Ex-Post Evaluation 2010
(Egypt, Tunisia, Morocco）

December 2011

JAPAN INTERNATIONAL COOPERATION AGENCY

Mitsubishi UFJ Research & Consulting Co., Ltd.

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Preface

Ex-post evaluation of ODA projects has been in place since 1975 and since then the coverage of evaluation has expanded. Japan's ODA charter revised in 2003 shows Japan's commitment to ODA evaluation, clearly stating under the section "Enhancement of Evaluation" that in order to measure, analyze and objectively evaluate the outcome of ODA, third-party evaluations conducted by experts will be enhanced.

This volume shows the results of the ex-post evaluation of ODA Loan projects that were mainly completed in fiscal year 2008, and Technical Cooperation projects and Grant Aid projects, most of which project cost exceeds 1 billion JPY, that were mainly completed in fiscal year 2007. The ex-post evaluation was entrusted to external evaluators to ensure objective analysis of the projects' effects and to draw lessons and recommendations to be utilized in similar projects.

The lessons and recommendations drawn from these evaluations will be shared with JICA's stakeholders in order to improve the quality of ODA projects.

Lastly, deep appreciation is given to those who have cooperated and supported the creation of this volume of evaluations.

December 2011
Masato WATANABE
Vice President
Japan International Cooperation Agency (JICA)

Disclaimer

This volume of evaluations, the English translation of the original Japanese version, shows the result of objective ex-post evaluations made by external evaluators. The views and recommendations herein do not necessarily reflect the official views and opinions of JICA. JICA is not responsible for the accuracy of English translation, and the Japanese version shall prevail in the event of any inconsistency with the English version.

Minor amendments may be made when the contents of this volume is posted on JICA's website.

JICA's comments may be added at the end of each report when the views held by the operations departments do not match those of the external evaluator.

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Morocco

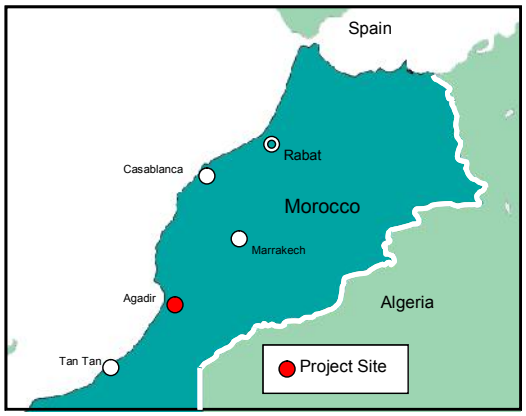
Agadir Water Supply Project

External Evaluator: Hajime Onishi
Mitsubishi UFJ Research & Consulting Co., Ltd.

0. Summary

This project is highly consistent with government policies and no problems with operation and maintenance (O&M) systems can be found. The financial situation of the executing agency (Office National de l'Eau Potable, ONEP) is in a favorable condition for the timebeing. Major indicators such as the population served by this project, the amount of water supplied, and the facility utilization rate have exceeded 80% of the target value, and there is no particular problem with the quality of the purified water produced. Furthermore, the project contributes to improving the living conditions of the beneficiaries to some extent, and numerous positive impacts have emerged, including the improvement of the service level of water supply and the business environment in the target areas. In addition, in terms of efficiency, although the project period was longer than planned, project cost was kept within the planned amount. In light of the above, this project is evaluated to be highly satisfactory.

1. Project Description



Location Map

Tamri Water Purification Plant

1.1 Background

In Morocco where the majority of land is located in semi-arid areas, securing "water" for the purposes of irrigation, daily life, etc. is highly prioritized in the government's development policies. At the same time however, water resource management for each river system, as well as the use and reuse of water resources through the development of the water supply and sewage system has made little progress, even after promulgation of the Water Law in 1995 - and there have been similar problems in Agadir, located in the southwestern part of

Morocco.

Agadir is a modern resort city in the seashore of the Atlantic Ocean, which has a temperate climate all year round.[1] After the great earthquake occurred in 1960, Agadir city was dedicated to providing infrastructure that was necessary for reconstruction. However, in 2001, the development of new water source had not proceeded in a timely manner, and the water demand was expanding along with the rapid population increase in the urban area of Greater Agadir. It was predicted by JICA's appraisal documents that the maximum demand for water in 2004 would reach the maximum capacity of existing water supply facilities, thus making the increase of water supply capacity in the Greater Agadir area a pressing task.

Against this backdrop, advancing the implementation of a new water supply project for Greater Agadir was an urgent challenge for the Moroccan government at the time, and the prompt implementation of a water supply project for the purpose of drastically closing this demand-supply gap was desired.

1.2 Project Outline

The objective of this project is to meet the increased demand of water and to provide safe water for 8 districts in the Greater Agadir area by constructing new facilities for water supply, thereby contributing to improving residents' quality of life and to stimulate the economic development in the target area.

Loan Amount / Disbursed Amount	6,412 million yen / 6,327 million yen
Exchange of Notes / Loan Agreement Signing Date	June 2000 / February 2001
Terms and Conditions	Interest Rate:1.70% (0.75% for Consulting Services) Repayment Period:30 years (40 years for Consulting Services) (Grace Period:10 years) Conditions for Procurement: General Untied (Bilateral Tied for Consulting Services)
Borrower / Executing Agencies	Office National de l'Eau Potable, ONEP / The same
Final Disbursement Date	June 2008
Main Contractors (over 1 billion yen)	Sogea Maroc S.A.(Morocco) / Omce (Morocco) / Sogetrama Gls (Morocco) (JV), Sogea Moroc S.A. (Morocco) / Sogea Satom S.A. (Morocco) / Sehi (Morocco) (JV) (Note: Sogea Maroc S.A. was awarded two contracts as a member company of Joint Venture.)

[1] The population as of 2001 was approx. 640,000 people. (Source: Documents provided by ONEP)

Main Consultant (over 100 million yen)	Nihon Jogesuido Sekkei Co., Ltd. (Japan) / Team Maroc, S.A. (Morocco) (JV)
Feasibility Studies, etc.	1996 Master Plan Study (by ONEP) 1999 Feasibility Study (by ONEP)
Related Projects, etc.	AFD: Water Supply Project at Agadir and Fez (1998 – 2003) KfW: Rural Water Supply Project in Agadir (2008 – On going) ONEP: Rural Water Supply Project (2009 – On going)

2. Outline of the Evaluation Study

2.1 External Evaluator

Hajime Onishi (Mitsubishi UFJ Research & Consulting)

2.2 Duration of Evaluation Study

Duration of the Study: December, 2010 – December, 2011

Duration of the Field Study: April 20, 2011 – May 4, 2011 / August 15, 2011 – August 22, 2011

2.3 Constraints during the Evaluation Study

None.

3. Result of the Evaluation (Overall Rating: A[2])

3.1 Relevance (Rating: ③[3])

3.1.1 Relevance with the Development Plan of Morocco

Relevance with the national policies

At the time that the project appraisal was being carried out in 2001, the Moroccan government had focused on water sector development as one of the major policies in the Economic and Social Development Plan (2000-2004). In this plan, the population served by water supply systems in the urban area and that in the rural area were 89% and 62% respectively as target values, aiming at an increase in the percentage of the population served both in urban and rural areas in Morocco.

Meanwhile, the enhancement of export competitiveness of the industrial sector and the improvement in service delivery of basic infrastructure to strengthen domestic sectors have been established as the policy goals of the present 2011 Finance Bill,[4] which is the top

[2] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[3] ③: High, ②: Fair, ①: Low

[4] Following the completion of the Economic and Social Development Plan (2000-2004), no new five-year long-term development plan has been formulated in Morocco. For the immediate future, it has been decided that provisional development policies will be denoted through the Finance Bill/Finance Act of each year.

priority national plan. In order to achieve these goals, "to promote investment for water supply and sanitation sector" as well as for energy and distribution sectors has been decided upon as one of the priority fields. Additionally, the National Initiative on Human Development, established in May 2005 by His Majesty King Mohamed VI, sought the improvement in accessibility to the basic social services including those of water supply, especially focusing on accelerating the provision of basic infrastructure such as water supply facilities in rural areas.

Therefore, for both the project planning and the ex-post evaluation, water sector development, especially the promotion of investment in the water supply and sewerage projects in urban areas, has been assigned high priority in higher-level national policies. Thus, consistency between this project's objective of "to provide the safe water and to improve resident's quality of life by constructing new facilities for water supply" and national policy is very high.

Relevance with the sector policies

At the time of appraisal in 2001, in both the Master Plan for the Potable Water Supply Sector (approved by the Government of Morocco in 1999) and the Urban Portable Water Supply Plan as part of the investment program 2000-2004 of ONEP, the provision and improvement of water supply facilities in Greater Agadir was positioned as being of the highest priority.

As of 2011 as well, ONEP's next investment program for 2011-2015 continues to hold up the "improvement in access to safe drinking water by the provision of water supply infrastructure" as a mission of the utmost importance. In this program, it is planned that more than 50% of the total budget for five years will be invested in water supply projects in urban areas and the percentage of drinking water supplied by water piping will be targeted to 95% in rural areas by 2015. As for the Greater Agadir area, a seawater desalination project is currently ongoing in anticipation of the water supply shortage in a few years, making progress in the prioritized development of water supply infrastructure.

Therefore, for both program planning and ex-post evaluation, water supply development in the Greater Agadir has been highly prioritized in the objectives for sector policies, and the direction of the project is completely relevant to those policies.

3.1.2 Relevance with the Development Needs of Morocco

In 2000, water demand in the Greater Agadir area had rapidly increased and it was anticipated that the demand would reach the total supply capacity of 960 liter/sec. in 2004. As shown in Table 1 below, the water supply capacity has been significantly strengthened by approximately 35% in April 2007. This is as a result of the start of operation at the facilities

related to this project, including water treatment plants. On the other hand, the maximum daily demand for water has increased at an average of 11% each year, again approaching the maximum capacity of daily water supply. The demand-supply gap that had once been mitigated by this project is again shortening.[5]

Table-1: Water Demand and Supply in Greater Agadir Area

(Unit: liter/sec., not applied to water connection rate)

Year	Maximum Daily Water Supply a	Maximum Daily Water Demand b	Demand - Supply Gap b-a	Water Connection Rate %
2000	863	669	-194	73
2006	1,300	1,266	-34	84
2007[1)]	1,760	*1,427*	*-333*	87
2008	1,760	*1,588*	*-172*	90
2009	1,960	*1,749*	*-211*	94
2010	1,960	1,910	-50	96
2014	3,000	2,500	-500	n.a.
2020	3,000	2,800	-200	n.a.
2022	3,000	3,000	0	n.a.

Source: Answers to the questionnaire to ONEP, documents provided by Régie Autonome Multi-Services d'Agadir (RAMSA), JICA Mid-Term Review Report, etc.

Note-1): Italic figures show estimated ones.

Note-2): The operation of the project facilities started in April 2007 and Phase-II facilities of the project (Capacity: 200 liter/sec.) did in 2009.

Maximum demand is predicted to reach 3,000 liter/sec. in 2022, and the supply of safe water through the expansion of water supply capacity continues to be a pressing task. Had this project—which achieved a substantial increase of water supply capacity and greatly contributed to bridging the supply-demand gap—not been implemented, the demand would have exceeded the supply capacity after 2006. This would have resulted in inducing negative impacts on the service delivery of water supply in the Greater Agadir area.

3.1.3 Relevance with Japan's ODA Policy

At the time of the project appraisal in 2001, the former Japan Bank for International Cooperation (JBIC) set the infrastructure for development which supports sustainable growth, enhances global competitiveness and promotes private investments as one of the target sectors on the Medium-Term Strategy for Overseas Economic Cooperation Operations to Morocco. Under this strategy, JBIC undertook a course of assisting Morocco that centered on

[5] Régie Autonome Multi-Services d'Agadir (RAMSA) which is in charge of water distribution in the Greater Agadir area is now implementing a seawater desalination plant construction project with a public-private partnership (PPP). The operation of the plant with the water supply capacity of 1,000 liter/sec. will commence in 2014. Although the demand-supply gap in Greater Agadir will be mitigated by this operation, it is also anticipated that the maximum water demand may exceed the maximum water supply from the latter half of 2011 to 2014. (For this critical situation, possible options such as the utilization of groundwater, an increase in the amount of water intake from the Moulay Abdellah Dam, etc. were currently considered.) As for the seawater desalination project, it is feared that the production cost of water might be increased and it may be passed on to the customers' charge.

infrastructure development, especially on water supply development programs. Therefore, this project was extremely consistent with Japan's aid policies.

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

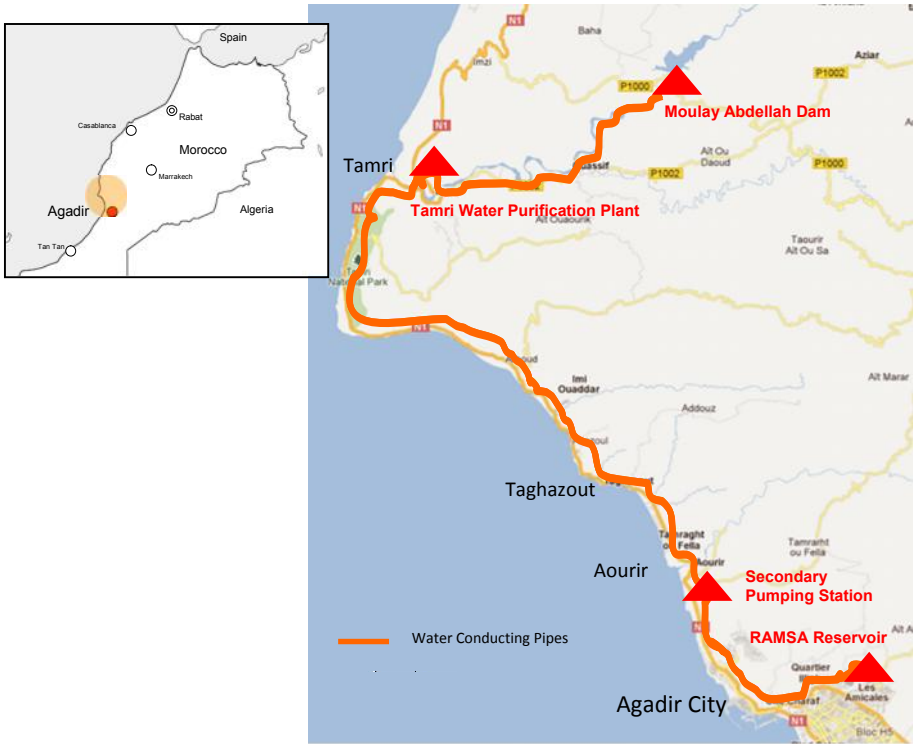


Figure-1: Location of the Project Site

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

A comparison of outputs for both the planned and actual performance is shown in Table 2 below. There is no major change for the following two outputs: iv) Construction of power lines and v) Construction of access roads.[6]

Regarding iv) construction of power lines, there was a 4 km difference between the original plan and the actual output, due to the shortened distance of power lines. The main reason was that the national grid to be connected from the water purification plant became different between the basic design (B/D), which was in charge of ONEP and the detailed design (D/D), which was in charge of the national power utility ONE. As for v) construction of access roads, the budget for construction was provided by the Public Works Department, and then the

[6] The wastewater treatment plant was constructed in the water purification plant site, as originally planned. The sludge after drying process is transported to a cement factory located in the northern part of Agadir City, without charge. The amount of dried sludge donated is about 2,000 tonnages on annual average. (For the detail, refer to the section of Impact.)

component was separated from the project scope.

Table-2: Changes in Output

Project Components	Original	Actual	Differences
i) Water Intake and Conducting Facilities			
・ Water Intake Weir	One location	The same	As planned
・ Primary Pump Stations	894 liter/sec., 3 units	895 liter/sec., 3 units	Mostly as planned
・ Surge Tank	1,000 m³ (500 m³×2)	The same	As planned
・ Water Conveyance Pipelines	9,159m in total	8,560m in total	93% of original plan
ii) Water Purification Plant			
・ Treatment Capacity	700 liter/sec.	The same	As planned
iii) Water Transmission Facilities			
・ Water Conducting Pipes	57,850m in total	57,525m in total	Mostly as planned
・ Secondary Pump Stations	700 liter/sec., 3 units	The same	As planned
iv) Power lines	8.7km	4.47km	51% of original plan
v) Access Roads	8.7km	Cancelled (Constructed by Public Works Department)	
vi) Consulting Services			
・ Consulting Service M/M	182M/M in total (Foreign:64M/M, Local: 118M/M)	165.54M/M in total (Foreign:64.36M/M, Local: 101.18M/M)	91% of original plan
・ Consulting Service TOR	Bid documents review, Bid support, Construction supervision, Training program for ONEP engineers, etc.	As the same, excluding bid documents review	

Source: JICA internal documents, answers to the questionnaire to ONEP and results of interviews

Regarding vi) consulting services, consultant input and the terms of reference were mostly the same as the original plan. The input from the project manager (who is primarily responsible for the project) and consulting engineers were increased by approximately 10 man-months and five man-months respectively, due to the delay in project implementation. At the same time, some experts' input was decreased by the cancellation of bid documents review (ONEP became in charge of this) and the input from local consulting engineers was also reduced by a review of activities relating to construction supervision, both contributing to the slight reduction of the total amount of consultants' input.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total cost of the project was originally 9,313 million yen (the Japanese ODA loan share was 6,412 million yen) but the actual project cost was 6,587 million yen (the Japanese ODA loan share was 6,327 million yen), which was equivalent to 71% of the original plan.

Main causes for the drastic reduction of the total project cost include the following: (1) a decrease in tax and duty rates (only 3% of the original estimate) due to the tariff reduction

after the commencement of the project, and (2) a decrease in land acquisition costs (28% of the original estimate). As already stated in the Section 3.2.1 Project Outputs, the cancellation of the construction of access roads did not affect the changes in project cost, mainly because of its magnitude to the total project cost. (Note that the original estimate was lower than 100 million yen).

3.2.2.2 Project Period

The project period was longer than planned. The project was scheduled from February 2001 to January 2007, a period of 72 months, but it was extended to 75 months, from February 2001 to April 2007[7], which was equivalent to 104% of the original plan. The main reasons for the delay included: (1) Delays caused by the changes in the design and (2) Delays relating to the bidding process.

Table-3: Comparative Table of Project Periods

Task	Original Schedule (months)		Actual (months)		Differences (months)
Consulting Service	Jan. 2001 – Feb. 2004	(38.0)	Aug. 2002 – May 2007	(58.0)	- 20.0
Tender / Contract / Procurement	Mar. 2001 – Feb. 2002	(12.0)	Dec. 2001 – Mar. 2004	(28.0)	- 16.0
Civil Works	Mar. 2002 – Jan. 2007	(59.0)	Sep. 2003 – Dec. 2007	(52.0)	+ 7.0
Completion Certificate		n.a.		May 2008	n.a.
Total[1)]	Feb. 2001 – Jan 2007	(72.0)[2)]	Feb. 2001 – Apr. 2007	(75.0)[3)]	- 3.0

Source: JICA internal documents, answers to the questionnaire to ONEP and results of interviews

Note-1): Project commencement was defined as the date of L/A conclusion (Feb.2001). For the definition of the date of project completion, refer to the Footnote-7.

Note-2): While the overall project period was planned for 38 months from February 2001 to April 2004, it was agreed between ONEP and JICA that the project would extend to January 2007, through the exchange of the Project Memorandum (P/M) signed in January 2002.

Note-3): Although the construction works was completed in December 2007 and project completion certificate was issued in May 2008, the operation of the constructed facilities started in April 2007.

Regarding (1), changes in water intake location, water purification plant location, specifications of water conducting pipes, of which all are the critical points for the design of the project, resulted in a one-and-a-half year delay from the original plan as a result.

For (2) Delays relating to the bidding process, it took 28 months in total (Original plan: 12 months) to complete the bidding process and contract negotiation, because of i) breaking the contracting lots related to the water conducting pipe construction into smaller lots (from two to three packages), ii) retendering of some of the contracting lots, and iii) delays in evaluation of some of the contracting lots.

[7] Although the loan completion date for this project was June 2008, as shown in Table 3 above, the majority of construction was completed in April 2007, and all of the related facilities began operating in April 2007. From that time onwards, water was supplied throughout the Greater Agadir area and project effects began to appear, thus it is considered reasonable to set the project completion to the above date of the start of operation.

Construction work was made very difficult as a result of restrictions on construction work due to topographical and geographical conditions along the construction sites.[8] However, the construction period was shortened by seven months compared with the original duration, due to the strengthening of the construction supervision and the dedicated efforts taken by the executing agency ONEP and the consultant team. In addition, the cancellation of the construction of access roads did not affect the project period.

Although the project cost was lower than planned, the project period was longer than planned (104% of the original plan), therefore efficiency of the project is fair.

3.3 Effectiveness (Rating: ③)

3.3.1 Quantitative Effects

3.3.1.1 Results from Operation and Effect Indicators

(1) Population served, average water supply per capita and percentage of population served

Population served by this project: As of the end of 2010, the population served by this project within the target areas reached to approximately 780,000 people, which exceeded the target value (as of five years after the plant operation) of 688,000. After completion of facilities related to this project, various work[9] aimed at increasing connections led by RAMSA has succeeded, and the number of households connected to the distribution network has been steadily growing at an average of 7.6% a year since 2006.

Average water supply per capita: The per capita water volume supplied for Greater Agadir, which includes the area in this project, was 137 liters/day (converted with an average of 4.27 persons per household) as of the end of 2011, being slightly lower than the target value (as of five years after the operation) of 160 liters/day. Two main factors are thought to be behind the target: (1) The increase in the water tariff in 2006, and (2) The awareness activities such as the water conservation campaign developed nationwide by ONEP and environmental ministries and agencies.

Percentage of population served: The percentage of the population served by the water supply in the Greater Agadir area has reached 96% as of 2010, which greatly exceeds the original target of 77%, due to the aforementioned steady growth of the population served by this project.

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[8] The contractor had a hard time securing the space for construction, transporting materials and equipment, and ensuring safety (especially in heavy rain) because approximately 50% of the pipe construction work, among the construction of water conducting pipeline of 57km in total, was implemented along the national highway that was located on top of the cliff in a coastal terrace. (Source: Results of interview with ONEP Agadir Office)

[9] Customer service improvements through the removal of public taps, construction of distribution pipeline, appropriate operation and maintenance of distribution network, etc.

Table-4: Achievement Rate of Main Indicators

Operation and Effect Indicators	Baseline Data (1996)	Target Value (5 Years After Plant Operation) [2)] a	Actual Value (2006, At the Time of Mid-Term Review)	Actual Value (As of 2010) b	Achievement Ratio (%) b/a
Population Served in Greater Agadir	364,000	688,000	669,000	778,000	113%
Average Water Supply per Capita [1)]	168 liters/day	160 liters/day	130 liters/day	137 liters/day [3)]	86%
Percentage of Population Served in Greater Agadir	67%	77%	90%	96% [3)]	125%
Maximum Water Supply in Greater Agadir	73,198 m^3/day	132,106 m^3/day	104,480 m^3/day	128,045 m^3/day	97%
Average Water Supply in Greater Agadir	60,998 m^3/day	110,074 m^3/day	87,067 m^3/day	106,704 m^3/day	97%
Rate of Facility Utilization	n.a.	70%	100%	70%	100%
Water Supplied Hours (for Target Area of the Project)	Not Known	24 hrs	24 hrs	24 hrs	100%
Water Supplied Hours (for Greater Agadir Area)	Not Known	24 hrs	24 hrs	24 hrs	100%

Source: Answers to the questionnaire to ONEP, results of interviews with ONEP, documents provided by RAMSA, JICA internal documents, etc.

Note-1): Average Water Supply per Capita = Average Water Supply / Population Served

Note-2): At the time of project appraisal, it was considered as preconditions that the water supply capacity of 700 liter/sec. could be added through the new purification plant of Phase-I (which means this project), after the construction of Moulay Abdellah Dam (former Ait Hammou Dam) in 2002.

Note-3): Estimated figures by various sources

(2) Water supply volume, rate of facility utilization and water supplied hours

Due to the abovementioned steady increase in the population served by this project, the original water supply volume target of 110,000 m^3/day has been mostly achieved. The rate of facility utilization has also reached 100%. As for the hours of water supplied per day, 24 hours-water supply has been achieved in each district of the target areas of the project.

(3) Water quality

This project's water quality monitoring at water intakes is conducted, daily or every two days (depending on monitoring indicators), at laboratories set up in water purification plants. To date, no serious problems with water quality have been confirmed.

Table-5: Quality of Water Produced by Tamri Purification Plant (This Project)

Monitoring Indicators	Measured Value (May 2007)	Moroccan Standard	Judgment
Salinity (mg/l)	734	1,000	Cleared
pH	7.32	6.5～8.5	Cleared
Turbidity	0.11	1.00	Cleared
Dissolved Oxygen (DO, mg/l)	1.9	5.0～8.0	Cleared
Temperature (℃)	23.9	n.a.	n.a.
Iron (mg/l)	0.01	0.30	Cleared
Magnesium (mg/l)	0	100	Cleared
Calcium (mg/l)	76.8	n.a.	n.a.
Coliforms	0	0	Cleared

Source: JICA internal documents

The quality of water produced by the Tamri purification plant (constructed by this project) has cleared the drinking water quality standards in Morocco, as shown in Table-5. There are

no problems with the quality of water.

(4) Target and status of the revenue water rate

After 2006, the revenue water (RW) rate shows signs of leveling off at 78%, as shown in Table-6. On the other hand, this level, namely the non-revenue water (NRW) rate is 22%, is relatively favorable in developing countries, and it is very difficult to expect the higher rate any more, considering the technological constraints and their cost-effectiveness. An engineer from ONEP pointed out that the technological limit of the RW rate in Morocco might be approximately 80%.[10]

Table-6: Revenue Water Rate in the Target Area of the Project

Area	1996 (Baseline)	2006	2010
Inside Greater Agadir Area	Not known	78.0%	78.5%

Source: Answers to the questionnaire to ONEP and JICA Mid-Term Review Report

(5) Water intake volume from the Moulay Abdellah Dam (former Ait Hammou Dam)

The construction of the Moulay Abdellah Dam (former name: Ait Hammou Dam), the raw water source of this project, was completed in March 2002 as originally scheduled. It was assumed that this dam would be used as a water source for this project. Given this, the effects from this project would not have emerged if this dam had not been constructed in a timely manner.

Table-7: Water Intake Volume from Moulay Abdellah Dam after the Project Completion

Year	Annual Water Intake Volume (Million m^3)
2007	13.16
2008	21.44
2009	21.41
2010	20.33

Source: Answers to the questionnaire to ONEP

Note): Water intake from the Moulay Abdellah Dam by this project has started in April 2007.

At the time of project appraisal, it was pointed out that “careful monitoring of the flow volume of the Tamri River might be needed on the grounds that the flow fluctuates annually, although the simulation results demonstrated that the river flow volume would become lower than the estimated intake volume at maximum for only six years out of 50 years time”. Relating to this issue, no major fluctuations in the intake volume from the Moulay Abdellah Dam have occurred since the start of water intake in 2007, as shown in Table-7.[11]

[10] Source: Results of interview with ONEP Agadir Office and several engineers at ONEP Headquarters

[11] Note that some difficulties in securing water intake volume currently happened especially at the time of flooding in rainy seasons, due to the design of intake facilities and other factors, as stated in the Section of Sustainability. At the same time, this malfunction does not relate to the maximum capacity of water intake volume from the Moulay Abdellah Dam itself.

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

(1) Financial Internal Rate of Return (FIRR)

FIRR figures were recalculated with several conditions described in Table 8 below.

The result of recalculating the FIRR was 10.16%, which was much higher than the 7.60% projected at the time of the project appraisal. The reason for this will be the drastic reduction in the total project cost, which is 70% of the original estimate.

Table-8: Recalculation of FIRR

Timing	Preconditions and Assumptions for Recalculation (Project Life: 30 years after the completion of the Project for each case)		FIRR
At the time of appraisal (in 2001)	Costs:	Construction cost, consulting service cost, operation and maintenance cost, repairing cost for aged facilities (5% of total project cost 15 years after the plant operation)	7.60%
	Revenue:	Water tariff revenue (assuming 15% increase in water tariffs for the first three years after operation, then a 5% increase every year)	
At the time of ex-post evaluation (in 2011)	Costs:	Construction cost, consulting service cost, operation and maintenance cost (based on the actual expenditure up to 2010), repairing cost for aged facilities (5% of total project cost 15 years after the plant operation)	10.16%
	Revenue:	Water tariff revenue (assuming 10% increase in water tariffs every 5 years after 2015)	
	NRW:	Assuming 5% reduction every 5 years from 2015 up to 2040, being 20% in 2015 as a base rate and being 5% after 2040 as a convergence rate.	

(2) Economic Internal Rate of Return (EIRR)

The economic internal rate of return (EIRR) was not calculated due to limited resources for this study. To do so, it would have been necessary to clarify input data from the beneficiary side, such as beneficiaries' WTP (Willingness to Pay) for water usage through individual interviews or through the estimation by using prices of substitution goods and water tariff level.

3.3.2 Qualitative Effects

Effects such as the improvement of public health and betterment of the living environment through the upgrading of water supply conditions are appearing. Details are in the Impact section below.

To sum up, the main indicators, including the population served by this project, the amount of water supplied, and the facility utilization rate, have all reached 80% of the target or greater. This is in addition to there being no particular problem with the quality of treated water produced. While the revenue water (RW) rate shows signs of leveling off at 78%, this level is extremely high in developing countries, and it is very difficult to expect the higher rate, taking the technological constraints and their cost-effectiveness into account.

This project has largely achieved its objectives; therefore its effectiveness is high.

3.4 Impact

3.4.1 Intended Impacts

(1) Impact on living environment by the distribution of new water

For the four villages (Aourir, Taghazout, Tamri and Immsouane) where the drinking water was provided through an independent water tank, purified water produced by this project is currently supplied through the distribution network. The quality of water and hours of water supply were improved dramatically.[12]

Table-9: Customer Satisfaction in Water Quality

i) Turbidity (N=149)

Answers	Before	After
Satisfactory	13	145
Moderately Satisfactory	10	4
Not Satisfactory	126	0
Total	149	149

Source: Results of beneficiary survey[13]

ii) Water Pressure (N=149)

Answers	Before	After
Satisfactory	20	146
Moderately Satisfactory	8	3
Not Satisfactory	121	0
Total	149	149

Source: Results of beneficiary survey

iii) Water Quantity (N=149)

Answers	Before	After
Satisfactory	15	146
Moderately Satisfactory	11	3
Not Satisfactory	123	0
Total	149	149

Source: Results of beneficiary survey

iv) Continuity (N=149)

Answers	Before	After
Satisfactory	27	148
Moderately Satisfactory	4	1
Not Satisfactory	118	0
Total	149	149

Source: Results of beneficiary survey

A survey of beneficiaries' level of satisfaction regarding the quality (turbidity, water pressure, quantity, and continuity) of water services revealed the following results shown in Table-9. It can be seen that through the implementation of this project, the level of water supply services improved greatly.

To the separate question regarding continuity, the number of beneficiaries who responded that water outages occurred once or more per month was 74% or 110 people before project completion, while only 20% or 31 people had the same response after project completion.

[12] Before the project: It took four to five days to receive new water tanks, After the project: 24 hours water supply has started.

[13] Beneficiary survey implementation overview:

Locations: Areas served by this project (Seven districts in total, both inside and outside Agadir City)

Subjects: General population, private companies (tourism, manufacturing, service sector, etc.), and public institutions (hospitals, schools, etc.)

Total sample: 149 (120 from general population, 21 private companies, 8 public institutions), segmented two-stage random sampling

Data collection method: Face-to-face interview

Column – Sewerage Development Project for Agadir City

In the Greater Agadir area, the aforementioned RAMSA is in charge of delivering sanitation services since 1993. The Sewerage Development Project in Greater Agadir Area (Phase-I) was implemented from 1998 to 2007, with the financial support from AFD (French Development Agency) and EIB (European Investment Bank). Details are as follows:

- Wastewater Treatment Capacity: 50,000 m^3/day (primary treatment), 10,000 m^3/day (secondary treatment)
- Construction of sewer pipelines: 72 km in total
- Total Project Cost: 828 mil Moroccan Dirhams (35 mil. Euro in total were financed by AFD and EIB while 476 mil Moroccan Dirhams were self-financed by RAMSA)

The phase-II of the above project is currently on-going, with the following specifications.

- Duration of Phase-II: From 2008 to 2015
- Wastewater Treatment Capacity: 20,000 m^3/day (secondary treatment) to be added to Phase-I
- Total Project Cost: 1,635 mil Moroccan Dirhams (35mil.Euro will be financed by AFD only.)
- Reuse of treated wastewater is the additional scope to Phase-I.

As mentioned above, a treatment plant with a certain capacity has started its operation while the secondary treatment capacity is only 10,000 m^3/day as of 2011. This level of capacity is not sufficient to response to the increased water supply capacity in the Greater Agadir (approx. 100,000 m^3/day in total as of now, refer to the Section of Effectiveness for more detail), remaining a particular concern that the volume of untreated water may increase in the future in this area.

(2) Impact on public health – decrease in waterborne diseases

Regarding waterborne diseases before and after the completion of this project, the following results shown in Table-10 were obtained from a beneficiary survey. It can be seen that the health conditions of some beneficiaries was greatly improved by the implementation of this project.[14] On the other hand it is hard to describe the decreasing trend in infectious waterborne diseases as solely due to the impact of this project, as it is naturally also thought to be largely due to the educational activities such as the Cleaning Campaign being implemented throughout the country by the Moroccan ministries, as well as the strengthening of health education.

Table-10: Health Condition of Beneficiaries before/after the Project (N=149)

Answers by Beneficiaries	No. of Respondent	Percentage
By receiving high quality water, my health condition was greatly improved.	42	28%
By receiving high quality water, my health condition was improved to some extent.	11	8%
There is no change in my health condition even after receiving high quality water.	33	22%
No answers / I cannot judge the difference, etc.	63	42%
Total	149	100%

Source: Beneficiary survey

At the same time, sewerage facility development in the Greater Agadir area was not implemented timeously in order to cope with the rapid increase of water supply capacity, as

[14] "Health condition" described in Table-10 includes waterborne diseases such as diarrhea.

stated in the "Column – Sewerage Development Project for Agadir City". At the time of analysis regarding the improvement of public health, it will be important to pay attention to the existence/nonexistence of a wastewater management project and related developments, and it seems that the positive effect by the existing sewage system can be limited in this case. Given these, we can suppose that this project contributed a certain extent to waterborne disease reduction in Greater Agadir, along with an improvement in the quality of water supplied and an increase in the percentage of population served.

(3) Impact on business environment

Regarding level of improvement of business environment for private companies, in-depth interviews of three (3) tourism companies in Greater Agadir conducted during the field survey provided the following views on the direct effects associated with project completion.

Table-11: Results of In-Depth Interviews with Private Companies in Greater Agadir Area

Answers by Interviewees	Type of Interviewees
Conditions of water quality, pressure, and hours supplied all improved markedly.	The hotel in Taghazout [1)]
Water quality has improved. (Decrease in turbidity, Decrease in salinity due to the change in water source from groundwater to purified water, etc.)	Hotels in the "touristic zone" [2)]
Cost of safe drinking water was reduced by 50%, compared to before the project. (Before project: Purchasing water tanks on a case-by-case basis	The hotel in Taghazout [1)]
Because of no complaints about quality of water (due to the continued supply of safe purified water), sales and the number of customers were increased.	The hotel in Taghazout [1)]
There are no remarkable changes in water pressure and hours supplied.	Hotels in the "touristic zone" [2)]

Note-1): The hotel which becomes to receive purified water from the project (located in Taghazout in the outskirts of Agadir City)

Note-2): Two hotels which already received purified water through RAMSA's distribution system before the completion of this project (located in the "touristic zone" in the seashore of Agadir City)

Similarly, regarding change in the business environment after project completion, the following responses were obtained from a total of 21 private companies in the beneficiary survey.

Table-12: Business Environment before/after the Project (N=21, Multiple Answers)

Answers by Private Companies	No. of Respondents
Production / sales were increased after receiving new water from the project	3 / 21
Quality of products / services were improved after receiving the new water from the project	12 / 21
Water purchase cost was reduced after receiving the new water from the project	8 / 21

Source: Results of beneficiary survey (for 21 private companies)

Note): Type of business and the number of respondents: 12 companies for tourism (including small and medium-sized hotel, restaurant, etc.), 2 companies for manufacturing (food processing) and 7 companies for service sector (including grocery retailing, hardware dealing, café, etc.)

Agadir is one of the most popular resort cities in the northern Africa and it attracts many tourists from Europe and the United States (especially from France and southern European countries) throughout the year. According to the result of Table-11, the business environment

of hotel industry in Agadir was surely improved by the implementation of the project. As for the hotel located in the rural area outside of Agadir City, in particular, some positive impacts (such as sanitary conditions, water purchase cost, sales, etc.) were realized in the course of the continued delivery of safe, purified water.

According to the beneficiary survey results demonstrated in Table-12, through the provision of quality water services that came with project completion, various positive impacts are being enjoyed by some companies located in Agadir City. Especially for the tourism sector including hotels and restaurants, this project contributed to improve the quality of service of this sector, by the continued delivery of safe purified water as well.

In addition to these, many of the interviewee companies in this survey were small and medium-sized enterprises run by a small number of staff. As the answers in Table 12 show, companies have been able to increase sales and to improve the quality of products and services. This is likely to have several indirect beneficial impacts on the owners and employees of these small and medium-sized companies (rise in income, etc.).

3.4.2 Other Impacts

3.4.2.1 Impact on Natural Environment

(1) Implementation status of EIA and Environmental Monitoring during Construction

While this project was not required, by the Moroccan law, to conduct an Environmental Impact Assessment (EIA), an EIA report was prepared during 2000 by an external consultant. This report corresponded with the guidelines[15] of the Overseas Economic Cooperation Fund (presently JICA).

Given the EIA report, where possible, mitigation measures were taken to minimize the environmental effects[16], specifically the damage to Argan trees[17], regarding the route alignment of water conducting pipes and the location of related facilities at the time of design. Special attention was paid to the cutting activities of an Argan tree during the construction period.[18] In addition, it is reported that there was no environmental effect on the habitat of many wild birds, which was part of the precautions considered at the time of the project appraisal.

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[15] The proper name was "Guidelines for Environmental Consideration" formulated in 1999.

[16] When implementing the civil works of water conducting pipes, for example, it was fully considered to mitigate environmental damage on the ecosystem as much as possible, by changing in the route alignment of conducting pipes, cutting trees as little as possible, etc.

[17] The Argan tree is found mostly in southern Morocco and belongs to the family of Sapotaceae. The "Argan Oil", squeezed from the fruit of the Argan tree, is receiving remarkable attention in these years as beauty products.

[18] Every single Argan tree along the construction route of a water conducting pipe was registered in the ledger, and cutting activities were approved and fully monitored by the Department of Forestry under the Ministry of Agriculture and Fishery if the need arose. (At the same time, this process was extremely time consuming, especially to obtain approval of cutting an Argan tree down, thus resulting in one of the main reasons for the project delay.)

As for environmental monitoring and management during construction, contractors monitored noise, dust and wastewater as appropriate. The Environmental Management Plan (EMP) was also prepared and related monitoring activities were reinforced, based on the recommendations by the environmental specialist who was employed specifically for this issue. As a result of these measures and activities, no complaints from the residents living in the vicinity, etc. were reported.[19]

Water sprinkling was also carried out as appropriate during construction operations in order to prevent any dust problems from occurring. The project was not seen to have any particular negative impacts on the natural environment. Also, some of the above recommendations (the preparation of an EMP, an introduction of checklists, etc.) were actually fed back to the civil works, contributing greatly to enhance the quality of environmental monitoring activities of the project.[20]

(2) Influence on the downstream of Tamri River by water intake

At the time of the project appraisal in 2001, there were some concerns that the increase in the volume of water intake by this project might cause a negative impact on the downstream of the Tamri River, such as the salination of underground water resources and a subsequent effect on plantation.[21]

With regards to the above caution, ONEP understands that no serious environmental problems with the increase of water intake volume have been confirmed in the downstream region.[22]

(3) Sludge from wastewater treatment plant

The dried sludge, which is the byproduct from the wastewater treatment plant, is currently donated to a cement factory in the northern part of Agadir City and the amount of donation reached to 2,000 tonnages on annual average. This can be regarded as one of the positive impacts of the project. Negative effects such as noise, odor, etc. from the sludge production have not been reported so far.

3.4.2.2 Implementation Status of Resettlement and Land Acquisition

The project involved land acquisition. No resettlement of local residents occurred during

[19] Source: Results of interview with ONEP

[20] Note that a specific environmental monitoring plan was not prepared after the project completion; given that no environmental impact was reported so far.

[21] Specifically, it was advised in the EIA report for the Moulay Abdellah Dam (Ait Hammou Dam at that time) project, which was conducted by Direction générale de l'hydraulique (DGH), that some detailed assessment of environmental impact on the downstream of Tamri River shall be implemented. (Source: JICA internal documents)

[22] Regarding the banana plantations that are sparsely located in the downstream of Tamri River, ONEP answered to the ex-post evaluator that "ONEP cannot be in the position of being responsible for taking actions for this issue, mainly because of illegal activities". (Source: Results of interview with ONEP)

the implementation of the project. Table-13 below shows the scale and process of the acquisition.

Table-13: Status of Resettlement and Land Acquisition of the Project

Item	Actual Status
Project-Affected Families (PAFs)	207 households
Scale of Resettlement	N.A.
Detailed Process of Land Acquisition	✓ Public announcement of land sales in "Official Bulletin" ✓ Decision of land price by the special committee ✓ Negotiation with the land owner, agreement and transfer of rights, etc.
Scale of Land Acquisition	139.4 ha in total (21.6 ha for forestry, 117.8 ha for public land)
Expenses for Land Acquisition	4.86 million Moroccan Dirhams

Source: Answers to the questionnaire to ONEP

Regarding the private land, land acquisition was conducted with 207 land owners in total, as shown in Table-13, and there were no disputes.[23] Sites for the surge tank, pumping stations and some areas along the water conducting pipes are on the state-owned land under the administration of the Haut Commissariat aux Eaux et Forêts et à la Lutte Contre la Désertification (HCEFLCD) and HCEFLCD is still the owner of these lands. As stated in Table-14, some lease expenses are paid from ONEP to HCEFLCD for the lease of these lands.

Table-14: Status of Land Acquisition and Lease by Project Facilities

Type of Facilities	Owner before Project	Owner after Project	Notes
Water Purification Plant Site	Privately owned	ONEP	Purchased through the process shown in Table-13
Surge Tank Site	Haut Commissariat aux Eaux et Forêts et à la Lutte Contre la Désertification (HCEFLCD)	The same	Lease expenses are paid from ONEP to HCEFLCD.
Pumping Stations Sites	HCEFLCD	The same	The same with the above
Water Conducting Pipe Sites	Privately owned HCEFLCD	ONEP The same	Purchased through the process shown in Table-13 Lease expenses are paid from ONEP to HCEFLCD.

Source: Answers to the questionnaire to ONEP

3.4.2.3 Unintended Positive/Negative Impact

In the course of the implementation of this project, many side effects occurred as follows. These can be regarded as the induced positive impacts from the project.

- "Rural Water Supply Project in Agadir" was implemented by KfW, a German agency. This project aims at providing purified water for the rural area in the northern part of Agadir City where the water conducting pipe was constructed by the JICA's Agadir Water Supply Project. With the usage of the above conducting pipe, the KfW project will distribute the water through the new distribution pipelines to be constructed under the project, which cannot be started without the JICA project.

[23] Source: Results of interview with ONEP Agadir Office

・ Similarly, the rural water supply project, which is currently implemented by ONEP in the vicinity of the target areas of the KfW project, also plans to utilize the JICA's conducting pipe for distributing the water. If the JICA project had not been implemented, this project could not have been launched as well.

To sum up, in addition to making contributions to improving the living environment of beneficiaries, this project, through its implementation, has significantly improved water supply services and service levels, and is contributing to the amelioration of the business environment for local companies. One can say that many positive impacts have been generated through this project's implementation.

3.5 Sustainability (Rating: ③)

3.5.1 Structural Aspect of Operation and Maintenance

ONEP[24], the executing agency of the project, is responsible for the operation and maintenance (hereafter O&M) of the related facilities that were built in the project. The ONEP's organizational structure includes departments involved in policy and strategy making, and water supply project implementation, as well as Regional Direction (RD) set up in 10 regions throughout the country. One of the abovementioned RDs, Regional Direction 1 (RD-1, also known as "ONEP Agadir Office"), is in charge of O&M for facilities related to this project, namely water intake, purification and transmission facilities.

Table-15: Responsibility Matrix of Operation and Maintenance Activities of Project Facilities

Type of Facilities	ONEP DR-1 (Agadir Office)	RAMSA
Water Intake and Raw Water Transmission	In charge	n.a.
Water Purification Plant in Tamri	In charge	n.a.
Water Transmission Facilities	In charge	n.a.
Water Distribution Facilities (outside the project scope)	*Water distribution facilities in 3 rural districts[1)]*	*Related facilities in Agadir City[2)] and in 1 rural district[3)]*

Source: Answers to the questionnaires to ONEP and RAMSA
Note-1): Three rural districts consisting of Tagazout, Tamri and Immousane
Note-2): Four urban districts consisting of Agadir, Ait Melloul, Inzegane and Dcheira
Note-3): Aourir (rural district)

Note that ONEP is only responsible for the water intake, purification and transmission facilities that are located in the urban areas, and Régie Autonome Multi-Services d'Agadir (RAMSA) is in charge of O&M for water distribution facilities (which is out of the scope of

[24] ONEP is a public corporation with financial autonomy, which is a predecessor of Industrial Exploitation Authority (REI) established in 1929 and was renamed as Office National de l'Eau Potable (ONEP) in 1972. The national drinking water authority ONEP is in charge of (1) the construction, operation and maintenance of water intake, purification and transmission facilities (in the urban areas such as Casablanca and Agadir), and (2) water distribution to the small and medium cities and rural areas. In addition to (1) and (2) of the above, (3) sanitation services delivery to the rural areas started in 2007 under the subcontract agreement with rural municipalities. As for the (2) and (3), the ONEP is also in charge of fare collection.

this project) located in the target areas of this project. Moreover, RAMSA is also responsible for the water tariff collection from customers and ONEP is just selling purified water to RAMSA. With regard to the service delivery in the rural areas, the responsibility between ONEP and RAMSA is complicated as shown in Table-15.

As shown in Table-16, O&M activities of the related facilities under ONEP Agadir Office's responsibility are implemented by (1) direct management for daily maintenance and (2) outsourcing to contractors for periodical and large scale maintenance. O&M manuals have been prepared by the consultant. No particular problems regarding the implementation structure of DR1 have been found for the planning, bidding and management of the contractors.

Table-16: Operation and Maintenance System of Project Facilities (for ONEP only)

Stage/Category of Maintenance Activities	Planning	Preparation of Tender Documents	Implementation	Supervision
Daily Maintenance	SP / LT	n.a.	SP / LT	SP / DR1
Periodical Maintenance	SP / DR1	SP / DR1	Contractors	SP / DR1
Large Scale Maintenance	SP / DR1	SP / DR1	Contractors	SP / DR1

Source: Answers to the questionnaire to ONEP

Note): DR1 refers to the headquarters of ONEP Agadir Office, and SP refers to the Sector Production Department of ONEP Agadir Office, and LT refers to the operation team in the site office of Tamri Water Purification Plant under the Sector Production Department.

As shown in Table-17, the number of workers engaged in O&M activities has increased for these four years. On the other hand, the number of O&M workers exclusively in charge of project facilities was only four people[25] (who are the operators of the water purification plant and others. Part-time workers and staff who are temporarily engaged in daily and periodical O&M activities for water intake, conveyance and transmission facilities are not included.). Although it seems that the number of full-time O&M staff might be small compared to the scale of the facilities in charge, there have been no serious problems, and this can be indirectly attributed to the (1) highly skilled professionals and (2) accumulated O&M experiences in similar facilities. There seem to be no problems in the structure of O&M work.

Table-17: Number of Staff of ONEP Agadir Office (DR1)

Year	ONEP Staff in Total	Of which, O&M Staff exclusively in charge of project facilities
2007	28	4
2008	28	4
2009	35	4
2010	36	4

Source: Prepared from answers to the questionnaire to ONEP

To sum up, no problems can be found in the institutional structure of O&M implementation,

[25] The total number of staff of ONEP was 7,265 at the end of 2008, which increased from 6,750 in 2004, with the growth rate of 8% for five years.

despite the relatively small number of workers in charge of O&M activities.

3.5.2 Technical Aspects of Operation and Maintenance

Technical skills of engineers and workers

The total number of employees at the ONEP Agadir Office (DR1) assigned to technical jobs for operation, maintenance, and management are 36 people as of 2011, consisting of 12% of university graduates, 32% of vocational schools, and 56% of others. They each have about ten years' average experience in operation and maintenance of the water supply facilities.

As shown in Table-17, the number of O&M workers at the ONEP Agadir Office has trended slightly upward from 2007. Measures to increase the number of staff engaged in O&M work at facilities related to this project have been taken, and the proportionate volume of personnel is being secured on an ongoing basis. ONEP has many similar water facilities in Morocco, and is amply accumulating O&M skills through the operation of these facilities. It would appear that there is no problem with the quantity and quality of engineering and technical staff.

Training programs provided by contractors of the Project

Various trainings for technical staff for operation and maintenance have been conducted by the contractors. Two types of training are provided; (1) lectures[26] and (2) On-the-Job Training (OJT) during the commissioning period, with the total number of participants at 20. Training is conducted by the contractor constantly, and the contents of the training are valued by the trainees.[27]

3.5.3 Financial Aspects of Operation and Maintenance

The financial situation of ONEP is sound and stable at this moment. Taking facilities related to this project alone into consideration, a certain amount of revenue has already been secured and it can be expected to continuously earn/generate a considerable amount of revenue from the purchases of the water produced by the project. At the same time, the decreasing trend in the gross profit margin and the increasing trend in receivables might be of some concern with regard to the financial management of ONEP overall. The ongoing upgrade of the fee collection system is desirable in order to improve financial soundness.

(1) Earnings condition

From 2004 onward, ONEP has posted a surplus every year, and it maintains an extremely favorable position as a public water utility. While the surplus had fallen to 9.2 million

[26] Subjects include control systems for water purification facilities, chemical products, bacteriological analysis of water quality, electrical components, hydraulics, etc.
[27] Source: Results of interviews with employees who underwent training.

Morocco Dirhams (MAD) in FY2008, it has recovered rapidly in FY2009 to the FY2007 level, due to the recovery in the accounts of non-operating profit and loss. The main reasons for the increase in sales are: (1) the start of operations of the new water supply facilities (including those of this project), (2) the increase in the volume of sales of water, due to the increase in water connections in the urban areas, (3) the increase in the population connected in the rural areas, and (4) the increase in the number of contracts of sanitation services delivery with rural municipalities. (The growth of sales was 18% for these four years.)

Table-18: Profit and Loss (P/L) Statement of ONEP

Unit: Million MAD

Year / Item	2006	2007	2008	2009
Sales	2,958	3,118	3,325	3,488
Cost of Sales	▲2,295	▲2,579	▲2,823	▲3,045
Material cost	▲468	▲610	▲677	▲755
Overhead Cost	▲855	▲869	▲940	▲995
Project investment, etc.	▲972	▲1,100	▲1,206	▲1,295
Gross Profit on Sales	663	539	502	443
Operating Profit	382	473	614	580
Non-Operating Profit and Loss	▲245	▲244	▲378	▲188
Ordinary Income	136	229	237	392
Extraordinary Income and Loss	83	▲4	▲67	▲167
Net Income before Tax	220	225	170	225
Net Income after Tax	134	137	92	124

Source: Prepared from documents provided by ONEP

At the same time, the increase in the rate of cost of sales is greater than that of sales, thus making the gross profit margin (operating profit on sales of water) decrease in trend. The causes for the increase in cost of sales are: (1) the sharp rise in the procurement cost of materials and equipment, (2) the growing investment into new water supply projects, and (3) the increase in the number of staff corresponding to the start of operations at new facilities, and the increase in associated overhead costs. Specifically, the procurement cost of materials and equipment has increased by 61% during the time between 2006 and 2009, which is supposed to be caused by the rise in electricity, fuel, and other fees associated with the sharp global rise in the price of oil.

As for trends in the water tariff increase, tariffs were raised a total of two times in April 2004 and March 2006 respectively. However, the recent increase in 2006 had a limited impact on the sales (the growth rate of sales from 2005 to 2006 was 7.6%), and there has been no tariff increase since 2006. In order to further boost earning capacity, there are expectations for further periodical increases in the water tariff on a continued basis, along with the curtailment of costs and development of new projects.

As for measures to reduce non-revenue water (NRW), ONEP is not in the position of taking practical measures on this issue because it is not responsible, as already mentioned earlier, for O&M of water distribution facilities located in the urban areas (When it comes to the measures to be taken for the water supply in the rural areas, this is a separate issue.).

Measures to prevent water leakage from water conveyance and transmission pipes of the project are operated successfully and are monitored by ONEP without any issues, given that.the rate of leakage is maintained at about 2%.

(2) Financial status

The capital ratio at the end of FY2009 was about 53%, maintaining a relatively high level. The current ratio and quick assets ratio were maintained at very high levels as well. There are no concerns regarding short-term financial security and short-term solvency.

Table-19: Balance Sheet (B/S) of ONEP

Unit: Million MAD

Year / Item	2006	2007	2008	2009
Assets				
Current Assets	4,375	5,143	5,605	6,709
Quick Assets	1,593	1,939	2,276	3,041
Fixed Assets	17,710	19,527	22,467	24,412
Total Assets	**22,086**	**24,670**	**28,702**	**31,121**
Liabilities and Equity				
Equity Capital	13,301	14,135	15,169	16,535
Current Liabilities	2,408	2,582	3,391	3,583
Fixed Liabilities	6,376	7,953	9,512	11,004
Total Liabilities and Equity	**22,086**	**24,670**	**28,702**	**31,121**

Source: Prepared from documents provided by ONEP

Table-20: Financial Indices

Year / Item	2006	2007	2008	2009
Gross Margin Ratio (%)	22.4	17.3	15.1	12.7
Sales to Receivable Ratio (%)	1.9	1.6	1.5	1.1
Days Sales Outstanding	196	227	250	318
Gross Debt (Mil. MAD)	8,784	10,535	12,903	14,587
Current Ratio (%)	181.7	199.2	165.3	187.3
Quick Asset Ratio (%)	142.0	168.3	137.8	183.5
Fixed Assets to Fixed Liability Ratio (%)	90.0	88.4	91.0	88.6
Capital Ratio (%)	60.2	57.3	54.0	53.1

Source: Prepared from P/L and B/S

However, total liability is consistently trending upward. The burden of interest payments on loans and repayment of principals are not urgent issues, but the future trends on these indicators must be noted. Receivables generated from unpaid water charges, etc., have been almost doubled in three years from 2006 to 2009. Regarding the sanitation services for the rural areas that started in 2007, the delay in collecting the service fee billed to the rural municipalities (client) is becoming a concern on the financial management of ONEP. As shown in Table-20, the sales to receivables ratio of 1.1 and the average days' sales outstanding at 318 are very high in 2009, thus resulting in a situation where an average of one year is needed to collect fees. In order to improve financial soundness, an ongoing upgrade of the fee collection system is desirable.

(3) Operation and maintenance expenditure relating to the Project

The income and expenditure relating to the facilities of this project is shown in Table-21. The annual O&M expenditure relating to the facilities of the project was ranged from 15 to 16 million Morocco Dirhams (for the Tamri Water Purification Plant only) after the start of plant operations in April 2007. Utilities costs such as electricity account for the majority of the overall expenditures.

The operating balance relating to the facility of this project was not clear because the O&M

personnel costs and operating costs of the water intake and transmission facilities were not disclosed. Considering the financial situation shown in Table-21 where the sales of water to RAMSA was accounted for 160 million Morocco Dirhams in total and the sales relating to this project was 57 million MAD, no concerns will be raised.

Table-21: Income and Expenditure relating to Project

Unit: Thousand MAD

Item	2008	2009	2010
Sales of Water to RAMSA	146,841	158,679	160,614
For this project (Estimated)	52,443	56,671	57,595
Total Income	**52,443**	**56,671**	**57,595**
Utility Costs (Electricity, Fuel, etc.)	13,081	13,487	12,049
Chemicals Cost	3,169	2,466	2,146
Repairing Costs, etc.	450	555	650
Total Expenditure	**16,700**	**16,508**	**14,845**

Source: Prepared from documents provided by ONEP

Note-1): Total expenditure only includes the O&M costs related to the Tamri Water Purification Plant that was constructed by this project.

Note-2): The water tariff revenue from the rural areas located in the target areas of this project (under the administration of ONEP) can be negligible.

As already described in the Section of Effectiveness, the number of households connected to the distribution network in Agadir City (where RAMSA is in charge of water distribution) has been growing steadily in recent years. Given this, this is expected to secure a certain amount of sales of water by RAMSA's needs.

3.5.4 Current Status of Operation and Maintenance

In general, the utilization status and O&M of the various facilities and equipment under the administration of the ONEP (such as the intake, water purification, transmission, and related equipment) are good, and no major problem has occurred to date. Items such as an O&M manual have been developed through this project.

Although some problems have occurred after the facilities went on-line, including: (1) Frequent power outages and unstable power supply[28] and (2) Difficulty in securing water intake volume[29], the ONEP Agadir Office (DR1) is continually looking for original solutions,

[28] **Frequent power outages and unstable power supply:** There has been difficulty in supplying power to the water purification plant due to frequent power outages (one time a week in some cases). Also, the voltage is sometimes unstable due to the problems with the power transmission line. In case of power cut, three generators were newly purchased by the own budget of ONEP (0.3 million Euro for the purchase cost). At the same time, a dedicated power line of approx. 40 km is being laid from the major power grid to the project's purification plant, since continuous use of a generator during outages has cost disadvantages. Project cost is estimated as MAD 12 million.

[29] **Difficulty in securing water intake volume:** The huge amount of floating debris is clogging up the water intake facility especially at the time of flooding in rainy seasons, and difficulties in securing intake volume currently happened. While there are some fences to protect the intake point from those debris and obstacles, it did not properly function because the unexpected amount of floating debris (which were not anticipated at the time of design) are continually coming from upstream to the intake area. ONEP is frequently doing the cleaning work to tackle with this issue at the moment. In addition to this, the project consisting of the construction of (1) a new water intake facility and (2) a new water conveyance pipe which directly connects

which it is steadily putting into practice. This development is the fruit of the technical capacity and ability of the relevant personnel of DR1 to act on them, as well as the sufficient O&M budget for the project facilities, and is highly commendable as a timely and pioneering response by the implementing agency.

Regarding the generators, as described in Footnote-28, these machines were not procured under the project but purchased by the ONEP's own budget after the completion of the project. Although the situation of frequent power outages and unstable power supply cannot be anticipated at the time of project planning, it might have been necessary to plan to install the generators at least for the purification plant, as a part of the contingency plan.

As for the issues of difficulty in securing the water intake volume, it seems that the situation of floating obstacles might have been easily anticipated from the beginning, although its amount was higher than initially estimated. It would have been more necessary to have considered some appropriate measures at the time of detailed design and other stages.

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

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project is highly consistent with government policies and no problems with operation and maintenance (O&M) systems can be found. The financial situation of ONEP is in favorable conditions at the moment. Major indicators such as the population served by this project, the amount of water supplied, and the facility utilization rate have exceeded 80% of the target value, and there is no particular problem with the quality of the purified water produced. Furthermore, the project contributes to improving the living environment of the beneficiaries to some extent, and numerous positive impacts have emerged, including the improvement of the service level of the water supply and the business environment in the target areas. In addition, in terms of efficiency, although the project period was longer than planned, the project cost was kept within the planned amount.

In light of the above, this project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations for Executing Agency

Receivables generated from unpaid water charges, etc., have been increasing in these years, making for a situation where an average of one year is needed to collect these outstanding

between the intake and Tamri Water Purification Plant is currently ongoing, as a fundamental solution. As of August 2011, the project is in the tender stage and the African Development Bank (AfDB) will co-finance to this project. Project cost is estimated as MAD 16 million.

fees (the average days' sales outstanding is 318 days). The soundness of the financial position of ONEP may not be questioned by this situation, at the same time, however, it must be especially noted that the delay in collecting the sanitation services' fee billed to the rural municipalities is becoming a concern for the financial management. From the long-term perspective, it is critical at an early stage to prevent the occurrence of a "possible influential factor" with regard to the financial sustainability, and it is desirable to take the necessary measures to encourage the client to pay service fees. More specifically, some practical options such as urging the central government to solve the issue, the case of violations of laws (i.e. payment in arrears to a municipal council, etc.) for example, should be considered.

4.2.2 Recommendations for JICA

Regarding the sewage system development in the Greater Agadir area, a treatment plant with a certain capacity has started operations, thanks to the financial support by the AFD and the EIB. On the other hand, the secondary treatment capacity is 10,000 m^3/day and this level of capacity is not a sufficient response to the increased water supply capacity. The water supply capacity is approximately 100,000 m^3/day in this region, thus the concern remains that the volume of untreated water may increase in the future. Moreover, the secondary treatment capacity may not be enough, even after the completion of the second phase of "The Sewerage Development Project in Greater Agadir Area" which is currently implemented by RAMSA.

Because water supply development will impose an increased burden on the environment, for example indirectly through the increasing wastewater, it is vital to advance measures for wastewater treatment concurrently with water supply development. It may be necessary for JICA to consider the possibility of cooperation in the sewage system development in the Greater Agadir area, under the donor coordination structure in Morocco. If the situation allows, exploration should commence with the possible cooperation with the AFD and the EIB, including the possibility of co-finance.

4.3 Lessons Learned

As for the issues of difficulty in securing the water intake volume at the Moulay Abdellah Dam, it seems that the situation of floating debris and obstacles during the flooding and rainy seasons might have been anticipated from the beginning, although its amount was much more than estimated. It would have been more necessary to have considered some appropriate measures at the time of detailed design and other stages.

Because it is one of the critical factors for a water supply project to continuously secure the stable quantity of water intake, some countermeasures to protect intake facilities from floating obstacles should be considered, with some detailed and appropriate technical studies, at the time of both basic and detailed design stages.

Comparison of Original and Actual Scope

Item	Plan	Actual
A) Output		
1.1 Water Intake and Conducting Facilities		
・ Water Intake Weir	One location	As planned
・ Primary Pump Stations	894 liter/sec., 3 units plus 1 backup, H=67m	894 liter/sec., 3 units plus 1 backup, H=70m
・ Surge Tank	1,000 m³ (500 m³×2)	As planned
・ Water Conveyance Pipelines	9,159m in total	8,560m in total
✓ Intake – Surge Tank	3,651m	3,430m
✓ Surge Tank – Purification Plant	5,508m	5,130m
1.2 Water Purification Plant		
・ Treatment Capacity	700 liter/sec.	As planned
1.3 Water Transmission Facility		
・ Water Conducting Pipes	57,850m in total	57,525m in total
✓ Purification Plant – Secondary Pump Station	40,800m	40,275m
✓ Secondary Pump Station – RAMSA Reservoir	17,050m	17,250m
・ Secondary Pumping Station	700 liter/sec., 3 units plus 1 backup, H=98m	700 liter/sec., 3 units plus 1 backup, H=98.5m
1.4 Power Lines	8.7km	4.47km
1.5 Access Roads	8.7km	Cancelled (Constructed by Public Works Department)
1.6 Consulting Service		
・ Consulting Service M/M	182 M/M in total (Foreign:64M/M, Local: 118 M/M)	165.54M/M in total (Foreign:64.36M/M, Local: 101.18M/M)
・ Consulting Service TOR	Bid documents review, Bid support, Construction supervision, Training program for ONEP engineers, etc.	As the same, excluding bid documents review
B) Project Period	February 2001 – January 2007 (72 months)	February 2001 – April 2007 (75 months)
C) Project Cost		
Foreign currency	3,438 million yen	193 million yen
Local currency	5,875 million yen	6,394 million yen
Total	9,313 million yen	6,587 million yen
Japanese ODA loan portion	6,412 million yen	6,327 million yen
Exchange rate	1MAD ＝10.76 yen (as of November 1999)	1MAD ＝ 12.80 yen (Average between Aug.2002 and May 2008)

Morocco

Meknes-Fes Track Doubling Project

External Evaluator: Hajime Onishi
Mitsubishi UFJ Research & Consulting Co., Ltd.

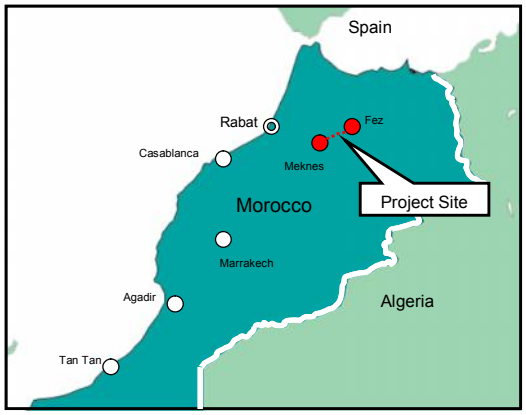
0. Summary

This project is highly consistent with government policies and no problems with operation and maintenance (O&M) systems can be found. Revenue from Morocco's key product, phosphates, dipped temporarily with the global economic slowdown. It is now on the track to recovery, however, with no apparent financial problems in particular.

With respect to freight transport, traffic has been declining over the long term because of intensifying competition from trucking due to development of the national highway network, and was affected by the aftermath of the Lehman Brothers collapse. Meanwhile, passenger transport has mostly achieved at least 80% of its targets in key indicators such as transport volume, trains in operation, travel time, and maximum speed.

Also, the project has made a number of positive impacts. Other than greatly contributing to increased convenience for residents along the project region, it has greatly improved the level of rail service and helped improve the business environments of local companies. In addition, in terms of efficiency, although the project period was longer than planned, project cost was kept within the planned amount. In light of the above, this project is evaluated to be satisfactory.

1. Project Description



Location Map

Upgraded Track and Passenger Train

1.1 Background

In 1998, the Morocco railway network spanned 1,907 km. Single track accounted for 1,537 km of this, however, and the network had reached its limits in terms of both passenger and

freight transport capacity. Passenger transport in particular accounted for less than a 10% presence[1] when compared to road transport. Given this, Morocco recognized the need to enhance railway transport capacity between the most important axis in economic development, running between the Casablanca area (population of 3.3 million), Rabat (1.38 million), Kenitra (1.06 million), and Fes (1.28 million). Seeing this as one of the most important policy issues in the rail sector, the administration undertook a project to convert the 320 km Casablanca-Fes rail segment to double tracks from 1975.

Of the above rail segment, the 57 km between Meknes and Fes was the last to be developed. In 1998, the railway transport volume for this last segment had reached 77%[2] single track usage with approximately 1.51 million passengers and 880,000 tons of freight. Well above the International Union of Railways (UIC) standard value of 60% for single track usage rates, the segment greatly needed double tracking to enhance its transport capacity.

Given the above, the Moroccan government of the time recognized the Meknes-Fes Track Doubling Project as a pressing issue and desired early implementation of the project.

1.2 Project Outline

The objective of this project is to strengthen the transport capacity, speed up trains, cut transport time and to improve punctual operation in the section between Meknes and Fes as well as in the section between Casablanca and Fez by doubling the track of 53 km, thereby contributing to increase logistics efficiency of the related area, and to accelerate economic development of the area along the track.

Loan Amount / Disbursed Amount	4,947 million yen / 3,871 million yen
Exchange of Notes / Loan Agreement Signing Date	June 2000 / February 2001
Terms and Conditions	Interest Rate:2.20% Repayment Period:30 years (Grace Period:10 years) Conditions for Procurement: General Untied
Borrower / Executing Agencies	Office National des Chemins de Fer, ONCF / The same with left
Final Disbursement Date	May 2008
Main Contractors (over 1 billion yen)	CEGELEC (Morocco), ALSOMA GEIE (France)
Main Consultant (over 100 million yen)	N.A.
Feasibility Studies, etc.	1997 Master Plan Study (by ONCF)

[1] Based on person-km, 1988 data (Source: JICA internal materials)
[2] Percentage of track capacity for trains in actual operation on said segment (including passenger vehicles, freight vehicles, maintenance vehicles, etc.).

	1997 Feasibility Study (by ONCF)

2. Outline of the Evaluation Study

2.1 External Evaluator

Hajime Onishi (Mitsubishi UFJ Research & Consulting)

2.2 Duration of Evaluation Study

Duration of the Study: December, 2010 – December, 2011

Duration of the Field Study: April 20, 2011 – May 4, 2011 / August 15, 2011 – August 22, 2011

2.3 Constraints during the Evaluation Study

The project is co-financed by the European Investment Bank (EIB) and the French government (AFD). Evaluations for efficiency, impact and sustainability include both EIB and French portions. To the extent possible, the data regarding both EIB and French portions were acquired for inclusion in efficiency evaluations.

Directly comparable freight transport data[3] corresponding to the target values set at the time of project appraisal were not provided. As such, the achievement rate to the target values was not able to be evaluated, but rather trends in recent years were evaluated.

3. Result of the Evaluation (Overall Rating: B[4])

3.1 Relevance (Rating: ③[5])

3.1.1 Relevance with the Development Plan of Morocco

Relevance with the national policies

At the time that project appraisal was carried out in 2001, the Moroccan government had plans to enhance transport capacity and improve safety for its railways. In its Five Year Development Program (2000-2004), the administration called for the following rail sector policies: (1) commercialization, (2) service upgrades, (3) modernized O&M, and (4) increased safety.

Even now in 2011, the 2010 Finance Act[6] calls for improved public access to basic services and corrections in regional disparities through rural development. In particular, it stipulates increased investment in road construction and airport construction along with

[3] Regarding the freight transport target values at the time of project appraisal, directly comparable data (with either origin or destination in the Meknes-Fes segment) was not provided.
[4] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[5] ③: High, ②: Fair, ①: Low
[6] Following the completion of the Economic and Social Development Plan (2000-2004), no new five-year long-term development plan has been formulated in Morocco. For the immediate future, it has been decided that provisional development policies will be denoted through the Finance Bill/Finance Act of each year.

modernization of the rail sector as part of efforts to strengthen infrastructure development programs.

From the above, enhanced transport capacity and increased investments in the rail sector were given as key policies both during project planning and ex-post evaluation. This is highly consistent with project objectives of "promotion and economic development of logistics by enhancing rail transport capacity, reducing travel time and ensuring safety."

Relevance with the sector policies

In 1996, the Moroccan government and ONCF entered into the 1996-2000 Business Project. The Business Project arranged for ONCF to start two key projects: 1) the Meknes-Fes Track Doubling Project and 2) procurement of freight and passenger railcars. ONCF was expected to invest a total of 6.7 billion Moroccan Dirhams (MAD).

Even now in 2011, the ONCF Investment Program for 2010-2015 stipulates upgrades to existing track as a key strategy along with modernization of facilities, procurement of new railcars, and a construction project for a new Tangier-Casablanca TGV line, with a total investment program of 32.8 billion Dirhams. Of this, 900 million Dirhams is expected to be invested between 2010-2015 on the project's Meknes-Fes section and points further east. The money will fund a track doubling and modernization project for the Fes-Oujda segment, a key component included in the above investment program.

From the above, it can be seen that rail sector policy for the Meknes-Fes Track Doubling Project was given high priority both during project planning and ex-post evaluation, and that it is fully consistent with the project's directionality.

3.1.2 Relevance with the Development Needs of Morocco

The table below gives railway transport volume for the Meknes-Fes and Casablanca-Fes sections since 2001 (also described in Section 3.3 Effectiveness). The project was completed in December 2006 with operation on double tracks commencing in January 2007. As a result, passenger traffic between Meknes and Fes is growing faster than the national average[7].

Meanwhile, freight traffic between Meknes and Fes peaked in 2004 at 990,000 tons. It then declined sharply, cut to 300,000 tons in 2010. The main factors in the decline in freight traffic since 2008 have been competition from road transport,[8] as well as reduced phosphate derivative exports in the aftermath of the Lehman Brothers collapse and the associated reduction in domestic freight transport of phosphoric acid products.[9]

[7] For example, passengers for the Meknes-Fes section for 2009-2010 increased 7.8%. Nationwide, passengers increased an average of 4.7% over the same period.
[8] Refer to Section 3.3 Effectiveness for detailed analysis.
[9] Refer to the column in 3.3 Effectiveness on the presence of phosphate derivative transport in Morocco rail freight transport.

Table-1: Railway Transport Volume between Casablanca/Fez and Meknes/Fez

Year	Passenger Casablanca - Fez (1000 persons)	Passenger Meknes - Fez (1000 persons)	Freight Casablanca - Fez (1000 tons)	Freight Meknes - Fez (1,000 tons)
2001	Not known	1,634	2,229	826
2002	Not known	1,738	2,339	764
2003	Not known	1,935	2,559	978
2004	Not known	2,148	2,568	987
2005	16,247	2,467	2,876	945
2006	17,764	2,508	2,372	862
2007	19,752	2,774	2,218	691
2008	20,395	2,953	2,007	556
2009	21,832	3,275	1,217	329
2010	22,945	3,530	483	298

Source: Answers to the questionnaire to ONCF

Note-1): The operation of the project facilities started in December 2006.

Note-2): Freight volume data shows the data where both of origin and destination of the freight are in between the sections described in the above table. (For example, the tonnage data on the extreme right in the Table-1 shows the freight volume transported between Meknes and Fez only.)

As mentioned above, passenger traffic has shown strong growth, and passenger transport demand in the project area is still high. Without the significant increases in transport capacity brought about by the project, passenger demand probably would not have been met, greatly impacting the quality of rail passenger service between Meknes and Fes. Meanwhile, there has been a significant reduction in freight traffic, greatly impacted by (1) competition with road transport and (2) reduced phosphate related exports, a key product, due to the aftermath of the Lehman Brothers collapse.

3.1.3 Relevance with Japan's ODA Policy

At the time of project appraisal in 2001, the Japan Bank for International Cooperation (JBIC) regarded infrastructural development for Morocco's sustainable growth, improving its international competitiveness, and promoting private investment as priority areas in Moroccan support in the enforcement policy for the Medium-Term Strategy for Overseas Economic Cooperation Operations to Morocco. For the rail sector in particular, JBIC provided three ODA loans in the 1970s and 1980s, all for rail vehicle procurement. Since the 1990s, policy has focused on the road and rail sectors, based on the aid framework for economic growth between Casablanca and Fes. Given the above, the project is highly consistent with Japanese aid policy.

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

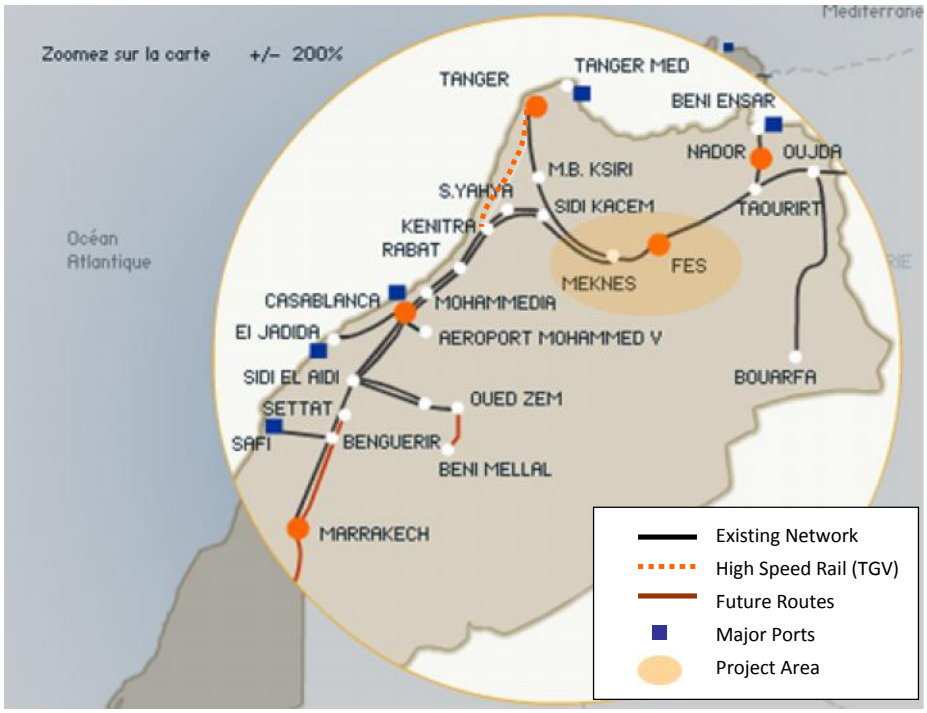


Figure-1: Location of the Project Site (Source: Prepared from the Figure on ONCF Website)

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

Comparison of outputs planned and actual performance is shown in Table 2 below. Of the components shown in Table 2, there are no major changes in output other than for tunnel and bridge construction under (4) Substructure, Tunnel and Bridge (EIB portion).

Table-2: Changes in Output

Project Components	Original	Actual	Differences
(1) Lot-1: Rail (JICA portion) ・ Procurement of steel rails	10,856 units	The same	As planned
(2) Lot-2: Switchgears (JICA portion) ・ Procurement of switchgears	51 units	The same	As planned
(3) Lot-3: Superstructure and Electrification Works (JICA portion)	Procurement and installation of sleeper, ballast, catenary wiring, and upgrading of substation	Mostly the same	Mostly as planned
(4) Substructure, Tunnel and Bridge (EIB portion) ・ Substructure construction works ➢ Double tracking of existing rail tracks ➢ Construction of new rail tracks ・ Construction of tunnel ・ Construction of bridges	 33 km in total 20 km in total 800m Construction of bridges	 The same 22 km in total Cancelled Boughani Viaduct Length: Extended to 856m Piers: Hightened	 As planned Mostly as planned Changed Changed

Project Components	Original	Actual	Differences
(5) Telecommunication Facilities (EIB portion)	Procurement and installation of telecom facilities	The same	As planned
(6) Signal Facilities (AFD portion)	Procurement and installation of signal facilities	The same	As planned
(7) Consulting Services (EIB portion)			
・ Consulting Service M/M	Approx.10 M/M in total (Foreign:6 M/M, Local: 4 M/M)	The same	As planned
・ Consulting Service TOR	Study, Quality control and Support for construction supervision	The same	As planned

Source: JICA internal documents, answers to the questionnaire to ONCF and results of interviews

For tunnel construction, the geological survey showed that ground water levels in the planned section were higher than expected at the time of project design, and were expected to greatly exceed the budget for the originally planned wall slab construction. Thus the tunnel construction was cancelled, and they decided to raise the track bed and apply the open-cut method.

Along with the aforementioned increase in track bed height, the Boughani Viaduct, originally to be built over an approximately 1 km section headed east from the tunnel entrance facing Fes, was extended further than planned. Viaduct piers were also raised higher.

The distance for newly constructed double tracks given in (4) Substructures, Tunnels and Bridge (EIB Portion) was increased from the planned 20 km to 22 km by the time construction was completed. This change was made in detailed design (D/D) due to topographical conditions and other factors.

In addition, the Lot 3 bid for superstructure, electrification and substation construction was to be entrusted to one contractor, but the lowest bid significantly exceeded the estimated prices. The bid was then retendered with Lot 3 further divided into three portions[10] to ensure competitiveness. There were no scope changes for Lot 3 following this division.

Boughani Viaduct

Both consultant input volumes and consulting service terms (TOR) are as originally planned for consulting services. As mentioned below, the project is well behind schedule, but there have been no changes in the

[10] Source: JICA internal documents

volume of consultant employment or TOR. The ONCF is directly managing all increases in workload caused by the delays.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total cost of the project (JICA portion only) was originally 6,596 million yen (the Japanese ODA loan share was 4,947 million yen) but the actual project cost was 3,871 million yen (the Japanese ODA loan share was 3,871 million yen), which was equivalent to 59% of the original plan.

The primary reason for the large decrease in total project cost is more efficient tendering[11] due to the subdivision of Lot 3. This subdivision has also greatly decreased foreign currency, local currency and ODA loans below initial estimates.

Note that the actual total project cost is 16,342 million yen, including EIB loans, loans from the French government and funds from the Moroccan government itself. This almost 17% cost overrun of the initially planned 13,975 million yen is attributable to depreciation of the yen (approximately 15% against the Moroccan Dirham).

3.2.2.2 Project Period

The project period was longer than planned.

The project was scheduled from February 2001 to December 2003, a period of 35 months, but it was extended to 71 months, from February 2001 to December 2006,[12] which was equivalent to 203% of the original plan.

The main reasons for the delays were: (1) retendering the superstructure, electrification, and substation construction bid for Lot 3 and (2) cancelling tunnel construction and the associated redesign of the route alignment.

Regarding the first point, as described above in 3.2.1 Project Outputs, the bid for the superstructure, electrification and substation construction was to be entrusted to one contractor, but the lowest bid exceeded price estimates by 83%. According to ONCF, the prime contractor's lowest bid rose due to the increase in management costs from having to include several specialist subcontractors in the bid to cover the technical requirements of the Lot, spanning a) track laying, b) constructing the catenary wiring, and c) substation work. There was then a retender with the lot divided into three sub-portions to ensure its

[11] The ONCF estimated price for Lot 3 was 442 million Moroccan Dirhams, and the lowest bid amounted to 807 million Dirhams, or approximately 1.8 times the estimates. By dividing Lot 3 and retendering, the total of the lowest bids came to 274 million Dirhams for a 66% discount off the initial estimated price. (Source: Answers to the questionnaire to ONCF)

[12] The loan disbursement was completed in June 2008, but as mentioned, the majority of work was completed in December 2006 and the double track section from the Project opened in January 2007. It was from this time that passenger and freight transport service started and the effects of the project started to show, so the above opening date can be considered as appropriate for project completion.

competitiveness. Contracts for Lots 3-1 through 3-3 were executed by May 2005, and said work was completed in December 2006. The above series of events resulted in almost a three year delay.

Table-3: Comparative Table of Project Periods

Task	Original Schedule (months)	Actual (months)	Differences (months)
JICA portion (Superstructure)			
EIA Approval & Land Acquisition	Completed in December 2001	Completed in March 2006	n.a.
Tender & Contract (Lot 1&2)	Completed in February 2002	Completed in July 2003	n.a.
Procurement & Civil Work (Lot 1&2)	Completed in July 2002	Aug. 2003 – Jan. 2005 (18.0)	n.a.
Tender & Contract (Lot 3)	Completed in August 2002	Completed in May 2005	n.a.
Procurement & Civil Work (Lot 3)	Completed in December 2003	Jun. 2005 – Dec. 2006 (19.0)	n.a.
EIB portion (Substructure / Telecommunications)			
Tender & Contract	Completed in June 2001	Completed in March 2002	n.a.
Procurement & Civil Work	Oct. 2001 – Mar. 2003 (18.0)	Apr. 2002 – Mar. 2005 (36.0)	+ 18.0
AFD portion (Signals)			
Procurement & Civil Work	Jun. 2003 – Dec. 2003 (7.0)	Apr. 2006 – Dec. 2006 (9.0)	+ 2.0
Total[1)]	Feb. 2001 – Dec. 2003 (35.0)	Feb. 2001 – Dec. 2006 (71.0)[2)]	+ 36.0

Source: JICA internal documents, answers to the questionnaire to ONCF and results of interviews.
Note-1): Project commencement was defined as the date of L/A conclusion (Feb.2001). For the definition of the date of project completion, refer to the Footnote-12.
Note-2): Although the construction works was completed in December 2006 and project completion certificate was issued in December 2007, the operation of the constructed facilities (commercial operation of the passenger train on the newly constructed tracks) started in January 2007.

Regarding the second point, as also described in 3.2.1 Project Outputs, tunnel construction was cancelled as ground water levels in the section scheduled for construction were deemed higher than estimated during design. With the raised track bed and other adjustments, longitudinal sections needed to be redesigned, including the Boughani Viaduct. The redesign took about eight months, thus delaying the tendering and contract for the EIB portion by eight months.

In addition, the delay in (2) above also delayed the start of adjustments on the French government portion (signal facilities) by about three years. Note that co-financing with EIB and the French government went forward as planned. There were no problems in coordinating components as the project progressed.

Although the project cost was lower than planned, the project period was longer than planned (203% of the original plan), therefore efficiency of the project is fair.

3.3 Effectiveness (Rating: ②)

3.3.1 Quantitative Effects

3.3.1.1 Results from Operation and Effect Indicators

(1) Passenger traffic

Passenger traffic shows strong growth. Since completion of the project in 2007, passenger traffic has grown an annual average of 8.4% (person-km). This greatly exceeds the national average for the same period at 6.3%.

In addition to population growth centered in Meknes and Fes, users have noted improvements in comfort, punctuality, and safety, as given in 3.4 Impact below. These improvements in service level are considered to have greatly contributed to the increase in passenger traffic.

Table-4: Achievement Rate of Main Indicators

Operation and Effect Indicators	Baseline Data (1998)	Target Value (3 Years After Facility Operation)[2)] a	Actual Value (2007, At the Time of Project Completion)	Actual Value (As of 2010) b	Achievement Ratio (%) b/a
Transportation Volume (Meknes-Fez)					
Passengers (thousand person)	1,507	3,008	2,774	3,530	117%
Passengers (thousand person-km)	Not known	906,308	150,463	191,926	21%
Freight (thousand ton)	Not known	Not known	691	298	n.a.
Freight (thousand ton-km)	Not known	Not known	172,000	124,000	n.a.
The Number of Running Train (Meknes-Fez, nos./day) [1)]	30	48	Not known	52	108%
The Running Hour (for Passenger Train)					
Casablanca – Fez (hrs./min.)	4 hrs. 40 min.	3 hrs. 10 min.[2)]	3 hrs. 20 min.	3 hrs. 20 min.	95%
Meknes – Fez (hrs./min.)	Approx. 50 min.	Approx. 30 min.[2)]	36 min.	47 min.	64%
Maximum Speed (Meknes-Fez)					
Passenger Train (km/h)	100	160[3)]	160	160	133%
Freight Train (km/h)	65	Not known	80	80	*123%*[4)]

Source: Answers to the questionnaire to ONCF, results of interviews with ONCF, Project Completion Report (PCR) and JICA internal documents

Note-1): Total number of passenger and freight trains operated

Note-2): Target value at the time of project completion in 2007

Note-3): It was planned that a "pre-conditioning operation" was conducted with the maximum speed of 120 km/h until half a year after the project, then the maximum speed was increased up to 160 km/h (Source: JICA internal documents). In actual, such an operation was firstly conducted with the maximum speed of 120 km/h, and then it was increased to 160 km/h after the middle of 2007, as originally planned.

Note-4): Achievement rate to the baseline data

The person-km target value at the time of project appraisal was 906,300,000 person-km, which assumes each person will ride more than 300 km annually (906,308 / 3,008 = 301 km). In light of Morocco national passenger traffic levels for 2010 (approximately 4.4 billion person-km, or 140 km/person/year; see Table 5 for details) and Japanese examples,[13] it is likely that the estimated person-km target value might be unreasonable or that there is some

[13] For example, approx. 28 person-km/years is the average value of the six Japan Railways (JR) companies in 2008. (Source: Suji de Miru Tetsudo 2010 (written in Japanese))

sort of error.

Table-5: ONCF Passenger Transport Volume for Past Five Yeas

Year		2006	2007	2008	2009	2010
Casablanca - Fez	(Thousand persons)	17,764	19,752	20,395	21,832	22,945
Casablanca - Fez	(Million persons-kilometers)	1,696	1,867	1,933	2,056	2,145
Meknes - Fez	(Thousand persons)	2,508	2,774	2,953	3,275	3,530
Meknes - Fez	(Million persons-kilometers)	136	150	160	178	192
Whole Country	(Thousand persons)	23,582	26,116	27,527	29,600	31,000
Whole Country	(Million persons-kilometers)	3,333	3,658	3,820	4,190	4,398

Source: Answers to the questionnaire to ONCF

(2) Freight traffic

As mentioned previously in Section 2.3 Constraints during the Evaluation Study, it is difficult to quantitatively assess freight transport as no data pertaining to target values was available. Even so, transport volume has been declining over time, as shown in Tables 1 and 4. Freight traffic (tons) between Meknes and Fes in 2010 slumped to 35% of 2006 levels.

Table-6: ONCF Freight Transport Volume for Past Five Yeas (for Reference)

Year		2006	2007	2008	2009	2010
Casablanca - Fez	(Thousand ton)	2,372	2,218	2,007	1,217	483
Meknes - Fez	(Thousand ton)	862	691	556	329	298
Whole Country (excl. Phosphate transport)	(Thousand ton)	3,803	4,036	4,836	4,127	4,960
Whole Country (incl. Phosphate transport)	(Thousand ton)	34,851	35,859	31,703	25,000	36,000
Whole Country	(Million ton-kilometers)	5,827	5,794	4,986	4,111	5,572

Source: Answers to the questionnaire to ONCF and ONCF Annual Reports

As mentioned in 3.1 Relevance, production of phosphates, a major Morocco export, and domestic transport of derivative products (chemical fertilizer, etc.) dropped sharply with the global economic downturn following the collapse of Lehman Brothers in September 2008.[14] According to Fes regional ONCF freight officials, the Office Chérifien des Phosphates (OCP), owners of a phosphate fertilizer factory in Jorf Lasfer in southern Casablanca, has seen depleted transport volumes for chemical fertilizer heading towards Meknes and Fes.[15] Specific details on the above are unknown as no concrete data has been disclosed. In addition, officials also pointed out that volumes for coal, petroleum products and other imports bound for Fes and Meknes have also decreased along with the slowdown in the domestic economy. Presumably, the sharp decline in rail freight transport since 2008 over the project section is largely due to the above two points.[16]

[14] 2010 figures have recovered to 2006 levels. Refer to the footnote 16 for details.
[15] The Meknès-Tafilalet and Fès-Boulemane Regions are major agricultural supply regions for Morocco.
[16] Presence of phosphate transport in Morocco rail transport: As of 2010, Morocco boasts the world's largest deposits of phosphates (76% of world deposits). It is first in export volume and third in production behind China and the U.S. (Data source: USGS website). Nearly all phosphates for export or purification is transported by railway. ONCF exports an average of 30 million tons of phosphate derivatives annually; 1/3 of this is for export, and the remaining 2/3 is for domestic purification (ratio taken from ONCF website). In 2010, approximately 31 million tons of phosphate was transported, with phosphate-related transport accounting for 87% of the 36 million tons total of freight transport for 2010. Phosphate-related transport

In addition to the above, since the 1980s, Morocco rail freight transportation has shown a general decreasing trend with intensifying competition from truck transport owing to the development of the national highway system. With no detailed data this is only speculation, but for container transport of imported industrial goods and daily goods from the major trading ports of Tangier-Med and Casablanca, road transport is expected to continue gaining in predominance along with the development of the highway network as Meknes and Fes are 200-300 km away.[17]

(3) Complementarily with High Speed Rail program in Morocco

From 2013, Morocco is scheduled to introduce the first high-speed rail (Train à Grande Vitesse, or TGV) on the African continent and new locomotives with technical assistance from France. The immediate plan is for a Tangier-Casablanca TGV. Construction started in September 2011 and the line is scheduled to open in late 2015.

Passenger Train on Meknes Station

In relation to the project, a TGV line is planned from near Sidi Kacem to Oujda, passing through Meknes and Fes, with service scheduled to start between 2025 and 2030. The track outfitted in the Meknes-Fes section in the project will be used as the TGV track (or further upgraded for use).[18] This will mean that the project will have outfitted some of the infrastructure for introducing future high-speed rail.

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

(1) Financial Internal Rate of Return (FIRR)

FIRR figures were recalculated with several conditions described in Table 7 below.

The result of recalculating FIRR was -0.33%, which was much lower than the 8.80% (3.4% for the case with no increase in freight transport volume) at the time of project appraisal. The reason for this will be, (as described in Section 3.3 Effectiveness), that the estimated

revenues also account for around 50% of annual ONCF operating revenues (Refer to the 3.5 Sustainability for more detail).

[17] Fes regional ONCF freight sector officials said that, "road and rail transport items are clearly segregated (rail transport is for phosphate and mineral resources, steel products, cement, energy-related and resource-related products; road transport is for daily goods and other products), and the two modes generally do not compete with one another." In contrast, a major freight forwarder with an office at Casablanca port replied that "it will depend on the goods for transport, but we generally use trucks to transport from Casablanca port to Meknes and Fes given the travel time."

[18] Source: Results of interview with ONCF

person-km target value might be unreasonable or there is some sort of error.[19]

Table-7: Recalculation of FIRR

Timing	Preconditions and Assumptions for Recalculation (Project Life: 20 years after the completion of the Project for each case)	FIRR
At the time of appraisal (in 2001)	Costs: Construction cost, consulting service cost and operation and maintenance cost. Revenue: Induced earnings caused by double tracking (Difference between unit operating revenue and marginal cost times additional demand on both passenger and freight transport.)	8.80% (8.4%[1)])
At the time of ex-post evaluation (in 2011)	Costs: Construction cost, consulting service cost, operation and maintenance cost (based on the actual expenditure up to 2010) Revenue: Induced earnings caused by double tracking (Difference between unit operating revenue and marginal cost times additional demand on both passenger and freight transport.)	- 0.33%

Note-1): The case with no increase in freight transport after the completion of this project

(2) Economic Internal Rate of Return (EIRR)

The economic internal rate of return (EIRR) was not calculated due to limited resources for this study, because it would have been necessary to clarify quantitative input data from the beneficiary side, such as "Cost reduction caused by the modal shift from road traffic to railway traffic".

3.3.2 Qualitative Effects

Along with the reduction in traffic accidents, eliminating railway crossings and moving to grade separation crossings has improved the safety of rail service. There were 15 crossings before the project, but 13 were eliminated as of August 2011.[20] Also, there were six cases of serious injury or death over the Project section from 2001 to 2006, but there have been zero cases since January 2007. Thus, eliminating railway crossings through the project has considerably improved the safety of train service.

From the above analysis, passenger travel has achieved at least 80% of its targets in all indicators, such as transport volume (in persons), trains in service, travel time, and maximum speed. Meanwhile, freight transport volumes are trending to decrease due to the sharp decline in transport volumes for fertilizer and energy-related products to Meknes and Fes. The underlying causes of this decline are the intensifying competition from trucking due to development of the national highway network and the aftermath of the Lehman Brothers

[19] 2006 estimates for three years after project completion were 906.3 million person-km, comprising almost a quarter of the current Morocco passenger traffic levels nationwide (approx. 4.4 billion person-km). From the scale of population along the Project areas (approx. 1.7 million), these estimates seem to be highly excessive. Incidentally, the total population of Morocco is around 31 million.

[20] Currently in 2011, ONCF is working together with local communes to eliminate the remaining railway crossings and install grade separation. The remaining two crossings are slated for elimination by 2015. (Source: Results of interview with ONCF)

collapse.

Therefore, this project has somewhat achieved its objectives, therefore its effectiveness is fair.

3.4 Impact

3.4.1 Intended Impacts

(1) Increase in the level of convenience in the residential people along the project area

A beneficiary survey[21] on levels of railway service before and after the project completion yielded the following responses:

Table-8: Difference in Service Level before/after the Project (N=150)

Answers by Beneficiaries	No. of Respondent	%
After the project, service level provided by ONCF was clearly improved.	57	38%
After the project, service level provided by ONCF was improved to some extent.	81	54%
There is no change in ONCF's service level even after the project.	6	4%
No answers / I cannot judge the difference, etc.	6	4%
Total	150	100%

Source: Beneficiary survey

Additionally, asking respondents who answered that a service had "clearly improved" or "improved to some extent" what they thought was most improved yielded the following responses:

Table-9: Detailed Reasons for Service Level Improvement (N=138)

Answers by Beneficiaries	No. of Respondent	%
Passenger train's speed was much faster than before the project.	40	29%
The amount of time required to the destination was reduced after the project.	75	54%
The congestion level inside the train was improved to some extent after the project.	15	11%
The safety of the train was improved after the project.	8	6%
Total	138	100%

Source: Beneficiary survey

The above results from the survey of beneficiaries show that railway service levels have definitely improved with the project completion. In particular, respondents pointed out service improvements in terms of the following: (1) shorter travel time due to improvements in train speed, (2) less congestion due to more trains in service, and (3) fewer accidents (and improved safety) arising from the elimination of railway crossings.

Additionally, the beneficiary survey demonstrates the following responses in terms of

[21] Below is a summary of the survey of beneficiaries:
Locations: Along the Project region (Meknes, Fes, and 3 stations between Meknes and Fes)
Target groups: Common rail passengers, cargo shippers, retailers
Sample totals: 150 (140 common passengers, 5 cargo shippers, 5 retailers), segmented two-stage random sampling
Data collection method: Face-to-face interviews

major destinations when using rail before and after the project completion:

From Table 10, changes in user behavior can be observed in terms of rail destinations with the project completion. Before the project completion, they preferred relatively closer destinations (Meknes, Fes, etc.), but after completion they were more likely to select cities further away like Casablanca, Rabat and Oujda as destinations. Reading further into this finding, it can be noticed that residents living along the Meknes-Fes line will likely start considering rail for trips to more distant destinations than before owing to service speed improvements, reduced travel times, increased trains and other improvements. With improved access to Meknes and Fes for far off residents, traffic in the opposite direction is also expected to increase.

Table-10: Changes in the Passenger's Primary Destination before/after the Project
(N=150, Multiple Answers)

Primary Destinations	Before the Project	After the Project
Fez	146	90
Meknes	87	80
Oujida	27	37
Rabat	40	53
Casablanca	26	38
Tangier	0	1

Source: Beneficiary survey

(2) Improvement in Logistic Efficiency and Business Environment

In-depth interviews on business environmental improvements were conducted with three manufacturers, one tourism company, and three other companies[22] in the Meknes and Fes areas during the field survey. The companies gave the following opinions on the direct effects of the project completion.

Table-11: Results of In-Depth Interview with Private Companies in Meknes-Fez Area

Answers by Interviewees	Number of Respondent (Type of Respondent)
Sales were increased due to the increase in the number of customers, after completion of the project.	4 companies (Tourism and other sector)
We started to use railway service for transporting our goods, after completion of the project.	3 companies (Manufacturing)
Because of this project, we decided to do additional investment (procurement of new machines, enhancement of storage capacities, etc.).	1 company (Cement production)
Because of this project, our factory became to avoid being shut down, due to timely and efficient supply of clinker from Oujida area.	1 company (Cement production)

The results shown in Table 11 suggest that business environments have improved after the project completion, especially for the manufacturing industry. The three manufacturing

[22] Manufacturing: 1 cement manufacturer and 2 food processing companies; Tourism: 1 hotel industry company; Other: 2 communications/postal companies and 1 logistics service company. Breakdown of manufacturing industry goods shipped - cement manufacturer: clinker (loaded as raw material) and cement (shipped as the product); food processor: caruppe (raw chocolate shipped as product), corn (loaded as raw material) and wheat (same).

companies in particular responded that they had switched domestic transport for some products from trucks to rail once the project was completed. All three companies identified (1) lower risk of product theft and (2) more reliability when compared to truck transport as the reasons for the switch.

3.4.2 Other Impacts

3.4.2.1 Impact on Natural Environment

Implementation status of EIA and Environmental Monitoring during Construction

While Morocco had no laws in place pertaining to Environmental Impact Assessments (EIA) at the time of project appraisal, JBIC did hire external consultants to conduct an initial EIA in January 2000 and a detailed EIA in April 2001 in accordance with its guidelines. The EIAs reported no particular negative impacts.

Given the above, there was no large-scale environmental monitoring during construction. Contractors also monitored noise, vibration and other disturbances as appropriate for construction in urban areas. There were no complaints from nearby residents or businesses.[23]

3.4.2.2 Implementation Status of Resettlement and Land Acquisition

The project involved land acquisition and resettlement of local residents (nine households in total) which occurred during the implementation of the project. Table 12 below shows the scale and process of the acquisition.

Table-12: Status of Resettlement and Land Acquisition of the Project

Item	Actual Status
Project-Affected Families, PAFs No. of Households (Land owners) for Land Acquisition No. of Resettled Households	229 households 220 households 9 households (all illegally settled)
Detailed Process of Land Acquisition:	・ Public announcement of land sales in "Official Bulletin" ・ Inventory survey of land (boundary identification, etc.) for acquisition (implemented by ONCF) ・ Preparation of the agreement with the land owner about the result of inventory survey (implemented by ONCF) ・ Discussion and decision of land price by the special committee (consisting of Min. of Agriculture, Min. of Finance and representatives of the residential people) ・ Negotiation with the land owner, agreement and transfer of rights, etc. (mainly implemented by ONCF)
Total Area of Land Acquisition	80 ha. in total
No. of Stakeholder Meetings Conducted	30 meetings in total
Total Expenses for Land Acquisition	6.1 million Moroccan Dirham

Source: Answers to the questionnaire to ONCF and results of interview with ONCF

As shown in Table 12, land was acquired from 220 land owners. All land acquired was farmland, covering a total of 80 ha. Some landowners with land from Fes Station to about 1.5 km in the Meknes direction did not agree to sell and had their land forcefully expropriated in

[23] Source: Results of interviews with ONCF personnel involved in Project construction management

accordance with domestic Morocco law. The expropriation was completed in March 2006. As already shown in 3.2.2.2 Project Period, the above forceful expropriation had almost no effect on the construction schedule.

Regarding the concerns noted at the time of project appraisal that "25 illegal homes located outside the city of Meknes have been successfully relocated without any special issues," it is confirmed by ONCF that (1) nine households, not 25, were resettled and (2) the above nine households were compensated through the local communes/government and resettled voluntarily with some support from the local communes/government. No specific problem was found in this resettlement process.[24]

3.4.2.3 Unintended Positive/Negative Impact

Several incidental projects were implemented alongside the project, including dry port construction and redevelopment of the areas in front of stations. These can be evaluated as positive impacts of the project.

- ONCF is taking the lead in construction of the Ben Suda Dry Port as a multi-modal logistics hub on the outskirts of Fes Station. This dry port is planned as a transshipment base for rail and road freight, timed in anticipation of the project completion. Construction of this dry port will strengthen ties with road transport. It can be expected to make freight transport more efficient and have a synergistic effect with road transport.
- Related to the above dry port, a construction project is underway to construct a new rail freight terminal near Ras El Ma Station, an intermediate station on the project rail section.
- A related project was started after completion of the project to develop the plaza in front of Fes Station. Besides improving safety for pedestrians, this has drastically improved the flow of taxis and private cars near the station entrance and significantly improved passenger convenience.
- As mentioned in 3.3 Effectiveness, serious injury and deaths have plummeted in conjunction with the elimination of railway crossings and developing grade separations. The project has improved the safety of neighboring residents.

Fez Station and Station Square

[24] Source: Results of interviews with ONCF personnel involved in Project construction management

As given above, other than greatly contributing to convenience for neighboring residents, the project is significantly improving the level of rail service and helping to improve the business environments of local private companies, resulting in having induced various positive impacts.

3.5 Sustainability (Rating: ③)

3.5.1 Structural Aspect of Operation and Maintenance

ONCF[25] is in charge of operation and maintenance (hereinafter O&M) for railway facilities constructed in the project. ONCF is comprised of 21 departments in total. Just under the Director General are Financial Management and Control, Strategy and Communication, Human Resources, Information Systems, and the Special Advisor to the Director General. Other departments include (1) Passenger Division, (2) Freight and Logistics Division, (3) Development Division, (4) Maintenance and Materials Division, (5) Safety and Administration Division, and (6) Infrastructure and Operations Division.

O&M for project-related facilities is handled by the following sections under the (6) Infrastructure and Operations Division: a) Infrastructure Maintenance Section, b) Infrastructure Engineering Section, and c) Direction Regionale Infrastructure et Circulation Nord (abbr.: DRICN). Details for the O&M implementation system is shown in Table 13.

Table-13: Responsibility Matrix of Operation and Maintenance Activities of Project Facilities

Planning	Preparation of Tender Documents	Implementation	Supervision	Planning
Daily Maintenance	DMI	n.a.	DRICN	DFCG / DMI
Periodical Maintenance				
For Superstructure, Substructure and Telecom	DMI	n.a.	DRICN	DFCG / DMI
For Catenary Wiring	DMI	DMI	Contractors	DFCG / DMI
Large Scale Maintenance	PD / DI / DMI	PD / DI / DMI	DRICN / Contractors	PD

Source: Answers to the questionnaire to ONCF

Note-1): DMI refers to the Infrastructure Maintenance Section, DI refers to the Engineering Section and DRICN refers to Direction Regionale Infrastructure et Circulation Nord. (All of these divisions are under the Infrastructure and Operations Division.)

Note-2): DFCG refers to the Financial Management and Control Division, and PD refers to the Projects Department.

As shown in Table 13, daily and periodical maintenance[26] for superstructure facilities, substructure facilities, and communications facilities is all directly managed by ONCF, other than maintenance for overhead catenaries. Periodical maintenance activities for overhead

[25] ONCF was established by edict of the King of Morocco in 1963, nationalizing and consolidating three private rail companies. ONCF experienced chronic deficits in the 1980s due to underlying problems with redundant staff and management inefficiencies. It then started a recovery program in 1994 with job cuts, pension reform, and other measures. This led to its first recorded profit in 1998 (10 million Dirhams).

[26] Maintenance work includes the following: 1) track management, 2) railway crossing maintenance, 3) ballast (crushed stone) servicing, 4) overhead catenary maintenance, and 5) culvert cleaning.

catenaries are outsourced to private contractors (normally every four years, extendable to six years). In the future, periodical maintenance for telecommunications and signal facilities will be outsourced to a private company. There have been no large-scale repairs to date, but in the case of such repairs, three (3) departments such as i) the Projects Division, ii) the Infrastructure Maintenance and iii) Engineering Sections under the Infrastructure and Operations Division will work together to formulate a maintenance plan for detailed activities. Such a plan would be handled by DRICN or privately outsourced. There is an O&M manual written by project consultants. Considering these, no special problems in the above system for formulating O&M plans, tendering bids, managing contractors (for overhead catenaries) can be found.

Table-14: Number of Technical Staff of ONCF

Year	ONCF Technical Staff in Total	Of which, O&M Staff in Total	Of which, O&M Staff Exclusively in Charge of Project Facilities
2006	3,623	3,502	104
2007	3,390	3,269	98
2008	3,252	3,131	92
2009	3,124	3,003	87
2010	3,065	2,944	85

Source: Prepared from answers to the questionnaire to ONCF
Note): Part-time workers (such as construction workers) are excluded in the above table.

Through a World Bank-led restructuring from 1994, its own rolling plan, and other reorganization plans, ONCF has cut its total staff numbers from roughly 10,000 in 1999 to 7,784 as of 2010. Accordingly, O&M personnel member have been reduced. Project-related O&M personnel member have dropped 22% since 2006 to 85 members as of 2010.

Meanwhile, DRICN has said that O&M staff reductions are primarily due to (1) retirement and other natural attrition and (2) decrease in O&M staff numbers needed along with elimination of railway crossings. They added that the skill level has not decreased, and no essential personnel members have been let go. DRICN continues to keep itself suitably staffed in general.

To sum up, no problems can be found in the institutional structure of O&M implementation.

3.5.2 Technical Aspects of Operation and Maintenance

Technical skills of engineers and workers

The total number of employees who are in charge of O&M activities are 85 persons as of 2010, consisting of 4% of university graduates, 40% of vocational schools and high schools, and 56% of others. They have about 24 years of collective experience on average in operation

and maintenance of the railway facilities, which seems to be long and sufficient enough to conduct this kind of activities.

As shown in Table 14, the number of O&M workers who are exclusively in charge of project facilities has trended downward from 2006. However, the proportionate volume of personnel is being secured on an ongoing basis, and technical skills obsolescence and the loss of critical specialists did not happen. ONCF has a 2,110 km railway network in Morocco (as of 2010) with the approximately 370 km-double track railway, and it is amply accumulating O&M skills through the operation of these facilities. It would appear that there is no problem with the quantity and quality of engineering and technical staff.

Training programs provided by contractors of the Project

No training has been conducted by contractors because O&M activities at the related facilities do not require any special technique or skill. On the other hand, for the O&M skills of the upgraded substations, various trainings for technical staff for operation and maintenance have been conducted by the contractor, Siemens AG. Three types of training are provided; (1) lecture, (2) on-the-job training (OJT) during the commissioning period, and (3) the fire training, with a total number of participants of 20. Training is conducted by the contractor constantly, and the contents of the training are valued by the trainees.[27]

3.5.3 Financial Aspects of Operation and Maintenance

ONCF currently finds itself in a favorable financial situation. With the global economic slowdown, revenue from phosphates dipped temporarily, but it is now on the track to recovery. There are no apparent financial problems in particular. In terms of the project related section, 2010 revenues turned a profit, and future revenues appear to be favorable.

(1) Earnings condition

Revenues temporarily dipped into the red in 2009 amidst the deteriorating global economic situation following the collapse of Lehman Brothers, but recovered to normal levels the next year in 2010 together with a quick recovery in transport-related revenues for phosphates. As shown in Table 15, while revenues for general freight other than phosphates are on a downward trend long-term, passenger revenue is steadily growing and more than compensating for the reduced freight revenue. ONCF is now completely profitable, primarily on the strength of steady implementation of the recovery program from 1994 with downsizing, pension reform and other measures and the World Bank's Railway Restructuring Project from 1996.

Morocco is in a unique situation with phosphate revenues. As phosphates and derivatives

[27] Source: Results of interviews with employees who underwent training.

account for roughly 50% (49% in 2010) of all transport revenues, phosphate production and transport trends greatly affect revenue. Meanwhile, global demand for fertilizer is increasing, but the world's two largest suppliers by volume, China and the U.S., give priority to domestic demand. The supply for fertilizer has thus been tight since around 2007, with the international market increasing year by year. With the world's largest phosphate deposits, Morocco is in a position of superiority in a seller's market; many discuss the global food crisis and demand for phosphate as fertilizer material as a set. While it is possible that Morocco may exhaust its phosphate supply in the ultra longer term, there are no apparent long-term issues with ONCF revenue.

Table-15: Profit and Loss (P/L) Statement of ONCF

Unit: Million MD

Year / Item	2006	2007	2008	2009	2010
Sales[1)]	2,174	2,894	2,731	2,523	3,098
Passenger traffic revenue	*870*	*970*	*1,003*	*1,097*	*1,179*
Freight traffic revenue[2)]	*357*	*344*	*341*	*241*	*308*
Phosphate related revenue	*1,403*	*1,489*	*1,316*	*1,122*	*1,515*
Cost of Sales[3)]	1,581	1,746	1,713	1,993	2,050
Materials cost	*464*	*606*	*529*	*742*	*614*
Utility cost	*277*	*277*	*284*	*309*	*362*
Overhead Cost	*725*	*736*	*768*	*801*	*850*
Gross Profit on Sales	1,133	1,148	1,019	529	1,048
Operating Profit	933	1,034	732	230	561
Ordinary Income	807	757	318	▲166	29
Net Income after Tax	762	712	267	▲179	▲41

Source: Prepared from the documents provided by ONCF

Note-1): Sales include some revenues other than those related to passenger, freight and phosphate shown in the above.

Note-2): Freight revenue in the above does not include the phosphate-related revenues.

Note-3): Cost of sales includes miscellaneous expenses other than costs of material, utility and overhead shown in the above.

Passenger railway fares have been raised twice in recent years: once in 2006, and once in 2009. Revenue from passengers increased approximately 13% from 2005 through 2006, and approximately 9% from 2008 through 2009. Given the growth in passenger numbers over the same periods (12% and 8%, respectively), the increase in revenue from fare hikes appears to have been limited.

As mentioned in 3.3 Effectiveness, work is underway on a plan to introduce the first high-speed rail (TGV) on the African continent with technical assistance from France. The Tangier-Casablanca TGV project is underway and scheduled to open in 2015. New tracks for the TGV are scheduled for construction in selected sections. While there are issues with the isolation of existing tracks over these sections, it can be expected to have a sharp increase in passenger revenues when the project is completed. In addition, creating a new source of passenger revenue with the TGV could greatly alter ONCF's unique financial structure and its heavy reliance on transport revenue from phosphates over the ultra long-term.

(2) Financial status

Since 2006, the capital ratio has maintained high levels, holding between 60-80%. Gross margin ratio, return on assets and net margin ratio were all significantly worse from 2008 along with the decrease in transport revenue from phosphates, but recovered rapidly in 2010 and appear to currently be on the track to recovery.

Meanwhile, total debt has been consistently on the rise. Increased new projects and new rail vehicle purchases have led to increases in fixed and current liabilities. It is important to note the increasing trend in future liabilities.

Table-16: Balance Sheet (B/S) of ONCF

Unit: Million MD

Year / Item	2006	2007	2008	2009	2010
Assets					
Current Assets	2,789	2,740	3,095	3,357	3,806
Fixed Assets	27,973	31,804	35,872	37,693	39,116
Facilities	*6,880*	*7,364*	*7,553*	*13,690*	*15,400*
Locomotives	*787*	*759*	*713*	*692*	*1,377*
Rolling Stocks	*1,298*	*2,155*	*3,031*	*3,559*	*3,565*
Total Assets	**30,762**	**34,544**	**38,967**	**41,050**	**42,922**
Liabilities and Equity					
Equity Capital	21,856	22,946	24,651	25,292	26,206
Current Liabilities	2,138	2,812	3,196	3,690	3,516
Fixed Liabilities	6,768	8,787	11,120	12,068	13,200
Total Liabilities and Equity	**30,762**	**34,544**	**38,967**	**41,050**	**42,922**

Source: Prepared from documents provided by ONCF

Table-17: Financial Indices

Year / Item	2006	2007	2008	2009	2010
Gross Margin Ratio (%)	41.8	39.7	37.3	21.0	33.8
Return on Assets (%)	2.5	2.1	0.7	▲0.4	▲0.1
Net Margin Ratio (%)	28.1	24.6	9.8	▲7.1	▲1.3
Gross Debt (Mil. MD)	8,906	11,598	14,316	15,759	16,716
Current Ratio (%)	130.5	97.5	96.8	91.0	108.2
Quick Asset Ratio (%)	128.0	138.6	145.5	149.0	149.3
Fixed Assets to Fixed Liability Ratio (%)	97.7	100.2	100.3	100.9	99.3
Capital Ratio (%)	71.0	66.4	63.3	61.6	61.1

Source: Prepared from P/L and B/S

(3) Operation and maintenance expenditure relating to the Project

Table 18 below shows the ONCF's O&M budgets and operating income for related facilities to the project (revenue and O&M expenses). Non-freight revenues for project-related facilities returned to profitability in 2010 with passenger revenues nearly doubling from 2007 to 2010. Development and population growth along the project rail section is expected to spur this along.

As shown below, annual O&M expenses have remained between 9-14 million MAD (approximately 100-150 million yen) since double track sections opened in January 2007. Maintenance costs are proportionately high for superstructure, particularly overhead catenaries.

As previously mentioned, ONCF is currently working to eliminate railway crossings remaining in the project rail section and install grade separations together with local governments. These projects not only improve safety, they will also reduce maintenance expenses for crossing facilities (crossing system maintenance costs and repair costs for tracks in the crossing) to zero. We anticipate future progress in these projects.

Table-18: O&M Budget of ONCF and Income and Expenditure relating to Project

Unit: Thousand MD

Item	2007	2008	2009	2010
Passenger Revenue (from the project section)	**6.1**	**6.9**	**8.6**	**11.5**
O&M Expenditure relating to this project				
Expenses for Superstructure	5.7	6.8	9.1	5.8
Expenses for Substructure	1.5	0.3	2.4	3.1
Expenses for Telecoms and Signals	1.1	1.6	1.0	0.2
Other Expenses	1.0	1.5	1.7	1.9
O&M Expenditure in Total	**9.3**	**10.2**	**14.2**	**11.0**
Operating Surplus of the project	**▲3.2**	**▲3.3**	**▲5.6**	**0.5**
O&M Budget of ONCF in total	**211.0**	**214.0**	**260.0**	**294.0**

Source: Prepared from documents provided by ONCF

Note-1): Passenger revenue of 2006 was 4.5 million MD.

Note-2): Revenues related to the freight traffic are not known.

With no data being disclosed for early budget allotments for project-related facilities, no comparisons can be made with current O&M expenses. However, as shown in Table 18, ONCF has increased the O&M budget by 40% from 2007 to 2010, so ample resources for O&M costs have been set aside.

3.5.4 Current Status of Operation and Maintenance

ONCF usage and O&M for its facilities and equipment (superstructure, overhead catenaries, substructure, tunnels and bridges, telecommunications equipment, and signal facilities) are exceedingly good with no particular problems. O&M manuals and documentation have been provided within the project. There have been no particular problems to date about the power supply from the Office National de l'Electricité (ONE), Morocco's power authority. There were torrential rains within the project region in 2010, but no ballasts were washed away and no track beds were damaged. There are also arrangements in place for residing departments and other parties to respond to any damage or issues with overhead catenaries or track that may occur in a timely manner to minimize disruptions to train services.

As seen above, there have been no major problems, and the facilities and systems developed in the project are running properly. However, with regards to this high performance, (1) only four years have passed since the project section opened for service, and procured equipment and systems are still reliable, (2) ONCF has ample capital for O&M, and (3) much will depend on the technical capabilities of DRICN and other ONCF personnel.

Given these, no major problems have been observed in the operation and maintenance system, therefore sustainability of the project is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project is highly consistent with government policies and no problems with operation

and maintenance (O&M) systems can be found. Revenue from Morocco's key product, phosphates, dipped temporarily with the global economic slowdown. It is now on the track to recovery, however, with no apparent financial problems in particular. With respect to freight transport, traffic has been declining over the long term because of intensifying competition from trucking due to development of the national highway network, and was affected by the aftermath of the Lehman Brothers collapse. Meanwhile, passenger transport has mostly achieved at least 80% of its targets in key indicators such as transport volume, trains in operation, travel time, and maximum speed. Also, the project has made a number of positive impacts. Other than greatly contributing to increased convenience for residents along the project areas, it has greatly improved the level of rail service and helped improve the business environments of local companies. In addition, in terms of efficiency, although the project period was longer than planned, project cost was kept within the planned amount.

In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations for Executing Agency

Since the 1980s, Morocco rail freight transportation has shown a decreasing trend with intensifying competition from trucking thanks to development of the national highway system. Freight transport in the project region has also been declining from its 2004 peak of 990,000 tons, plummeting especially hard since the collapse of Lehman Brothers in 2008. Freight in the region dropped to almost 30 tons in 2010. Excluding phosphate transport, revenue from other freight transport makes up less than 10% of overall ONCF revenue. ONCF should make an earnest effort to intensify new customer acquisitions and stop the decline in rail freight handling volume to diversify its revenue sources and right its heavy reliance on phosphate rock income[28].

The Ben Suda Dry Port that ONCF is building as a multi-modal logistics hub on the outskirts of Fes Station is an example of a key project that could have an influence on the restoration of rail freight in the project region. Rail freight should not view competition from trucking as a negative, but rather continually look to strategically increase rail freight by fully leveraging transshipment bases like Ben Suda in the future.

4.2.2 Recommendations for JICA

N.A.

[28] ONCF fully realized the necessity to diversify its revenue sources, and has started to implement some projects including logistics platforms, dry ports, telecom infrastructure, etc.

4.3 Lessons Learned

As mentioned previously, the Lot 3 bid for line superstructure, electrification and substation construction was to be entrusted to one contractor, but the lowest bid significantly exceeded price estimates and was retendered. The prime contractor's lowest bid rose due to the increase in management costs from having to include several specialist subcontractors in the bid to cover the technical requirements of the Lot, spanning a) track laying, b) building catenaries, and c) substation work. As it increases ordering tasks, approval tasks and administrative burdens with regards to contractor progress, subdividing the Lot was not preferable from an ordering perspective, but doing so greatly reduced project costs. Having assessed the management capacity of ONCF, the best method of dividing lots should be considered carefully at the planning stage, taking indivisible portions into account.

Taking Morocco's national passenger traffic levels and examples from Japan, it must be noted that the 906.3 million person-km figure for passenger demand forecasts at the time of project appraisal were unreasonable. Improving demand forecast accuracy is always difficult due to data availability and technical issues, but simulations should be conducted as precise as possible based on realistic assumptions.

Comparison of Original and Actual Scope

Item	Plan	Actual
A) Output 1.1 Lot-1: Rail (JICA portion) ・ Procurement of steel rails	 10,856 units	 As planned
1.2 Lot-2: Switchgears (JICA portion) ・ Procurement of switchgears	 51 units	 As planned
1.3 Lot-3: Superstructure, Electrification and Substations Works (JICA portion)	Procurement and installation of sleeper, ballast, catenary wiring (53km in total) Upgrading of Substations	(Lot 3 was further divided into 3 sub-lots) ・ Lot 3-1: Superstructure works (Procurement and installation of sleeper and ballast) ・ Lot 3-2: Electrification works (Catenary wiring: 53km in total) ・ Lot 3-3: Substation works (Upgrading of substations)
1.4 Substructure, Tunnel and Bridge (EIB portion) ・ Substructure construction works including railway bed ✓ Double tracking of existing rail tracks ✓ Construction of new rail tracks by realignment	 33 km in total 20 km in total	 As planned 22 km in total
・ Construction of tunnel ・ Construction of bridges	800 m Construction of bridges	Cancelled Changes in Boughani Viaduct (Length: Extended to 856m, Piers: Hightened)
1.5 Telecommunication Facilities (EIB portion)	Procurement and installation of telecom facilities	As planned
1.6 Signal Facilities (AFD portion)	Procurement and installation of signal facilities	As planned
1.7 Consulting Service ・ Consulting Service M/M	 Approx.10 M/M in total (Foreign:6 M/M, Local: 4 M/M)	 As planned
・ Consulting Service TOR	Study, Quality control and Support for construction supervision	As planned
B) Project Period	February 2001 – December 2003 (35 months)	February 2001 – December 2006 (71 months)
C) Project Cost Foreign currency Local currency Total Japanese ODA loan portion Exchange rate	 3,248 million yen 3,348 million yen 6,596 million yen 4,947 million yen 1 MAD ＝ 10.76 yen (As of Nov. 1999)	 2,677 million yen 86,674 thousand MAD 3,871 million yen 3,871 million yen 1 MAD ＝ 13.78 yen (As of Oct. 2008)

Tunisia

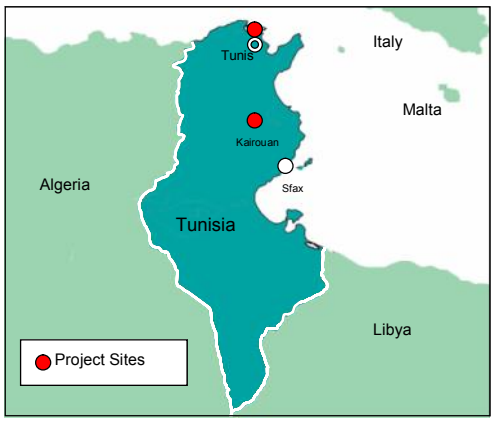
Inundation Protection Project

External Evaluator: Hajime Onishi
Mitsubishi UFJ Research & Consulting Co., Ltd.

0. Summary

This project is highly consistent with government policies and no problem with the operation and maintenance (O&M) systems can be found. Owing to various inundation protection facilities constructed under this project, no serious flood damage has occurred since the completion of disbursement of loans from JICA in 2008, which means this project has achieved its targets as of now. Although there still remains flood occurrence risk associated with the existence of the uncompleted section in a certain project portion where land purchase has not been completed, the executing agency continues to earnestly make efforts contributable to financial sustainability. This project makes a certain contribution to the improvement of the local business environment through reduced flood risk, and brings about indirect effects such as conversion from a river floodplain to agricultural land. In addition, in terms of efficiency, although the project period was longer than planned, the project cost was kept within the planned amount. In light of the above, this project is evaluated to be satisfactory.

1. Project Description



Map of Project Area

(Clockwise from upper left) Retarding Basin in Ariana, Concrete Channel in Ariana, New Diversion on Merguellil River and City Center in Kairouan

1.1 Background

Except for the northern and coastal areas, most of the land in Tunisia belongs to the semiarid zone. In the rainy season from September to March, however, Tunisia experiences many torrential rains and flooding of the dried-up river (wadi) has frequently caused flood damages. Especially in 1998 when the appraisal was conducted, accelerated urbanization and

development in the Greater Tunis Area and local cities exacerbated the extent of flood damages in river floodplains.

Ariana near Tunis has been urbanized more drastically in comparison to the other cities in the vicinity of Tunis.[1] The poor capacity of existing drainage facilities have caused frequent floods and inconvenience to the residents' lives.[2]

Kairouan, 160km south of Tunis, is located in the middle of the Kairouan Plain and has achieved prosperity as a key intersection of traffic flow in the region. On the other hand, when it rains, a considerable amount of river water from the surrounding mountains flow into the plain and frequently causes floods. As such, Kairouan is called "a city with the highest flood risk in Tunisia."[3]

Under these circumstances, the reduction of flood damages and improvement of the living environment in Ariana near Tunis (as well as in Kairouan) were the issues to be solved by Tunisian government urgently at that time. Accordingly, swift implementation of comprehensive flood control measures, including construction of drainage and embankments, was desired.

1.2 Project Outline

The objective of this project is to reduce flood damage and to improve the environment of the areas concerned in Ariana Governorate and around the city of Kairouan at risk by constructing flood control facilities, thereby contributing to promote social and economic development of the target areas.

Loan Amount / Disbursed Amount	3,130 million yen / 2,374 million yen
Exchange of Notes / Loan Agreement Signing Date	March 1998 / March 1998
Terms and Conditions	Interest Rate:2.50% (0.75% for Consulting Services) Repayment Period:25 years (40 years for Consulting Services) (Grace Period:7 years (10 years for Consulting Services) Conditions for Procurement: General Untied (Bilateral Tied for Consulting Services)

[1] The Greater Tunis Area consists of four administrative districts: Tunis, Ariana, Manouba, and Ben Arous.
[2] In 1998, Ariana had a population of 460,000. Once it rained, a considerable amount of river water flowed from hills and caused frequent floods, which affected the life of the residents.
[3] In 1998, Kairouan had a population of 530,000. Some flood control measures including the construction of the embankment surrounding the urban area (called the "old embankment" hereafter) and the upstream Sidi Saad dam have been taken since the beginning of the 1970s. Since it is expected that development within the old embankment will reach its limit due to accelerated urbanization, however, development outside the old embankment has become urgent need. Further outside the old embankment, potential agricultural lands of about 28,000ha has been left as river floodplain since Great flood in 1969 (as detailed later). Effective utilization of this river floodplain is also desired.

Borrower / Executing Agencies	Government of the Republic of Tunisia / Ministere de l'Equipement et de l'Habitat, MEH, (Ministère de l'Equipement, ME at present)
Final Disbursement Date	May 2008
Main Contractors (over 1 billion yen)	N.A.
Main Consultant (over 100 million yen)	N.A.
Feasibility Studies, etc.	1982 Feasibility Study (by the Canadian Government, for Kairouan) 1994 Master Plan Study and Feasibility Study (by JICA, for Ariana in Greater Tunis)
Related Projects, etc.	Greater Tunis Flood Control Project (Loan Agreement: March 2008)

2. Outline of the Evaluation Study

2.1 External Evaluator

Hajime Onishi (Mitsubishi UFJ Research & Consulting)

2.2 Duration of Evaluation Study

Duration of the Study: December, 2010 – December, 2011

Duration of the Field Study: May 29, 2011 – June 6, 2011 / September 13, 2011 – September 19, 2011

2.3 Constraints during the Evaluation Study

None.

3. Result of the Evaluation (Overall Rating: B[4])

3.1 Relevance (Rating: ③[5])

3.1.1 Relevance with the Development Plan of Morocco

Relevance with the national policies

Under the "9th Five-year Development Program" (1997 to 2001), the Tunisian government set two strategic targets, which are (1) enhancement of industrial competitiveness by promoting private investment and (2) well-balanced development of the urban and local areas, to intend further implementation of economic infrastructure and development of local cities

[4] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[5] ③: High, ②: Fair, ①: Low

which contribute to promotion of private investment. Especially higher priority was given to the flood control measures contributable to the promotion of private investment against flood damage frequently caused by torrential rains during the rainy season.

Now in the "11th Five-year Development Program" (2007 to 2011), the government still lists the implementation of water supply and sewerage as well as flood control measure as issue to be solved by priority with the view of correcting the difference among regions, improving the living standard of local residents, and preserving the environment. Under the program, special attention is focused on flood control measures in the urban areas, for which the implementation of storm drains, the cleanup of existing drainage, and other flood control measures in the urban area are planned.

Therefore, for both program planning and ex-post evaluation, flood control measures have been assigned high priority; especially flood control measure operations in the urban areas have been listed as a national policy. Thus, consistency between this project's objective of "reducing flood damage and improving the living standards in the target areas" and the national policy is very high.

Relevance with the sector policies

Though no clear sector policy was set at the time of the appraisal in 1998, the Five-year Development Program as described above indicated that the flood control measure in Ariana was a matter of great urgency. Beside, with view of promoting private investment in Ariana, high priority was given to the implementation of the flood control measures. In addition, for Kairouan, under the above Five-year Development Program, high priority was given to implementation of the food control measures and development of the urban area as a part of local development promotion.

As of 2011 as well, the competent authority, Direction del'Hydraulique Urbaine of the Ministère de l'Equipement (ME) has established an investment plan (2007 to 2011) associated with the flood control project in the urban area according to the above 11th Five-year Development Program and expects investment of 210 million Tunisia Dinars (TND) in total for five years. Also in 2006, utilizing experience of the flood in 2003 that caused serious damage in the capital, Direction de l'Hydraulique Urbaine of the former Ministere de l'Equipement et de l'Habitat (ME at present) conducted the "investigation on flood control measures in the Greater Tunis Area" and updated the master plan for the flood control measures in the Greater Tunis Area accordingly.

Therefore, for both program planning and ex-post evaluation, flood control measures for Ariana and Kairouan have been assigned high priority in sector policies. Thus consistency between this project's objective and sector policy is very high.

3.1.2 Relevance with the Development Needs of Tunisia

Since the appraisal of this project (1998), Tunisia has frequently experienced torrential rains, which is considered to be an effect of climate change.

In 2000, 2001, 2003, and 2007, for example, torrential rains caused large-scaled flood damages in the Greater Tunis Area as well as downstream areas of nearby rivers.[6] Above all, the torrential rain that occurred in September 2003 was identified as a once in a century rain. It killed four people and its damage amounted to about 45 billion yen. Tunis suffered the greatest damage on record. The capital ceased to function for more than two days because of large-scaled flooding in the waterfront area near Tunis and traffic blockage due to flooded roads. Also the torrential rain in October 2007 recorded an average rainfall of 108 mm over the three days[7], and northern Tunis including Ariana, the target area of this project, as well as southern Tunis suffered from damages due to the flood. At that time, 13 people were reported as either dead or missing.

In Kairouan, no such serious flood damage has been reported since the appraisal of this project, though some minor damages including flooded roads occurred. However, it is expected that the frequency of torrential rain occurring in Tunisia will become higher than ever before.

As described above, the frequency of flood occurring in Tunisia is expected to continuously increase since the appraisal of this project due to climate change and other factors. It is an urgent task to reduce flood damage by providing flood control facilities such as drainage, retarding basins, and embankments. Thus there still remains the need for inundation protection.[8]

3.1.3 Relevance with Japan's ODA Policy

In the Overseas Economic Cooperation Operation Enforcement Policy (2005 to 2007), the former Japan Bank for International Cooperation emphasized "implementation of infrastructure for sustainable growth" and "support of global issues and peace building" as important sector on the whole. Also it referred to the "action for preservation of environment" for Tunisia. Thus this project is extremely consistent with Japan's aid policies with respect to the reduction of flood damage through construction of drainage facilities and improvement of the living environment of local residents.

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[6] Besides, reclamation of dried-up rivers for road construction and building of houses in areas with high risk of flood damage associated with recent accelerated urbanization and development cause further flood damage.

[7] The average annual rainfall in Tunisia is about 450 mm.

[8] Especially as for the flood occurring in northern Tunis in 2007, the facilities built under this project made a large contribution to reduction of flood damage, as described in the Effectiveness section later. Unless this project were implemented, the flood damage in 2007 (13 dead) would expand.

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

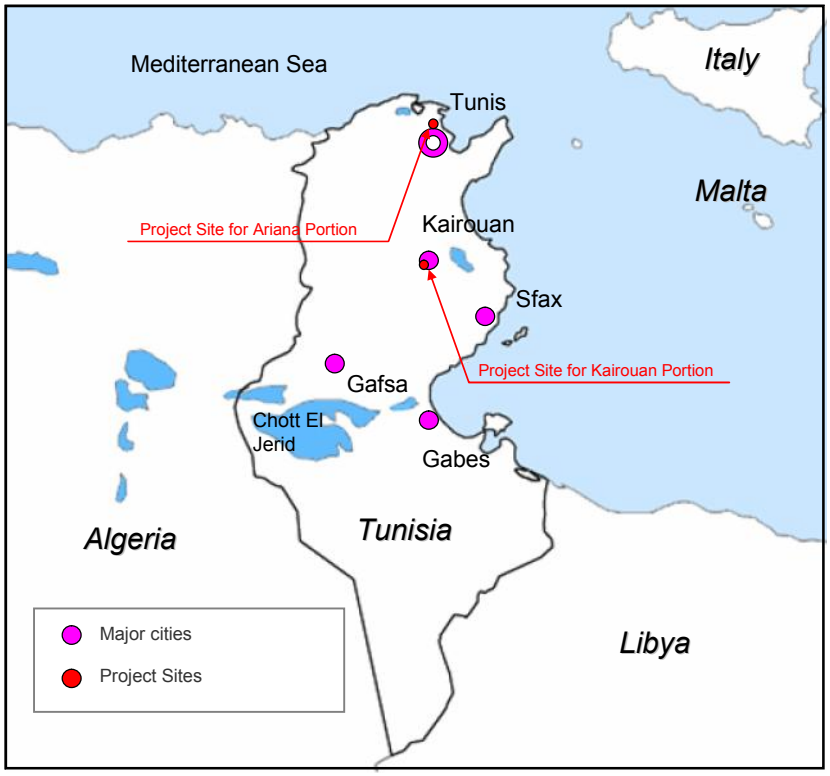

Figure-1: Location of the Project Site

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

Comparison between outputs planned and actual performance is shown in Table 1 below. Some outputs show an increase or decrease due to several reviews of the Detailed Design. In the Kairouan portion, the uncompleted section still exists. Also in the Ariana portion, the facility output has increased for the enhancement of flood protection capacity, which was intended based on the large flood in the Greater Tunis Area in 2003.

On the other hand, the above factors have indirectly made the project period considerably longer. However, this is a positive result of timely action under the varying external conditions and can be highly evaluated in respect of effectiveness and financial sustainability.

In the Ariana portion of the Greater Tunis Area, two of four retarding basins were cancelled while other two basins were added (that is, the total number remained four as planned). This change was made because a plan to extend some roads in the project target area was found at the review of Detailed Design (D/D).[9] This plan led to the decrease of estimated catchment

[9] **Background of the implementation of Detailed Design (D/D) and effects on final outputs:** For Ariana,

area, which required a reconsideration of the number and locations of retarding basins. The increase of outputs associated with the improvement of the Ennkhilet River was caused by extensive design change for enhancement of flood protection capacity in Ariana, which was intended based on the large flood in the Greater Tunis Area in 2003 and its damage.[10] As a result, a total length of box culverts and concrete revetments was considerably increased.

Table-1: Changes in Output

Project Components	Original	Actual	Differences
I. Ariana Portion			
i) Construction of retarding basins	4 retarding basins in total	The same	As planned (locations were changed in 2 basin.)
ii) Improvement works for Ennkhilet River	4,398m in total	13,100m in total	298% of original plan
・ Enbankment	1,195m	Cancelled	
・ Concrete open channel	1,095m	3,700m	
・ Box culvert	2,108m	9,400m	
iii) Construction and rehabilitation of drainage	9,671m in total	10,440m in toal	108% of original plan
II. Kairouan Portion			
i) Merguellil River section			
・ Construction of new diversion	Approx. 8.7km	9.3km in total (0.7km: Not completed, Left bank: Cancelled)	94% of original plan incl. uncompleted sections)
・ Construction of new embankment	120m	The same	As planned
・ Construction of bridges	Not specified	4 bridges	
ii) Zeroud River section			
・ Construction of new embankment (in the downstream, for left bank only)	6,678m	Approx. 7km	Mostly as planned
・ Construction of new embankment (in the upstream)	5,170m in total	Cancelled	
III. Consulting Services			
・ Consulting Service M/M	53 M/M in total (Foreign:22 M/M, Local: 31 M/M)	72.82 M/M in total (Not known by foreign and	137% of original plan

a two-phase plan was proposed at the F/S investigation time of the JICA master plan: construction of flood control facilities based on once a decade flood volume (Phase I) as an emergency plan and that based on once a century flood volume (Phase II) as a whole plan. Then at the appraisal time, the 2-phase plan was changed into a one-phase plan based on once two-decade flood volume, considering Tunisia's comment on the implementation level. For Kairouan, though the original plan was based on once a ten thousand flood volume, which is an unrealistic level, new plans have been made based on once two-decade flood volume for the Merguellil River, and based on once a century flood volume for the Zeroud River after discussion with Tunisia. In response to these changes, it was required to reset a planned flood water level (high water level) based on the simulated flood flowing calculation, and to re-examine some design elements including embankment height accordingly. At the time of the appraisal, it was decided that "Tunisia would do these tasks by making consideration during the current Detailed Design and including design review in TOR of the consultant employed for this project." Therefore, D/D review and some changes were made by the consultant of this project.

[10] In September to October 2003, it rained heavily in northern Tunisia, and serious flood damage occurred in Ariana and nearby areas. Then judging that the flood control facilities under construction should be reinforced, surplus loan was used to do additional construction (expansion of retarding basins, addition of drainage, etc.)

Project Components	Original	Actual	Differences
・ Consulting Service TOR	Tender documents review, Tender evaluation support, Construction supervision, Training program for ME engineers, etc.	local) Tender evaluation support : Cancelled Review of D/D for Ariana Portion: Added	

Source: JICA internal documents, answers to the questionnaire to ME and results of interviews

In the Kairouan portion, as for the construction of new drainage associated with inundation protection of Merguellil river, there still exists an uncompleted section of about 700 m on the left bank. As described in the Project Period section later, the land has not been acquired yet, which prevents construction from commencing. (For more details, refer to the Project Period section.) Construction of the embankments on the right bank of Merguellil River and at the upstream of the Zeroud River was cancelled because these embankments were judged unnecessary after the review of the Detailed Design.

Regarding consulting services, consultant input increased by 137% over the original estimate. The reasons for this increase are an increase in the work hours of consultants against the backgrounds of design change associated with the flood in 2003 (as described above) and action required for the uncompleted section in the Kairouan portion. As for the contents of the consulting services, the executing agency ME will be directly in charge of tender evaluation while the original TOR was cancelled. Furthermore, the design change operation in the Ariana portion (associated with the flood in 2003) was added.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total cost of the project was originally 4,173 million yen (the Japanese ODA loan share was 3,130 million yen) but the actual project cost was 3,377 million yen (as of June 2011, the Japanese ODA loan share was 2,374 million yen), which was equivalent to 81% of the original plan.

The total project cost was considerably reduced mainly because of (1) decrease of the Tunisian Dinar against the Japanese Yen in currency value (decrease by 17% compared to that at the time of the project appraisal) and (2) effective ordering through competitive tendering. The foreign currency portion was widely decreased compared to the original estimation, while the local currency portion slightly exceeded the original estimated plan. The decrease of the foreign currency portion and the increase of the local currency portion were caused by the fact that all consultants and contractors were sourced from local companies and therefore every procurement activity was made within the country.

As described in the Efficiency section, the embankment in the Kairouan portion includes an

uncompleted section of about 700m. The executing agency ME estimated the construction cost of the uncompleted section amounted to about 1 million Tunisian Dinars (about 60 million yen at the current rate). This figure was reported and recorded as an official requested budget amount to Tunisian Ministere des Finances every year.[11]

3.2.2.2 Project Period

The project period was longer than planned.

The project was scheduled from March 1998 to October 2003, a period of 68 months, but it still continues due to the existence of the uncompleted section as described before. On the other hand, the loan from JICA was completed in May 2008, and the agreement with contractors was completed in November 2008. Assuming the project was completed in November 2008, the project period was about five years (61 months) longer than planned.

The main causes of the delay include (1) the delay in consultant selection (six months),[12] (2) the re-review of Detailed Design and execution of additional construction associated with the large flood in northern Tunisia in September 2003 (nine months for additional construction),[13] (3) the delay of contractor arrangement for the Ariana construction (about 30 months),[14] and (4) the delay of land acquisition in the Kairouan portion and its resultant construction stop (about 27 months).[15]

Table-2: Comparison of Project Periods

Task	Original Schedule (months)		Actual (months)		Differences (months)
Consultant Selection / Contract	Mar. 1998 – Jun. 1999	(16.0)	Mar. 1998 – Dec. 1999	(22.0)	+ 6.0
Consulting Service	Jul. 1999 – Oct. 2003	(52.0)	Jan. 2000 – Mar. 2008	(99.0)	+ 47.0
Tender / Contract / Procurement	Oct. 1999 – Oct. 2000	(13.0)	Jan. 2000 – May. 2002	(29.0)	+ 16.0
Civil Works	Dec. 2000 – Oct. 2003	(35.0)	Aug. 2002 – Nov. 2008	(76.0)	+ 41.0
Total[1)]	Mar. 1998 – Oct. 2003	(68.0)	Mar. 1998 – Nov. 2008	(129.0)	+ 61.0

Source: JICA internal documents, answers to the questionnaire to ME and results of interviews

Note-1): Project commencement was defined as the date of L/A conclusion (Mar.1998). For the definition of the date of project completion, Nov.2008 was tentatively applied.

[11] Source: Result of the interview with an financial officer of ME Direction de l'Hydraulique Urbaine

[12] The main cause was delay in passage of the resolution relating to the selection of a consultant which was in charge of the Higher Commission, the authorization agency for consultant procurement process and other procurement issues.

[13] As described above, in response to the heavy rain in 2003, the flood control facilities in the Ariana portion were reinforced while re-review of the Detailed Design by the consultant as well as associated additional construction (expansion of retarding basins and addition of drainage) were executed. The period of the additional construction was September 2004 to June 2005, nine months. (Source: JICA internal document and hearing from ME)

[14] In addition to the delay of acknowledgement of the contractor agreement by the Higher Commission as described above, the breach of the former JBIC procurement guideline caused the procurement procedure for Ariana construction work lot 1 to be considerably delayed, which postponed the construction start by about 30 months. (Source: Same as above)

[15] The delay of land acquisition caused the construction in the Kairouan portion to be stopped between April 2004 and June 2006. (Source: Same as above)

Regarding the uncompleted section, ME, the executing agency, said "If the land acquisition problem is solved, the embankment construction in the uncompleted section will complete in about seven months."

Background and current situation of the uncompleted section in the Kairouan portion

On the left bank of the Merguellil River, a section of about 700m still remains uncompleted. This is because the land acquisition has not been completed yet. One land owner in particular still refuses to sell his agricultural land.

He once accepted selling his land at the time of Detailed Design (D/D), and exchanged an agreement with ME. Then from 2003 to 2005, he received 43,000 Dinars as compensation (about four million yen, as a price for buying a pump for the irrigation of agricultural lands). When the construction started, however, he changed his mind and has consistently refused since then.

As of 2011, ME tries to solve this problem in cooperation with Ministère des Domaines de l'Etat and la Commission Régionale d'investigation et de réconciliation. Though traditionally forcible land expropriation had not been done in Tunisia, a new land expropriation law established in August 14, 2007 (Decree 2007/2103) allows for forcible expropriation. However, trials should be held to execute expropriation. Though this case has been down for trial twice and ME won on each trial, the land owner appealed to the Supreme Court. In January 2011 during the appeal, the Revolution occurred. Subsequently the situation including the process of the trial is now uncertain.

Although the project cost was lower than planned, the project period was longer than planned (190% of the original plan); therefore the efficiency of the project is fair.

3.3 Effectiveness (Rating: ②)

3.3.1 Quantitative Effects

3.3.1.1 Results from Operation and Effect Indicators

The operation and effect indicators of this project include (1) discharge capacity at flood control observation points, (2) annual maximum flow, (3) annual highest water level, (4) annual maximum flooded area, (5) annual maximum number of flooded houses, (6) annual reduction times of flood damage, and (7) annual maximum amount of flood-related damage.[16] However, the field investigation results showed the executing agency ME had only limited types of data, and did not systematically collect quantitative data before and after the project.

Therefore, it was found difficult to understand the degree of performance and target achievement degree regarding this project from a quantitative perspective. Thus evaluation

[16] Note that the operation and effect indicators were not set at the time of project appraisal.

and judgment of effectiveness was based not on quantitative evaluation using operation and effect indicators, but on qualitative analysis using the result of a beneficiary survey. (For details, refer to 3.3.2 or later sections.)

As for quantitative data including discharge capacity, and annual maximum flow and annual highest water level at flood control observation points, ME decided "to collect and monitor these data only when water exceeds a given warning level".[17]

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

When recalculating the economic internal rate of return (EIRR), it is necessary to clarify the quantitative effects, such as cost reduction in reconstruction in case of floods, transport cost reduction by the decrease in inundated time, an increase in agriculture production, etc. as input data. The EIRR was not able to be calculated because the critical information to quantitatively estimate the above input data was not obtained through the study.

3.3.2 Qualitative Effects

(1) Decrease in Damage by Flood Occurrence in the Target Areas

Physical Damage by Flood

In the Greater Tunis Area, Ariana suffered serious flood damages in September to October 2003 and in October 2007, as shown in Table 3. In case of the flood in 2007, however, it was observed that the facilities already constructed under this project (including retarding basins, drainage, and box culverts) functioned properly as planned and helped minimize flood damage, as described in the Relevance and other sections.[18]

In Kairouan, serious floods occurred in 1969 and 1973. Furthermore, local roads in the city such as GP1 and GP2 were frequently flooded before this project was completed.[19] After the project was completed, however, no serious flood damage was found as shown in Table 3.

Table-3: Major Floods in the Target Areas and Physical Damage and Personal Suffering

Year of Occurrences	Locations	Scale of Flood	Dead / Missing	Details of Physical Damage
1969	Kairouan	Equal to a one-hundred-year flood	Not known	6.5 million TND (45 million TND in 1994 prices)[20]
1973	Kairouan	Not known	Not known	National highway No.12 was disconnected and some diversion was necessary until 1998.

[17] However, the performance of each facility should be periodically checked. If performance is lowered or is expected to be lowered due to degradation of the facility, a countermeasure should be promptly considered and reflected on the operation and maintenance activity.

[18] Source: Result of the in-depth interview with Ariana residents by ME Direction de l'Hydraulique Urbaine

[19] Source: Result of hearing from ME Kairouan local construction office

[20] Three Kairouan residents who actually experienced the flood were interviewed. They pointed out (1) inundation above floor level at their houses (about 40 days), (2) damage of train rails, (3) blackouts, and (4) insufficient food supply after flood as a result of flood damage.

Year of Occurrences	Locations	Scale of Flood	Dead / Missing	Details of Physical Damage
Sep. to Oct. 2003	Northern Tunisia	Not known	Dead: 4	Total financial damage: Equivalent to 45 billion Japanese yen Lakeshore area in the suburban of Tunis: Heavily inundated City function of Tunis was severely disturbed for two days or longer, due to the malfunction in traffic by floods in road, etc.
Oct. 2007	Northern and Southern Tunisia	Equal to a one-hundred -year flood Rainfall in 3 days: 108 mm	13 persons in total	Houses and offices: Heavily inundated Traffic: Disturbed
Oct. 2009	Northern Tunisia	Not known	Not known	Houses and offices: Partly inundated due to heavy rains Traffic: Disturbed by floods in road
Winter 2010	Kairouan	Not known	Not known	Floods in road and associated traffic disturbance, etc.

Source: JICA internal documents, results of interview with ME and in-depth interview with beneficiaries, etc.

The beneficiary survey[21] was conducted regarding flood frequency and flood damage. As shown in the two tables below, it was found both flood frequency and flood damage were considerably reduced compared to pre-project in the target areas of this project (Ariana in the Greater Tunis Area and Kairouan).

Table-4: Beneficiary's Recognition on Frequency of Flood before/after the Project

Answers from Beneficiaries	Ariana		Kairouan	
	No. of Res.	%	No. of Res.	%
After the Project, the frequency of flood occurrence was greatly reduced.	64	85.3%	49	72.0%
After the Project, the frequency of flood occurrence was reduced to some extent.	10	13.3%	18	26.5%
There are no changes in the frequency of flood.	1	1.3%	1	1.5%
Total	75	100.0%	68	100.0%

Source: Beneficiary survey

Note): The number of beneficiaries who experienced some floods and inundation before the Project implementation: 75 beneficiaries for Ariana and 68 beneficiaries for Kairouan

Table-5: Degree of Damage Mitigation By the Project (Multiple Answers)

Detailed Type of Physical Damages by Flood Occurrence	Ariana: No. of Res.			Kairouan: No. of Res.		
	Before	After	Reduction (%)	Before	After	Reduction (%)
House yard / Factory / Office / Cultivated land was inundated.	20	1	95%	23	3	87%
Furniture / Equipment / Instruments / Livestock / Agricultural products was damaged.	3	1	67%	23	3	87%
Neighborhood roads were closed / Transportation service was interrupted.	70	10	86%	68	20	71%
Electricity supply / Water supply / Gas supply was stopped.	0	0	n.a.	68	20	71%
Daily life / Business activities / Agricultural work was interrupted for a period of time.	50	6	88%	68	20	71%
No damages were/are experienced.	0	64	n.a.	0	56	n.a.

Source: Beneficiary survey

Note): The number of beneficiaries who experienced some floods and inundation before the Project implementation: 75 beneficiaries for Ariana and 68 beneficiaries for Kairouan

[21] Beneficiary survey implementation overview:
Locations: Target area of this project (Ariana in the Greater Tunis Area and Kairouan)
Subjects: Local residents, farmers, and private companies (manufacturers, merchants, service agencies, etc.)
Total sample: 150 (75 samples in Ariana and 75 samples in Kairouan), segmented two-stage random sampling
Data collection method: Face-to-face interview

The results of the beneficiary survey above show that flood frequency was more reduced in Ariana. Though this area suffered serious flood damages in 2003 and 2007, it was observed that the facilities already constructed under this project (including retarding basins, drainage, and box culverts) properly functioned as planned to minimize flood damage in case of the 2007 flood.[22]

Also in Kairouan, no serious flood damage was found after the project was completed. Especially the frequency of inundation of roads was further decreased. This means the project has made a large contribution to the industrial activities of Kairouan, which is an important place for traffic-flow.

Flood occurring risk and flood damage risk associated with the uncompleted section

As described above, a section of about 700m on the left bank of the Merguellil River remains uncompleted. In the left embankment with a total length of 8.6km, a section of about 700m positioned slightly upstream from the middle point is still uncompleted. It cannot be denied that if a serious flood occurred, water would flow into the urban area of Kairouan via this uncompleted section and cause some damage.[23] Though such a serious flood has not occurred until now, if this section is kept uncompleted, the facility performance expected at the time of Detailed Design (D/D) will not be available and flood occurring risk in some parts of southwest Kairouan will not be reduced.[24]

When an in-depth interview was made with seven farmers who lived near the uncompleted section, all of them claimed that the uncompleted section of 700m on the left bank of the Merguellil River generates a flood risk as well as ruins their benefits (common benefits people living in the vicinity could obtain, such as more accessibility to agricultural land).

(2) Beneficiary's Fear for Flood Occurrence

Given below are the results of the beneficiary survey regarding fear about flood damage.

When residents answering "No fear at all" in the table above were further asked their reasons, all of them (59 residents in Ariana and 45 residents in Kairouan) mentioned the existence of this project. This indicates that the residents' recognition about flood damage was changed upon completion of this project.

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[22] Source: JICA internal document

[23] As for the central area of Kairouan, the old embankment constructed in 1963 (which surrounds the central part of Kairouan) as well as two dams (Sidi Saad dam and El Houareb dam) as described in the footnote below helped minimize flood damage risk.

[24] On the other hand, a hydraulic analysis specialist of ME Direction de l'Hydraulique Urbaine said "Though a flood occurring risk actually still exists, Sidi Saad dam constructed upstream of Zeroud river in 1982 and El Houareb dam constructed upstream of Merguellil river in 1989 help control water volume in case of flood in some degree. So a probability that a serious flood occurs is low." Additionally, he said, "The result of hydraulic simulation shows the flood damage risk associated with the uncompleted section is very low. The estimated flooded zone is only the agricultural land in the southwest part of Kairouan."

Table-6: Beneficiary's Level of Fear for Flood Occurring After the Project (N=150)

Answers from Beneficiaries	Ariana		Kairouan	
	No. of Res.[1)]	%	No. of Res.[1)]	%
There are still serious fear for possibility of having damages by flood occurring.	0	0.0%	3	4.0%
There are still some fear for possibility of having damages by flood occurring.	16	21.3%	27	36.0%
There are no fear for possibility of having damages by flood occurring.	59	78.7%	45	60.0%
Total	75	100.0%	75	100.0%

Source: Beneficiary survey

Note): The number of beneficiaries who experienced some floods and inundation before the Project implementation: 75 beneficiaries for Ariana and 68 beneficiaries for Kairouan

3.3.3 Conclusion of Effectiveness

Since the completion of this project in 2008, various flood control facilities constructed under this project have prevented serious flood damage. Further it was observed, in case of the 2007 flood in Greater Tunis, the facilities that had already constructed under this project properly functioned as planned and minimized flood damage. In Kairouan, the frequency of road flooding has been greatly reduced since the completion of this project. Judging from facility performance until 2011, the project facilities are properly functioning as planned. Therefore, their effectiveness is very high.

On the other hand, potential flood damage risk associated with the uncompleted section in Kairouan is another story. As long as the section remains uncompleted, flood occurring risk will not be reduced in some areas. Though ME Direction de l'Hydraulique Urbaine judges flood damage risk to be very low as a result of hydraulic simulation, the fact that the expected facility performance is not achieved still exists, as such, this partially prevents the achievement of effectiveness.

Therefore, this project has somewhat achieved its objectives, therefore its effectiveness is fair.

3.4 Impact

3.4.1 Intended Impacts

(1) Impact on Business Environment and Industrial Promotion

Regarding change in the business environment after project completion, the following responses were obtained from a total of 52 private companies in the beneficiary survey.

Table-7: Business Environment before/after the Project (N=52, Multiple Answers)

Answers by Private Companies	Ariana	Kairouan	Total
Production / sales / profit were drastically increased after construction of flood control facilities.	6	6	12 out of 52
Production / sales / profit were increased to some extent after construction of flood control facilities.	7	15	22 out of 52
The construction of flood control facilities and my company's production / sales / profit were not correlated. / No answers	11	7	18 out of 52
Total	24	28	52

Source: Results of beneficiary survey (for 52 private companies)

Note): Type of business: Manufacturing (food processing, construction materials, etc.), retailers and

service sector (warehouse, grocery retailing, foods, machine repairing, restaurant, pharmacy, etc.)

Regarding the tendency of agricultural production and the change of agricultural business environment after the completion of this project, the following responses were obtained from 25 households in total subject to the beneficiary survey in Kairouan.

Table-8: Environment After the Project for Farmers in Kairouan (N=25, Multiple Answers)

Answers by Farmers	No. of Res.	Detailed Reasons for Increase in Agricultural Production (Multiple Answers)	Total
After the Project, the amount of agricultural production was increased.	17	The agricultural land is now protected from flooding and the area of agricultural land was drastically increased because of this Project.	5 out of 17
After the Project, the amount of agricultural production was not increased.	8	Access to the agricultural land by large agricultural machine can become possible, because of new access road (new embankment) to the land, which was constructed by this Project.	17 out of 17
		Because of newly constructed access road (new embankment), it becomes possible to transport the agricultural products to the assembly warehouse much faster than before.	17 out of 17
Total	25		

Source: Beneficiary survey for 25 famers in Kairouan

Further as described in the Effectiveness section, an in-depth interview was conducted with seven farmers living near the Merguellil River in Kairouan to obtain the following comments as direct effect of the completion of this project.

Table-9: Impact on Agriculture Business by the Project (N=7, Multiple Answers)

Answers from Selected Farmers	No. of Respondent
After the Project, irrigation scheme was introduced near my farm, and then transformation from rain-fed agriculture to irrigation agriculture can become possible at my land.	1 farmer
Because of access road (new embankment) construction, it become much easier to access to the own land, and it become possible to transport the agricultural products by a larger vehicle (truck, etc.)	5 farmers
After the Project, water supply facilities were newly introduced, which truly contributed to secure the safe drinking water much more than before.	1 farmer
There is still a certain level of fear of flood occurring because of the uncompleted section of 700m at the left bank of Merguerill river. This also ruins related farmers' common benefits such as improvement of accessibility to the market.	7 farmers

Source: Results of in-depth interview with the farmers in the vicinity of the Merguellil River in Kairouan

The results of a series of beneficiary survey and in-depth interviews above show the reduced flood risk associated with the completion of this project had various positive impacts on local companies and contributed to an improved business environment. Especially in Kairouan, conversion from river floodplain to agricultural land, as described later, allowed the agricultural lands of some farmers near the left embankment of the Merguellil River to expand greatly and agriculture production to increase. Furthermore the left embankment operates as access road for nearby farmers, which partially contributed to an improvement of the business environment in such cases as when large agricultural machines are brought in or agricultural produce are carried out.

Regarding the uncompleted section of 700m on the left bank of the Merguellil River in the Kairouan portion, many farmers have fears about flood risk, as described in the Effectiveness section. Furthermore it is pointed out that delayed completion of the embankment prevents nearby farmers from obtaining potential common benefits (improved accessibility to agricultural lands and its resultant increase of agricultural income).

(2) Changes in Land Price

Regarding change of land price before and after the implementation of this project, the results shown in Table 10 and Table 11 were obtained from the beneficiary survey. According to the survey, nearby residents recognized that land price was increased after the implementation of this project. Thus it was thought that this implementation had made some contribution towards this.

Since the increase in land price depends on various factors including increase in consumer price index, we cannot say it is due to the impact of this project only. Especially in Ariana, however, 75% of the residents thought the impact of inundation protection under this project contributed to increase in land price.

Table-10: Beneficiary's Recognition on Changes in Land Price After the Project

Answers from Beneficiaries	Ariana		Kairouan	
	No. of Res.	%	No. of Res.	%
Compared to 3 years before, the price of land near my house/office was increased.	43	57.3%	75	100.0%
Compared to 3 years before, the price of land near my house/office was not so increased.	11	14.7%	0	0.0%
Don't know / No answers	21	28.0%	0	0.0%
Total	75	100.0%	75	100.0%

Source: Beneficiary survey

Table-11: Reasons for Increase in Land Price

Answers from Beneficiaries	Ariana		Kairouan	
	No. of Res.	%	No. of Res.	%
Flood protection by the Project was greatly contributed to increase in land price.	11	25.6%	10	13.3%
Flood protection by the Project was contributed to increase in land price, to some extent.	32	74.4%	29	38.7%
There is no explicit correlation between the Project and increase in land price.	0	0%	36	48.0%
Total	43	100.0%	75	100.0%

Source: Beneficiary survey

In addition to the above results, many retail shops, restaurants, auto repair shops, drug stores, and other service-related companies were located intensively along the local road near the Merguellil River in Kairouan (Route GP2) after the completion of this project. From interviews with people who had located their service-related companies in this area, it was pointed out such intensive location allowed the land price to considerably increase.[25]

[25] Though the land price was 0.5 to 1.0 Tunisian Dinars per square meter before this project, it reached 25 to 30 Tunisian Dinars after the project. (Source: Result of the in-depth interview with people engaged in service business near the embankment of Merguellil river in Kairouan))

Therefore, it is thought that a considerable reduction of flood damage risk associated with the completion of this project largely contributed to the increase in land price in some areas.

(3) Conversion of the River Floodplain to New Agricultural Land

In the Kairouan portion, it was observed that of the 28,000ha of land that had been left as a river floodplain before this project, the land of 23,000ha was converted to agricultural land.[26] The implementation of this project led to the conversion from a river floodplain to agricultural land in the vicinity of Kairouan.

Since Tunisia falls in a semiarid zone, the expansion of agricultural land by securing irrigation water has been one of the most important political issues for past governments. As a whole, we can say conversion from river floodplain to agricultural land under this project is not only contribution to agriculture production, but very significant enterprise for Tunisian government.

3.4.2 Other Impacts

3.4.2.1 Impact on Natural Environment

(1) Implementation status of EIA and Environmental Monitoring during Construction

At the time of appraisal of this project in 1998, Tunisia law required neither execution of an EIA nor a report to the National Environmental Protection Agency (ANPE). According to the "Guidelines for Environmental Consideration" of the Overseas Economic Cooperation Fund (present JICA), however, external consultants were employed to execute an EIA by the time of the appraisal.[27].

Since the EIA report showed that the impact on the environment was small, environmental monitoring was not conducted during construction work except for strategy for smooth transportation in the Ariana portion.[28] Also for noise and vibration on nearby residents during construction work, very little impact was reported in the Ariana portion and almost no impact was reported in the Kairouan portion.[29] Thus there occurred no special impact of the construction work on the environment.

(2) Impact on Natural Environment by Constructed Facilities

No special impact on the natural environment surrounding the locations of various facilities (retarding basins, drainage, embankments, etc.) constructed under this project is observed. Wadi river, which is subject to this project in both Ariana and Kairouan, is a river where water

[26] Source: Kairouan Operation and Maintenance (O& M) office of ME Direction de l'Hydraulique Urbaine

[27] Now to carry out a similar-sized flood control project in the urban area, execution of EIA is required by law. (Source: ME Direction de l'Hydraulique Urbaine)

[28] Since construction of box culverts affected traffic flow on local roads, a countermeasure for smooth traffic flow was taken during the construction period. (Same as above)

[29] Source: Responses of the questionnaire and results of hearing delivered to ME

only flows during the rainy season and floods, and where fish and animals are rarely seen. Thus no special impact on the natural environment was reported.[30]

3.4.2.2 Implementation Status of Resettlement and Land Acquisition

The project involved land acquisition and resettlement of local residents upon the construction work. Table 12 shows the scale and process of the resettlement.

No particular problem can be seen in the resettlement and land acquisition process[31] except for one household still opposing land acquisition. To three households subject to resettlement, compensation was paid prior to construction work. Resettlement was implemented smoothly, and residents concerned moved voluntarily after compensation payment.[32] In Ariana, there was no resettlement.

Negotiation with the land owner still opposing is in deadlock partially because of the confused judicial system after the Revolution in January 2011, as described in the Efficiency and Project Period sections.[33] ME is making some efforts[34] to resume negotiations.

Table-12: Status of Resettlement and Land Acquisition of the Project

Item	Ariana	Kairouan
Project-Affected Families (PAFs)	7 households	147 households
Number of Resettled Households among PAFs	None	3 households
Total Compensations Paid to Resettled Households	n.a.	138,223 TD
Number of Households for Land Acquisition among PAFs	7 households	147 households[1)]
Total Area of Land Acquisition	0.32 ha	191 ha
Total Expenses for Land Acquisition	51,535 TND	2.2 million TND
Detailed Process of Land Acquisition: ・ Boundary identification of land for acquisition (implemented by ME through outsourcing to private contractors) ・ Land price evaluation by the Ministry of State Domain & Land Affairs ・ Negotiation with land owners through the Commission of Arbitration ・ Exchange of oaths when agreed, then transfer of compensation from ME to the owner, etc.		

Source: Answers to the questionnaire to ME and results of interview
Note-1): Including three resettled households

As a result, this project somewhat helped to improve the business environment of beneficial companies by reducing flood risk, and had indirect effects including increased land

[30] Source: Results of hearing delivered to ME Direction de l'Hydraulique Urbaine
[31] Regarding the stakeholder meetings relating to land acquisition, the meeting and discussion were appropriately held with the PAFs. (Source: Results of hearing delivered to ME Direction de l'Hydraulique Urbaine and stakeholder farmers)
[32] At the appraisal, it was reported that the land of 55ha was to be acquired in Ariana and that only a few households in Ariana were subject to resettlement. As described in the Efficiency section, however, the scale of land acquisition became smaller because constructions of two retarding basins (both planned in private land) were cancelled and other two retarding basins were constructed in public lands (both assigned free of charge) (Same as above)
[33] It seems that the Tunisian government has strictly enforced a rule about implementation of public projects that a project should not start until land acquisition is complete since 2006. In south Tunisia, historically land owners are not clear (owners do not have title certificates or other documents in most cases), it is said land acquisition is always difficult to achieve. (Source: JICA ex-post evaluation report of "Sewage System Development Project in Four Cities in Tunisia") Although this project covers the northern middle part of Tunisia, the same situation occurs.
[34] For details, refer to the paragraph 3.5.4.

price and conversion from a river floodplain to agricultural land. Therefore, it can be said that the implementation of this project has generated many positive impacts.

3.5 Sustainability (Rating: ③)

3.5.1 Structural Aspect of Operation and Maintenance

Direction de l'Hydraulique Urbaine of the executing agency ME[35] is responsible for operation and maintenance (called O&M hereafter) of the related facilities that were built under this project and holds three O&M offices: in Sfax, Nabeul, and Ariana in Greater Tunis Area. The Ariana O&M office as described above is in charge of O&M activities of the related facilities in the Ariana portion, while ME Direction de l'Hydraulique Urbaine is directly in charge of those of the related facilities in the Kairouan portion.

The detailed system of O&M activities is shown in Table 13 below. The O&M activities of the project related facilities are under direct control of ME Direction de l'Hydraulique Urbaine or under control of its Ariana O&M office. Their control scopes are clearly distinguished.

Table-13: Responsibility Matrix of Operation and Maintenance Activities of Project Facilities

O&M in Charge	Facilities in Ariana		Facilities in Kairouan	
	Ariana Office of Direction de l'Hydraulique Urbaine		Direction de l'Hydraulique Urbaine	
Stage/Category of Maintenance Activities	Planning	Preparation of Tender Documents	Implementation	Supervision
Daily Maintenance [1)] Periodical Maintenance Large Scale Maintenance	Not conducted ME[2)] Not decided	Not conducted ME[2)] Not decided	Not conducted Contractors[3)] Not decided	Not conducted ME[2)] Not decided

Source: Answers to the questionnaire to ME and results of interview
Note-1): Daily maintenance activities were not conducted because of no need.
Note-2): "ME" shown in the table refers to the Ariana Office of Direction de l'Hydraulique Urbaine for the facilities in Ariana, and that does to Direction de l'Hydraulique Urbaine for the facilities in Kairouan.
Note-3): Direction de l'Hydraulique Urbaine is in charge for some cases.

Daily maintenance activities are not conducted because they were judged unnecessary. Periodical maintenance activities including periodical cleaning of box culverts and drainage (in Ariana) and overlaying of roads on the embankment (in Kairouan) are outsourced to contractors. Large-scale rehabilitation is not planned yet because only about three years has passed since the operation start of the facilities.

As of the end of 2010, Direction de l'Hydraulique Urbaine has 74 staff in total, of which 18 engineers are engaged in O&M activities (who are in charge of planning of flood control projects, construction management, and maintenance for cities in Tunisia). Then 10 O&M staff work for the related facilities in the Ariana portion (same number as that of staff at

[35] In response to Revolution in January 2011 and its subsequent political change, Ministere de l'Equipement et de l'Habitatsucceeding (MEH) was reorganized into Ministère de l'Equipement (ME).

Ariana O&M office), while engineers are dispatched from ME Direction de l'Hydraulique Urbaine as necessary in the Kairouan portion. There seems to be no problem with the O&M structure due to sufficient human resources.

Table-14: Number of Staff of ME Direction de l'Hydraulique Urbaine

Year	Direction de l'Hydraulique Urbaine	O&M Staff in Direction de l'Hydraulique Urbaine	Staff in Ariana Office in Direction de l'Hydraulique Urbaine
1998	70	12	Not provided
2006	70	12	7
2007	68	12	8
2008	68	14	10
2009	74	14	10
2010	74	18	10

Source: Prepared from the answers to the questionnaire to ME and documents provided by ME

To sum up, there are clear demarcations between O&M related divisions and it seems that the appropriate number of the staff was appointed and no problems can be found in the institutional structure of O&M implementation.

3.5.2 Technical Aspects of Operation and Maintenance

Technical skills of engineers and workers

As described above, the number of staff engaged in O&M activities in ME Direction de l'Hydraulique Urbaine is 18 in total (as of the end of 2010), while the number of full-time employees is 39. They have around an average of 10-year O&M experience collectively.

As shown in Table 14, the total number of staff at Direction de l'Hydraulique Urbaine, the number of staff engaged in O&M activities, and the number of staff working at Ariana O&M office have been intentionally increased since 2008 and an appropriate number of staff has been continuously secured. ME Direction de l'Hydraulique Urbaine has many similar flood control facilities in Tunisia and is amply accumulating O&M skills through the operation of these facilities. It appears that there is no problem with the quantity and quality of engineering and technical staff.

Training programs provided by contractors of the Project and JICA

No training has been conducted by contractors because O&M activities at the related facilities do not require any special techniques or skills (one of the main activities is the cleaning of drainage). On the other hand, senior staff members from ME Direction de l'Hydraulique Urbaine have earnestly given younger staff on-the-job training (OJT) regarding O&M activities.

Further according to the JICA Japan Training Program, four staff members from ME Direction de l'Hydraulique Urbaine were sent to Japan and duly given training in a variety of

programs, which much satisfies the trainees.[36]

3.5.3 Financial Aspects of Operation and Maintenance

Table 15 shows the expenditure of O&M for the project facilities. The annual expenditure of O&M has been growing since 2008, with that of 2010 increased by 25% compared to 2008, of which the expenditure of O&M for Ariana accounts for 80%. On the other hand, budgets are approved as requested every year, as shown in the table below. Thus enough financial sources for O&M activities have been secured.

Table-15: O&M Budget of ME Direction de l'Hydraulique Urbaine

Unit: Thousand Tunisia Dinar (TND)

Year	O&M Budget Requested	O&M Budget Approved	O&M Budget for Ariana	O&M Budget for Kairouan
2008	200	200	200	0
2009	220	220	200	20
2010	250	250	200	50

Source: Answers to the questionnaire to ME and results of the interview

The total amount of the 2010 O&M budget in ME is 57 million Tunisian Dinars, of which the O&M budget related to this project accounts for only 0.4% only. Neither Ariana nor Kairouan is engaged in O&M activities for the project facilities.[37]

3.5.4 Current Status of Operation and Maintenance

The utilization status and O&M of the various facilities under the administration of ME Direction de l'Hydraulique Urbaine (such as drainage, retarding basins, diversions, and embankments) are good and no major problem has occurred to date.

In the case of the heavy rain which occurred in the northern part of Tunisia during October 2007 (equivalent to a once in a century flood volume), as described before, the project facilities in Ariana properly functioned as planned and helped minimize flood damage. This was partly because the scale of the 2003 flood was promptly analyzed and effectively reflected on the Detailed Design of this project. As a result, the original Detailed Design was reviewed twice, which indirectly caused a considerable delay of the project period, but finally helped to achieve the goal of this project.

Regarding the flood damage risk associated with the uncompleted section on the left bank of the Merguellil River in Kairouan, there are some fears about floods occurring and flood damage, as described in the Impact section. To solve the problem promptly, ME is considering

[36] The training period is three months. The training includes i) lectures (hydraulics, disaster prevention theory, etc.) and ii) field tour to facilities related to disaster prevention. (Source: Result of the interview with staff receiving the training)

[37] However, there are some exceptions; Ariana Municipal Council is in charge of some O&M activities for a detour around the retarding basin newly constructed under this project in Ariana.

some measures for land acquisition.[38] Besides, as described in the Efficiency section, the construction of the uncompleted section is appropriately budgeted at the beginning of each year. Though the court trial in progress is unclear because of the confused judicial system, which was caused by the Revolution in January 2011, ME is steadily executing possible options as executing agency. This can be evaluated as effort contributable to financial sustainability.

As described in the Effectiveness section, ME does not periodically collect quantitative data including discharge capacity and annual highest water level, as there is no problem regarding the recognition of flood risk without such data. Thus ME intends to "collect and monitor data only when the river water exceeds a warning level." At least in the rainy season, however, it is thought ME should perform any monitoring activity.

As a result, no major problem has been observed in the operation and maintenance system. In Ariana, the constructed facilities have no problem about the O&M, and show performance as expected. Although flood occurrence risk still exists associated with the uncompleted section in the Kairouan portion, the executing agency ME is making efforts contributable to financial sustainability including proper measures for land acquisition and securing of necessary budget. Given these, no major problems have been observed in the operation and maintenance system, therefore sustainability of the project is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project is highly consistent with government policies and no problem with the operation and maintenance (O&M) systems can be found. Owing to various inundation protection facilities constructed under this project, no serious flood damage has occurred since the completion of disbursement of loans from JICA in 2008, which means this project has achieved its targets as of now. Although there still remains flood occurrence risk associated with the existence of the uncompleted section in a certain project portion where land purchase has not been completed, the executing agency continues to earnestly make efforts contributable to financial sustainability. This project makes a certain contribution to the improvement of the local business environment through reduced flood risk, and brings about indirect effects such as conversion from a river floodplain to agricultural land. In addition, in terms of efficiency, although the project period was longer than planned, the project cost was kept within the planned amount.

[38] For example, ME suggested increase of price to Ministry of State Domain & Land Affairs, which is responsible for deciding land acquisition price. (Source: Result of the interview with an officer of ME Direction de l'Hydraulique Urbaine)

In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations for Executing Agency

Regarding the uncompleted section of the embankment (700m) on the left bank of the Merguellil River in the Kairouan portion, many of the farmers concerned have expressed fears regarding flood risk. Besides, the delayed construction of the embankment somewhat diminishes the common benefits that local farmers might be able to obtain (improved accessibility to their agricultural lands and its resultant increase of agriculture income). Though the court trial in progress is uncertain due to the Revolution in January 2011, the executing agency is requested to continuously make efforts for land acquisition to complete the uncompleted section as soon as possible. For example, it is desired that the executing agency may swiftly take some measures to solve the current land acquisition problem while starting and continuing periodical monitoring of this area in the rainy season.

4.2.2 Recommendations for JICA

It can be recommended that JICA observes ME's periodical monitoring and try to identify risks associated with the uncompleted section of the embankment on the left bank of the Merguellil River in advance. Furthermore, JICA is advised to take all necessary actions including re-organization and/or enhancement of the communication channel with ME.

4.3 Lessons Learned

From the 2007 flood, it was found that the flood control facilities constructed in Ariana under this project functioned properly, and helped minimize physical damage. This is partly because the scale of the 2003 flood was appropriately analyzed and effectively reflected on the Detailed Design of this project. As a result, the original Detailed Design was reviewed more than once, which made the project period much longer. However, positive impact outweighing this negative impact (delay) was generated. This is an excellent example of flexible and timely project management according to the change of external factors and conditions.

Comparison of Original and Actual Scope

Item	Plan	Actual
A) Output		
I. Ariana Portion		
1.1 Construction of retarding basins	4 retarding basin in total (A, G, I and J1)	4 retarding basin in total (A, G, BE-15 and BE-18) (BE-15 and BE-18 were additionally constructed.)
1.2 Improvement works for the Ennkhilet River	4,398m in total	13,100m in total (298% of original plan)
・ Enbankment	1,195m	Not constructed
・ Concrete Channel (Open)	1,095m	3,700m
・ Box culvert	2,108m	9,400m
1.3 Construction and rehabilitation of drainage	9,671m in total	10,440m in toal (108% of original plan)
II. Kairouan Portion		
1.4 Merguellil River section		
・ Construction of new diversion (DM1)	Approx. 8.7km in total (8.7km for left bank, 4.9km for light bank)	9.3km in total (8.6km for left bank, 0.7km of uncompleted secton), Cancellation of left bank diversion
・ Construction of new embankment (DM1-G)	120m	As planned
・ Construction of bridges	Not specified	4 bridges
1.5 Zeroud River section		
・ Construction of new embankment (in the downstream, for left bank only)	DZ1-A (left bank): 4,961m DZ1-B (left bank): 1,717m	DZA & DZB (left bank): Approx 7km in total, mostly as planned
・ Construction of new embankment (in the upstream)	5,170m in total	Cancelled
1.6 Consulting Service		
・ Consulting Service M/M	53 M/M in total (Foreign:22 M/M, Local: 31 M/M)	72.82 M/M in total (Not known by foreign and local)
・ Consulting Service TOR	Tender documents review, Tender evaluation support, Construction supervision, Training program for MTH (current ME) engineers, etc.	Tender evaluation support : Cancelled Review of D/D for Ariana Portion: Added after the 2003 Flood
B) Project Period	Mar. 1998 – Oct. 2003 (68 months)	Mar. 1998 – Nov. 2008 (129 months)
C) Project Cost		
Foreign currency	1,783 million yen	102 million yen
Local currency	21,729 thousand TND	36,843 thousand TND
Total	4,173 million yen	3,377 million yen
Japanese ODA loan portion	3,130 million yen	2,374 million yen
Exchange rate	1 TND ＝ 110 yen (July 1997)	1 TND ＝ 12.80 yen (Average between 2000 and 2011)

Egypt

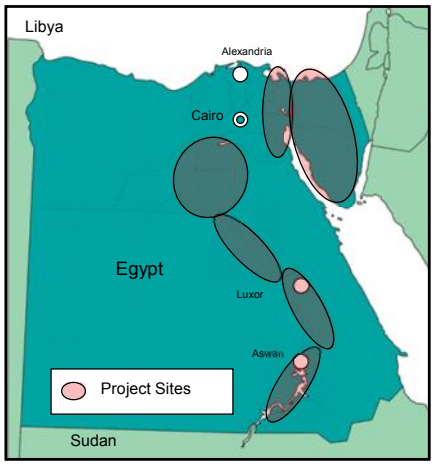
Social Fund for Development Project

External Evaluator: Hajime Onishi
Mitsubishi UFJ Research & Consulting Co., Ltd.

0. Summary

This project was carried out with the objective of satisfying the financial needs of micro and small enterprises in the poverty-stricken regions of Egypt and thereby encouraging job creation and poverty reduction, which is highly consistent with the relevant policies. In the initial stage of the project, it was found that the loan terms did not meet the needs of the users. However, owing to the modification of the loan terms and other efforts, both the cumulative amount of sub-loans (sub-projects) disbursed and the cumulative number of sub-loans approved exceeded the target value. To date, over 30,000 job opportunities have been created, which contributed to some extent to the decline in the unemployment rate in the target areas. In addition, the implementation of the project generated many positive impacts, including substantial improvement in the business conditions of end users. Although the economic disorder caused by the people's revolution in February 2011 is expected to affect debt collection in the future, the ratio of sub-loans in arrears remains low so far, and there is no problem with the operation and maintenance system of the executing agency and intermediary banks. In terms of efficiency, although the implementation period was longer than planned, the project cost did not exceed the planned amount. In light of the above, this project is evaluated to be satisfactory.

1. Project Description



Map of Project Area

Automobile Repair Shop (End-User) in Quena

1.1 Background

Egypt received structural adjustment loans from the World Bank and the IMF in 1991, which resulted in the country's macro economic recovery. However, the radical economic structural reform required as a condition led to deterioration into poverty and unemployment, and the development of a safety net became an urgent necessity. Under these circumstances, the Social Fund for Development (SFD) was established in 1991 to finance projects for the development of small enterprises, human resources, and the country's regions, with the main objectives of reducing poverty and alleviating the negative impacts of the economic structural reform through the creation of job opportunities and community development.

At the time of project appraisal in 2002, 550,000 jobseekers were pouring into the labor market every year due to: 1) the weakening appeal of working in the agricultural sector and the outflow of young people from farming villages as a result; 2) the slowing down of economic growth in oil-producing countries and the return of redundant migrant workers from those countries; and 3) massive job cuts in the public sector as a result of the privatization of public enterprises. Thus, providing and ensuring job opportunities for these unemployed people had been the top priority for the Egyptian government.

In the Upper Egypt area, comprising the governorates such as in Assuit and Minya, the poverty rate was particularly high. The Sinai and Suez Canal areas were suffering from high unemployment. These areas were regarded as those where poverty reduction and unemployment measures should be promoted with high priority.

1.2 Project Outline

The objective of this project is to meet financial needs of micro and small enterprises (MSEs) and to promote job creation in Upper Egypt and the Suez Canal & Sinai Peninsula by providing soft loans on concessionary terms by way of two financial intermediaries under the Small Enterprise Development Organization (SEDO) of SFD, established by the Government of Egypt, thereby encouraging the reduction of poverty and socio-economic inequalities of the target governorates.

Loan Amount / Disbursed Amount	5,194 million yen / 5,194 million yen
Exchange of Notes / Loan Agreement Signing Date	June 2001 / February 2002
Terms and Conditions	Interest Rate: 0.75% (for borrower) Repayment Period: 40 years (Grace Period:10 years) Conditions for Procurement: General Untied
Borrower / Executing Agencies	The Government of Arab Republic of Egypt / Social Fund for Development (SFD)

Final Disbursement Date	November 2008	
Main Contractors (over 1 billion yen)	(Not applicable because the project provides soft loans on concessionary terms by way of financial intermediaries)	
Main Consultant (over 100 million yen)	(The same as the above)	
Feasibility Studies, etc.	1999	Preliminary Study on Social Fund for Development Project (by JICA)
	2000	Financial Conditions Study (by JICA)
	2004 - 2005	Special Assistance for Project Implementation (SAPI, by JICA)

2. Outline of the Evaluation Study

2.1 External Evaluator

Hajime Onishi (Mitsubishi UFJ Research & Consulting)

2.2 Duration of Evaluation Study

Duration of the Study: December, 2010 – December, 2011

Duration of the Field Study: June 7, 2011 – June 16, 2011 / September 20, 2011 – September 21, 2011

2.3 Constraints during the Evaluation Study

The people's revolution, triggered by the "Jasmine Revolution" in Tunisia, brought about the collapse of the Mubarak regime in February 2011, and Egypt is under the interim military rule of the Supreme Council of the Armed Forces as of November 2011. The "Socio-economic Development: Long-term Vision 2022" and the "6th Five-year National Programme" referred to in the "Relevance" section below were formulated under the former regime. Since a new government has not yet been formed, the aforementioned national strategy and plan as well as the policies for related sectors were analyzed for this evaluation, for the reader's convenience.

3. Result of the Evaluation (Overall Rating: B[1])

3.1 Relevance (Rating: ②[2])

3.1.1 Relevance with the Development Plan of Egypt

Relevance with the national policies

At the time of the project appraisal in 2002, the Egyptian government treated the expansion

[1] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[2] ③: High, ②: Fair, ①: Low

of employment opportunities (creating 550,000 job opportunities a year) as a key issue in the long-term development plan, "Egypt and the 21st Century" (launched in 1997 with the target year set at 2016/17), along with private sector-led high economic growth and the full implementation of compulsory education. At the time, it was emphasized that poverty and the job crunch faced by the young generation was creating a hotbed for Islamic extremists, and therefore, poverty reduction through job creation was indispensable for Egypt in order to remove factors of social unrest.

At the time of the ex-post evaluation, the "Socio-economic Development: Long-term Vision 2022" for the target year of 2022 (formulated in April 2002 shortly after the project appraisal) set the main objectives of: 1) poverty reduction and the improvement of income distribution; and 2) human resource development and job increase (targeting the creation of 750,000 job opportunities a year), therefore showing that poverty reduction and job increases remain the main pillars of the long-term national strategy.

Also in the "6th Five Year National Programme" (2007/08‐2011/12), 1) achievement of high economic growth (8% a year); 2) job creation (3.8 million job opportunities in five years); and 3) reduction in the unemployment rate (5.5%) are listed among major policy objectives, and thus, employment measures are regarded as an issue of high priority.

As stated above, poverty reduction in the poverty regions and job increases have been the major national strategy since the time of project planning through to the ex-post evaluation, and therefore, this project aiming to "reduce poverty and eliminate regional disparities through job creation" is extremely consistent with the national strategy.

Relevance with the sector policies

At the time of the project appraisal in 2002, no policy concerning the development of micro, small, and medium-sized enterprises was put in place. The new SME Law No.100141, enacted in 2004 and "Enhancing Competitiveness for SMEs in Egypt – General Framework and Action Plan", drawn up by the SME Unit of the Ministry of Finance, became the first policy framework for the development of small and medium-sized enterprises in Egypt, which is still in effect at the time of the ex-post evaluation. This policy is oriented toward poverty reduction and income generation through the development of small and medium-sized enterprises, and it underlines the importance of social consideration in enterprise development.

In addition, the "Multi-Donor Review" conducted by SFD donors in 2004 reiterated 1) poverty reduction and 2) job creation as the long-term mission goals of the SFD.

From the above, at the time of the ex-post evaluation, the sector policy concerning the development of small and medium-sized enterprises is oriented toward poverty reduction and income generation through enterprise development, and is completely in line with the

direction aimed at by this project.

3.1.2 Relevance with the Development Needs of Egypt

Table 1 below shows the poverty and unemployment rates in the governorates and the city covered by the project (12 governorates/one city in total, comprising six governorates and said one city in Upper Egypt, including Beni Suef and five governorates in Suez Canal & Sinai Peninsula) in 2001, shortly before the launch of this project, and in 2008, soon after project completion (also detailed in the "Impacts" section).

Table-1: Poverty and Unemployment Rate in Target Governorates and City of the Project

Target Governorates / City	Poverty Rate (%, Population Ratio)		Unemployment Rate (%)	
	2000/01	2007/08	2000/01	2007/08
Upper Egypt				
Beni Suef	51.2	41.5	8.1	3.5
Minya	24.4	30.9	7.8	5.5
Assuit	58.1	61.0	11.2	8.3
Soharg	45.5	47.5	9.6	9.4
Quena	33.3	39.0	10.9	7.5
Luxor City	Not known	40.9	11.7	17.2
Aswan	24.5	18.4	14.9	12.9
Suez Canal & Sinai Peninsula				
Port Said	2.6	4.4	9.6	11.2
Suez	4.2	1.9	7.6	9.7
Ismailia	7.9	18.8	7.5	11.1
North Sinai	Not known	Not known	5.9	3.8
South Sinai	Not known	Not known	2.0	7.8
National Average	20.1	21.6	9.0	8.9

Source: Prepared from Institute of National Planning "Egypt Human Development Report"

Note): The Loan Agreement (L/A) of the project was concluded in February 2002 and the date of final disbursement of yen loan from JICA to SFD was November 2008.

As shown in Table 1, the poverty rates and unemployment rates in the target governorates were still high in 2008.[3] As governorate-related data is only available up to 2008, the situation in 2011 is unknown. However, in view of the slowing down of the Egyptian economy after 2008 in the wake of the global financial crisis, the situation in 2011 is assumed to be similar (or deteriorated). Therefore, the needs for job creation and poverty reduction are considered to be present today.

On the other hand, as described later in the "Efficiency" and "Effectiveness" sections, this project was designed to provide capital investment loans to the manufacturing industry, but the industrial structure in Upper Egypt and Suez Canal & Sinai Peninsula was not exactly

[3] The poverty rate (percentage of the population below the poverty line out of the total population) remains high for governorates in Upper Egypt, particularly in Assuit, which has a high rate of over 60%. All six governorates except Aswan have poverty rates above the national average (21.6%). In Minya, Assuit, Sohag, and Quena, the percentage of the population below the poverty line increased from 2000/2001 to 2007/2008. The unemployment rate has declined substantially in the governorates in Upper Egypt, with the exception of Luxor City and Aswan, while relatively high rates are recorded in Suez Canal & Sinai Peninsula, as was observed in 2002. In Port Said and Ismailia, in particular, the unemployment rate is over 10%, well exceeding the national average of 8.9%.

what was assumed for the scheme. Therefore, in the initial stage of the project, a situation arose where the loan terms did not meet the needs of the enterprises. In hindsight, it can be said that the needs assessment prior to the project was not sufficiently reflected in the project design.[4]

3.1.3 Relevance with Japan's ODA Policy

At the time of the project appraisal in 2002, the former Japan Bank for International Cooperation (JBIC) in its implementation policy for overseas economic cooperation projects referred to the development of a social safety net for the socially vulnerable as one of the priority areas of its support for economic structural reform. This project, which aimed to promote job creation by micro and small enterprises and to eliminate regional disparities, is highly consistent with the above policy.

3.1.4 Relevance with Application of Two-Step Loan Scheme and Consistency with Similar Program

At the time of project appraisal in 2002, which was about 10 years after the start of the SFD projects, the SFD had received a total of 157.1 billion yen in funding from over 20 donors and international organizations, including the World Bank, the EU Fund, and the Arab Fund. Given these circumstances, this project was formed by: 1) limiting the target of support to micro and small enterprises (see the "Efficiency" section for details); 2) limiting the geographic target areas to the particularly underdeveloped Upper Egypt and Suez Canal & Sinai Peninsula; and 3) setting the main objectives of job creation and economic development in underdeveloped regions. Under the "select and focus" strategy, which had not been taken in the programs of other donors, the program adopted an approach clearly different from that of other donors.

The prime rate (the prime lending rate for enterprises in good standing) quoted by commercial banks in Egypt was around 12% as of the time of project appraisal, a situation that encouraged the use of the SFD, a public fund, for loans to small and medium-sized enterprises. This project was also relevant in that it offered concessional rates for the end users (planned at 7–11%).[5]

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[4] According to JICA's internal documents, the background factors that led to the formation of this project include: 1) high expectations of the Egyptian government for the new scheme provided by the former JBIC (softening of the conditions for providing funds in the cases where loans are extended to human resource development and small and medium-sized enterprise development projects); 2) the urgent need to form the first project after the resumption of ODA lending to Egypt; and 3) the need to secure the presence of Japan in an unfavorable environment where many donors were involved and where Japan was lagging behind in SFD projects.

[5] As mentioned later, the original loan limit of 200,000 L.E. did not meet the needs of end users in many cases, and as a result, customers defected to other programs and fund sources in the project's beginning.

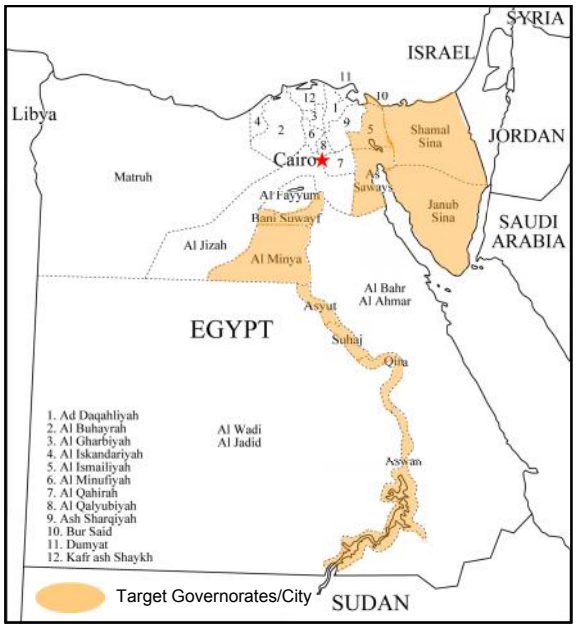

Figure-1: Location of the Project Site

3.1.5 Appropriateness of Selection of Intermediary Banks

At the time of project appraisal, the candidates for intermediary banks were rated based on a scoring system, and the National Bank of Egypt (NBE[6]) and Bank of Alexandria (BOA[7]) were finally selected as the intermediary banks.

The NBE was appropriate as the intermediary bank for this project in that: 1) the ratio of nonperforming loans in the SFD programs (not covered by this project) had been on the decline; and 2) it considered small and medium-sized business financing as a priority sector. In this regard, the right decision was made at the time.

As for BOA, on the other hand, various new facts concerning its business performance[8] unfolded one after another in 2004. Even though it was difficult to foresee such situations at

[6] The National Bank of Egypt (NBE) is the oldest bank in Egypt founded in 1898 and had functioned as the central bank until 1961. After the separation and independence of the central bank, it has been operating as a commercial bank. As of 2011, it exists as a national bank and is involved in the financing of 84% of the total loans (in terms of monetary amount) provided.

[7] The Bank of Alexandria (BOA) is a national commercial bank founded in 1957 to take over the operations of Barclays Bank, which pulled out of Egypt, and BOA became nationalized in 1960. In October 2006, it became an affiliate of the Bank of Intesa Sanpaolo Group of Italy by selling 80% of its outstanding shares to the group, and was converted to a private bank (the name of "Bank of Alexandria" remains unchanged).

[8] The following four facts were found in 2004 (the source is JICA internal document for each case): 1) The asset inspection conducted at the time of the management change in 2004 revealed a high ratio of irregularly performing loans (48%), and the bank suspended the issuance of new loan commitments for one and a half months in the first quarter of 2004; 2) In the SFD programs (not covered by this project) in Suez Canal & Sinai Peninsula that BOA was involved in, many loans became nonperforming regarding cattle-rearing and other sectors, and the approval of new loans in these sectors was suspended for a year; 3) The ratio of nonperforming loans in the SFD programs (not covered by this project) that BOA was involved in as of December 2003 was high, at 17.2% for Upper Egypt, 52.7% for Suez Canal & Sinai Peninsula, and 45.5% for other regions; and 4) When the SFD investigated the causes of the increase in the ratio of the nonperforming loans of BOA, it was determined that the factor of a lack of experience cannot be removed, and thus the SFD announced a policy to order BOA to discontinue loans in the livestock industry.

the time of appraisal due to insufficient information disclosure and other reasons, there remains the question as to whether it was proper to select BOA as a candidate for an intermediary bank and to give high scores to it in ratings at the time of appraisal. BOA was acquired by an Italian investor in 2006 and was converted to a private bank. The new BOA is now proceeding with operational improvements.

Based on the above, the implementation of this project has been sufficiently consistent with Egypt's development policy and Japan's support policy, both at the time of project appraisal and ex-post evaluation. On the other hand, the project design did not meet the development needs in some respects, such as the loan terms, which did not meet the needs of the users in the initial stage of the project. Therefore, the relevance of the project is rated as moderate.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

Table 2 below shows a comparison between the planned and actual outputs of the project. Major changes have been made in the following two points, and others were carried out as planned.

- Regarding the restrictions on the purposes for which the sub-loan is used, the limit of use for working capital was raised to 70% from 30% of the total amount of each sub-loan after 2008.
- The loan limit was raised to 500,000 L.E. from 200,000 L.E. (Egyptian pounds) per sub-loan after 2008.

Table-2: Changes in Output

Project Components	Original	Actual	Differences
(1) Sub-Loans Disbursement			
・ Type of end-users	Micro and small enterprises (MSEs)	The same	As planned
・ Sub-loan amount per end-user	5,000 L.E. to 200,000 L.E.	Maximum loan amount: Increased up to 500,000 L.E. after 2008	Changed after 2008
・ Eligible end-users of sub-loan	i) Private entities ii) Total asset of existing end-users: 5,000 to 200,000 L.E. (excl. land and building)	i) The same ii) Total asset: Increased up to 500,000 L.E. after 2008	As planned Changed after 2008
・ Conditions for sub-loan use	Basically for capital investment For working capital: Not exceeding 30% of the total amount of each sub-loan	The limit of working capital: Increased up to 70% of the total amount of each sub-loan, after 2008	Changed after 2008
・ Collateral	Land, building, equipment, etc.	In addition to the left, third party guarantor	Mostly as planned
(2)Sub-Loan from SFD to IBs			
・ Intermediary banks (IBs)	National Bank of Egypt (NBE), and Bank of Alexandria (BOA)	The same	As planned
・ Interest rate	4 to 8.5%	The same	As planned

Project Components	Original	Actual	Differences
・ Repayment period	Up to seven years (incl. two years grace period at maximum)	The same	As planned
(3) Subsidiary Loan from IBs to End-Users	7-11%	Almost the same (6.5% for some cases)	Mostly as planned
・ Interest rate	Up to five years (incl. one year grace period at maximum)	The same	As planned
・ Repayment period			
(4) Target Governorates for Sub-Loan	Six Governorates and one City (Beni Suef, Mynia, Assuit, Sohag, Quena, Aswan and Luxor City)	The same	As planned
・ Upper Egypt			
・ Suez Canal & Sinai Penninsula	Five Governorates (Port Said, Ismailia, Suez, North Sinai and South Sinai)	The same	As planned

Source: JICA internal documents and answers to the questionnaires to NBE and BOA

The background and detailed reasons for the abovementioned changes are as follows.

Changes in the restrictions on the purposes for which the sub-loan is used: As this project was oriented toward providing funds for capital investment mainly in the manufacturing industry, a restriction was imposed to "limit the use of loans for working capital to 30% of the total sub-loan amount." On the other hand, as it turned out, the industrial structure of the target areas was not necessarily reflected in the selection of target industries,[9] and as a result, the restrictions on the use of sub-loans imposed in this project did not work to meet the needs of the enterprises that were seeking funding mainly for working capital. Subsequently, based on the results of the analysis conducted through Special Assistance for Project Implementation (SAPI), it was determined appropriate to raise the limit on the use for working capital to 70% of the total amount of the sub-loan.

Increase in the loan limit: While the situation was as described above, financing needs for capital investment existed to some extent. However, the initially set loan limit of 200,000 L.E. (equivalent to about six million yen based on the exchange rate at that time) did not meet the needs of the end users in many cases, and as a result, customers defected to other programs and fund sources.[10] In light of these circumstances, and based on the results of the analysis conducted through SAPI, it was determined appropriate to raise the loan limit to 500,000 L.E.

It can be highly appreciated that these two problems were detected early on, and that: 1)

[9] In Upper Egypt and Suez Canal & Sinai Peninsula: 1) commerce and service industry accounts for a higher percentage than the national average, while the industries requiring capital investment account for only a small percentage; and 2) the major customers of the SFD in these regions have been traditionally those in the livestock industry, apiculture, and the agricultural products processing industry. (Source: JICA internal documents)

[10] This is pointed out as one of the factors that held down the growth of lending between 2002 and 2004. In addition, according to JICA internal documents, the following two factors are pointed out as the reasons for little growth in lending from the SDF as a whole: 1) Restructuring of the entire SDF was initiated, based on the report of the Multi-donor Review Mission in 2000; and 2) in the process of restructuring, various restrictions were imposed on the operations of the SFD, such as that the signing authority of the managing director of the SFD (the *de facto* head of the SFD) was limited to the disbursement of up to 50,000 L.E. in 2001. (Source: JICA internal documents)

SAPI was carried out in a timely manner and that 2) the experts in long-term residence at the project site were engaged in SAPI to define the problems in detail, which led to the suggestion of the specific solutions as described above.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The total cost of the project was originally 5,194 million yen (the Japanese ODA loan share was 5,194 million yen) and the actual project cost was 5,194 million yen (the Japanese ODA loan share was 5,194 million yen), which was equivalent to 100% of the original plan. Table 3 shows the amount actually disbursed by JICA to the SFD each year.

Table-3: The Amount Disbursed by JICA to the SFD

Year	Loan Disbursement from JICA (million yen)
2002	0
2003	1,145
2004	0
2005	1,434
2006	0
2007	1,270
2008	1,340
Total	**5,189**

Source: JICA Internal documents
Note-1): Exchange rate: 1L.E. = 19.64 yen (Average between 2003 and 2008)
Note-2): The difference between 5,194 mil. yen and 5,189 mil. yen includes the miscellaneous charges, etc.

Loan disbursements by JICA to the SFD were made only in the four years of 2003, 2005, 2007, and 2008. In the last two years, 2007 and 2008, a total of 2.610 billion yen was disbursed, which accounts for 50% of the total amount disbursed.

No disbursement was made by JICA to the SFD in 2002 and 2004, probably due to: 1) the incompatibility between the loan terms and the needs caused by a gap between the target industries and the industrial structure of the target areas; and 2) the mismatch between the loan amount needed by end users and the loan limit, which resulted in sluggish disbursement by the SFD to the intermediary banks. In addition, no disbursement was made in 2006 because of the contract problem regarding the external auditor of the special account (see the "Project Period" section below for details).

3.2.2.2 Project Period

The project was scheduled from February 2002 to December 2006, a period of 59 months, but it extended to 82 months, from February 2002 to November 2008,[11] which was equivalent

[11] The project is deemed to have started in February 2002 when the signing of the L/A took place and completed with the disbursement deadline in November 2008.

to 139% of the original plan. As a result, the project period was longer than planned.

The main causes of delay were: 1) delay in procedures at the start of project (delayed by about a year); 2) sluggish growth in lending during the early years of the project; and 3) the suspension of disbursement from JICA (for two years) due to the contract problem concerning the external auditor of the special account.

Regarding the delay in procedures in 1) above, after the signing of the L/A for the project in February 2002 as scheduled, a series of procedures were taken, including i) ratification by the parliament, ii) publication of a government gazette, iii) establishment of the special account, iv) negotiation with the intermediary banks on terms & conditions and the consent of JICA, and v) the effectuation of a Presidential Decree concerning the project. According to SFD-SEDO (SEDO: Small Enterprise Development Organization), which is responsible for the project, they could not start work relating to the project until the process of i) to v) was cleared. As a result, the start of the full operation of the project was delayed until February 2003.[12]

The main reasons for the sluggish growth in lending during the early years of the project as mentioned in 2) above are summarized as follows, based on JICA internal documents and the interview with the SFD staff concerned: i) restructuring of SEDO and confusion in its operation; ii) the gap between the aim of the loan scheme and the industrial structure of the target area;[13] iii) the loan limit (up to 200,000 L.E); iv) flaws in the selection of intermediary banks[14] and delay in understanding lending conditions;[15] v) the limit on the use of loans for working capital; and vi) competition with the programs of other donors.

Regarding vi) above, it is pointed out that the program by the EU that was implemented around the same time as this project was given higher priority at SEDO and the NBE, and, as a result, this project was slow in progress.[16]

The contract problem regarding the external auditor of the special account in 3) occurred as

[12] SEDO insists that "it is appropriate to consider the date of effectuation of v) to be the start of the project. (Source: Answers to the questionnaire to SFD and results of interviews with SFD) If their views were adopted, the actual project period would have been 70 months from February 2003 to November 2008 (119% of the planned period). Even so, the rating of efficiency (②) would not be affected.

[13] Details are as already stated in "Outputs." As the target areas of the project were underdeveloped, the manufacturing industry had not yet developed sufficiently, while the enterprises in agriculture and related industries, commercial, and service industries accounted for the majority of enterprises in the target areas. Therefore, lending for capital investment, which was initially the main objective of the project, was not expected to be promoted under such an industrial structure as described above.

[14] As of 2004, BOA made all the sub-loans in Suez Canal & Sinai Peninsula subject to headquarter approval, which substantially prevented the formation of sub-projects and also led to the suspension of lending to the agriculture-related sectors. (Source: JICA internal documents)

[15] The lack of sufficient instructions to the intermediary banks on the conditions for lending (the percentage of the amount to be used for working capital in the total amount of the sub-loan, the types of end users eligible for sub-loans, and loan limits, etc.) made it difficult for them to carry out business operations in an efficient manner and also constituted an obstacle in the acquisition of new customers. (Source: Results of interviews with the JICA Egypt Office, intermediary banks, and the regional offices of the SFD, etc.)

[16] Since the deadline for disbursement under the EU program for SEDO was set at the end of 2004, the resources of SEDO and the NBE as the intermediary bank were used intensively in order to use up the funds provided under the program before the deadline. (Source: JICA internal documents)

the SFD terminated the contract with the existing auditor due to difficulties in the negotiations for an additional contract and as the SFD invited bids to select a new auditor. The position of the external auditor was left vacant for some period of time during which no disbursement was made according to the provisions of the L/A.

Although the project cost was lower than planned, the project period was longer than planned (139% of the original plan), therefore efficiency of the project is fair.

3.3 Effectiveness (Rating: ③)

3.3.1 Quantitative Effects

3.3.1.1 Results from Operation and Effect Indicators

(1) Cumulative amount of sub-loans disbursed[17]

Under this project, 5,395 sub-projects were approved and a total of 264.41 million L.E. was disbursed as sub-loans from the SFD. Thus, the quantitative target for fund supply to micro and small enterprises in the target areas has been achieved. Most of the funds were disbursed in 2005, 2006, and 2008. It is assumed that the increase in disbursement in 2005 and 2006 is attributable to the leverage effect of SAPI (intended to promote lending through the long-term dispatch of experts) by the former JBIC, and the disbursement in 2008 was boosted by the easing of lending conditions and the jump in the number of sub-loans approved toward the disbursement deadline of the project.[18] The fact that about 40% of the total amount disbursed was concentrated in 2008 indicates that a sort of "last-minute push" was made.

Table-4: Achievement Rate of Main Indicators

Operation and Effect Indicators (Unit)	Target Value (Expected Completion Year, 2009) a	Actual Value (As of 2011) b	Achievement Ratio b/a
Operation Indicators			
Cumulative Amount of Sub-Loans Disbursed	187 million L.E.	264 million L.E.	141%
For National Bank of Egypt (NBE)	n.a.	223 million L.E.	
For Bank of Alexandria (BOA)	n.a.	41 million L.E.	
The Number of Sub-Loans (Sub-Projects) Approved	5,342	5,395	101%
For National Bank of Egypt (NBE)	n.a.	4,657	
For Bank of Alexandria (BOA)	n.a.	738	
The Number of Sub-Loans (Sub-Projects) in Arrear	Not known	285	n.a.
For National Bank of Egypt (NBE)	Not known	278	
For Bank of Alexandria (BOA)	Not known	7	
Effect Indicators			
Cumulative Number of Job Opportunities Created	18,700	31,320	167%

Source: JICA internal documents, and answers to the questionnaire to SFD and National Bank of Egypt (NBE)

[17] It is argued that the achievement of sub-loan disbursement should be evaluated as an efficiency item. Given that the main objective of this project is to satisfy the financial needs of micro and small enterprises, it is decided to be evaluated as an effectiveness item.

[18] As mentioned in the "Efficiency" section, sub-loan disbursement concentrated in 2008 largely because the funds for lending were not available until late 2007 due to the suspension of disbursement from the former JBIC to the SFD from 2005 to the middle of 2007.

Note): The percentage of the number of sub-loans in arrear to the total number of sub-loans (sub-projects) approved is 5.3% (=285/5,395)

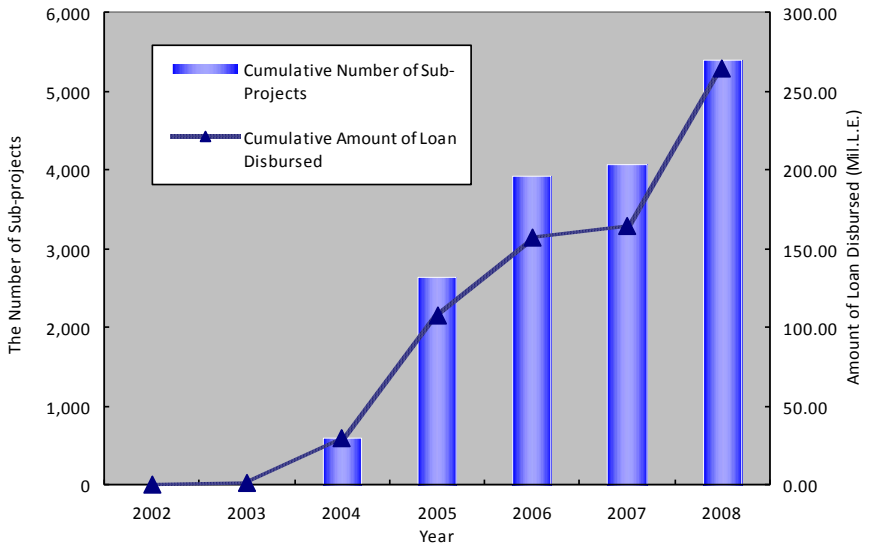

Figure-2: Cumulative Number of Sub-projects and Amount of Loan Disbursed

The data of sub-loans disbursed in each governorate and city in the target areas shows that the amount disbursed is unevenly distributed, as the disbursement was concentrated in specific governorates. About 70% of the number of sub-loans and 63% of the amount is concentrated in the top three governorates (Minya, Assuit, and Quena). In order to examine the situation of the uneven distribution of sub-loan disbursement, the number of sub-loans and the amount disbursed per 100,000 people below the poverty line were calculated using the data on population below poverty line for each governorate/city in 2008/2009. As shown in Table 5, a conspicuously large amount was disbursed in Suez, Aswan, Port Said, and Minya. The above facts show an excessive concentration of lending in Minya. Assuming that there was no specific strategic intention (or no region-wise target set for the amount of disbursement), efficiency in lending and the fair implementation of the project are questioned.

Table-5: Annual Sub-Loan Disbursement by Target Governorates and City

Unit: Million L.E.

Target Governorates / City	2002	2003	2004	2005	2006	2007	2008	Cumulative Amount	Amount Disbursed Per 100,000 People Below the Poverty Line
Upper Egypt									
Beni Suef	0	0	1.77	6.54	2.63	1.32	11.24	**23.50**	2.39
Minya	0	0.69	6.21	23.5	16.39	1.91	40.00	**88.70**	6.66
Assuit	0	0	3.91	18.77	12.10	1.03	11.66	**47.47**	2.19
Soharg	0	0	2.31	5.56	4.33	0.06	14.71	**26.97**	1.46
Quena	0	0.11	4.15	7.72	7.26	0.92	10.92	**31.08**	2.57
Luxor City	0	0	0	0	0	0	4.73	**4.73**	2.46
Aswan	0	0.18	4.67	8.54	4.96	0.98	5.72	**25.05**	11.11
Sub-Total	**0**	**1.06**	**33.36**	**85.13**	**52.27**	**7.12**	**102.38**	**247.50**	

Target Governorates / City	2002	2003	2004	2005	2006	2007	2008	Cumulative Amount	Amount Disbursed Per 100,000 People Below the Poverty Line
Suez Canal & Sinai Peninsula									
Port Said	0	0	0.7	0.32	0.13	0.37	0.33	**1.85**	7.14
Suez	0	0.02	0.84	1.24	0.58	0.01	0.39	**3.08**	29.90
Ismailia	0	0.02	2.36	2.64	0.32	0.02	0.60	**5.96**	3.20
North Sinai	0	0	0.71	1.76	0.23	0.01	0.38	**3.09**	N.A.
South Sinai	0	0	0.56	1.29	1.04	0.04	0	**2.93**	N.A.
Sub-Total	**0**	**0.04**	**5.17**	**7.25**	**2.30**	**0.45**	**1.70**	**16.91**	
Total	**0**	**1.02**	**28.19**	**77.88**	**49.97**	**6.67**	**100.68**	**264.41**	

Source: Answers to the questionnaire to SFD (The data of "amount disbursed per 100,000 people below the poverty line" were calculated by the evaluator.)

Also as mentioned above, about 40% of the total amount disbursed was concentrated in 2008—the year when the conditions for lending were eased. The rapid increase in the number of sub-loans approved over a short period of time raises the concern that the examination of loan applications may have not been strict enough. A close watch needs to be kept on the repayment situation of the sub-loans approved in 2008.

(2) Sub-loans disbursed by sectors

As shown in Table 6, lending to tertiary industries accounted for nearly 70% of the total amount disbursed, with the wholesale and trading industry making up nearly 40% and the service industry accounting for 26%. Lending to the manufacturing industry, which was designated as the main target industry at the project design phase, accounted for less than 10% of the total, due to the abovementioned issue of loan limit and other factors that held back the growth in the number of sub-loans extended.

Table-6: Sub-Loans Disbursed By Sectors

Indicators	Service	Trading	Manufacturing	Agriculture	Others
Cumulative Amount (Mil. L.E.)	68.8	104.9	26.1	62.0	2.1
Percentage (%)	26.1	39.8	9.9	23.5	0.8

Source: Answers to the questionnaire to SFD

(3) Satisfaction of financial needs of MSEs in the target governorates/city

As stated in the "Relevance" section, the poverty rate is high in the governorates in Upper Egypt. As of 2008, all six governorates in the target areas of the project except Aswan have poverty rates higher than the national average (21.6%). In Minya, Assuit, Sohag, and Quena, the percentage of population below the poverty line increased over 2000/2001. As the data on the financial needs of micro and small enterprises is not available, this is only speculation, but there was presumably a strong need for funds to micro and small enterprises in Minya, Assuit, Sohag, and Quena where the percentage of the population below the poverty line was increasing.

In this project, although the disbursement of sub-loans was concentrated in Minya, a

certain amount of sub-loans were disbursed also in Assuit, Sohag, and Quena. It can be said that this project made a certain contribution to satisfying the financial needs of micro and small enterprises in these regions.

On the other hand, further financing may have been needed for the end users in Sohag (where the amount disbursed per 100,000 members of the population below the poverty line is 1,460,000 L.E., the lowest among target governorates).

(4) Job creation

The number of job opportunities created was probably calculated by dividing the total amount disbursed by a certain coefficient, as shown in Table 7. Therefore, the number of job opportunities created presented in Table 4, or 31,320, is not the actual figure. In the meantime, the results of the in-depth interviews with end users[19] suggest that the coefficient established by the SFD is higher than the actual value. In other words, as explained in footnote 19, the actual number of job opportunities created is estimated to exceed the abovementioned figure calculated by the SFD

Table-7: Job Creation Co-efficient - Calculating Method for Job Creation under SFD Program

Indicators (Unit)	SFD's Estimate[1)] (Average from 2000 to 2003)	MDRM's Estimate[2)] (Average from 1997 to 1999)	MDRM's Estimate[3)] (For 2004)	Post Evaluator's Estimate #1[4)] (Average from 2002 to 2008)	Post Evaluator's Estimate #2[5)] (Average from 2002 to 2008)
The number of job creation per sub-project (people)	3.97	2.15	2.68 (4.1 for new loans)	5.81	7.88
The average amount of sub-loan per sub-project (L.E.)	21,924	20,775	31,273	49,010	49,010
The amount of loan needed to create unit (1) employee (L.E.)	5,516	9,656	11,666	8,442	6,216

Source: Prepared from JICA internal documents and answers to the questionnaire to SFD
Note-1): Data of the whole SFD program including this project after 2002 (Original source: SFD)
Note-2): Data of the whole SFD program (Original source: Multi Donor Review Mission (MDRM) Report in 2000)
Note-3): Data of the whole SFD program including this project after 2002 (Original source: Report prepared by impact assessment team at the Multi Donor Review Mission-II (MDRM-II) in 2004)
Note-4): Data relates only to this project. Estimated from answers to the questionnaire sent to the SFD.
Note-5): Data relates only to this project. Estimated from results of in-depth interviews with end-users.

To monitor the number of job opportunities created, the following three methods are available to the SFD, in addition to the coefficient method described above: 1) actual counting by field officers; 2) the acquisition of data based on quarterly reports submitted by intermediary banks; and 3) checking against the employment data owned by the social

[19] The "amount of loan needed to create employment for one person" is estimated at 8,442 L.E. for this evaluation, as shown in Table 7. This amount is a little lower than those estimated by the Multi-Donor Review Mission (9,656 L.E./person in 2000, 11,666 L.E./person in 2004). As described later in the "Impacts" section, according to the results of the in-depth interviews with a total of 23 enterprises as end users, the average number of job opportunities created per sub-project (sub-loan) is 7.88. Based on this figure, the total number of job opportunities created should be 42,538 (=7.88 x 5,395). Suppose that those end users interviewed represent an average sample of population (5,395), SFD's estimation for the number of job opportunities created, or 31,320, seems to be an overly severe estimation.

insurance offices of the target regions. Methods 1) and 2) have faults in terms of the frequency of counting and reliability, while 3) is considered impractical because it is complicated, although accurate. However, considering that the number of job opportunities created is the most critical indicator for SFD-SEDO to determine the relevance of the project and the meaning of its existence, it is advisable to establish a more precise data collection system.[20].

(5) Market interest rate and sub-loan amount

In a previous two-step loan project, it was pointed out that, "As the market interest rate declined substantially during the project period, the sub-loan interest rate neared the market interest, and as a result, the growth of loan disbursement slowed down." Whereas in this project, no situation arose where the sub-loan interest rate came closer to the market interest rate,[21] and there is no correlation between the sluggish growth of disbursement at the beginning of the project with changes in the market interest rates.

3.3.1.2 Results of Calculation of Internal Rates of Return (Economic Internal Rate of Return)

This project is to provide soft loans on concessionary terms; therefore the EIRR was not recalculated.

3.3.2 Qualitative Effects

The effects of unemployment reduction and the elimination of regional disparities, etc., have been generated. Details are to be discussed in the "Impacts" section.

3.3.3 Conclusion of Effectiveness Evaluation

As shown in Table 4, the target values set at the time of appraisal have been achieved in all of the three indicators for operation and effect, namely: 1) Cumulative amount disbursed under sub-projects (sub-loans), 2) cumulative number of sub-projects (sub-loans) approved, and 3) the number of job opportunities created. Judging from these achievements, the project was highly effective.

With respect to indicators 1) and 2) above, the uneven distribution of sub-loans by region was observed. The objective of this project was to "satisfy the financial needs of micro and small enterprises and thereby encourage job creation in Upper Egypt and Sinai Peninsula & Suez Canal." However, the differences among regions in benefits were too large to be attributed solely to the problem of efficiency (i.e. targets were achieved while there was a

[20] In this regard, SEDO started monitoring the number of job opportunities created as of September 2011. (Source: Results of interview with an official in charge at SEDO)

[21] The prime lending rate in Egypt hovered around the 13–14% range from 2002 to 2010. (Source: World Development Indicators)

problem in the process of project implementation). As mentioned in the "Efficiency" section, there were presumably some problems with the selection of target areas and the establishment of the conditions for lending at the time of appraisal.[22]

By sector, lending to the wholesale and trading industry accounts for by far the largest part (nearly 40%) of all lending under sub-projects (sub-loans), while lending to the manufacturing industry, which was initially the target industry, accounts for slightly less than 10% due to the abovementioned reasons. Looking at the number of job opportunities created, the number exceeded by more than 1.5 times that expected at the time of project appraisal. As explained above, 31,320 is not the actual number of job opportunities created, though it is not an unrealistic figure either. The actual number of job opportunities created is estimated to have exceeded the above figure. The proportion of the number of sub-loans that became irrecoverable is low at 5.3%.

This project has largely achieved its objectives; therefore its effectiveness is high.

3.4 Impact

3.4.1 Intended Impacts

(1) Reduction in the unemployment rate and the situation of poverty reduction in the target governorates/city

As shown in Table 8, changes in the unemployment rate and the situation of poverty reduction during the period from 2003/04 to the completion of the project differ greatly by governorates/city.

Looking at the unemployment rate in Minya, Assuit, Quena, and Aswan, which ranked high in the number of sub-projects of this project, the rate has improved between 2003/2004 when the economy bottomed out[23] and between 2007/2008 when the project was completed. In Minya, Quena, and Aswan in particular, the unemployment rate declined by more than 40%,

[22] At first glance, the benefits brought to Sinai Peninsula & Suez Canal seem to be much smaller than those brought to Upper Egypt both in terms of the number of sub-projects and the amount disbursed. However, when comparing those figures per 100,000 people below the poverty line, for example (see Table 5 for details), the results indicate that those regions received larger benefits than Upper Egypt.

[23] Economic situation in Egypt in the 2000s: In Egypt, the Luxor incident in 1997, etc., caused a significant economic downturn in the late 1990s. In addition, other factors such as: 1) a sharp drop in the tourism revenue, 2) the slump of export of oil products due to weak oil prices on the global market, and 3) the downward trend of remittances from workers overseas that resulted from a decrease in Egyptian workers in Gulf countries restrained economic growth at a low level around the lower end of the 3% range until 2002/2003. Then, the introduction of the floating exchange rate system in 2003, which helped stabilize the macro economy, and the economic reform pushed through by the Nazif administration that took office in July 2004 put the economy back on track during the period from 2005/2006 until the wake of the global financial crisis in the second half of 2008. Such deterioration in the macro economy as described above has a critical impact on indicators such as the unemployment rate and poverty rate. Therefore, due attention must be paid to the movement of various indicators during the period from 2002, when the project started, to 2004. In addition, as mentioned in "Project Period" and "Efficiency," disbursement under the project was slow until boosted by SAPI in 2004. All these things considered, it would be appropriate to focus on changes in various indicators after 2003/2004 when evaluating the impacts of this project.

which is much higher than the national average rate of decrease in the unemployment rate (from 9.9% to 8.9%, a decreased of 10%). Considering that various factors including economic recovery contributed to the improvement of these indicators, it cannot be said that only this project had impacts that caused these improvements. Even so, this project is believed to have made a certain contribution to the decline in unemployment rates in these regions through the lending to micro and small enterprises and through the promotion of job creation as described later.[24]

Table-8: Poor Persons of Total Population, Gini Co-Efficient, Unemployment Rate and Wages of Poor Household of Total Wages in Target Areas

Target Governorates / City	Poor Persons of Total Population (%)			Gini Co-efficient			Unemployment Rate (%)			Wages of Poor Households of Total Wages (%)		
	2000/01	2003/04	2007/08	2000/01	2003/04	2007/08	2000/01	2003/04	2007/08	2000/01	2003/04	2007/08
Upper Egypt												
Beni Suef	51.2	43.7	41.5	0.252	0.259	0.210	8.1	3.4	3.5	22.7	26.1	33.1
Minya	24.4	38.2	30.9	0.243	0.248	0.240	7.8	12.9	5.5	25.3	31.1	23.7
Assuit	58.1	61.0	61.0	0.233	0.246	0.270	11.2	9.8	8.3	35.3	49.2	48.3
Soharg	45.5	45.8	47.5	0.220	0.253	0.230	9.6	9.2	9.4	33.7	32.2	36.3
Quena	33.3	33.0	39.0	0.228	0.264	0.230	10.9	13.3	7.5	25.4	16.5	28.5
Luxor City	Not known	12.5	40.9	Not known	0.218	0.240	11.7	13.1	17.2	Not known	8.0	30.8
Aswan	24.5	27.4	18.4	0.262	0.232	0.270	14.9	21.9	12.9	22.6	13.0	13.9
Suez Canal & Sinai Peninsula												
Port Said	2.6	8.8	4.4	0.337	0.309	0.340	9.6	24.1	11.2	0.3	2.4	2.4
Suez	4.2	8.4	1.9	0.287	0.260	0.290	7.6	17.9	9.7	0.4	9.5	1.5
Ismailia	7.9	12.6	18.8	0.229	0.217	0.270	7.5	19.4	11.1	3.5	7.2	13.7
North Sinai	Not known	Not known	Not known	Not known	Not known	Not known	5.9	12.7	3.8	Not known	Not known	Not known
South Sinai	Not known	Not known	Not known	Not known	Not known	Not known	2.0	9.4	7.8	Not known	Not known	Not known
National Average	20.1	20.2	21.6	0.293	0.352	0.310	9.0	9.9	8.9	12.4	8.7	15.2

Source: Prepared from Institute of National Planning "Egypt Human Development Report"
Note-1): Some data are the same with those in Table 1.
Note-2): The fiscal year in Egypt runs from July 1 through June 30. "2000/01" in the above table demonstrates the date from July 2000 to June 2001.

Among the data related to poverty, the percentage of the population below the poverty line, for example, shows improvement only in three governorates of Aswan, Minya, and Beni Suef (although improvement was observed also in Port Said and Suez, they are excluded for the reason described below). As for Gini coefficient, the national average improvement rate (from 0.352 to 0.310, an improvement of 12%) was exceeded only in the two governorates of Beni Suef (improved by 19%) and Quena (improved by 13%) in the same period. In the target areas of the project, the unemployment improved very rapidly between 2003/2004 and 2007/2008. However, the redistribution of income did not take place accordingly, and poverty reduction was not brought about with the exception of a few regions.

In Suez Canal & Sinai Peninsula, as already stated in the "Effectiveness" section, 1) the

[24] In Miniya, Quena, and Aswan, for example, the number of unemployed decreased by 133,000 in total from 2004 to 2007 (Data source: Calculated based on the Institute of National Planning's "Egypt Human Development Report"). In the meantime, employment for an estimated 17,000 persons was created in the above-named three governorates (Data source: Questionnaire answers by SFD), indicating that this project greatly contributed to the decline in the unemployment rate in those three governorates.

number of subprojects was far smaller than in Upper Egypt, 2) sub-loan disbursement was concentrated in a specific period (2005/2006), and 3) in these sparsely populated regions, changes in external conditions such as the political and economic situations, etc., are probably more strongly reflected in the various indicators than in other regions. Because of these reasons, it is difficult to evaluate the impacts of the project.

(2) Cumulative number of job created in the target governorates and city

As mentioned in the "Effectiveness" section, at least 31,320 job opportunities were created in total under this project. These job opportunities are believed to have partially contributed to the abovementioned decline in the unemployment rate. A breakdown by region and by year for job opportunities created is shown in Table 9. According to this information, 93% of the job opportunities created occurred in Upper Egypt, and a particularly large number of job opportunity were created in Minya and Assuit.

Table-9: The Number of Job Created in Target Governorates/City

Target Governorates / City	2002	2003	2004	2005	2006	2007	2008	Total by Governorates / City
Upper Egypt								
Beni Suef	0	0	209	773	310	156	1,328	2,776
Minya	0	8	733	2,724	1,937	228	4,728	10,358
Assuit	0	0	462	2,218	1,430	121	1,378	5,609
Soharg	0	0	273	657	511	7	1,738	3,186
Quena	0	13	490	912	859	109	1,290	3,673
Luxor City	0	0	0	0	0	0	559	559
Aswan	0	21	552	1,009	586	116	676	2,960
Sub-Total	**0**	**42**	**2,719**	**8,293**	**5,633**	**737**	**11,697**	**29,121**
Suez Canal & Sinai Peninsula								
Port Said	0	0	86	272	15	9	39	421
Suez	0	2	99	147	68	1	46	363
Ismailia	0	3	279	312	37	2	70	703
North Sinai	0	0	84	208	27	1	46	366
South Sinai	0	0	66	152	123	5	0	346
Sub-Total	**0**	**5**	**614**	**1,091**	**270**	**18**	**201**	**2,199**
Total	**0**	**47**	**3,333**	**9,384**	**5,903**	**755**	**11,898**	**31,320**

Source: Answers to the questionnaire to SFD

Note): The Loan Agreement (L/A) of the project was concluded in February 2002 and the date of final disbursement of yen loan from JICA to SFD was November 2008.

(3) Impact on business environment of end-users

Looking at the status of end users at the time of lending, the results of the beneficiary survey[25] show that nearly half (47%) of respondent enterprises used the loaned funds to start a new business, and 24% were in the first year after the start of their business start-up. These

[25] The outline of the beneficiary survey is as follows:
Conducted in: Seven governorates in the target areas (Minya, Assuit, Quena, Beni Suef, Ismailia Suez, and North Sinai)
Surveyed: Target end users of the project
Total number of samples: 205, selected by stratified two-stage random sampling
Data collection method: Face-to-face interviews

two categories accounted for about 70% of all end users, suggesting that the project contributed to an increase in employment opportunities.

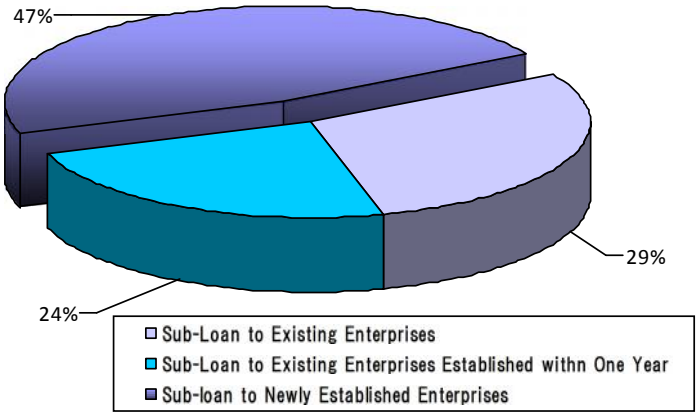

Figure-3: Status of End-Users at Time of Loan Disbursement (N=205)

Regarding the impacts on the businesses of end users, the results of the beneficiary survey are shown in Table 10. These results indicate that the use of sub-loans had various positive impacts on many end users and helped improve their business environment. In particular, about half of the 205 enterprises surveyed in the beneficiary survey mentioned positive impacts regarding the creation of employment, expansion of business, and sustainability of business, far exceeding those that mentioned negative impacts on these three items (24, 16, and 11 enterprises, respectively).

Table-10: Impact on End-Users' Business after Using Sub-Loans (N=205, Multiple Answers)

Answers by End-Users	No. of Responses	%
New employees can be hired after receiving sub-loan.	109 out of 205	53.2%
Business continuity including financial performance was improved after receiving sub-loan.	105 out of 205	51.2%
Business operation was expanded after receiving sub-loan.	103 out of 205	50.2%
Total assets of the company were increased after receiving sub-loan.	68 out of 205	33.1%
Sub-loan disbursement did not help to increase employees.	24 out of 205	11.7%
Sub-loan disbursement did not improve business continuity including financial performance.	16 out of 205	7.8%
Sub-loan disbursement did not contribute to expand business operations.	11 out of 205	5.4%
Sub-loan disbursement did not contribute to increase the assets of the company.	22 out of 205	10.7%

Source: Results of beneficiary survey for 205 end-users

Note): Type of business of respondents: Wholesale retailing, livestock farming, manufacturing, grocery retailing, transport, food and pharmacy, etc.

In addition, in-depth interviews were conducted with 23 end users in total[26] in the four governorates/cities of Aswan, Luxor, Quena, and Beni Suef during the field survey, in order to

[26] A total 23 enterprises including six in Aswan, seven in Luxor, five in Quena, and five in Beni Suef; by industry, six enterprises in the manufacturing industry (two in steelmaking, two in sewing, one in food processing, and one in marble manufacturing) and 17 enterprises in the service industry (pharmacies, restaurants, laundromats, photo studios, consumer-electronics retailers, IT devices retailers, vehicle and mechanical repair, gas stations, and retail supermarkets, etc.)

grasp the actual state of the use of sub-loans and the current business conditions. The results are shown in Table 11.

Table-11: In-Depth Interviews with End-Users in Aswan, Luxor, Quena and Beni Suef

Characteristics of Responded End-Users	Data / Information
Total number of sub-loans/sub-projects (for 23 end users)	26 sub-loans in total
Average amount of sub-loan disbursed per sub-project	194,808 L.E.
The case for new start-up business (among 23 end users)	13 end-users
The number of job creation in total Average number of job creation per sub-project	205 employees 7.9 employee per sub-loan
Reasons for Using SFD Loans to Start New Business (for 13 End-Users)	No. of Respondents
The interest rate was lower than similar loans by other banks.	8 end-users
Tax exemption of 5 years can be applied.	1 end-user
Collateral conditions were much more favorable than other banks' loan.	1 end-user
Loan appraisal process was much faster than other banks' loan.	1 end-user
Financial advisory services by SFD were much attractive (including supports for starting-up new business, etc.)	1 end-user
Grace period of loan was much attractive than other banks' loan.	1 end-user
Current Situation of End-Users' Business (for 23 End-Users)	No. of Respondents
The business condition of my company is very good after receiving sub-loan , even after the revolution	1 end-user
The business condition of my company was very good after receiving sub-loan , but it becomes serious situation after the revolution.	16 end-users
The business condition of my company was good to some extent after receiving sub-loan. After the revolution, it becomes serious situation.	1 end-user
No answers	5 end-users

Note: All the new employees mentioned in the table are the full-time workers.

According to the results of the interviews, about half of the end users started up a new business using the sub-loan. The reason they mentioned this was that the interest rate of the sub-loan was lower than that of the loans provided by commercial banks. These results suggest that this project significantly contributed to the creation of new business through the provision of highly concessionary loans. On the other hand, 16 end users, accounting for 70% of all respondents, said that "business performance has deteriorated significantly after the revolution in February 2011." With an eye toward the collection of the last sub-loans that become due in 2013, the SFD is expected to enhance its monitoring activities.

3.4.2 Other Impacts

3.4.2.1 Impact on Natural Environment

This is a development loan project targeting micro and small enterprises, and therefore no negative impact on environment was expected at the time of project appraisal in 2002. No funds have been provided for so-called blacklist projects (projects that may have large-scale and significant environmental impacts),[27] which was mentioned as an issue requiring careful attention. Considering that the scale of sub-projects under this project was limited to 500,000 L.E. (approximately seven million yen) even after the loan limit was raised in 2008, it is assumed that there was no such case.

[27] Source: Questionnaire answers received by the SFD and interviews with the SFD

In the in-depth interviews with 23 end users in Aswan, Luxor and other locations, it was confirmed that no specific impact on the environment was caused on the sub-project level. In Beni Suef, visits were made to the plant premises of two steelmakers that are end users. Their plants were located in an industrial complex equipped with all related infrastructure, and there was no problem with the treatment of wastewater from the plant, etc. In addition, no noise or vibration impact on residents has been reported.

3.4.2.2 Implementation Status of Resettlement and Land Acquisition

No relocation of residents took place in this project. Land acquisition was conducted on an extremely small scale for the expansion of plant premises, etc., in the 48 sub-projects under the Bank of Alexandria (BOA), and no specific problem has occurred.

Based on the above, at least 31,320 job opportunities in total are estimated to have been created under this project through lending to micro enterprises, and these job opportunities are believed to have partially contributed to the decline in the unemployment rate in the target regions. In addition, the implementation of this project had a number of positive impacts including the substantial improvement in the business conditions of the end users.

3.5 Sustainability (Rating: ③)

3.5.1 Condition of Revolving Fund[28]

In this project, a special account was established to separate the yen loan from the loans provided by other donors. The SFD established and maintains special accounts for each project as agreed upon with the donors. The income and expenditure of each project is managed under each account in an ensuring manner.

The state of revolving fund management is as shown in Table 12. The management of revolving funds started in 2009, and the balance of the secondary sub-loans outstanding as of 2010 was 1.52 million L.E. The SDFD is required to monitor the revolving fund during the project implementation and for a certain period of time after project completion (stipulated by the L/A to be four years after completion). According to the JICA Egypt Office, a monitoring report is submitted by the SFD at regular intervals and monitoring is conducted appropriately.

Thus, no problem is found with the management of both the special and the revolving fund.

[28] A revolving fund is a mechanism for utilizing liquidity resulting from the gap between the repayment period of the sub-loans and the repayment period of the JICA loan, whereby the liquidity funds are managed under a special account and lent to the end users repeatedly while managed under a special account. This is expected to further enhance the effects of the JICA loans.

Table-12: Management Status of Revolving Fund (From 2002 to 2010)

Indicators (Unit: Million L.E.)	2002	2003	2004	2005	2006	2007	2008	2009	2010
a. Balance carried from the previous year	0	0	-0.33	-0.33	12.90	44.04	104.50	100.44	-6.84
b. Disbursement received from JICA	0	55.67	0	75.32	0	60.80	67.70	0	0
c. Principal collections on SFD sub-loan (from NBE / BOA to SFD)	0	0	0	13.61	31.14	29.47	29.47	44.65	46.09
d. Principal collections on Revolving Fund	0	0	0	0	0	0	0	0.34	15.45
Total amount of money received (a+b+c+d=A)	0	55.67	-0.33	88.60	44.04	134.31	201.67	145.43	54.71
e. SFD sub-loan disbursement (from SFD to NBE / BOA)	0	56.00	0	75.70	0	29.80	101.23	0	0
f. Revolving Fund loan disbursement	0	0	0	0	0	0	0	152.27	0
g. Principal repayment to JICA	0	0	0	0	0	0	0	0	0
Total amount of money repaid (e+f+g=B)	0	56.00	0	75.70	0	29.80	101.23	152.27	0
Balance carried to the next year (A-B)	0	-0.33	-0.33	12.90	44.04	104.50	100.44	-6.84	54.71

Source: Prepared from JICA internal documents and answers to the questionnaire to SFD

3.5.2 Executing Agency

3.5.2.1 Status of Cash Collection

As concerns about the current status of the operation and maintenance of sub-loans extended by the SFD and two intermediary banks under this project, there is presumably no problem with the capital repayment status as shown in Table 13 below. In addition, as already mentioned in the "Effectiveness" section, only 5.3% of the total number of sub-loans had became irrecoverable.

Regarding the performance of the SFD on a whole, including this project, the proportion of the number of loans in arrears is maintained at a low level of 4.1%, with the amount at 1.9%, as shown in Table 14. As stated later in the analysis of the operation and maintenance status, there is no problem with the loan monitoring system of the SFD and the intermediary banks, at present. According to the in-depth interviews with 23 enterprise end users, all enterprises have been repaying sub-loans as scheduled without incurring arrears.

Table-13: Repayment of Sub-Loans for SFD (This Project Only, From 2002 to 2010)

Indicators	2002	2003	2004	2005	2006	2007	2008	2009	2010
a. Principal (Cumulative amount, Mil.LE)	0	1.02	28.6	108	158	164.4	264.4	264.4	264.4
b. Cash repaid (Cumulative amount, Mil.LE)	0	0.03	2.2	25.8	63.3	93.1	125.7	178.4	211.1
c. Cash Collection Ratio (%) b/a*100	0.0	2.9	7.7	23.9	40.1	56.6	47.5	67.5	79.8

Source: Prepared from answers to the questionnaire to SFD
Note: Repayment status of interest was not disclosed.

Table-14: Status of Non-Performing Loans (NPLs, in default more than 90 days) for SFD

Indicators	2002	2003	2004	2005	2006	2007	2008	2009	2010
a. Number of subprojects/loans (Cumulative)	0	10	599	2,630	3,918	4,060	5,395	5,395	5,395
b. Number of subprojects/loans in arrear (Cumulative)	0	0	1	24	120	139	228	280	219
c. Arrears ratio by number of subprojects/loans b/a*100	0.0%	0.0%	0.2%	0.9%	3.1%	3.4%	4.2%	5.2%	4.1%
d. Amount of loans disbursed (Cumulative, Mil.LE)	0.00	1.02	29.21	107.09	157.06	163.73	264.41	264.41	264.41
e. Amount of loans in arrear (Cumulative, Mil.LE)	0	0.002	0	0.45	1.4	2.79	5.56	6.16	4.99
f. Arrears ratio by amount of sub-loans e/d*100	0.0%	0.2%	0.0%	0.4%	0.9%	1.7%	2.1%	2.3%	1.9%

Source: Prepared from answers to the questionnaire to SFD

As explained above, the rate of sub-loans in arrears has been maintained at a low level, and the repayment status is good so far. According to the results of the beneficiary survey of 205 enterprises, 103 have completed the repayment of sub-loans. The remaining 102 have not

incurred arrears as of October 2011.

Meanwhile, in the in-depth interviews with 23 end users, those who replied that "the business performance has deteriorated significantly after the revolution in February 2011" account for 70% of all end users interviewed. Deterioration in business performance is particularly serious for the enterprises in tourism-related industries in Aswan and Luxor. If the economic disorder triggered by the people's revolution prolongs, as a matter of course, it will inevitably have a great influence on the collection of sub-loans in the future.

Supposing the influence of the revolution will continue, the intermediary banks and the SFD are advised to enhance monitoring activities with an eye toward the collection of the last sub-loans that become due in 2013. For example, it would be necessary to increase the frequency of monitoring or conduct monitoring in a more careful manner while taking into consideration the human and physical resources of the regional offices of the SFD and the intermediary banks.

3.5.2.2 Structural Aspect of Operation and Maintenance

The collection of sub-loans is primarily the responsibility of the intermediary banks (NBE and BOA), and the SFD does not bear the risk of collection. The monitoring of end users is carried out jointly as necessary by the NBE, BOA, and the SFD, as described below.

Operation and Maintenance System of SFD

At the SFD,[29] SEDO is responsible for this project. Prompted by the Multi-Donor Review Missions (MDRM)[30] that were conducted several times and by the enactment of the New SME Law in 2004, SEDO has been making continuous efforts to improve the project implementation system.[31] As part of this process, they are now establishing a One-stop Service (OSS) Center at each regional office, thus proceeding with the development of a system for delivering services for micro and small business financing in an integrated manner.

For the monitoring of end users, the SFD has regional offices in 29 governorates/cities throughout the country, where a field officer is posted, in order to engage in monitoring

[29] The SFD, which was established in 1991, has four programs including SEDO functioning as its divisions. The supreme decision-making body is the board of directors. In addition to cabinet ministers including the minister of finance, representatives of financial circles and NGOs are appointed directors by Prime Ministerial Decree.

[30] As stated in the "Relevance" section, Multi-donor Review Mission II, carried out in 2004, reiterated 1) poverty reduction and 2) job creation as the mission goal of the SFD.

[31] In the Multi-donor Review Mission carried out in 2000, it was suggested that SEDO be separated as an independent organization. The Egyptian government at first accepted this suggestion but later rejected it, and with this as momentum, the restructuring of the entire SFD was promoted. In addition, with the enactment of the New SME Law 2004, it became necessary to take systematic measures in order to comply with the new law. As part of such measures, the reshuffle and expansion of middle management was conducted. In addition the, "Integrated Finance Package Service" is actively promoted to provide comprehensive services to micro and small enterprises, including loans, micro finance, technical support, and business startup advisory services, etc. In this process, the introduction of "One-stop Shop" (OSS) Centers" is under way.

activities. SEDO, the organization responsible for this project, requires initial monitoring to be carried out within 90 days after the disbursement of sub-loans and subsequent monitoring to be conducted once or twice a year. For end users falling into arrears, monitoring is conducted three or four times a year.[32]

With respect to the system for monitoring sub-projects, it was pointed out in SAPI in 2005 that "in the monitoring activities, most of the effort is spent on first visits and the handling of problematic cases, leaving limited capacity to cover those customers who are making payment as scheduled." On the other hand, according to the in-depth interviews with 23 end users, all of them are visited for monitoring about twice a year without exception and are receiving advice as necessary. There seems to be no problem with the current monitoring system of the SFD.

Operation and Maintenance System of NBE and BOA

No problem is found with the monitoring system of the NBE[33] and BOA[34] in general. The NBE has been taking part in SFD projects since 1992, in the fund's early days of establishment. From the mid-2000s onward, it has been reinforcing its credit management system focusing on financing for small and medium-sized enterprises as a core of its business strategy. In this process, it has been strengthening its involvement in SFD projects. As of 2011, over 40% of all employees are engaged in SFD projects. BOA became an affiliate of an Italian investor in 2006 and was converted to a private commercial bank. The activities of this project have been continuing, and the collection of sub-loans has been conducted continuously. The inefficiency that was observed when it was a state-owned bank has been improving substantially, and the SFD is now negotiating with BOA toward a new project. This fact also suggests that the operation performance of BOA has improved.

In the in-depth interviews, several end users pointed out that "The loan appraisal period is rather long." In this regard, the NBE submits its loan applications to the SFD in hard copy. As the work and time needed at the SFD to examine these documents and approve the loan is the largest bottleneck in shortening the examination period,[35] improvements such as the computerization of the process are expected.

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[32] Monitoring is conducted in cooperation with the intermediary banks as necessary. After the revolution in February 2011, SEDO increased the frequency of monitoring. (Source: Interview with the officials in charge at SEDO)

[33] Divisions involved in SFD projects are: 1) Business Development Division, 2) Follow-up Division, 3) Risk Analysis Division, and 4) regional branch offices. The SFD has 32 branch offices in Suez Canal & Sinai Peninsula and 50 in Upper Egypt. Of its 1,400 employees working as of 2010, 600 are involved in SFD-related projects.

[34] After it became an affiliate of the group of the Bank of Intesa Sanpaolo of Italy in 2006, tools related to SME financing have been carried on. The financing under this project continued until project completion in 2008. As of 2011, the collection of sub-loans continues. The Collection & Recovery Division is in charge of the collection of sub-loans.

[35] Source: Interviews with the SFD head office and regional offices

From the above, there is no specific problem regarding the operation and maintenance system. The organizational system necessary for the future continuation of similar two-step loan projects through revolving funds is maintained.

3.5.2.3 Technical Aspects of Operation and Maintenance

The SFD and the intermediary banks NBE and BOA have various training programs in place for employees on the methods and tools for the credit evaluation of loan customers and project feasibility studies, while regional offices are strengthening the ability of employees through OJT.[36] Considering that efforts are made to enhance the ability of employees through such training, etc., and also considering the to-be-mentioned trends in the number of sub-loans in arrears, there is no specific problem regarding the examination skills, etc., of the employees of the SFD and the intermediary banks.

Since its establishment to date, the SFD has been implementing many programs for the financing for micro and small enterprises, in particular with the funds provided by various donors including the UNDP, JICA, the EU, AFDB, the World Bank, the Kuwait Fund, and the Islamic Development Bank has accumulated sufficient skills and experience in loans, from examination through to monitoring. In addition, the succeeding Micro Enterprise Assistance Project (the L/A was signed in December 2008) has planned to enhance the ability of the employees of SFD regional offices and intermediary banks, while also planning to strengthen SEDO's system for monitoring intermediary banks.

Therefore, there seems to be no problem with the technical level concerning operation and maintenance.

3.5.2.4 Financial Aspects of Operation and Maintenance

The SFD, the NBE, and BOA all reported increases in both income and profit in the last three years, and their financial indicators of profitability are good in general. As for the NBE and BOA, the gross income, return on equity (ROE), and return on assets (ROA) are all on the increase, as shown in Table 15 and Table 16, indicating that they are soundly operated banks. There are, however, concerns over the future impact of the revolution. It is necessary to keep a careful watch on the financial position of the intermediary banks.

Although the financial statements of the executing agency, the SFD, were furnished, the SFD requested not to disclose information externally. Information disclosure is indispensable for an entity in the financial sector, and even higher transparency is required for a public entity. With the people's revolution as a turning point, the SFD is expected to disclose currently undisclosed data such as financial statements and organizational structure.

[36] At the SFD, about 110 employees participated in some kind of training program from 2008 to 2011. Through these training programs, 60 employees of regional offices assumed the position of credit officer. (Source: Interviews with the regional offices of the SFD and intermediary banks)

Table-15: NBE's Financial Status

Indicators	FY2007	FY2008	FY2009
Gross Income (Mil.L.E.)	14,703	14,939	17,807
Net Income (Mil.L.E.)	373	385	900
Net Income to Gross Income (%)	2.5	2.6	5.1
ROE (%)	5.2	5.0	10.3
ROA (%)	0.18	0.17	0.35

Source: Prepared from the NBE Annual Report
Note): Financial year runs from July 1 through June 30.

Table-16: BOA's Financial Status

Indicators	FY2007	FY2008	FY2009
Gross Income (Mil.L.E.)	1,215	1,502	2,368
Net Income (Mil.L.E.)	382	409	506
Net Income to Gross Income (%)	31.4	27.2	21.4
ROE (%)	18.1	16.2	17.3
ROA (%)	1.02	1.05	1.57

Source: Prepared from the BOA Annual Report, etc.
Note-1): Financial year runs from July 1 through June 30.
Note-2): Data includes from January to December for FY2009.

3.5.3 Sustainability of the Whole SFD Program

Regarding the sustainability of the SFD as a whole, the SFD should ideally function independently, without relying on donor loans, by issuing long-term bonds or raising funds on the stock market in the presence of loan-term financial markets. However, the long-term financing markets (stock and bond markets) in Egypt are still under development, and, particularly, the bond market is much less liquid than the stock market. It is rarely the case that a private enterprise issues bonds, and the environment is not ready for the SFD to issue bonds and raise funds. The privatization of the SFD is not planned in the short-to-medium term, in light of its social position, etc.

Even though the importance of the diversification of the SFD's fundraising menu is recognized by some in the parties involved in the SFD, "operating the fund with donor loans" seems to be the only option effective for the time being.

Based on the above analysis, no specific problem is found regarding the operation of special accounts and revolving funds. In addition, there is no problem with the management structure of the executing agency and the intermediary banks, and the ratio of sub-loans in arrears remains low. If the economic disorder caused by the people's evolution is prolonged, it would somehow affect the collection of sub-loans in the future. As of the time of the ex-post evaluation, however, the repayment status is generally good.

Therefore sustainability of the project is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project was carried out with the objective of satisfying the financial needs of micro and small enterprises in the poverty-stricken regions of Egypt and thereby encouraging job creation and poverty reduction, which is highly consistent with relevant policies. In the initial stage of the project, it was found that the loan terms did not meet the needs of the users. However, owing to the modification of the loan terms and other efforts, both the cumulative amount of sub-loans (sub-projects) disbursed and the cumulative number of sub-loans

approved exceeded the target value. To date, over 30,000 job opportunities have been created, which contributed to some extent to the decline in the unemployment rate in the target areas. In addition, the implementation of the project generated many positive impacts, including substantial improvement in the business conditions of end users. Although the economic disorder caused by the people's revolution in February 2011 is expected to affect debt collection in the future, the ratio of sub-loans in arrears remains low so far, and there is no problem with the operation and maintenance system of the executing agency and intermediary banks. In terms of efficiency, although the implementation period was longer than planned, the project cost did not exceed the planned amount.

In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations for Executing Agency

Recommendations for SFD #1

There is no problem with the loan monitoring system of the SFD and the intermediary banks so far. However, it is assumed that the business conditions of the loan customers have largely deteriorated after the people's revolution in February 2011. In addition, considering that the disbursement of about 40% of the total amount disbursed was concentrated in 2008 (the year when the loan conditions were eased), there are concerns over the various impacts that such a last-minute push may have caused. Based on the above analysis, the further strengthening of the monitoring system is expected for the future. Particularly close attention needs to be paid from now on to the repayment status of those sub-loans that were agreed during 2008. It would be necessary, for example, to increase the frequency of monitoring or conduct a more careful monitoring (more detailed analysis of the financial data of loan customers, etc.) taking into consideration the human and physical resources available at the regional offices of the SFD and the intermediary banks.

Recommendations for SFD #2

In grasping the number of job opportunities created, the SFD calculates the figure using a method of "dividing the total amount disbursed by a certain coefficient," instead of counting the actual number accurately. Based on the results of the in-depth interviews with end users, etc., the coefficient established by the SFD is determined to be higher than the actual value (i.e., the number of job opportunities created is underestimated). The following three methods are available to the SFD in the monitoring of the number of job opportunities created: 1) actual counting by field officers; 2) the acquisition of data based on quarterly reports submitted by intermediary banks; and 3) checking against the employment data owned by the

social insurances office of the target region. Considering that the number of job opportunities created is the most critical indicator for SFD-SEDO to determine the relevance of the project and meaning for its existence, it is advisable to establish a more precise data collection system, including, for example, imposing reporting obligations on end users, seeking "organic cooperation" with social insurance offices, or increasing the frequency of the monitoring by field officers.

Recommendations for SFD #3

Information disclosure is indispensable for an entity in the financial sector, and even higher transparency is required for a public entity. With the people's revolution as a turning point, the SFD should attempt to disclose currently undisclosed data such as financial statements and organizational structure through websites and other means.

Recommendations for SFD #4

Currently, the documents necessary for the approval of a new loan are submitted to the SFD in hard copy, and the work and time needed at the SFD to examine these documents and approve the loan is the largest bottleneck in shortening the examination period. Therefore, and also in order to increase customer satisfaction and improve the operational efficiency of the intermediary banks, the SFD should encourage the NBE to computerize the procedure.

4.2.2 Recommendations for JICA

If the economic disorder triggered by the people's revolution is prolonged, it would inevitably have great influence on the collection of sub-loans in the future. It is necessary to observe the monitoring activities of the SFD and the intermediary banks closely with an eye toward the collection of the last sub-loans that become due in 2013.

4.3 Lessons Learned

There have presumably been some flaws in grasping the needs at the project's beginning. There was no problem with targeting regions where the need for job creation was high, from the perspective of poverty reduction. However, applying the loan conditions designed to promote capital investment to under-developed regions where financing for working capital was needed resulted in the slow growth of lending in the early years of the project. When planning and designing a similar project in the future, it is advisable to grasp the needs for the project accurately, carefully consider the conditions based on the needs, and make a proper choice.

On the other hand, it is highly appreciated that the serious state of the project was detected early and that a series of problems were solved through the prompt implementation of SAPI.

In addition, in the implementation of SAPI, engaging the experts in long-term residence at the project site contributed to not only defining the problems in detail but also suggesting effective and concrete solutions in the recovery stage later on. As detailed investigation of the current conditions and practical proposals are indispensable for SAPI, this is expected to be handled in the same way in the future.

Comparison of Original and Actual Scope

Item	Plan	Actual
A) Output		
1.1 Sub-Loans Disbursement		
・ Type of end-users	Micro and small enterprises (MSEs)	As originally planned
・ Sub-loan amount per end-user	5,000 L.E. to 200,000 L.E.	As planned up to 2008, and then maximum loan amount was increased up to 500,000 L.E. after 2008
・ Eligible end-users of sub-loan	i) Private entities (excl. public ones), ii) Total asset of existing end-users: 5,000 to 200,000 L.E. (excl. land and building)	i) The same, ii) Total asset: Increased up to 500,000 L.E. after 2008
・ Conditions for sub-loan use	Basically for capital investment For working capital: Not exceeding 30% of the total amount of each sub-loan	As planned up to 2008, and then the limit of working capital: Increased up to 70% of the total amount of each sub-loan, after 2008
・ Collateral	Land, building, equipment, etc.	In addition to the left, third party guarantor
1.2 Sub-Loan from SFD to IBs		
・ Intermediary Banks (IBs)	National Bank of Egypt (NBE) and Bank of Alexandria (BOA)	As originally planned (BOA changed from a national bank to a private one in 2006)
・ Interest rate	4 to 8.5%(Contingency cost of foreign exchange risk and administration cost were added as a spread.)	As originally planned
・ Repayment period	Up to 7 years (incl. 2 years grace period at maximum)	As originally planned
1.3 Subsidiary Loan from IBs to End-Users		
・ Interest rate	7 to 11%(Allowance for NPLs and administration cost were added.)	As mostly originally planned (6.5% for some cases)
・ Repayment period	Up to 5 years (incl. one year grace period at maximum)	As originally planned
1.4 Target Governorates for Sub-Loan		
・ Upper Egypt	6 Governorates and 1 City (Beni Suef, Mynia, Assuit, Sohag, Quena, Aswan and Luxor City)	As originally planned
・ Suez Canal & Sinai Penninsula	5 Governorates (Port Said, Ismailia, Suez, North Sinai and South Sinai)	As originally planned
B) Project Period	Feb. 2002 - Dec. 2006 (59 months)	Feb. 2002 - Nov. 2008 (82 months)
C) Project Cost		
Foreign currency	None	None
Local currency	170 million L.E.	264 million L.E.
Total	5,194 million yen	5,194 million yen
Japanese ODA loan portion	5,194 million yen	5,194 million yen
Exchange rate	1 L.E. ＝ 30.55 yen (As of Feb. 2002)	1 L.E. ＝ 19.64 yen (Average between 2002 and 2008)

Egypt

Ex-Post Evaluation of Japanese Grant Aid Project

The Project for Rehabilitation and Improvement of Sakoula Regulator on Bahr Yusef Canal

External Evaluator: Masami Tomita, Mitsubishi UFJ Research and Consulting Co., Ltd.

0. Summary

This project aimed at achieving and ensuring appropriate water management and stable provision of irrigation water to the benefited area by rehabilitating the Sakoula Regulator on the Bahr Yusef Canal and introducing an overflow type gate that enables easier control of water level and flow volume.

Relevance of this project is high, as the project is consistent with priority areas of Egypt's development plans and Japan's ODA policy, and moreover development needs for the project are high. Efficiency of the project is high, as both project cost and period were within the plan. Effectiveness of the project is fair, as on the one hand the project more or less achieved targets in a major operation and effect indicator, which is the amount of water intake from the Sakoula Regulator to the gravity irrigation area, but on the other hand, the amount of water intake from the Sakoula Regulator is still in deficit in July and water shortage has not been solved yet in the benefited area (especially at downstream of branch canals) largely due to deteriorated small water structures etc. Sustainability of the project is fair, as some problems have been observed in terms of operation of the regulator and water flow management, while no major problems have been observed in the O&M system and financial status.

In light of the above, this project is evaluated to be satisfactory.

1. Project Description

Project Location

Sakoula Regulator

1.1 Background

In Egypt, where annual amount of precipitation is approximately as little as 5 mm, 55.5 billion m^3 of the water right per year which is stated in the Nile Agreement is the major available amount of water for agricultural, industrial and domestic (daily life) uses. On the other hand, population of the country

is expected to increase from approximately 38 million in 1977 to approximately 83 million in 2017[1], and the horizontal expansion of agricultural land has been promoted in order to increase food production in line with the population growth. However, as the available amount of water resources within the country is limited and the cultivated area is merely 4% of the area of the whole country[2], the vertical expansion which aims at increasing cropping intensity and yield of production in existing cultivated areas has also been promoted. The Egyptian government determined to renew and/or upgrade deteriorated water structures such as weirs and water intake facilities within the country to modern facilities for the efficient use of limited amount of water resources as part of the vertical expansion policy.

The amount of water intake into the Bahr Yusef Canal on which the Sakoula Regulator is situated is 4.5 billion m^3 per year, which equals to approximately 8% of the amount of the water right stated in the Nile Agreement. The total area benefited from the Bahr Yusef Canal is 11% of the total cultivated area within the country and the canal is one of the important agricultural infrastructures for the country's agriculture[3]. The Japanese government has provided assistance for the rehabilitation of the canal since 1990 based on requests from the Egyptian government. The Japanese government reported the survey results of the canal as a whole in 1992 as "Feasibility Study for Rehabilitation and Improvement of Delivery Water System on Bahr Yusef Canal", and provided grant aid for rehabilitation of the Lahoun Regulator (completed in 1997) and the Mazoura Regulator (completed in 2002) based on the F/S report. One thing to note is that an overflow type gate that enables easier control of water level and flow volume has been introduced to these regulators. This project was implemented for the purpose of an integrated water flow management among the three regulators in order to utilize the limited amount of water resources of the Nile River efficiently, by renewing the heavily deteriorated Sakoula Regulator, which is located at the upstream of the above mentioned two regulators, and introducing an overflow type gate which is the same as those introduced to the other two regulators.

1.2 Project Outline

The objective of this project is to achieve and ensure appropriate water management and stable provision of irrigation water to the benefited area by rehabilitating the Sakoula Regulator on the Bahr Yusef Canal and introducing an overflow type gate that enables easier control of water level and flow volume.

Grant Limit / Actual Grant Amount	2,001million yen / 1,897 million yen
Exchange of Notes Date	June, 2004

[1] National Water Resources Plan 2017 P.22
[2] Basic Design Report on the Project for Rehabilitation and Improvement of Sakoula Regulator on Bahr Yusef Canal in the Arab Republic of Egypt (2003) P.S-1
[3] Same as above. P.1-6

Implementing Agency	Ministry of Water Resources and Irrigation
Project Completion Date	June, 2006
Main Contractor	Dai Nippon Construction
Main Consultant	Sanyu Consultants Inc.
Basic Design	"Basic Design Report on the Project for Rehabilitation and Improvement of Sakoula Regulator on Bahr Yusef Canal in the Arab Republic of Egypt" Japan International Cooperation Agency (JICA), Sanyu Consultants Inc. August, 2003
Detailed Design	June, 2004
Related Projects (if any)	"Feasibility Study for Rehabilitation and Improvement of Delivery Water System on Bahr Yusef Canal" (1990-1992), "Project for the Rehabilitation and Improvement of Lahoun Regulator of Bahr Yusef Canal in the Arab Republic of Egypt" (1995-1997), "Project for Rehabilitation and Improvement of Mazoura Regulator of Bahr Yusef Canal in the Arab Republic of Egypt" (2000-2002) Irrigation Improvement Project (IIP) (1996-2006) The World Bank

2. Outline of the Evaluation Study

2.1 External Evaluator

Masami Tomita, Mitsubishi UFJ Research and Consulting Co., Ltd.

2.2 Duration of Evaluation Study

Duration of the Study: December, 2010 – December, 2011

Duration of the Field Study: June 18, 2011 – July 1, 2011, September 11, 2011–September 20, 2011

2.3 Constraints during the Evaluation Study

The area covered by this project is comprised of the gravity irrigation area (old land), where irrigation water is supplied to branch and secondary canals by gravity, and the pump irrigation area (newly reclaimed land), where irrigation water is delivered to branch and secondary canals through pump stations. At the time of the basic design study, target figures were set for required amount of

irrigation water, actual water intake, agricultural production volume and yield per unit area in the gravity irrigation area after the project implementation. However, for the pump irrigation area, target figures were not set, as the area has been expanded due to the horizontal expansion policy and thus making assumption for the increase of cultivated areas and yield per unit area was very difficult. Moreover, at the time of ex-post evaluation, reliable data regarding the cultivated area by major crops and water intake volume in the pump irrigation area (it accounted for approximately 40% of the entire area benefited from the project at the time of the basic design study) was not provided by the executing agency, and therefore it cannot be judged whether water shortage has been solved or not in the area. Consequently, the ex-post evaluation study focuses on the gravity irrigation area only to evaluate this project. Furthermore, reliable data regarding production volume of major crops, yield per unit area and agricultural income in the benefited area after the project implementation was not provided by the executing agency, and thus, impact of the project is evaluated based on a qualitative analysis such as beneficiary survey etc.

3. Results of the Evaluation (Overall Rating: B[4])

3.1 Relevance (Rating: ③[5])

3.1.1 Relevance with the Development Plan of Egypt

The Fourth Five-Year Plan of Egypt (1997-2002) focused on an effective use of limited amount of water resources and improvement of irrigation efficiency, and targeted at saving approximately one billion m^3 of water during the plan period of five years by improving efficiency of irrigation systems through renewal of deteriorated water structures such as pump stations, water intake facilities and weirs etc.

On the other hand, the Sixth Five-Year Plan of Egypt (2007-2012), which is the national development plan at the time of ex-post evaluation, aims at saving water for agricultural uses (promotion of production of crops which consume less amount of water and reuse of agricultural drainage etc) and developing new water resources (use of ground water), and securing water resources is still a critical issue in Egypt. The Five-Year Plan states that the country will carry out construction of weirs and dams etc in Assiout, construction of drainage networks (target area: 560,000 feddan[6]), expansion of drainage networks (target area: 450,000 feddan), and renewal of drainage networks (target area: 550,000 feddan) etc, in order to save approximately two billion m^3 of water. Moreover, National Water Resources Plan 2017 states that the country will carry out construction of weirs and drainages for the purpose of appropriate distribution and effective use of water.

Therefore, construction and renewal of water structures for the purpose of effective use of water resources were/are prioritized in Egypt's development plans both at the time of basic design study and ex-post evaluation.

[4] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[5] ③: High, ② Fair, ① Low
[6] 1 feddan = approximately 0.42 hectare

3.1.2 Relevance with the Development Needs of Egypt

At the time of basic design study (2003), the Sakoula Regulator on the Bahr Yusef Canal which was constructed more than 100 years ago was deteriorated severely, and water leakage from the regulator caused unstable water level at upstream of the regulator, which resulted in the shortage of water inflow into branch canals. Consequently, the gravity irrigation area (approximately 50,000 feddan) at upstream of the regulator was faced with the shortage of 5,640 thousand m^3 of irrigation water for summer cropping and 3,515 thousand m^3 for winter cropping. Meanwhile, in the pump irrigation area (approximately 33,000 feddan) unstable water intake level caused excessive hours of operation of pumping facilities. Moreover, previously the gates of the regulator had been operated manually (by hand) in order to control the downstream water level of the regulator (the control of the upstream water level of the regulator had not been carried out), which took a long time, increased the amount of waste discharge during the gate operation, and resulted in the unstable upstream water level of the regulator.

On the other hand, at the time of ex-post evaluation, agricultural land in Egypt keeps being developed and expanded for the purpose of improving the rate of food self-sufficiency and increasing production of export crops etc. The cultivated areas in the country are expected to increase from approximately 8 million feddan in 1997 to approximately 11 million feddan in 2017[7]. On the other hand, the amount of water for agriculture that could be increased during the same period is limited to 200 million m^3 even if efforts are made to reuse agricultural discharge water etc. Under these circumstances effective use of water resources has become ever more important. In the area benefited from the Sakoula Regulator, newly reclaimed land (pump irrigation area) has been expanded (approximately 33,000 feddan in 2002 and approximately 45,000 feddan in 2010[8]), and the Sakoula Regulator is a very important facility in order to supply limited amount of water stably to both old land (gravity irrigation area) and newly reclaimed land, and hence development needs for the project are still high.

3.1.3 Relevance with Japan's ODA Policy

In Japan's Official Development Assistance (ODA) Charter revised in 2003, assistance for the area of agriculture targeted at poverty reduction was prioritized, and the Country Assistance Program for Egypt formulated in 2000 stated provision of agricultural infrastructure and increase of agricultural production as important areas for Japan's assistance to Egypt.

This project has been highly relevant with Egypt's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

[7] National Water Resources Plan 2017 P.15-16
[8] Data provided by the executing agency

3.2 Efficiency (Rating: ③)

3.2.1 Project Outputs

Table 1 below shows outputs of the project (both planned and actual) which were constructed and provided with Japan's grant aid, and Table 2 below shows outputs of the project (both planned and actual) which were provided with Egypt's budget.

Table 1: Outputs of the Project Constructed and Provided with Japan's Grant Aid (Planned/Actual)

Item	Planned	Actual
Regulator Body	Reinforced concrete structure, Maximum discharge: 193.64m^3/sec, Minimum discharge: 39.76 m^3/sec, Highest control water level (upstream): 33.70m, Lowest control water level (downstream): 30.28m	Almost as planned (In detailed design, widening of a regulator base plate was required, which accompanied changing the location of the regulator body towards 2.5m right bank of the canal)
Gate	Slide type double leaf roller gate, Gate span width: 8.0m, Height of upper leaf: 2.8m, Height of lower leaf: 3.0m, Quantity: 4sets	As planned
Bed Protection	Concrete block, Length of downstream protection: 44m, Width: 38m	As planned
Closure Dike	Steel sheet pile type III and IV: 10.5-12.5m Stone pitching slope protection:133m	Almost as planned (Steel sheet pile type III and IV: 10.5-15.0m) (Changing the location of the regulator body required a modification of the length of steel sheet pile)
Slope Protection	Steel sheet pile type III and IV: 9.0-12.5m Stone pitching slope protection: 157m	Almost as planned (Steel sheet pile type III and IV: 9.0-15.0m) (Changing the location of the regulator body required a modification of the length of steel sheet pile)
Attached Bridge	Reinforced concrete structure, Length of bridge: 40.0m, Design load: 60ton, One side single lane, Total width: 12.8m	As planned
Control House	One story, RC structure, Floor area: 78m^2	As planned
Control Panel	Upper and lower gate operation button, Recorder for water level, gate opening and discharge, Upper and lower gate opening indicator, Upstream and downstream water level gauge etc	As planned

Emergency Generator	50kVA, 380V/220V 1unit	As planned

Source: Basic Design Study Report, JICA Internal Documents, Answer to Questionnaire

Table 2: Outputs of the Project Provided with Egypt's Budget (Planned/Actual)

Planned	Actual
Regulation of flow in the Bahr Yusef Canal during construction including repair of existing gates (4 gates)	As planned
Land acquisition (3,000m^2) for temporary yards and preparation	As planned
Internal transportation of products for permanent use from the port of disembarkation to the project site	As planned
Installation of a permanent transformer and switch gear at near the control house and extension cable from the existing high voltage power line	As planned

Source: Basic Design Study Report, JICA Internal Documents, Answer to Questionnaire

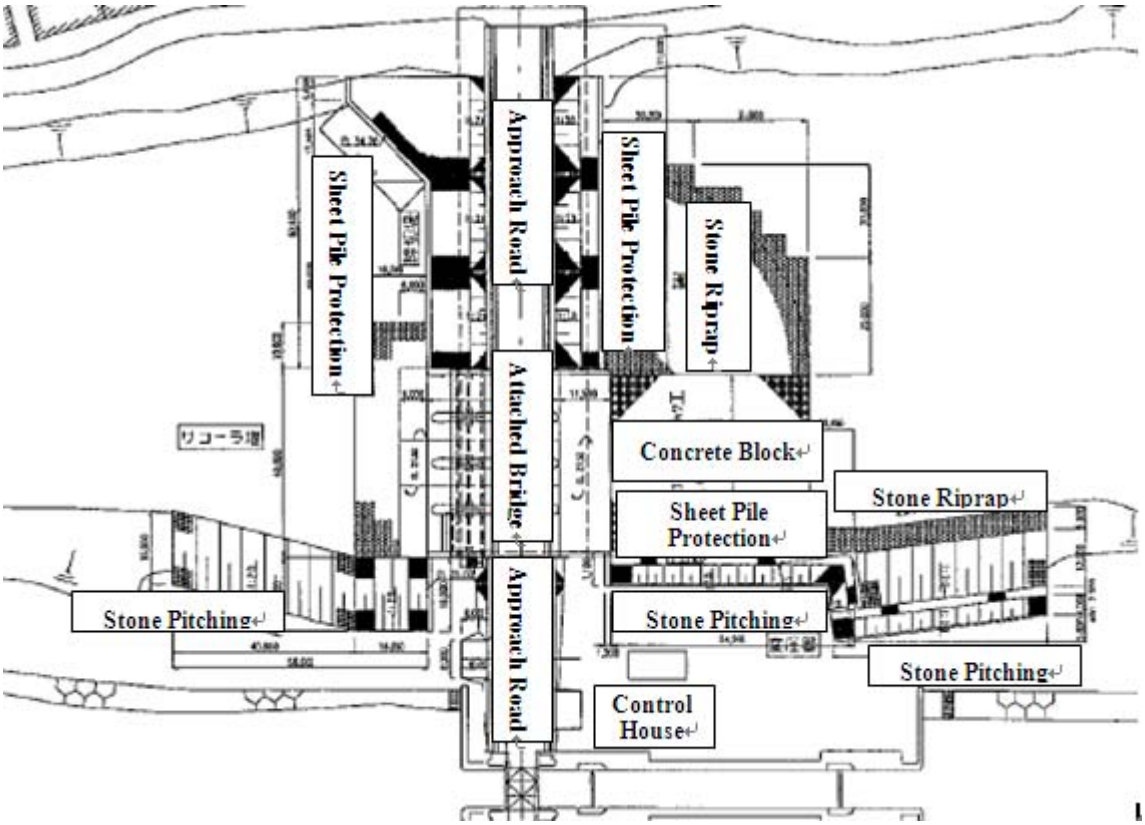

Figure 1: Overview of the Sakoula Regulator

Source: Edited based on the ground plan of the regulator in the basic design study report

Outputs of the project were as planned. A state-owned land was used for the temporary yard, which

was to be acquired and prepared with the Egyptian budget, and thus land acquisition cost was not required.

Control House

Gates and Attached Bridge

3.2.2 Project Inputs

3.2.2.1 Project Cost

The grant limit at the time of the basic design study was 2,001 million yen, on the other hand, the actual grant amount was 1,897 million yen, and it was lower than planned (95% against the plan). The planned Egyptian budget was 278 million yen[9], while the actual cost was 95 million yen[10], and it was lower than planned (34% against the plan). The reason for the large reduction of the project cost financed with Egyptian budget was due to the fact that land acquisition cost was not required as a state-owned land was used for the temporary yard, that outsourcing cost was not required as employees of the executing agency carried out repair and operation of existing 4 gates during the construction, and that custom fee was not required (became exempted) in the middle of the project implementation.

3.2.2.2 Project Period

The planned project period at the time of the basic design study was 29 months in total (5 months for detailed design and preparation of bidding documents, 3 months for bidding and selection of a contractor and 21 months for civil works)[11]. On the other hand, the actual project period was 27 months in total (5 months for detailed design and preparation of bidding documents, 3 months for bidding and selection of a contractor and 19 months for civil works), and it was shorter than planned (93% against the plan). The reason for the shorter project period was due to efforts made by contractors to proceed construction works efficiently through conducting concrete works during night time.

[9] Basic Design Report on the Project for Rehabilitation and Improvement of Sakoula Regulator on Bahr Yusef Canal in the Arab Republic of Egypt (2003) P.3-110

[10] Calculated as multiplying 5.08 million LE of the total cost by the average exchange rate of 1LE=18.65 yen (the average exchange rate of the period of 2004/6/10-2006/6/11).

[11] Basic Design Report on the Project for Rehabilitation and Improvement of Sakoula Regulator on Bahr Yusef Canal in the Arab Republic of Egypt (2003) P.3-99

Both project cost and project period were within the plan, therefore efficiency of the project is high.

3.3 Effectiveness[12] (Rating: ②)

3.3.1 Quantitative Effects

3.3.1.1 Irrigation Water Intake in the Gravity Irrigation Area

Figure 2 below shows the conceptual diagram of the area benefited by the project.

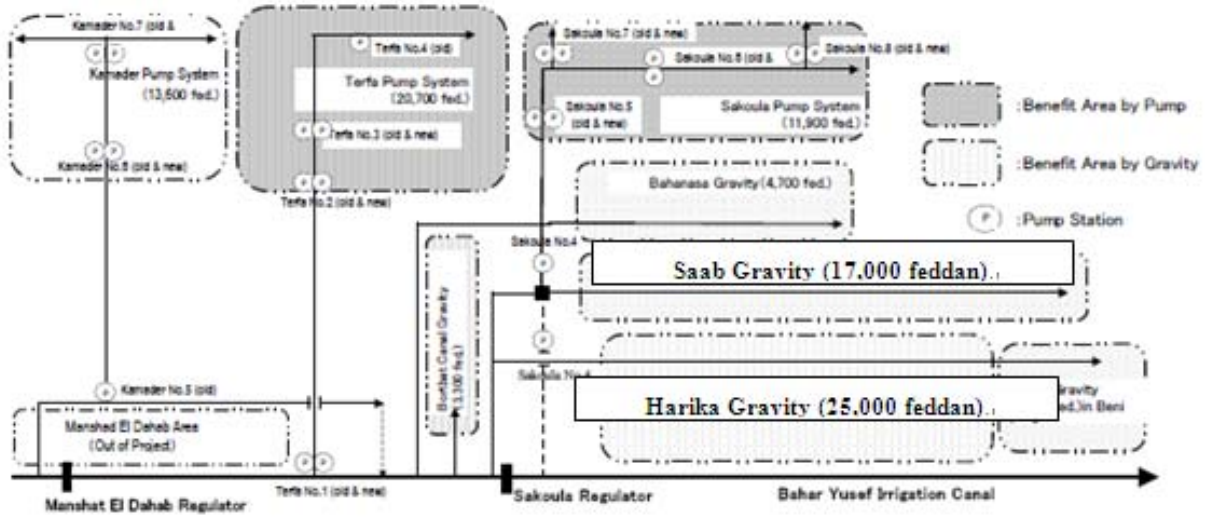

Figure 2: Conceptual Diagram of the Benefited Area

Source: Basic Design Study Report

As mentioned earlier, the area covered by this project is comprised of the gravity irrigation area and the pump irrigation area, and the former was faced with water shortage at the time of the basic design study, particularly in the areas benefited from the Harika and Saab Canals indicated above. The table below shows baseline data at the time of the basic design study (2003) and target figures after the completion of the project of the amount of water required, the actual water intake, and water deficit in the gravity irrigation area.

[12] The rating of the project's effectiveness takes into account the evaluation of the project's impact.

Table 3: Baseline Data (2003) and Target Figures (2007) of the Amount of Water Required and the Actual Water Intake in the Gravity Irrigation Area

Indicator	Before Project (2003, baseline)			After Project (2007, target)
	Summer Cropping (May - September)	Winter Cropping (October - April)	Total	
Amount of Water Required (thousand m^3)	120,176	78,103	198,279	198,279
Amount of Water Taken (thousand m^3)	114,536	74,588	189,124	198,279 (4.8% increase)
Deficit (thousand m^3)	−5,640	−3,515	−9,155	0

Source: Basic Design Study Report
Note: The table above indicates the amount of water required and actually taken into the major branch canals (Harika, Saab and Bahanasa: the area covered is approximately 46,700 feddan) in the gravity irrigation area shown in the Figure 2.

The objective of the project was to solve the water deficit indicated above by renewing the severely deteriorated Sakoula Regulator and introducing an overflow type gate that enables easier control of water level and flow volume. The table below shows actual figures after the completion of the project (2007 and 2010) of the amount of water required, the actual water intake, and balance in the gravity irrigation area. While data on the actual cultivated area by major crops in each month for the whole year in 2007 and 2010 was requested to the executing agency in order to calculate the amount of water required after the project completion, figures for each month were not available. Thus, the amount of water required was calculated using the rate (percentage) of cultivated area in each month at the time of the basic design study[13]. Therefore, the amount of water required indicated below is the approximate value.

Table 4: Actual Figures after the Project (2007 and 2010) of the Amount of Water Required and the Actual Water Intake in the Gravity Irrigation Area

Indicator	After Project (2007, actual)			After Project (2010, actual)		
	Summer Cropping (May - September)	Winter Cropping (October - April)	Total	Summer Cropping (May - September)	Winter Cropping (October - April)	Total
Amount of Water Required (thousand m^3)	130,344	92,089	222,433	122,934	100,015	222,949
Amount of Water Taken (thousand m^3)	142,516	130,994	273,510	146,844	134,954	281,798
Balance (thousand m^3)	＋12,172	＋38,905	＋51,077	＋23,910	＋34,939	＋58,849

[13] For example, as for wheat, which is winter crop, the total cultivated area was 20,000 feddan and it was cultivated 100% during January to March, 90% in April, 50% in May and November, 90% in December at the time of the basic design study (2003). The cultivated area by types of crops in each month after the project was calculated using the rate (percentage) above, and then the amount of water required after the project was calculated based on the cultivated area. Moreover, in calculating the amount of water required, the amount of water consumption for each type of crop which was standardized in the "Utilization of Water Resources and Basic Development Plan 1980" was used at the time of the basic design study. As the executing agency confirmed that the same standard is currently used in calculating the amount of water required, the same standard was used in the ex-post evaluation. Furthermore, the irrigation efficiency was taken as 60.5% which is the same as at the time of the basic design study.

Source: Cultivated area by major crops and amount of water taken: provided by the executing agency
Note: The table above indicates the amount of water required and actually taken into all branch canals (the area covered is approximately 50,000 feddan) in the gravity irrigation area shown in the Figure 2.

The amount of water required shown above might have a margin of error, as the figures are the approximate value as explained above. However, the table above suggests that deficit of water has more or less been solved in the gravity irrigation area after the project implementation. On the other hand, an analysis of the amount of water shown above by each month reveals that deficit of water is still seen in July when the amount of water required is the largest. The tables below show actual figures of the amount of water required, the actual water intake, and balance in each month in the gravity irrigation area.

Table 5: Actual Figures after the Project (2007) of the Amount of Water Required and the Actual Water Intake in Each Month in the Gravity Irrigation Area

Indicator	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Amount of Water Required (thousand m^3)	16,155	21,798	22,591	19,877	30,314	39,982	28,345	11,827	9,243	9,636	12,665
Amount of Water Taken (thousand m^3)	19,247	23,622	24,599	24,562	29,713	31,114	31,437	25,691	24,035	22,466	17,027
Balance (thousand m^3)	+3,092	+1,824	+2,008	+4,685	-601	-8,868	+3,092	+13,864	+14,792	+12,830	+4,362

Source: Cultivated area by major crops and amount of water taken: provided by the executing agency
Note: January was not included in calculating the amount of water required at the time of the basic design study, as water is stopped for 20 days and dredging of the Bahr Yusef Canal and repair and maintenance of irrigation facilities are carried out in January. Thus, January is not included in calculating the amount of water required in the ex-post evaluation study.

Table 6: Actual Figures after the Project (2010) of the Amount of Water Required and the Actual Water Intake in Each Month in the Gravity Irrigation Area

Indicator	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Amount of Water Required (thousand m^3)	17,546	25,875	24,835	17,289	27,006	36,653	28,493	13,493	10,825	8,696	12,238
Amount of Water Taken (thousand m^3)	20,048	26,435	24,560	27,447	30,509	31,863	31,948	25,077	25,370	21,549	16,994
Balance (thousand m^3)	+2,502	+560	-275	+10,158	+3,503	-4,790	+3,455	+11,584	+14,545	+12,853	+4,756

Source: Cultivated area by major crops and amount of water taken: provided by the executing agency
Note: January was not included in calculating the amount of water required at the time of the basic design study,

as water is stopped for 20 days and dredging of the Bahr Yusef Canal and repair and maintenance of irrigation facilities are carried out in January. Thus, January is not included in calculating the amount of water required in the ex-post evaluation study.

According to the tables above, approximately 20% of the amount required is in deficit in July 2007 and approximately 10% of the amount required is in deficit in July 2010. The ratio of the amount of water deficit to the amount of water required in July at the time of the basic design study was 11.5%[14], and looking at the amount of water in July alone reveals that the same level of water deficit is still seen in July after the project completion and careful water flow management is required in July when the amount of water required is the largest in a year.

3.3.2 Qualitative Effects

A beneficiary survey was conducted in order to evaluate the project qualitatively[15]. The overview of the survey results is presented below.

In the gravity irrigation area, approximately 80% of respondents replied that the amount of irrigation water supplied was decreased after the project and approximately 20% replied that there is no difference in the amount of irrigation water supplied before and after the project. According to the executing agency and consultants who were involved in the study for rehabilitation of the Dirout group of regulators[16] conducted by JICA in 2010, farmers generally tend to claim that irrigation water is not supplied sufficiently in Egypt where the amount of water resources is very limited, however, short interviews were conducted with beneficiaries regarding the situation of water shortage for summer and winter cropping at upstream, midstream and downstream of branch canals in order to understand the situation in detail. The results are shown below.

[14] Basic Design Report on the Project for Rehabilitation and Improvement of Sakoula Regulator on Bahr Yusef Canal in the Arab Republic of Egypt (2003) P.4-1

[15] The beneficiary survey was conducted in a following manner. Time: June, 2011, place: the area benefited from the Sakoula Regulator, the number of samples (valid responses): 111 in total in the gravity irrigation area (66 in total of the Harika gravity area (22 in upstream, 22 in midstream and 22 in downstream of the canal) and 45 in total of the Saab gravity area (15 in upstream, 15 in midstream and 15 in downstream of the canal)), sampling method: random sampling by selecting equal numbers from upstream, midstream and downstream of branch canals according to the area benefited from the canals, survey method: questionnaire survey.

[16] The area benefited from the Dirout group of regulators includes the area benefited from the Bahr Yusef Canal where the Sakoula Regulator is located.

Table 7: The Current Amount of Irrigation Water Supplied for Summer Cropping

(Unit: %)

Area	No water shortage at all	Rarely have water shortage	Sometimes have water shortage, but not the level that affects growing crops	Frequently have water shortage, which affects growing crops to some extent	Frequently have water shortage, which seriously affects growing crops
Harika Upstream	0.0	0.0	4.6	63.6	31.8
Harika Midstream	0.0	0.0	31.8	54.6	13.6
Harika Downstream	0.0	0.0	0.0	0.0	100.0
Saab Upstream	0.0	0.0	13.3	80.0	6.7
Saab Midstream	0.0	0.0	13.3	13.3	73.3
Saab Downstream	0.0	0.0	0.0	0.0	100.0

Table 8: The Current Amount of Irrigation Water Supplied for Winter Cropping

(Unit: %)

Area	No water shortage at all	Rarely have water shortage	Sometimes have water shortage, but not the level that affects growing crops	Frequently have water shortage, which affects growing crops to some extent	Frequently have water shortage, which seriously affects growing crops
Harika Upstream	0.0	72.7	18.2	9.1	0
Harika Midstream	0.0	36.4	27.3	31.8	4.5
Harika Downstream	0.0	4.5	0.0	27.3	68.2
Saab Upstream	0.0	6.7	20.0	60.0	13.3
Saab Midstream	0.0	6.7	6.7	40.0	46.7
Saab Downstream	0.0	0.0	6.7	26.7	66.7

As shown above, water shortage is particularly serious in summer cropping and the tendency is stronger at downstream of branch canals. Many beneficiaries who replied that they face water shortage use groundwater by digging a well themselves in order to compensate for water deficit. Water shortage for summer cropping seems to be attributable to some extent to the fact that the amount of water intake is in deficit in July when the amount of water required is the largest in a year, as shown in the Tables 5 and 6. On the other hand, the major reason for the water shortage in the benefited area (particularly at downstream of branch canals) despite the fact that the amount of water intake from the Sakoula Regulator has increased overall after the project is considered that there are problems in small irrigation facilities including branch canals such as deterioration and lack of proper maintenance. According to the study report of rehabilitation of the Dirout group of regulators submitted in 2010, which was mentioned above, among 128 sites of small structures (intake weirs, regulators, aqueducts and culverts etc) which were taken as samples from 2,000 – 3,000 sites of those structures within the benefited area subject to the study, 103 sites were identified as in need of rehabilitation and renewal within 5 years. In the Minia governorate, where the project was implemented, 54 sites of small structures were identified as in need of rehabilitation and renewal within 5 years. Moreover, according to those involved in the Dirout study, garbages tend to be dumped and left in branch and end canals and these garbages are piled up at the front of gate facilities and block water flow. Many cases were

reported that the water level of canals (many of them are earth canals) was dropped by digging out garbages piled up in branch and end canals periodically, which made water intake from the canals difficult.

Moreover, the Dirout study investigated the annual water flow from major regulators on the Bahr Yusef Canal from 1999 to 2009 and revealed that there is no major difference in the amount of water flow from the Sakoula Regulator before and after the project that is likely to cause serious water shortage in the benefited area. Taking into account the overall increase of the actual water intake in the gravity irrigation area as shown in Table 4 as well as the finding of the Dirout study, water shortage in the benefited area (particularly at downstream of branch canals) revealed in the beneficiary survey seems to be largely attributable to deteriorated small structures etc. Deterioration of the small structures was not pointed out in the basic design study, nor was included in the scope of the project, however, the objective of the project was to solve water shortage in the benefited area, and it cannot be said that the project objective has been completely achieved.

In light of the increasing tendency of the actual water intake in the gravity irrigation area, this project has somewhat achieved its objectives, therefore its effectiveness is fair.

3.4 Impact

3.4.1 Intended Impacts

3.4.1.1 Volume of Agricultural Production and Yield per Unit Area in the Gravity Irrigation Area

In the basic design study, an increase of the volume of agricultural production and yield per unit area through an increase of irrigation water intake to the benefited area was expected as indirect effects of this project. Data on production volume of major agricultural crops, yield per unit area and agricultural income in the area benefited from the Sakoula Regulator after the project implementation was requested to the executing agency, however, reliable data was not provided. Therefore, a quantitative analysis of the indirect effects is not possible, and evaluation of the indirect effects is conducted qualitatively utilizing beneficiary survey data etc. The tables below show the results of the beneficiary survey.

Table 9: Changes of the Volume of Agricultural Production after the Project

(Unit: %)

Area	Increased	Decreased	Unchanged
Harika Upstream	31.8	13.6	54.6
Harika Midstream	4.6	31.8	63.6
Harika Downstream	0.0	59.1	40.9
Saab Upstream	20.0	0.0	80.0
Saab Midstream	6.7	33.3	60.0
Saab Downstream	0.0	60.0	40.0

Table 10: Changes of Yield per Unit Area after the Project

(Unit: %)

Area	Increased	Decreased	Unchanged	Unanswered
Harika Upstream	45.5	13.6	40.9	0.0
Harika Midstream	4.6	9.1	63.6	22.7
Harika Downstream	0.0	45.5	36.4	18.2
Saab Upstream	20.0	0.0	73.3	6.7
Saab Midstream	13.3	13.3	66.7	6.7
Saab Downstream	0.0	60.0	20.0	20.0

Results regarding the volume of agricultural production and yield per unit area turned out to be different in different areas. Approximately 20% to 40% of respondents at upstream of branch canals replied that agricultural production volume and yield per unit area have increased, on the other hand, there is a tendency that more respondents (approximately 40% to 60%) at downstream of branch canals replied that these have decreased (some of them replied that they stopped summer cropping due to water shortage). As there are many factors influencing agricultural productivity apart from the amount of irrigation water such as types and qualities of seeds and fertilizers used etc, and thus it cannot be said that the above is the result brought by the project only. However, as explained in 3.3.2, the decrease of agricultural production at downstream of branch canals seems to be affected by water shortage due largely to deteriorated small structures etc.

3.4.1.2 Irrigation Improvement Project (IIP)

At the time of the basic design study, the Irrigation Improvement Project (IIP), which was promoted by the Egyptian government with assistance from the World Bank, was expected to be implemented in the area targeted by this project (the area benefited from the Sakoula Regulator) for the purpose of increasing agricultural productivity and agricultural income. IIP is a project which rehabilitates severely deteriorated end canals called Mesqa and promotes formulation of water users associations that are responsible for operation and maintenance (O&M) of irrigation facilities. Before IIP was started, there was no water users association and farmers took water from irrigation canals to their farm land directly and individually, which prevented appropriate and equal distribution of limited amount of water resources. At the time of ex-post evaluation, IIP is implemented in the area under the jurisdiction of the East Bahr Yusef Inspectorate Office, which is under the West Minia Irrigation Directorate responsible for O&M of the facilities provided by the project (the project of the Sakoula Regulator), however, IIP has not been implemented in the area (the area benefited from the Sakoula Regulator) under the jurisdiction of the West Bahr Yusef Inspectorate Office, nor has water users association been formulated yet. Earlier implementation of IIP in the area benefited from the Sakoula Regulator is desired for equal distribution of limited amount of water resources and appropriate O&M of irrigation facilities such as end canals.

3.4.2 Other Impacts

3.4.2.1 Impacts on the Natural Environment

At the time of the basic design study, in Egypt, Environmental Impact Assessment (EIA) was conducted for only projects which are large-scale, involve land acquisition and resettlement, and are more likely to have serious impacts on the natural environment, and EIA was not implemented for projects which are small-scale and more likely not to have serious impacts on the natural environment. EIA was not required for this project, as the project scope is rehabilitation of irrigation facilities, which is less likely to have serious impacts on the natural environment. According to the executing agency, results of environmental monitoring during construction were not required to be reported to JICA. According to both the executing agency and the result of the beneficiary survey, no negative environmental impact was seen related to this project.

3.4.2.2 Land Acquisition and Resettlement

Neither land acquisition nor resettlement was required in this project.

3.4.2.3 Other Benefits to Residents

At the time of the basic design study, the width of the existing bridge attached to the Sakoula Regulator was as narrow as 4 m and the bridge was overcrowded, as vehicles had to follow one way traffic only to cross the bridge and there was always a large flow of people. In the beneficiary survey, some respondents raised savings of travelling time and an improvement of the situation regarding distribution of goods in the area through rehabilitation of the attached bridge as indirect effects of the project.

As a result of the project implementation, an increase of agricultural production was seen in part of the upstream of branch canals in the gravity irrigation area and some other positive impacts were seen such as an increase of the level of convenience for local residents through rehabilitation of the attached bridge etc. On the other hand, a decrease of agricultural production was seen particularly at downstream of branch canals, which seems to be affected by water shortage due largely to deteriorated small structures etc, as explained in 3.3.2, and therefore, impact of the project is fair.

3.5 Sustainability (Rating: ②)

3.5.1 Structural Aspects of Operation and Maintenance

The West Minia Irrigation Directorate under the Ministry of Water Resources and Irrigation is responsible for O&M of the Sakoula Regulator renewed by the project, the West Bahr Yusef Inspectorate Office is in charge of O&M of the regulator, and the Edwa Irrigation Office actually conducts O&M of the regulator (the Edwa Irrigation Office carries out daily, monthly, annual inspection and long-term repair of the Sakoula Regulator). The table below shows the comparison of

the number of staff in charge of O&M at the time of the basic design study and ex-post evaluation.

Table 11: The Number of Staff in Related Organizations and O&M Staff of the Sakoula Regulator

(Unit: persons)

Organization	2003	2010
West Bahr Yusef Inspectorate Office	53	451
Edwa Irrigation Office	109	67
Of which staff who operate and maintain the Sakoula Regulator	8	6

Source: 2003: basic design study report, 2010: answer to questionnaire

According to the West Minia Irrigation Directorate, there has not been a major change in the number of staff who directly operates and maintains the Sakoula Regulator before and after the project and sufficient number of staff is assigned. As explained below, the Sakoula Regulator was visited during the field study of ex-post evaluation, and no major problem was seen regarding the condition of regulator. Thus, no major problem has been observed in the structure of O&M.

3.5.2 Technical Aspects of Operation and Maintenance

The number of engineers such as irrigation engineers and mechanical engineers is 36 in the West Minia Irrigation Directorate as a whole, and the number of university graduates is 8 and the number of special secondary school (upper-intermediate) graduates is 33 in the West Bahr Yusef Inspectorate Office, and no major problem is seen in terms of the number of engineers.

Technical training on O&M of the regulator was provided to O&M staff of the Sakoula Regulator in 2005 by the O&M agency of the Mazoura Regulator, which was also renewed with Japan's grant aid. Moreover, OJT on O&M of the regulator was conducted by the contractors when the Sakoula Regulator was handed over, and O&M is carried out based on O&M manuals provided by the contractors. According to the West Minia Irrigation Directorate, an integrated water flow management is carried out among the Lahoun, Mazoura, Sakoula and Dahab Regulators that have already been renewed, however, as explained below, an underflow operation, which is different from the operation assumed at the time of the basic design study, is carried out in all of these regulators from June to August. According to the consultants who were engaged in this project, experts were dispatched from Japan three times during and after the project and technical guidance on the overflow operation of the regulator gate was provided. However, as explained below, the overflow operation is not carried out only in summer in order to avoid excessive water intake at upstream of the Bahr Yusef Canal by the overflow operation in summer, while the overflow operation was expected for throughout a year at the time of the basic design study.

3.5.3 Financial Aspects of Operation and Maintenance

At the time of the basic design study, the annual O&M cost of the Sakoula Regulator after renewal

was estimated as 76,900LE (1,920 thousand yen), and it was judged feasible to secure the budget based on the O&M cost of the West Bahr Yusef Inspectorate Office in the past five years[17]. At the time of ex-post evaluation, according to the West Minia Irrigation Directorate, O&M budget for irrigation facilities allocated to the Directorate is further allocated to the West Bahr Yusef Inspectorate Office, the East Bahr Yusef Inspectorate Office and the West Samalot Inspectorate Office according to the amount required annually. The actual budget allocation within the West Minia Irrigation Directorate is unknown, as such data was not provided. The tables below show the actual amount of budget allocated to the West Minia Irrigation Directorate and the actual O&M cost of the Sakoula Regulator in the recent three years.

Table 12: Actual Amount of Budget Allocated to the West Minia Irrigation Directorate

(Unit: LE)

	2008	2009	2010
Amount	6,705,710	4,451,600	5,094,700

Source: answer to questionnaire

Table 13: Actual O&M Cost of the Sakoula Regulator

(Unit: LE)

	2008	2009	2010
Labour Cost	3,000	3,500	4,000
Utilities	4,202	4,272	2,350
Maintenance cost (lubrication, fixing wires etc)	4,000	4,000	4,000
Total	11,202	11,772	10,350

Source: answer to questionnaire

The reason for the large reduction of the actual O&M cost of the Sakoula Regulator compared with the estimate at the time of the basic design study (76,900 LE (1,920 thousand yen)) is largely due to the reduction of the labour cost, and according to the West Minia Irrigation Directorate, the labour cost of the estimate seems to include all the employees of the Edwa Irrigation Office, and on the other hand, the labour cost of the actual O&M cost is calculated based on the number of staff actually operate and maintain the Sakoula Regulator. According to the Directorate, O&M cost of the Sakoula Regulator is allocated every year without any problems.

3.5.4 Current Status of Operation and Maintenance

According to the interview with the O&M staff of the regulator, cleaning of the regulator and motors and inspection of sensors are carried out for daily inspection, lubrication and inspection of

[17] Basic Design Report on the Project for Rehabilitation and Improvement of Sakoula Regulator on Bahr Yusef Canal in the Arab Republic of Egypt (2003) P.3-111

oiling devices are carried out once in two weeks, and inspection of mechanical parts and wires etc is carried out for annual inspection. Moreover, according to the O&M manual, an exchange of wires is required once in ten years. Small spare parts are procured when needed. No major problem was seen regarding the condition of the Sakoula Regulator when the regulator was visited during the field study of ex-post evaluation.

On the other hand, when the regulator was visited in June, an underflow operation was carried out at the Sakoula Regulator. According to the Water Distribution Department of the Ministry of Water Resources and Irrigation, the Ministry needs to distribute the limited amount of water resources of the Bahr Yusef Canal equally to the benefited area, and as the flow volume increases and the water level becomes higher on the canal from June to August, the overflow operation makes it easier for those at upstream of the canal to intake the amount of water more than actually needed, which is likely to cause water shortage at downstream of the canal, and thus the underflow operation is also carried out (apart from June to August, only the overflow operation is carried out). In short, the Ministry manages the regulators by combining both overflow and underflow operations as practical operation and management for the purpose of equal water distribution to the benefited area. It might be said that the Ministry carries out operations according to the current conditions of the locality, however, according to the consultants who were engaged in the project, the overflow operation is more desirable from the viewpoint of appropriate water intake management, as the control of water level and flow volume is easier by the overflow operation. Moreover, as shown in the Tables 5 and 6, the amount of water intake in the gravity irrigation area was in deficit in July, but on the other hand, the amount of water intake was much more than actually needed in other months. Furthermore, considering the fact that reliable data on the cultivated area by major crops and actual water intake in the pump irrigation area was not provided by the executing agency, it cannot be said that appropriate management of the amount of water required and actually taken is carried out in the benefited area. A system of an integrated water management on the Bahr Yusef Canal is necessary to carry out water flow management on a real time basis.

Some problems have been observed in terms of operation of the regulator and water flow management, therefore sustainability of the project effect is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

Relevance of this project is high, as the project is consistent with priority areas of Egypt's development plans and Japan's ODA policy, and moreover development needs for the project are high. Efficiency of the project is high, as both project cost and period were within the plan. Effectiveness of the project is fair, as on the one hand the project more or less achieved targets in a major operation and effect indicator, which is the amount of water intake from the Sakoula Regulator to the gravity irrigation area, but on the other hand, the amount of water intake from the Sakoula Regulator is still in deficit in July and water shortage has not been solved yet in the benefited area (especially at

downstream of branch canals) largely due to deteriorated small water structures etc. Sustainability of the project is fair, as some problems have been observed in terms of operation of the regulator and water flow management, while no major problems have been observed in the O&M system and financial status.

In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

(1) As explained in 3.3.2, there is a tendency that the benefited area (particularly at downstream of branch canals) still faces serious water shortage especially in summer, despite the fact that the amount of water intake from the Sakoula Regulator to the gravity irrigation area has increased overall after the project. This is considered largely due to problems in small irrigation facilities including branch canals as well as the deficit of water intake from the Sakoula Regulator in July as explained earlier, and investigation, rehabilitation and renewal of these small irrigation facilities would be necessary, as these are one of the factors that affect achievement of the project objective, although these were not included in the project scope.

(2) As explained in 3.4.1.2, IIP has not been implemented in the area targeted by the project, nor has water users associations been established in the area. Earlier implementation of IIP in the area is desired for equal distribution of limited amount of water resources and appropriate O&M of irrigation facilities such as end canals.

(3) As explained in 3.5.4, it cannot be said that appropriate management of the amount of water required and the amount of water actually taken is carried out in the benefited area. Properly understanding the amount of water required in the benefited area based on the current cultivated area by major crops and distributing water based on the water requirement are necessary.

4.2.2 Recommendations to JICA

As explained earlier, rehabilitation of small irrigation facilities including branch canals was not included in the project scope, however, rehabilitation and renewal of these facilities and establishment of a system of an integrated water management to carry out water flow management on a real time basis at major water intake facilities are important factors that affect achievement of the project objective. While self-reliant efforts of the executing agency are necessary, it would be beneficial to provide financial and/or technical assistance for the parts that cannot be completed by the executing agency.

4.3 Lessons Learned

(1) In the basic design study, to solve water shortage in the benefited area was stated as the project objective, and it was judged that there was no major problem regarding small irrigation facilities that are one of the factors affecting the achievement of the project objective. At the time of ex-post

evaluation, on the one hand, there seems to be no major problem in the amount of water intake from the Sakoula Regulator except for July, however, on the other hand, the benefited area still faces water shortage particularly at downstream of branch canals due largely to deterioration of small water structures etc. When implementing a project that has a similar objective in the future, it would be desirable to conduct a detailed investigation of factors that affect the achievement of the project objective in advance including small irrigation facilities.

(2) Considering the fact that a grant aid is generally provided for projects that have urgent needs in a short period, it would have been difficult to rehabilitate and renew a large number of small irrigation facilities as well as renewal of the Sakoula Regulator in this project. When implementing a similar project in the future, it might be beneficial to implement parts of the project that have urgent needs with a grant aid and to implement parts of the project that require a relatively long time with other schemes such as loan.

Egypt

Ex-Post Evaluation of Japanese Grant Aid Project

The Project for Water Supply Development in Northwestern Part of Sharqiya Governorate

External Evaluator: Masami Tomita, Mitsubishi UFJ Research and Consulting Co., Ltd.

0. Summary

This project aimed at achieving increased and stable water supply and improving water quality in Hihya Markaz of Sharqiya Governorate by constructing a new water treatment plant and water distribution facilities.

Relevance of this project is high, as the project is consistent with priority areas of Egypt's development plans and Japan's ODA policy, and moreover development needs for the project are high. Efficiency of the project is high, as both project cost and period were within the plan. Effectiveness of the project is also high, as the project more or less achieved targets in major operation and effect indicators and beneficiaries showed high level of satisfaction with this project. Sustainability of the project is fair, as some problems have been observed in terms of financial status of the operation and maintenance (O&M) agency and the lack of procurement procedure of spare parts, while no major problems have been observed in the O&M system and technical capacity.

In light of the above, this project is evaluated to be highly satisfactory.

1. Project Description

Project Location

Drainage and Sludge Tanks

1.1 Background

In Sharqiya Governorate, where the project was implemented, National Organization for Potable Water and Sanitary Drainage (NOPWASD), which is responsible for provision of water supply and sewerage systems in Egypt, had constructed five water treatment plants in accordance to the master plan formulated by the survey conducted with Japan's technical cooperation from 1983 to 1984. These plants were operated and maintained by Sharqiya Economical General Authority for Water and Sanitary Drainage (SHEGAWASD). However, water treatment plants had not been constructed in Hihya, Ibrahimiya and Diarb Nigm Markaz yet due to the lack of funds. Potable water had been

supplied from compact units and wells in these areas, however, compact units were severely deteriorated and the salt level of groundwater reached the undrinkable level. Consequently, NOPWASD formulated the Three Markaz Water Supply Master Plan in 2002, stating the provision plan of water treatment plants and water distribution lines in these areas (the first target year is 2020 and the second target year is 2040), and requested financial assistance from Japan for the part unable to be financed by Egyptian governmental budget. This project was implemented as part of the Three Markaz Water Supply Master Plan.

An initial component requested from the Egyptian government was the construction of water treatment plants in all of Hihya, Ibrahimiya and Diarb Nigm Markaz. On the other hand, water distribution lines were to be constructed with Egyptian budget, which usually takes a long time (over 10 years), and hence the component funded by the Japanese government needed to be reduced so that it would become in line with the component that could be funded by the Egyptian government within a relatively short period of time. Accordingly, it was judged reasonable to provide potable water supply facilities in these markaz in a step-by-step manner. As there was not a large difference in the amount of water supply and water quality before the project was implemented, the priority was given to Hihya markaz, which was located closest to the water treatment plant, as the target area of this project. Moreover, the target year for the capacity of the water treatment plant was determined as 2010, since it was considered that the capacity for 2010 would be sufficient to determine the capacity for expansion of the plant afterwards taking into account the quality of water source and the level of population growth in future.

1.2 Project Outline

The objective of this project is to achieve increased and stable water supply and improve water quality in Hihya Markaz of Sharqiya Governorate by constructing a new water treatment plant and water distribution facilities.

Grant Limit / Actual Grant Amount	2,843 million yen / 2,781 million yen
Exchange of Notes Date	June, 2004
Implementing Agency	National Organization for Potable Water and Sanitary Drainage (NOPWASD)
Project Completion Date	January, 2007
Main Contractor	Dai Nippon Construction
Main Consultant	Yachiyo Engineering Co, Ltd
Basic Design	“Basic Design Study Report on The Project for Water Supply Development in Northwest Part of Sharqiya Governorate in the Arab

	Republic of Egypt" Japan International Cooperation Agency (JICA), Yachiyo Engineering Co, Ltd September, 2003
Detailed Design	June, 2004
Related Projects (if any)	"The Project for Improvement of Management Capacity of Operation and Maintenance for SHAPWASCO" (2006-2009)

2. Outline of the Evaluation Study

2.1 External Evaluator

Masami Tomita, Mitsubishi UFJ Research and Consulting Co., Ltd.

2.2 Duration of Evaluation Study

Duration of the Study: December, 2010 – December, 2011

Duration of the Field Study: June 18, 2011 – July 1, 2011, September 11, 2011–September 20, 2011

2.3 Constraints during the Evaluation Study (if any)

None

3. Results of the Evaluation (Overall Rating: A[1])

3.1 Relevance (Rating: ③[2])

3.1.1 Relevance with the Development Plan of Egypt

The Fifth Five-Year Plan of Egypt (2002-2007) targeted at increasing the daily water production capacity in the country from 17,000 thousand m^3 to 26,000 thousand m^3, and extending the total length of water distribution lines from 25,000 km to 31,000 km, and construction of water treatment plants and water distribution lines was prioritized in the water supply sector. Sharqiya Governorate was the fifth largest governorate in the country, with the population of approximately five million (2002)[3]. The NOPWASD Fifth Five-Year Plan (2002/7-2007/6) stated that its budget allocated for Sharqiya Governorate was approximately 7.5% of the entire budget, placing the governorate the third out of 22 governorates that NOPWASD was responsible for, and the governorate was positioned as an area with urgent necessity for provision of infrastructures.

On the other hand, according to the Sixth Five-Year Plan of Egypt (2007-2012), which is the national development plan at the time of ex-post evaluation, the national daily water production

[1] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[2] ③ High, ② Fair, ① Low

[3] "Basic Design Study Report on The Project for Water Supply Development in Northwest Part of Sharqiya Governorate in the Arab Republic of Egypt" P.i

capacity was increased to 21,900 thousand m^3 and the total length of water distribution lines was extended to 29,200 km and achieved more than 80% of the target during the Fifth Five-Year Plan period. The Sixth Five-Year Plan targets at increasing the daily water production capacity in the country to 27,800 thousand m^3 and extending the total length of water distribution lines to 36,100 km, investing 12,300 million LE of the national budget (7.8 % of the national budget) in the water supply sector, and construction of water treatment plants and water distribution lines is still prioritized in the water supply sector. Moreover, according to NOPWASD, construction of water distribution lines in Hihya Markaz for the first target year of 2020 stated in the Three Markaz Water Supply Master Plan has been completed, while approximately 70% has been completed in Ibrahimiya and Diarb Nigm Markaz. On the other hand, as explained earlier, the target year for the water treatment plant constructed by the project is 2010, and the expansion of the plant to meet the water demand after 2011 was to be implemented with Egyptian budget. However, the expansion has not been started yet due to the lack of NOPWASD's budget. While the budget for the expansion is currently not allocated yet, partly influenced by the disruption of governmental agencies due to the democratization movement in February, 2011, efforts are being made to obtain the budget, utilizing the modified compact unit in order to meet the increasing demand for potable water.

Therefore, water supply projects including construction of water treatment plants and water distribution lines were/are prioritized in Egypt's development plans both at the time of basic design study and ex-post evaluation, as well as the Three Markaz Water Supply Master Plan is still valid, and thus relevance of this project remains high.

3.1.2 Relevance with the Development Needs of Egypt

At the time of basic design study (2003), in Hihya Markaz of Sharqiya Governorate potable water was supplied from compact units (three units at two locations, production capacity 6,000 m^3 per day) which took water from the Muweiz Canal and wells (13 units, production capacity 25,490 m^3 per day) whose source was groundwater[4]. The planned production capacity of existing water supply facilities was 31,490 m^3 per day, however, these facilities were deteriorated severely and actual amount of water supply was as little as 17,680 m^3 per day[5] (101 L per person per day, while the national average was 158 L per person per day in 2000[6]), and deterioration of water supply facilities often caused water stoppage (once to four times per week, three to five hours per stoppage)[7]. Moreover, the saline groundwater development became severer year by year, and residents of Hihya Markaz were forced to cope with insufficient amount of water whose quality had been deteriorated overtime.

On the other hand, while the situation regarding water supply per capita, water stoppage and water quality has been improved at the time of ex-post evaluation, as explained in "3.3 Effectiveness",

[4] "Basic Design Study Report on The Project for Water Supply Development in Northwest Part of Sharqiya Governorate in the Arab Republic of Egypt" P.10
[5] Same as above.
[6] Same as above. P.50
[7] Same as above. P.41

demand for potable water has been increasing due to population growth and improved living standards. The table below shows the demand and supply of daily life water in Hihya Markaz.

Table 1: Demand and Supply of Daily Life Water in Hihya Markaz

(Unit: m^3 per day)

	2004 (Before Project Completion)	2007 (Project Completion)	2008 (1 Year After Completion)	2009 (2 Years After Completion)	2010 (3 Years After Completion)
Demand	29,550	31,725	32,651	33,575	36,799
Supply	23,760	29,202	30,636	32,989	37,000
Balance	-5,790	-2,523	-2,015	-586	201

Source: answer to questionnaire

Note: The reason for the supply amount had been below the production capacity of the Hihya water treatment plant (35,000 m^3 per day) until 2009 is that construction of water distribution lines in all villages in Hihya Markaz was not completed until June, 2010. The supply amount in 2010 includes water supplied from both the Hihya plant (35,150 m^3 per day) and the modified compact unit (1,850 m^3 per day).

Apart from the Hihya water treatment plant, the modified compact unit has been used since 2010 in order to meet the increasing demand for potable water due to population growth and improved living standards, and development needs for the project is still high.

3.1.3 Relevance with Japan's ODA Policy

In Japan's Official Development Assistance (ODA) Charter revised in 2003, assistance for the area of water and sanitation targeted at poverty reduction was prioritized, and the Country Assistance Program for Egypt formulated in 2000 stated improvement of living conditions including stable supply of safe potable water as an important area for Japan's assistance to Egypt.

This project has been highly relevant with Egypt's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

3.2 Efficiency (Rating: ③)

3.2.1 Project Outputs

Table 2 below shows outputs of the project (both planned and actual) which were constructed and procured with Japan's grant aid, and Table 3 below shows outputs of the project (both planned and actual) which were constructed and procured with Egypt's budget.

Table 2: Outputs of the Project Constructed and Procured with Japan's Grant Aid (Planned/Actual)

Item		Planned	Actual
Facilities	Water Intake Facilities	3 Intake pipes, raw water pit	As planned.
	Raw Water Transmission Pumps	Intake volume 38,500 m^3 /day, 3 pumps (including 1 spare pump)	As planned.
	Water Purification Facilities	Production volume 35,000 m^3 /day, receiving well, mixing basin, flocculation basin, sedimentation basin, rapid sand filter, chlorine system, sludge treatment facilities, treated water reservoir etc	As planned.
	Water Transmission Pumps	Transmission volume 44,000 m^3 /day, 4pumps (including 1 spare pump)	As planned.
	Operation Management Facilities	Control panel, monitor panel, flow monitor etc	As planned.
	Electric Facilities	Power receiving system, transformer	As planned.
	Emergency Power Generating Facility	1 Diesel generator 700kVA	As planned.
	Buildings	Central monitoring and administration building, raw water and transmission pump house, chemical dosing house, rapid sand filter basin operation building	As planned.
Procured Equipments		Spare parts for water treatment equipments, maintenance tools for water treatment plant, water quality analysis equipments, equipments for water treatment plant operation etc	As planned.
Technical Guidance on Operation and Maintenance of the New Water Treatment Plant		Period: 4 months, the number of trainees: 17	Almost as planed (period: 4 months, the number of trainees: 13-21)
Technical Guidance on Information Management (customer data, plant operation data etc)		Period: 2 months, the number of trainees: 17	Almost as planed (period: 2 months, the number of trainees: 17-21)

Source: Basic Design Study Report, JICA Internal Documents, Answer to Questionnaire

Table 3: Outputs of the Project Constructed and Procured with Egypt's Budget (Planned/Actual)

Planned	Actual
Securing the land for the construction site of the water treatment plant	As planned.
Clearing, levelling and reclaiming the site of the water treatment plant	As planned.
Providing facilities for the distribution of electricity	As planned.
Executing the construction work for water transmission mains from the new water treatment plant to each town/village	As planned. (completed the construction of approximately 20 km of water transmission mains by the end of December 2006)
Executing the construction work for water distribution facilities (construction of new lines and replacement of old lines)	As planned. (completed the construction and rehabilitation of approximately 97 km of water distribution lines by June 2006)

Source: Basic Design Study Report, JICA Internal Documents, Answer to Questionnaire

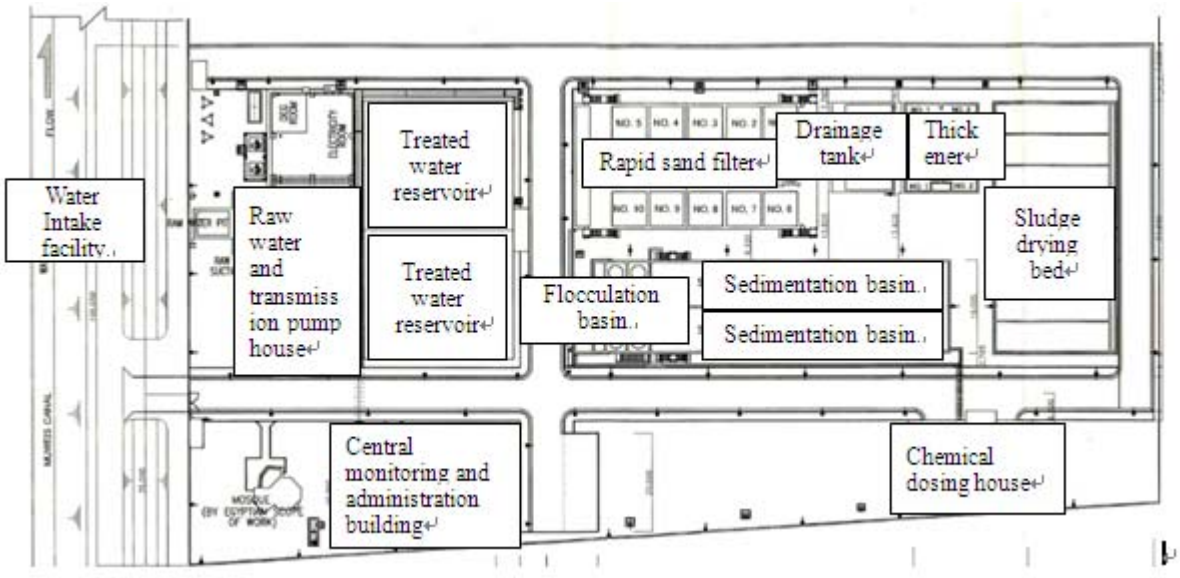

Figure 1: Overview of the Hihya Water Treatment Plant

Source: Edited based on the general layout of the water treatment plant in the basic design study report

Outputs of the project were almost as planned. However, there was no clear mention in the basic design study report about planned figures for water distribution lines from the water treatment plant to end users, which were to be constructed with Egyptian budget. According to NOPWASD, while the majority of the construction works of water distribution lines was completed in 2006, the construction works to cover all villages in Hihya Markaz continued until June, 2010. Based on reasons that there is no precise planned figure of water distribution lines, that the amount of water deficit due to incomplete provision of water distribution lines was less than 10% of water demand according to the Table 1: "Demand and Supply of Daily Life Water in Hihya Markaz" in "3.1 Relevance" and hence that the majority of the construction works seems to have been completed in 2006, outputs of the project are evaluated as having been produced as planned within the project period.

Water Intake Facility

Sedimentation Basin

3.2.2 Project Inputs

3.2.2.1 Project Cost

The grant limit at the time of basic design study was 2,843 million yen, on the other hand, the actual grant amount was 2,781 million yen, and it was lower than planned (98% against the plan). The planned Egyptian budget was 1,144 million yen[8], while the actual cost was 625 million yen[9], and it was lower than planned (55% against the plan). The reason for the large reduction of the project cost financed with Egyptian budget was due to the reduction of construction cost of water distribution lines (while NOPWASD explained that the budget was estimated more than actually needed at the time of basic design study, the fact that the construction of water distribution lines was not completed at the time of project completion (January, 2007) seems to be another reason for the reduction of the project cost).

3.2.2.2 Project Period

The planned project period at the time of basic design study was 31.5 months in total (3.5 months for detailed design and 28 months for preparation, civil works and trial operation)[10]. On the other hand, the actual project period was 29.5 months in total (3.5 months for detailed design and 26 months for preparation, civil works and trial operation), and it was shorter than planned (94% against the plan) . The reason for the shorter project period was due to efforts made by contractors to proceed construction works efficiently through an increase of workforce.

Both project cost and project period were within the plan, therefore efficiency of the project is high.

3.3 Effectiveness (Rating: ③[11])

3.3.1 Quantitative Effects

3.3.1.1 Population Served and Percentage of Population Served

The table below shows the baseline data in 2002, target figures for 2010 and actual figures in 2010 of the number of population served and the percentage of population served in Hihya Markaz.

[8] "Basic Design Study Report on The Project for Water Supply Development in Northwest Part of Sharqiya Governorate in the Arab Republic of Egypt" P.163

[9] Calculated as multiplying 32.93 million LE of the total cost by the average exchange rate of 1LE=18.98 yen (the average exchange rate of the period of 2004/6/10-2007/1/16).

[10] "Basic Design Study Report on The Project for Water Supply Development in Northwest Part of Sharqiya Governorate in the Arab Republic of Egypt" P.155

[11] The rating of the project's effectiveness takes into account the evaluation of the project's impact.

Table 4: Population Served and Percentage of Population Served

(Unit: population served: person, percentage of population served: %)

Indicator	2002 (baseline)	2010 (planned)	2010 (actual)
Population Served	175,000	223,360	229,996
Percentage of Population Served	90	100	100

Source: baseline data in 2002 and target figures for 2010: basic design study report, actual figures in 2010: answer to questionnaire

The actual number of population served exceeds the planned figure, as the population of Hihya Markaz, where the project was implemented, has been increasing more than estimated at the time of basic design study. According to the basic design study report, the estimated percentage of population served before the project was 90%. However, a beneficiary survey was conducted in the ex-post evaluation study (for the detailed results of the beneficiary survey, see "3.3.2 Qualitative Effects" and "3.4 Impact"), and more than 50% of respondents replied that the major source of their daily life water five years ago (in 2005) was other than tap water inside their houses and/or offices such as purchasing water from water vendors and obtaining water from wells etc, since the quality of tap water inside their houses and/or offices was aggravated. Thus, the substantive percentage of population served seems to have been much lower than 90% before the project. On the other hand, according to Sharqiya Potable Water and Sanitation Company (SHAPWASCO), which is responsible for operation and maintenance of the Hihya water treatment plant, the actual percentage of population served in 2010 is 100%, however, according to the results of the beneficiary survey, the actual percentage is 96.7%[12]. Thus, the actual percentage of population served does not seem to have reached 100% yet, however, it has been largely improved compared with the situation before the project.

3.3.1.2 Amount of Water Supply

The table below shows the baseline data in 2002, target figures for 2010 and actual figures in 2010 of the daily average amount of water supply (both of Hihya Markaz as a whole and per capita).

Table 5: Daily Average Amount of Water Supply

(Unit: Hihya Markaz: m^3/day, per capita: L/person/day)

Indicator	2002 (baseline)	2010 (planned)	2010 (actual)
Water Supply (Hihya Markaz)	17,680	35,000	37,000
Water Supply per Capita	101	157	161

Source: baseline data in 2002 and target figures for 2010: basic design study report, actual figures in 2010: answer to questionnaire

Note: The actual figure of water supply in 2010 includes both the amount of water supplied from the Hihya water treatment plant (35,150m^3/day) and the modified compact unit (1,850m^3/day).

[12] Among the total number of valid response of 213, 206 households/offices had water connection, and thus the percentage of population served was 96.7% (206 divided by 213).

Apart from the Hihya water treatment plant, a modified compact unit is currently used in order to meet the increasing demand for water in Hihya Markaz due to population growth and improved living standards. The actual amount of water supply in 2010 both in terms of water supply in Hihya Markaz as a whole and per capita has been largely improved compared with that of before the project and exceeds the planned figure. However, the quality of water supplied from the compact unit modified with Egyptian budget is low compared with that of water supplied from the Hihya plant, since the water purification process is simplified in the compact unit (for example, flocculation and sedimentation are carried out in the same basin). According to SHAPWASCO, some complaints have been reported from the residents who were supplied water from the compact unit. Budget allocation for the expansion of the Hihya water treatment plant as early as possible would be necessary in order to solve this problem and meet the water demands for 2011 onwards.

Modified Compact Unit (flocculation and sedimentation basin)

3.3.1.3 Water Quality

The TDS (Total Dissolved Solid) concentration of groundwater, which was the major water source before the project in 2002, was 800 mg/L on average, and the TDS concentration of water supplied from the Hihya water treatment plant was targeted at below 500 mg/L after the project completion. According to SHAPWASCO, the current TDS concentration of water supplied from the Hihya plant is 220 mg/L and achieved the target.

3.3.2 Qualitative Effects

A beneficiary survey was conducted in order to evaluate the project qualitatively[13]. The overview of the survey results is presented below.

[13] The beneficiary survey was conducted in a following manner. Time: May, 2011, place: Hihya Markaz (Hihya City and 28 villages), the number of samples (valid responses): 213 in total (residents: 182, small and medium companies: 31)

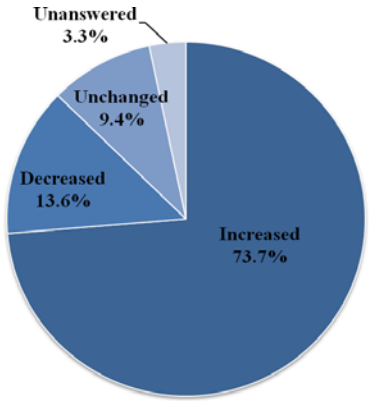

Figure2: Change in the amount of water supply after the project

Note: respondents who did not answer do not have water connection at home/office

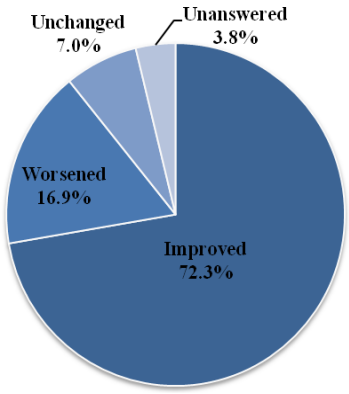

Figure3: Change in water pressure after the project

Note: respondents who did not answer include those who do not have water connection at home/office

More than 70% of respondents replied that the amount of water supply increased and water pressure was improved after the project. However, 58.7% replied “No” to the question, whether beneficiaries are satisfied with the current amount of water supply, and 55.4% replied “No” to the question, whether beneficiaries are satisfied with the current water pressure. As there is a tendency for water not to reach sufficiently two or more steps of buildings, 82.6% of respondents installed water pumps at their home and/or offices (by doing so, water shortages are more or less resolved). As more than half of respondents are not satisfied with the current amount of water supply and water pressure, there is a room for improvement.

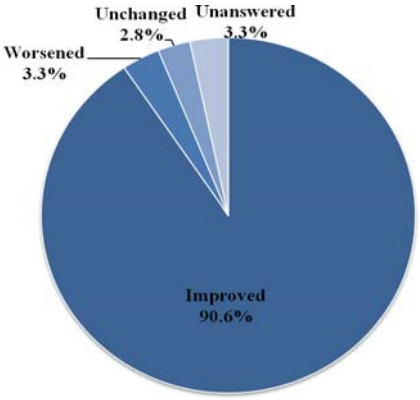

Figure4: Change in water quality after the project

Note: respondents who did not answer do not have water connection at home/office

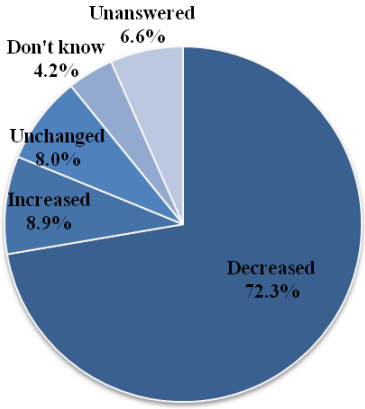

Figure5: Change in frequencies and duration of water stoppage after the project

Note: respondents who did not answer include those who do not have water connection at home/office

Water quality was greatly improved after the project, and more than 90% of respondents replied that the currently supplied water has no colour, no taste, and no odour. Moreover, more than 70% replied that frequencies and duration of water stoppage were decreased after the project. While

approximately 80% replied “Yes” to the question, whether beneficiaries still face water stoppage, approximately 60% replied that they rarely have water stoppage, and approximately 20% replied that they have water stoppage once to three times per week. As for durations of water stoppage, approximately 40% replied that the duration is two to three hours per stoppage, approximately 20% replied that the duration is 0.5 to 1.5 hours per stoppage, and approximately 10% replied that the duration is three to four hours per stoppage. Furthermore, 85% of respondents are satisfied with the project. Thus, while there is a room for improvement regarding the amount of water supply and water pressure, residents were forced to cope with insufficient amount of water whose quality had been deteriorated overtime before the project, as explained in “3.1.2 Relevance with the Development Needs of Egypt”. This project achieved the increased amount of water supply, improvement of water pressure and quality, and reduction of frequencies and duration of water stoppage, and benefits brought to the residents seem to have been significant.

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

3.4 Impact

3.4.1 Intended Impacts

3.4.1.1 Reduction of the Rate of Ineffective Water Volume and Unaccounted-for Water Volume

According to the basic design study report, in Hihya Markaz the unknown water volume rate was estimated approximately 40% before the project, of which the leakage rate was estimated approximately 30%, and the leakage rate was to be reduced by almost 10% after the project. However, executing agencies do not have data on the leakage rate in Hihya Markaz as a whole. According to the completion report (2009) of “the Project for Improvement of Management Capacity of Operation and Maintenance for SHAPWASCO”[14], which was implemented from 2006 to 2009 with Japan’s technical cooperation, the leakage rate of the pilot area in Hihya Markaz (the south-east part of Hihya City) was reduced by 10.9% (from 24.3% to 13.4%)[15]. However, the number of population served in the pilot area is 8,484[16], which is only 4% of the number of population served in Hihya Markaz as a whole, which is 229,996 (2010), and thus the leakage rate in Hihya Markaz as a whole cannot be estimated. On the other hand, according to SHAPWASCO, the sum of the rate of ineffective water

[14] The objective of the project was to improve management and capacity of operation and maintenance of SHAPWASCO, and major activities were to reduce leakages from water distribution lines, to reduce unaccounted-for water volume by replacing water meters, and to diffuse Standard Operational Procedure (SOP) in water treatment plants. The project component to reduce unaccounted-for water volume included a part of Hihya Markaz (south-east part of Hihya City) as a pilot area, and replacement of broken water meters, provision of leakage detection equipment and leakage water treatment etc were carried out in the pilot area.

[15] “The Project for Improvement of Management Capacity of Operation and Maintenance for SHAPWASCO” completion report P.4-20

[16] “The Project for Improvement of Management Capacity of Operation and Maintenance for SHAPWASCO” terminal evaluation report P.3-10

volume[17] and the rate of unaccounted-for water volume[18] in Hihya Markaz is 28% (2010). While it is not appropriate to simply compare the figure with the unknown water volume rate of before the project, the rate of ineffective water volume and the rate of unaccounted-for water volume seem to have been improved compared with those of before the project, based on the fact that water distribution lines were constructed and rehabilitated in Hihya Markaz, that technical guidance on information management (customer data, plant operation data etc) was provided, and that the above mentioned technical cooperation project contributed to the reduction of the rate of unaccounted-for water volume.

3.4.1.2 Changes in Frequencies of Water-related Diseases

Figure 6 shows the result of the beneficiary survey regarding frequencies of water-related diseases after the project. 35.2% of respondents replied "Yes" to the question, whether any members of their family or employees have had an incidence of water-related diseases, of which 60.1% replied that frequencies of water-related diseases were decreased after the project (major symptoms were diarrhoea, fever, vomiting, kidney failure and hepatitis etc). It cannot be said that the above achievement is attributable only to this project, as water-related diseases are caused by various factors apart from potable water supply systems, nonetheless, this project seems to have contributed to the achievement to some extent through improvement of water quality.

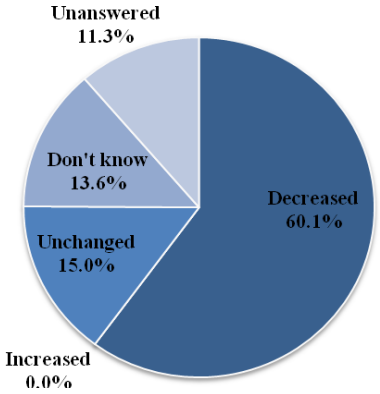

Figure6: Change in frequencies of water-related diseases after the project

3.4.1.3 Changes in Living Conditions

Figure 7 shows the result of the beneficiary survey regarding changes in living conditions after the project. 57.7% of respondents replied that their major source of daily life water five years ago was other than tap water inside their houses and/or offices such as purchasing water from water vendors and obtaining water from wells etc, and 78.4% replied that their living conditions were changed after the project. Examples of such changes are reduction of health

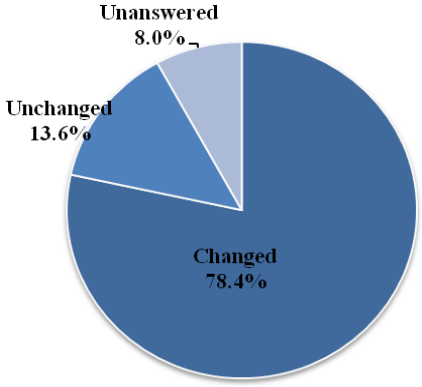

Figure7: Change in living conditions after the project

[17] Ineffective water volume: water volume that is ineffective in use (water volume not reached end users) due to leakages from water distribution lines etc.
[18] Unaccounted-for water volume: water volume of which water charge is not billed and/or collected, due to broken water meters and other reasons.

problems, improvement of sanitary and hygienic conditions at home and/or schools, saving of water purchasing fee, increased income, and higher degree of comfort etc.

3.4.2 Other Impacts

3.4.2.1 Impacts on the Natural Environment

In the basic design study, it was planned to reduce environmental burden by stopping directly discharging sludge and backwashing water into canals, which was the prevailing practice in Egypt, and treating sludge by drying bed in the Hihya water treatment plant. Currently sludge is treated as planned. Moreover, according to NOPWASD, the results of environmental monitoring during the project implementation were reported to JICA. Furthermore, no negative impact on environment has been reported from the beneficiary survey.

3.4.2.2 Land Acquisition and Resettlement

In the basic design study, acquisition of approximately 4 ha of land was planned, and the land acquisition was completed before the commencement of the project, and approximately 15 households were affected by the land acquisition, according to NOPWASD. Compensation was paid for the affected households and some of them were employed as O&M staff at the water treatment plant. No major problem has been reported from the beneficiary survey.

3.4.2.3Other Benefits to Residents

In the beneficiary survey, approximately 20% of respondents replied that the project contributed to development of economic activities in Hihya Markaz. Examples of such development are increased employment during construction of the Hihya water treatment plant, and increased numbers of café, restaurants and car wash stations after the project.

This project mostly achieved overall goals of the project such as reduction of the rate of ineffective water volume and the rate of unaccounted-for water volume, and improvement of sanitary and living conditions of residents.

3.5 Sustainability (Rating: ②)

3.5.1 Structural Aspects of Operation and Maintenance

The Hihya branch of Sharqiya Potable Water and Sanitation Company (SHAPWASCO)[19] is responsible for O&M of the Hihya water treatment plant constructed by the project. The table below shows the comparison of the number of staff at the time of basic design study (the number of staff at the Hihya water treatment plant was the planned figure) and ex-post evaluation.

[19] Sharqiya Economical General Authority for Water and Sanitary Drainage (SHEGAWASD) was changed its name to Sharqiya Potable Water and Sanitation Company (SHAPWASCO) in 2005.

Table 6: The Number of Staff of SHAPWASCO

(Unit: persons)

Organization/Division	2002	2010
Hihya Branch	220	267
Of which Potable Water Supply Division	107	115
Of which Hihya Water Treatment Plant	82	39

Source: 2002: basic design study report, 2010: answer to questionnaire

At the time of ex-post evaluation, the number of staff of the Hihya branch has increased, however, the actual number of staff of the Hihya water treatment plant is kept less than half of the planned number, through self-reliant efforts to operate and maintain the plant efficiently. According to SHAPWASCO, the necessary number of O&M staff is secured, and as explained below, the Hihya plant was visited during the field study of ex-post evaluation, and all facilities were kept clean and well maintained, which suggests that the current number of O&M staff is sufficient for O&M of the plant. Thus, no major problem has been observed in the structure of O&M.

3.5.2 Technical Aspects of Operation and Maintenance

Among 39 staff of the Hihya water treatment plant, three are engineers, eight are chemists, 17 are technicians, and sufficient number of technical staff is assigned. Daily, weekly, monthly and yearly maintenance is carried out based on O&M manuals provided in this project and Standard Operational Procedure (SOP) prepared in “the Project for Improvement of Management Capacity of Operation and Maintenance for SHAPWASCO”. When conducting periodical maintenance (such as monthly and yearly maintenance etc), workshops are held to check if staff understand tasks and procedures of O&M correctly. Moreover, according to SHAPWASCO, customer data, which was not managed properly before the project, is now centrally managed at the commercial department of SHAPWASCO headquarter, and the daily amount of water distribution is recorded and managed using flow meters set at the Hihya water treatment plant. Through these efforts and skills to detect water leakage acquired in the above technical cooperation project, the rate of ineffective water volume and the rate of unaccounted-for water volume have been reduced. Thus, no major problem has been observed in technical capacity of O&M.

3.5.3 Financial Aspects of Operation and Maintenance

Water charges of SHAPWASCO are kept low due to political reasons, while they have been revised after the project. The table below shows water charges before and after the project.

Table 7: Water Charges of SHAPWASCO

(Unit: LE/m^3)

User Category	2003 (before project)	2010 (after project)
Households (below 10m^3)[3)]	0.23	0.23
Households (below 20m^3)		0.31
Households (below 30m^3)		0.43
Households (below 40m^3)		0.45
Households (over41m^3)		0.50
Governmental Facilities	0.40	0.80
Small Enterprises	N/A	1.50
Large Enterprises	0.85	2.00
Construction Companies	N/A	4.00
O&M Charge	N/A	0.45
Tax	N/A	0.030

Source: 2003: basic design study report, 2010: answer to questionnaire

Note: both O&M charges and tax are added to the water charges and billed to customers.

SHAPWASCO's operating balance has been in deficit since before the project largely due to low water charges shown above. The table below shows operating revenue and expenditure of SHAPWASCO for the recent three years.

Table 8: Operating Revenue and Expenditure of SHAPWASCO

(Unit: LE)

	2008	2009	2010
Operating Revenue			
Water Revenue	72,926,736	82,383,709	100,403,574
Sewerage Revenue	22,795,481	29,743,524	38,229,475
Equipment Sales	9,633,292	11,110,235	16,050,985
Other Revenue	1,056	0	0
Total	105,356,565	123,237,468	154,684,034
Operating Expenditure			
Production Cost	109,577,534	131,279,490	164,387,506
Sales Cost	60,263,740	59,702,228	68,223,267
Total	169,841,274	190,981,718	232,610,773
Balance	- 64,484,709	-67,744,250	-77,926,739
Government Subsidy	16,920,000	26,000,000	12,594,678

Source: answer to questionnaire

According to SHAPWASCO, depreciation cost, which had not been booked before, has been included in production cost since SHAPWASCO became a public corporation, and the depreciation cost accounts for almost 30% of production cost (however, operating balance is in deficit even if depreciation cost is excluded from production cost). Labor cost also accounts for almost 30% of production cost. In the beneficiary survey, approximately 80% of respondents replied that water charges are billed and collected roughly once in two months, however, some beneficiaries complained

that reading water meters and billing are not conducted on a regular schedule. Reading water meters and collecting water charges on a regular schedule are necessary for improved management of SHAPWASCO.

On the other hand, annual O&M cost of the Hihya water treatment plant was estimated 3,422 thousand LE before the project[20], however, actual O&M cost is kept almost half of the planned cost due to self-reliant efforts to keep the number of O&M staff less than half of the planned number and efforts to reduce the consumption of chemicals and electricity in each process at the water treatment plant to less than half of planned volumes through the activities of the technical cooperation project. The tables below show actual O&M cost of the Hihya water treatment plant and water supply revenue of the SHAPWASCO Hihya branch.

Table 9: Actual O&M Cost of the Hihya Water Treatment Plant

(Unit: LE)

	2008	2009	2010
O&M Cost	1,540,055	1,581,401	1,840,126

Source: answer to questionnaire

Table 10: Water Supply Revenue of SHAPWASCO Hihya Branch

(Unit: LE)

	2008	2009	2010
Water Revenue	2,352,211	2,123,811	3,382,687

Source: answer to questionnaire

As shown above, taking the Hihya water treatment plant separately, O&M cost is covered by water supply revenue of the Hihya branch. However, water supply revenue of the Hihya branch is absorbed into SHAPWASCO's overall accounting and O&M cost of the Hihya plant is allocated from the account, and thus, SHAPWASCO's operating deficit should be improved in order to continue to secure sufficient amount of O&M cost of the Hihya plant in the future.

3.5.4 Current Status of Operation and Maintenance

The Hihya water treatment plant was visited during the field study of ex-post evaluation, and periodical O&M is conducted and facilities overall are kept in a good condition. However, according to SHAPWASCO, spare parts of the plant constructed by the project are Japanese-made and need to be imported from Japan (the same spare parts are not sold locally), but many spare parts have not been

Flocculator (the blue equipment in the middle)

[20] "Basic Design Study Report on The Project for Water Supply Development in Northwest Part of Sharqiya Governorate in the Arab Republic of Egypt" P.164

procured yet due to reasons that import procedures are complicated and that local agents are not available for some spare parts, while the list of Japanese spare parts agents is available. Consequently, two flocculators out of eight in total are out of order (while there is no negative influence on the amount of water supply yet, as SHAPWASCO operates the rest of flocculators with increased speed). While four years have passed since the start of plant operation and there are many other spare parts including those for aluminium sulfate injection pumps that need to be procured, they have not been procured due to above reasons. According to JICA Egypt Office, a local branch of the Japanese company that procured some facilities for the project exists in Egypt, and kinds of spare parts that can be procured through the branch need to be checked and the procurement procedure for spare parts needs to be established as early as possible in order to sustain effects achieved by the project.

Some problems have been observed in terms of financial status of SHAPWASCO and procurement of spare parts, therefore sustainability of the project effect is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

Relevance of this project is high, as the project is consistent with priority areas of Egypt's development plans and Japan's ODA policy, and moreover development needs for the project are high. Efficiency of the project is high, as both project cost and period were within the plan. Effectiveness of the project is also high, as the project more or less achieved targets in major operation and effect indicators and beneficiaries showed high level of satisfaction with this project. Sustainability of the project is fair, as some problems have been observed in terms of financial status of the O&M agency and the lack of procurement procedure of spare parts, while no major problems have been observed in the O&M system and technical capacity.

In light of the above, this project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency (SHAPWASCO)

(1) While improvements have been made regarding the rate of ineffective water volume and the rate of unaccounted-for water volume, SHAPWASCO's operating balance is still in deficit, and following actions should be taken for improved management of SHAPWASCO; 1) revision of water charges in Sharqiya Governorate (to the level that can cover water supply cost), 2) self-reliant efforts in SHAPWASCO as a whole to reduce labour cost and electricity expense etc as has been done in the Hihya plant, 3) rehabilitation and renewal of water distribution lines in Sharqiya Governorate to reduce further ineffective water rates, and 4) regular water meter reading and improvement of water charge collection in Sharqiya Governorate including Hihya markaz.

(2) To keep relying on the Japanese side for provision of spare parts for a long time is unrealistic, and self-reliant efforts would be needed to check the procurement procedure with the Japanese side and procure spare parts independently.

4.2.2 Recommendations to JICA

Regarding procurement of spare parts, information on the local branch of the Japanese company that procured some facilities for the project should be provided to SHAPWASCO, and in case it requires a long time to procure spare parts that are urgently needed by SHAPWASCO, actions would be needed to provide these spare parts to SHAPWASCO.

4.3 Lessons Learned

Two flocculators out of eight have stopped operation as necessary spare parts have not been procured yet. Information on local agents that deal with necessary spare parts should be provided to O&M organizations in advance and locally available spare parts should be used as much as possible in the future projects in order to make it easier for O&M organizations to procure spare parts and conduct O&M independently.