irrigués) and the Irrigation Facilities Operation and Maintenance Section (Arrondissement de la Maintenance des Equipements Hydrauliques) of the Water Supply Rural Facilities Department (Division de l'Hydraulique et l'Equipement Rural) in addition to 4 irrigation support staff in the Cellule de Territoriale de Vulgalisation (CTV) who educate concerning irrigation and provide guidance concerning planting. By and large, there are no problems in the operation and maintenance system.

Figure 4: Organization of
Commissariat Régional au Développement Agricole (CRDA)



source: Béja Governorate, Commissariat Régional au Développement Agricole (CRDA)

2.5.1.3 Financial Status

CRDA has maintained a surplus since 2003. Its annual income is approximately 1.80 million dinars (about 160 million yen), and the main sources of income are the cost allocation budget from the Ministère de l' Agriculture et des Ressourrces Hydrauliques and sales of water for irrigation. The budget is adequate for the operation and maintenance of irrigation facilities in Goubellat. Given that sales of water for irrigation are likely to further increase as usage of irrigation expands for cultivation of potatoes and tomatoes, there are no problems in the financial status overall.

2.5.2 Operation and Maintenance Agency

Part of the Irrigation Equipment: Groupement de Développement Agricole（GDA）

2.5.2.1 Technical Capacity

There are no problems overall in the GDA's knowledge and techniques concerning planting. However, there is room for improvement in GDA's knowledge and techniques for operation and maintenance of equipment for tertiary canals, lower-ranked canals, and drainage canals.

2.5.2.2 Operation and Maintenance System

The four water users groups (Groupement d'Intérêt Collectif: GIC) which were active heretofore were integrated and reorganized into two GDAs for the sake of strengthening their organizational functions and finances as well as improving efficiency. Each GDA is composed of a director, an accountant, four office staff, a consultant engineer, and two guards. There are no problems overall in the operation and maintenance system.

2.5.2.3 Financial Status

Both GDAs have maintained a surplus since 2005. Given that the system was strengthened for the purpose of strengthening the financial status, that the irrigation fee collection rate is extremely high, and that sales of water for irrigation use are likely to further increase as usage of irrigation expands for cultivation of potatoes and tomatoes, there are no problems in the financial status overall.

2.5.3 Operation and Maintenance Status

No problems.

3. Feedback

3.1 Lessons Learned

N.A.

3.2 Recommendations

N.A.

Comparison of Original and Actual Scope

Item	Plan	Actual
1.Output	(1) Intake sluice gate, 1 site (2) Water supply facility, 1 site (2-pump set) (3) Pump stations, 2 sites (3-pump set at each site) (4) Reservoir, 1 site（15,000 m^3） (5) Primary and secondary canals 13.3 km (6) Tertiary canals 93 km (7) Area drainage canals 900ha (8) Consulting services 56MM	(1) Intake sluice gate, same as left (2) Water supply facility, same as left (3-pump set) (3) Pump stations, same as left (4-pump set at each site) (4) Reservoir, same as left (20,000 m^3) (5) Primary and secondary canals 33.2 km (6) Tertiary canals 88.3 km (7) Area drainage canals, same as left (8) Consulting services 61.75MM
2.Project Period	December 1996 – December 2000 (48 months)	December 1996 – August 2004 (92 months)
3.Project Cost Total ODA Loan Portion Exchange Rate	3,516 million yen 2,637 million yen 1 dinar = 110 yen (as of April 1996)	2,398 million yen 2,008 million yen 1 dinar = 87.6 yen (weighted average during project period)