Republic of Tunisia

Ex-Post Evaluation of Japanese ODA Loan

Rural Water Supply Project (I) (II)

External Evaluator: Keishi Miyazaki, OPMAC Corporation

0. Summary

The objective of this project was to improve the coverage of the rural water supply by constructing small scale water supply facilities in 20 Governorates, thereby contributing to an improvement in people's living standards.

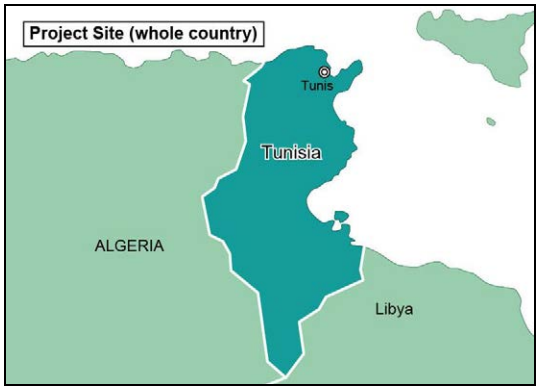
This project matched the Tunisian national development policy and development needs and Japan's ODA policy, therefore its relevance is high. Based on data analysis of 102 sub-projects in 14 Governorates (out of 270 sub-projects in 20 Governorates) obtained from the executing agency, it can be seen that the main operation and effect indicators such as water supply coverage, water production volume per person/day, water supply volume per person/day, accounted-for-water rate, and water price have achieved their target values. The water quality of the water source, which was newly developed by this project, met the Tunisian environmental standards. The beneficiary survey conducted with local residents revealed that residents were highly satisfied with the water quality and that there had been an improvement in the water quality of water supply facilities. There were some positive impacts which improved the living standards of local residents such as decreases in the labor of drawing water, improved convenience of living, and improved hygiene and health conditions. No negative impact on the natural environment was observed, and there was no land acquisition or resettlement. Therefore, the effectiveness and impact of the project is high.

Although the project cost was within the plan, the project period slightly exceeded the plan, therefore the efficiency of the project is fair. The Jasmine revolution in 2011 caused political and social reform and a change in people's awareness and attitudes throughout Tunisia. It also had some negative influence on the capacity and organization management of the Water User's Association (GDA[1]) which was mainly in charge of the operation and maintenance of the project. For this reason, there were some issues observed in the structural, technical and financial aspects of the project's operation and maintenance. Thus, the sustainability of the project is fair.

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

[1] GDA: Groupement de Développement Agricole.

1. Project Description



Project Site (20 Governorates)

Public Water Tap in Mahdia Governorate

1.1 Background

In 1999, the average amount of rainfall in Tunisia was approximately 600 mm. In the northern region, where the amount of rainfall is relatively high, it was approximately 1,000 mm, but in the southern region, closer to the desert, it was approximately 100-200 mm. The country is located in a semi-arid region. For this reason, more efficient development and use of the limited water sources has been a major developmental task for the country. The domestic water and sewage services of Tunisia have been looked after by the National Water Exploitation and Distribution Company (SONEDE[2]) and the General Direction of Rural Water Works and Water Supply, Ministry of Agriculture. The former is in charge of the water supply service in urban areas and the latter in rural areas. Since the 1980s, the Ministry of Agriculture has promoted the construction of small scale water supply facilities in the areas. Although the water supply coverage in urban areas has reached almost 100%, the coverage rate in rural areas remained at 79% in 2000. Thus, the need for water supply development in such areas was high from the viewpoint of disparity rectification between urban and rural areas.

1.2 Project Outline

The objective of this project was to improve the coverage of the rural water supply by constructing small scale water supply facilities in 20 Governorates, thereby contributing to an improvement in people's living standards.

[2] SONEDE: Sociéte Nationale d'Exploitation et de Distribution des Eaux.

	Phase I	Phase II
Loan Approved Amount/ Disbursed Amount	3,352 million yen / 3,201 million yen	4,495 million yen / 4,403 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	February 2000 / March 2000	March 2003 / March 2003
Terms and Conditions	Main contract Interest rate: 1.7% Repayment period: 25 years (Grace period: 7 years) Condition of procurement: General untied Consulting service Interest rate: 0.75% Repayment period: 40 years (Grace period: 10 years) Condition of procurement: Bilateral tied	Main contract Interest rate: 1.8% Repayment period: 20 years (Grace period: 6 years) Condition of procurement: General untied Consulting service Interest rate: 1.8% Repayment period: 20 years (Grace period: 6 years) Condition of procurement: General untied
Borrower / Executing Agency	Government of Republic of Tunisia / Ministry of Agriculture	
Final Disbursement Date	June 2010	December 2010
Feasibility Studies, etc.	• Special Assistance for Project Formation for Rural Water Supply Project in the Republic of Tunisia (JICA, 1993) • The detailed design study on the rural water supply project in the Republic of Tunisia (JICA, 2002) • The study on the rural water supply project (phase II) in the Republic of Tunisia (JICA, 2006)	
Related Projects	• Japanese ODA Loan Project: Agricultural Sector Investment Project (Signing of L/A: 1995)	

2. Outline of the Evaluation Study

2.1 External Evaluator

Keishi Miyazaki, OPMAC Corporation

2.2 Duration of Evaluation Study

Duration of the Study: October 2012 – October 2013

Duration of the Field Study: February 17 – March 3, 2013, May 11 – 15, 2013

2.3 Constraints during the Evaluation Study

This project targeted 270 sub-projects in 20 Governorates in Tunisia. However, it was difficult to collect data on operation and effect indicators in all the sub-projects. For this reason, the evaluation analysis was conducted based on data obtained by the executing agency from 102 sub-projects in 14 Governorates.

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

3.1 Relevance (Rating: ③[4])

3.1.1 Relevance to the Development Plan of Tunisia

The 9th Five-Year Socio-Economic Development Plan (1997-2000) of Tunisia at the time of the project appraisal (2000) targeted water source development as a priority for: (1) irrigation work that gives stability and high agricultural yields (agriculture making up the major part of Tunisia's economy), and (2) increased water supply and demand for the revitalization of economic activities as well as ongoing urbanization and tourism promotion (another of Tunisia's main industries). In addition, disparity rectification between urban and rural areas was another important policy task. The plan was to construct rural water supply facilities with 541 projects and 350,000 beneficiaries targeted at an increase in the national water supply coverage to 78% by 2001.

The Draft 12th Five-Year Socio-Economic Development Plan (2012-2016), which was in place at the time of the ex-post evaluation, listed the strengthening of social development as part of its developmental policy, and it described the need for promoting regional development programs and strengthening public services. Of all 24 Governorates in Tunisia, 20 have rural districts with limited accessibility to drinking water, and therefore the plan stated that its aim was to continuously increase the water supply coverage. The plan is to conduct 342 water supply projects (including the construction of 187 new water supply facilities and the rehabilitation of 155 existing water supply facilities) targeting an increase in the national water supply coverage to 98% by the end of the Plan.

3.1.2 Relevance to the Development Needs of Tunisia

At the time of the project appraisal (2000), water coverage in urban regions had reached 97.8%, while the coverage remained at 59% in rural regions of Tunisia. The problem of poverty was mostly localized in the rural regions, and 70% of the population in poverty resided in these regions. In particular, the northwestern mountainous areas had the highest percentage of the population in poverty and delayed development was prominent. In these regions, women and children had to put up with the long hours of labor involved in going back and forth between water sites and villages, as there were no water supply facilities in the surrounding areas. Even the villages with nearby wells did not necessarily have sufficient water supply in terms of volume and quality. The villages which received their water supply by water wagon were also in an inconvenient situation since the water supply came only once or twice a week and the water price was rather high. For these reasons, access to a safe and sufficient water supply in the rural regions was a priority issue. In addition, the need for water supply development in the rural regions was high from the viewpoint of disparity rectification.

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

[4] ③: High, ②: Fair, ①: Low.

At the time of the ex-post evaluation, the coverage of the water supply had improved to 93.8% in rural areas in comparison with 98.9% in urban areas, as of 2011 (Table 1). However, there are still some mountainous regions and remote villages with extremely limited access to drinking water. In particular, the water supply coverage in the northwestern regions remained at 87%, which was below the average for rural areas[5]. The traditional rural water supply was provided on a village or community base and used a public water tap system. However, the 10th Rural Drinking Water Supply Program (2002-2006) announced the policy of promoting a water supply system using individual water pipe connections. Ever since, the Ministry of Agriculture has promoted a shift from the public water tap system to the individual water pipe connection system. It has also strengthened the water supply capacity of water sources and has expanded the water supply pipe networks and buildings or has made changes to a water supply system which corresponds to the individual water pipe connection system. In this way, the development need for rural water supply facilities, such as the construction of new water supply facilities and expansion in the capacity of existing facilities continue to be acknowledged.

Table 1: Percentage of the Water Served Population

Unit: %

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1. Urban Area	97.7	96.9	97.3	97.7	97.9	98.2	98.4	98.5	98.6	98.7	98.8	98.9
2. Rural Area	79.2	81.9	84.2	85.7	87.4	88.9	90.3	92.1	92.4	93.0	93.5	93.8
(Individual pipe connection)	(32.0)	(35.3)	(37.1)	(38.8)	(52.0)	(53.0)	(53.4)	(53.8)	(54.4)	(54.9)	(55.5)	(55.7)
3. Entire Tunisia	92.3	93.6	94.4	95.0	95.6	96.1	96.7	97.3	97.4	97.6	97.8	97.9
(Individual pipe connection)	(75.2)	(76.7)	(77.7)	(78.8)	(83.3)	(84.0)	(84.4)	(84.7)	(85.0)	(85.4)	(85.7)	(85.8)

Source: DGGREE, Ministry of Agriculture

3.1.3 Relevance to Japan's ODA Policy

The Japanese Government's Country Assistance Policy for Tunisia at the time of the project appraisal (2000) included the following five priority areas: (1) the development and promotion of agriculture and fishery, which are Tunisia's main industries, (2) water source development for agriculture and drinking water, (3) the development of a basic infrastructure to help sustainable economic growth, (4) rural development for disparity rectification between urban and rural regions, and (5) environmental conservation. This project planned the construction of small scale water supply facilities – basic infrastructure in rural regions with less development – and was therefore relevant to the above priority areas (2), (3) and (4).

Also, the Medium-Term Strategy for Overseas Cooperation Operations[6] (2002-2004)

[5] The water supply coverage in each part of Tunisia (2011) was 95% in the northeast, 87% in the northwest, 97% in the mid-east, 93% in the mid-west, 98% in the southeast and 99% in the southwest.

[6] It states the basic philosophy and direction of ODA loans for the development support of developing countries implemented by the Japan Bank for International Cooperation (JBIC, currently JICA).

stated “strengthening the strategy to decrease poverty” as one of its priority areas, and focused on effective and efficient support for basic infrastructure development, including the construction of water and sewage facilities in rural regions with a population in poverty. This project planned the construction of water supply systems in the rural regions of Tunisia with 70% population in poverty and therefore is relevant to the above implementation policy.

In the light of the above, this project has been highly relevant to Tunisia’s development plan, development needs, as well as to Japan’s ODA policy; therefore its relevance is high.

3.2 Effectiveness[7] (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

This project constructed new small scale water supply facilities and rehabilitated others within 270 rural villages/communities of 20 Governorates in Tunisia. However, it was difficult to collect data on the operation and effect indicators in all the target sub-projects, therefore evaluation analysis was made based on data obtained by the executing agency for 102 sub-projects[8] in 14 Governorates.

For each operation and effect indicator, all actual values have reached the target values except for the “average duration of breakdowns in the water supply system” and “number of beneficiaries” (Table 2).

Table 2: Operation and Effect Indicator of the Project

Indicator	Baseline (2001)	Target (2010)	Actual (2012)
1. Percentage of Water Served Population (%)	81	94	94 (national average)
2. Water Production Volume per Person/Day (litre/person/day)	—	50	57.4
3. Water Supply Volume per Person/Day (litre/person/day)			
a) New Construction	—	42.5	41.3
b) Rehabilitation	21.25	42.5	41.3
4. Accounted-for-Water Rate (%)	—	60	78
5. Average Duration of Breakdowns in the Water Supply System (for New Construction Sub-Projects) (day)	—	Maximum 3 days for each breakdown	19 days
6. Water Charge (Tunisian Dinar/m^3)	Average 1.5	Less than 1.0	0.83

[7] The impacts are taken into account when rating effectiveness.

[8] At the time of the ex-post evaluation, information on 128 sub-projects in 14 Governorates was provided by the executing agency. Analysis was conducted on 102 sub-projects in 14 Governorates excluding the ones with no data records due to the shift in operation and maintenance of the water supply facilities to SONEDE (7 sub-projects), the ones that were not in operation due to issues of water source capacity (10 sub-projects), and the ones with incomplete data (9 sub-projects).

Indicator	Baseline (2001)	Target (2010)	Actual (2012)
7. Average Annual Rehabilitation Cost per 1 m^3 of water (for Rehabilitation Sub-Projects) (Tunisian Dinar)	—	Decrease in rehabilitation cost	N.A.
8. Participation Rate of Water User's Association (%)	51	75	N.A.
9. No. of Beneficiaries (person)			
Phase I	(1998)	(2015)	
a) New Construction	96,706 (84 villages)	114,233 (84 villages)	130,000 (104 villages)
Phase II	(2002)	(2010)	
a) New Construction	103,694 (161 villages)	123,721 (161 villages)	100,000 (133 villages)
b) Rehabilitation	103,714 (85 villages)	125,469 (85 villages)	41,211 (33 villages)
Total	304,114	363,423	271,211

Source: JICA's appraisal documents for the Phase II project (20003), JICA's internal documents (1999), and DGGREE, Ministry of Agriculture.
Note 1: The operation and effect indicators and their targets were not set for the Phase I project.
Note 2: The target year of 2010 was anticipated as two years after completion of the Phase II project. However, since the indicator of number of the beneficiaries did not have a base line figure in 2001 or a target figure in 2010, alternative available data for the respective years was utilized.
Note 3: The actual figures for each indicator in 2012 were based on the average figures for the selected 102 sub-projects out of the 127 sub-projects in 14 Governorates that were provided by the executing agency. Regarding the actual figure of the percentage of the water served population in 2012, the national average figure was provided as an alternative due to the lack of information.
Note 4: The actual figure of the accounted-for-water rate in 2012 was calculated based on the average water loss (22%) of the 102 sub-projects as accurate data was not available.
Note 5: The actual figures of the water production volume per person/day and the water supply volume per person/day in 2012 were calculated based on the assumption that one household has 6 family members.
Note 6: "N.A." means that the respective data was not available because the executing agency did not record the data.

As of 2012, each indicator had achieved more than, or had almost achieved, the target values as seen in the "percentage of the water served population" at 94%, the "daily water production volume per person/day" at 57.4 liter/day/person, the "daily water supply volume per person/day" at 41.3 liter/person/day, the "accounted-for-water rate" at 78% and the "water charge" at 0.83 Tunisian dinar/m^3. On the other hand, the actual value for the "number of beneficiaries" was 271,211, which was 75% of the target value of 363,423. The reason for this nonattainment in the "number of beneficiaries" was the reduction in the number of sub-projects from 330 at the time of the project appraisal to 270 (See 3.4 Efficiency, for the reason for the reduced output). For the "average duration of breakdowns in the new construction sub-projects", the target value was a maximum of 3 days for each malfunction, while the actual value was 19 days. However, the exact definition for a "maximum of 3 days for each malfunction" was not clear and therefore an accurate comparison analysis of the target and actual values for this particular indicator was difficult. In addition, actual data for the "average annual rehabilitation cost per 1 m^3 of water" and the "participation rate of the water user's association" could not be obtained and therefore the attainment for these two indicators could not be evaluated.

The leakage rate of the rural water supply in the Project's sub-projects was 22%, which was below the national average of 32% as of 2012.

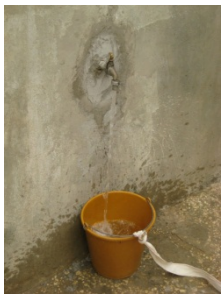
Photographs of the sub-projects

Board member and staff of GDA
(Bir Ben Zahra Village,
Nabeul Governorate)

Water Tower (Reservoir)
(Bir Ben Zahra Village,
Naneul Governorate)

Pumping Facility
(Gmara Village, Beja Governorate)

Board member and staff of GDA
(Soumara Bon Slim Village,
Mahdia Governorate)



Individual water pipe connection
(Soumara Bon Slim Village,
Mahdia Governorate)

Public water tap
(Ghanzour Village, Kairouan Governorate)

3.2.2 Quantitative Effects

(1) Improvement of Water Quality in the Water Supply Facilities

When the development of a new water source, such as water well drilling, was conducted during implementation of the project, a strict water quality investigation was carried out based on the Tunisian environmental standards. Only projects that fulfilled the standard value for all the investigation indices were developed[9]. For this reason, no water supply facility indicating a water quality issue was reported during the annual water quality test by the Ministry of Health from the time of project implementation to the present, according to the project executing agency. The beneficiary survey described later in this report revealed that 75% of the respondents considered that there was no problem in water quality. Prior to the implementation of the project, most residents had to obtain drinking water from remote water sources, household wells or water distributors/sellers. It is considered that the quality of water supplied by the water sources developed by this project and which meet Tunisian environmental standards, has improved compared to the water utilized before the project.

[9] Because of the strict water quality investigations, there were many sub-projects that were cancelled during Phase II as their water sources did not fulfill the water quality standards.

3.3 Impacts

3.3.1 Intended Impacts

Results of Beneficiary Survey

At the time of ex-post evaluation, three Governorates (Beja, Kairouan, and Medenine) and 6 sub-project sites (three new constructions and three rehabilitations) were chosen from the 20 project target Governorates and an semi-structured interview survey[10] was conducted with 120 households on the project impacts.

(1) Reduced Labor in Water Drawing and Improved Life Convenience

As far as reductions in the labor of drawing water are concerned, 94.2% of respondents acknowledged an improvement. In addition, 93.3% of respondents acknowledged that their convenience of living improved. Prior to project implementation, 57.6% of respondents had bad access to water and most of them were dependent on a remote water source or water sales by water distributors. The remaining 31.4% used public water taps and 10.9% used domestic water wells. After project implementation, 57.5% had an individual water pipe connection and 42.5% received their water supply services by public water taps. Their workload of walking a great distance taking many hours of the day in order to draw water was significantly reduced. Their convenience of living was also greatly improved as more than half the total number of households possessed an individual water pipe connection, while the rest of the households were able to use public water taps nearby.

(2) Improved Hygiene and Health Conditions

For hygiene and health conditions, 91.7% of respondents acknowledge improvements. The increased amount of water usage for drinking, cooking, cleaning, washing, and bathing is considered to be due to the significant improvement in access to safe water. In addition, education on water and hygiene has been provided as a part of an awareness program for local residents, which led to raised hygiene awareness among the residents and promoted improved hygiene and health conditions. On the other hand, regarding the frequency of water-borne diseases, 38.3% of respondents considered that they had “decreased” while 23.3% said there had been “no change” and 38.3% responded “unknown/no answer”. The background for this relatively low improvement effect may be the under developed investigation system for water-borne diseases in rural areas as well as the respondents’ lack of knowledge about such diseases.

[10] For the survey, one Governorate was selected from each of the northern, mid and southern regions of Tunisia (Beja Governorate, Kairouan Governorate and Medenine Goernorate) and each Governorate chose one new and rehabilitation sub-project each. The number of samples was set at 20 (20 households) from each sub-project - 120 in total. The samples were randomly selected from rural residents where each sub-project was implemented and an interview style survey was conducted.

(3) Evaluation of Water Supply Services

When asked specific questions on water supply services, the response of "no problem" was given for 75% on water quality, 81.7% on water volume, 68.3% on water pressure, 70.8% on water stoppages and 89.2% on maintenance of facilities. However, frequent drops in water pressure or water stoppages seem to occur during the summer season when demand for water is high. In Medenine Governorate, the level of residents' satisfaction on water quality was lower compared to other two governorates as the water tasted a little salty and bitter. As for water supply services overall, the level of satisfaction for local residents was extremely high and 96.6% of the respondents answered "satisfied" (18.3% "very much satisfied", and 78.3% "satisfied to some extent"). On the other hand, 83.3% of the respondents considered the water charge to be high (18.3% "high", and 65% "high to some extent"). This may be due to the fact that 55.4% of the respondents had used natural spring water or public/domestic well water at no cost prior to project implementation, and their financial burden increased with the introduction of water bills after project implementation. For this reason, 70% of the respondents answered that their water charge burden has "increased".

The main requests from beneficiaries included improvement in water pressure, fewer water stoppages during the summer season, price cuts for water bills, and improvements in the financial foundation of the water user's association (GDA).

At the time of project appraisal, improvements in the Human Deprivation Index[11] and the Beneficiary Household Rates by the National Aid Program for Poor Families (PNAFN)[12] were expected as a poverty alleviation impact. However data for these indices could not be obtained at the time of the ex-post evaluation, and therefore there is no verification of the said impact.

3.3.2 Other Impacts

(1) Impact on the Natural Environment

This project was categorized as Type-B in the JBIC Guideline for ODA Loan Environmental Consideration and there was no Environmental Impact Assessment (EIA) requirement for the construction of small scale water supply facilities under Tunisian Environmental Acts, therefore no EIA was conducted. According to the executing agency, each water supply facility was small scale and there was no negative influence observed during implementation of the project. The Regional Agricultural Development Offices (CRDA[13]),

[11] The Human Deprivation Index is calculated with the average of the following four indices that are quantified: (i) Rate of population with no access to health services, (ii) Female child illiteracy rate, (iii) Dropout rate from elementary school and (iv) Rate of population with no access to safe water. At the beginning, the plan was to improve the 2001 standard value "median of 0.417" after the completion of the project.

[12] The Beneficiary Household Rates by PNAFN are calculated with the rate of the beneficiary household by the national aid program for poor families (Programme National d'Aide aux Familes Necessiteuses: PNAFN). At the beginning, the plan was to improve the 2001 standard value "median of 5.7" after the completion of the project.

[13] CRDA: Commissariat Régional au Développment Agricole.

which are regional branch offices of the Ministry of Agriculture in each governorate, are in charge of the environmental monitoring of each rural water supply facility. However, annual water sampling investigations on water quality are conducted by the Ministry of Health.

Sewage, including household wastewater is treated in a septic tank of individual household and is regularly collected by service providers such as the National Sanitation Office (ONAS)[14], local governments and the private sector. At the time of the ex-post evaluation, project site visits were conducted in 7 rural villages but there were no reported environmental issues caused by wastewater. During the beneficiary survey, 90.9% of respondents answered that there had been "no" negative impact on the natural environment related to this project (51.7% "none" and 39.2% "almost none"). For wastewater treatment, 96.7% of the respondents had an individual septic tank in their household while the wastewater of the remaining 3.3% drained into a gutter. For this reason, 77% of the respondents answered that there was no negative impact on the natural environment.

On the other hand, according to the Ministry of Agriculture and the African Development Bank[15], the sewage volume has increased as the water supply coverage to rural areas has improved and individual water supply has become widespread. Regarding this issue, the Ministry of Agriculture plans to work on primarily including the establishment of related regulations and an implementation system for the sewage treatment in the rural areas[16].

(2) Land Acquisition and Resettlement

Land for the facilities was provided by land owners free of charge according to an agreement between the land owners and the local governments, therefore there was no land acquisition and resettlement.

In summary, the major operation and effect indicators such as the percentage of the water served population, the water production volume per person/day, the water supply volume per person/day, the accounted-for-water rate and the water charge attained their target values. The water quality of the newly developed water sources has met the Tunisian environmental standards and the level of satisfaction of water quality among local residents was high according to the beneficiary survey. There was also a reported improvement in the water quality of the water supply facilities. There were some positive impacts on the living standards of local residents such as reduced labor in drawing water, improved convenience of living and improved

[14] ONAS: Office National de l'Assainissement.

[15] The African Development Bank (AfDB) has a temporary headquarters office in Tunis, the capital of Tunisia (it was temporarily moved from Abidjan in Côte d'Ivoire) and it is a major donor providing much support to rural water supply development projects in Tunisia including this project.

[16] In Tunisia, a state-owned sewage company (ONAS) takes charge of the sewage system in urban regions, however, in rural regions, it is not legally clear who takes responsibility for the sewage system, whether it is each local government or the Ministry of Agriculture. The diffusion rate of sewage in the urban regions of Tunisia is 30-40%.

hygiene and health conditions. No negative impact on the natural environment was reported and no land acquisition and resettlement occurred. From the above, it can be agreed that there were positive impacts seen through the implementation of this project, and therefore its effects and impacts are high.

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

The project output was to construct new and rehabilitate old small-scale water supply facilities in 20 out of 24 Governorates in Tunisia. The planned output (total of Phase I and Phase II) was 330 sub-projects (245 new, 85 rehabilitation) whereas the actual output was 270 sub-projects (237 new and 33 rehabilitation). The attainment rate for the planned outputs was 82%. In detail, the planned output for Phase I[17] was 84 new sub-projects in 17 Governorates while the actual output was 104 sub-projects in 17 Governorates; an increase of 20 sub-projects. On the other hand, the planned output for Phase II[18] was 161 new sub-projects in 19 Governorates and 85 rehabilitation sub-projects in 16 Governorates whereas the actual output was 133 sub-projects in 19 Governorates and 33 rehabilitation sub-projects in 12 Governorates; a decrease of 28 new sub-projects and 52 rehabilitation projects (See Table 3).

The reason for the increase in the number of sub-projects in Phase I was a surplus fund (approximately 700 million JPY) due to changes in the foreign exchange rate and competitive bidding results. An addition of 20 sub-projects were conducted using the surplus fund. Of all 104 sub-projects in Phase I, 9 of them were not subject to the project implementation due to (i) changes in the project implementation period, (ii) the possibility of water supply from SONEDE, (iii) decreased water levels of water sources, and (iv) the water quality of water sources not fulfilling the Tunisian water quality standards. However, the same number of sub-projects were replaced.

The reasons for the reduction in the number of new sub-projects in Phase II were: (i) issues of water quality and the capacity of water sources, (ii) disagreements with local residents on the implementation of water supply project, and (iii) the possibility of water supply from SONEDE. A total of 28 sub-projects were excluded. Especially the major cause for such reductions in number was that the water quality of the water sources did not meet the standard value. While, the major cause for the reduction in rehabilitation sub-projects in Phase II was that a new diagnosis method for deteriorated water supply facilities developed by the project executing agency with the support of the German Development Bank (KfW) was introduced by the

[17] The sub-projects during Phase I were selected from the 2000-2001 program of the rural water supply plan while 'urgency', 'development of the implementation structure', 'secured water resources' and 'geographical distribution' were taken into consideration.

[18] The sub-projects during Phase II were selected from the 2004-2006 program of the rural water supply plan while 'poverty rate', 'water source and rural population', and 'investment amount per water source or beneficiary' were taken into consideration.

Ministry of Agriculture. Training for the new diagnosis method was provided for CRDA staff in each governorate. However the training took longer time and the implementation of the rehabilitation project in each CRDA was delayed. For this reason, the number of sub-projects that were ready to be implemented during the project period was reduced.

Table 3: Planned and Actual Project Outputs

Governorate	Plan				Actual			
	Phase I	Phase II		Total	Phase I	Phase II		Total
	New Construction	New Construction	Rehabilita -tion		New Construction	New Construction	Rehabilita -tion	
Ariana	5	3	-	**8**	5	3	-	**8**
Beja	6	14	10	**30**	6	11	5	**22**
Bizerte	3	11	3	**17**	5	12	2	**19**
Manouba	2	4	-	**6**	-	4	-	**4**
Nabeul	4	9	3	**16**	4	7	3	**14**
Ben Arous	2	-	1	**3**	1	-	-	**1**
Jendouba	9	5	3	**17**	8	3	-	**11**
Le Kef	4	6	7	**17**	8	5	1	**14**
Siliana	1	13	9	**23**	1	7	-	**8**
Zaghouan	4	2	1	**7**	4	2	1	**7**
Sousse	4	2	-	**6**	4	2	-	**6**
Kairouan	3	13	5	**21**	13	13	3	**29**
Mahdia	3	12	-	**15**	5	12	-	**17**
Kasserine	7	10	14	**31**	10	11	7	**28**
Sfax	2	3	2	**7**	-	3	-	**3**
Sidi Bouzid	7	20	9	**36**	9	14	2	**25**
Gafsa	6	14	7	**27**	9	13	4	**26**
Gabes	5	5	4	**14**	5	4	2	**11**
Medenine	7	12	4	**23**	7	5	1	**13**
Tataouine	-	3	3	**6**	-	2	2	**4**
Total	**84**	**161**	**85**	**330**	**104**	**133**	**33**	**270**

Source: DGGREE, Ministry of Agriculture

The original plan of this project was to target the rural water supply system using a public water tap system as its basic policy. However, as mentioned earlier, the 10th Rural Drinking Water Supply Program (2002-2006) announced the policy of promoting individual water pipe connection systems in rural areas and the demand for these on the part of local residents to CRDA was high. Therefore, some design changes were made such as an expansion in water pipe diameter supposing future individual water pipe connections during Phase II of the project. After project completion, each CRDA received a request from GDA and approved the changes from public water tap systems to individual water pipe connection systems with the provision that this could be catered for using the existing capacity of water supply facilities. Because of all this, many of the sub-projects of the project were changed from public water tap systems to

individual water pipe connection systems.

Furthermore, this project has given support with the technical cooperation of JICA (the detailed design study)[19] which was associated with JBIC at that time, and with JICA. The JICA technical cooperation supported implementation design, the preparation of tender documents, and the drawing up of an operation management plan for water supply facilities by the water user's association (GDA). The executing agency has listed advantages of cooperation in this ODA loan and technical cooperation, such as effects in technical transfer and the high quality of survey and design[20].

In cases where rural water supply facilities had been designed and constructed based on the conventional designing guidelines of the General Direction of Rural Water Works and Water Supply, Ministry of Agriculture, some public water taps had output malfunction. On the other hand, there was also excessive amounts of water flow when public water taps were used by only a single or few units. This may have caused significant errors in water meters or trouble in the equipment used for the public water taps. In order to solve these problems, JICA has suggested a design system introducing a new hydraulic calculation method using software, as well as the carrying out of workshops for the Ministry of Agriculture and CRDA on design method correction. The Ministry of Agriculture has now introduced a new system and it is widely used as the standard method for designing rural water supply projects in Tunisia. JICA also introduced earthquake-proof water supply towers using Japan's experience with seismic countermeasures. These are listed as a part of the technical transfer effects of JICA.

In addition, JICA has worked intensively using all means during its cooperation period in order to provide optimal outputs. Its quality of survey was highly evaluated compared to that of the Ministry of Agriculture.

3.4.2 Project Inputs

3.4.2.1 Project Cost

The actual project cost amounted to 9,030 million yen (equivalent to 85% of the original plan) against the planned cost of 10,664 million yen (total of Phase I and II), which was within the plan (Table 4).

[19] The detailed design study on the rural water supply project in the Republic of Tunisia (JICA, 2002); and the study on the rural water supply project (phase II) in the Republic of Tunisia (JICA, 2006).

[20] As for another advantage, the 'short implementation period for the design survey' was listed. When the Ministry of Agriculture conducts an survey/design while hiring a consultant, it is necessary to follow certain procedures according to governmental procurement guidelines, such as the preparation of terms of reference (TOR) for the consulting services, public announcement, bidding, evaluation and contract, and this is time consuming. On the other hand, for JICA technical cooperation, JICA conducts the procurement of local consultants and quality control according to the TOR for the survey agreed between JICA and the Ministry of Agriculture in advance. Therefore, the time needed to start survey activities and their implementation period are acknowledged to be shortened.

Table 4: Planned and Actual Project Cost

Unit: Million Yen

Item	Plan			Actual		
	Phase I	Phase II	Total	Phase I	Phase II	Total
1. Civil Works and Equipment	2,980	4,002	6,982	3,766	4,904	8,670
2. Phydical Contingecy	298	331	629	0	0	0
3. Consulting Services	346	162	508	207	153	360
4. Survey and Study	-	362	362	-	N.A.	N.A.
5. Deep Well Construction	-	178	178	-	N.A.	N.A.
6. Administration Costs	95	120	215	N.A.	N.A.	N.A.
7. Tax and Duties	750	1,040	1,790	N.A.	N.A.	N.A.
Total	4,469	6,195	10,664	3,973	5,057	9,030

Source: DGGREE, Ministry of Agriculture

Note 1: Exchange rate used for Planned Cost: TND 1 = JPY 104.71 (May 1999, Phase I), TND 1 = JPY 81.91 (September 2002, Phase II).

Note 2: Exchange rate used for Actual Cost: TND 1 = JPY 82.44 (Average 2000-2010, Phase I), TND 1 = JPY 81.95 (Average 2003-2010, Phase II).

Note 3: The actual cost for civil works and equipment includes costs for surveys and studies, deep well construction, administration and tax and duties.

The main reason for this was the reduced project outputs described earlier and the changes in the foreign exchange rate.

3.4.2.2 Project Period

The project period planned was 106 months (Total of Phase I and II), or from March 2003 (ODA loan signing) to December 2008 (Completion of Phase II). The actual project period was 129 months, or from March 2000 to November 2010 (equivalent to 122% of the original plan). This was slightly longer than planned (Table 5).

Table 5: Planned and Actual Project Period

Activities	Plan	Actual
Phase I		
1-1. Signing of L/A	March 2000	March 2000
1-2. Tender	March 2000 – November 2000 (9 M)	June 1999 – February 2001 (20 M)
1-3. Civil Works	May 2000 – June 2003 (38 M)	March 2000 – June 2010 (124 M)
1-4. Consulting Service	May 2000 – December 2003 (44 M)	June 2000 – December 2003 (43 M)
1-5. Project Completion	December 2003	June 2010
1-6. Total Duration	March 2000 – December 2003 (46 M)	March 2000 – June 2010 (124 M)
Phase II		
2-1. Signing of L/A	March 2003	March 2003
2-2. Tender	February 2004 – August 2006 (31 M)	June 2003 – June 2006 (37 M)
2-3. Civil Works	April 2004 – March 2008 (48 M)	February 2004 – Nov. 2010 (82 M)
2-4. Consulting Service	October 2004 – December 2008 (51 M)	July 2005 – June 2009 (48 M)
2-5. Project Completion	December 2008	Noember 2010
2-6. Total Duration	March 2003 – December 2008 (70 M)	March 2003 – Nov. 2010 (93 M)

Source: DGGREE, Ministry of Agriculture

The reasons for the delay were as follows:

(1) Delay caused by additional scope of Phase I

During Phase I of the project, 20 sub-projects were implemented as an additional scope between 2007 and 2010. For this, the loan expiry date was extended from July 2007 to June 2010.

(2) Delay in detailed design by CRDA

For the detailed design of this project, it was planned that JICA technical cooperation was used for new sub-projects and CRDA was in charge of rehabilitation sub-projects, with a consultant. However, the detailed design of rehabilitation sub-projects during Phase II by CRDA was delayed due to the fact that it took time to introduce new survey methods for diagnosing deteriorated water supply facilities, also due to lack of CRDA manpower, and lack of time from the concurrent donor support project.

(3) Delay in supply for rehabilitation projects

During Phase II of the project, the coordination works for the rehabilitation of pump facilities, engineering work and water supply pipe construction work, needed to be carried out smoothly as the rehabilitation and expansion of existing facilities was to be done without any stoppage of the water supply system that was in operation. For that reason, at first, the executing agency decided to hire only one contractor to work on the above three works. However, it was difficult to agree a contract with a contractor which could fulfill all the technical requirements described above, and rebidding was necessary. As a result, the implementation of the Phase II rehabilitation project was delayed for a year.

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

Economic Internal Rates of Return (EIRR)

EIRR for Phase II of the project was calculated at the time of project appraisal (2001). For the new construction projects, it was 13.4% and for rehabilitation projects it was 23.3%. For the recalculation of EIRR, there was no detailed data on the calculation basis at the time of project planning, and it was difficult to collect the necessary data from the executing agency, therefore no recalculation was done at the time of the ex-post evaluation.

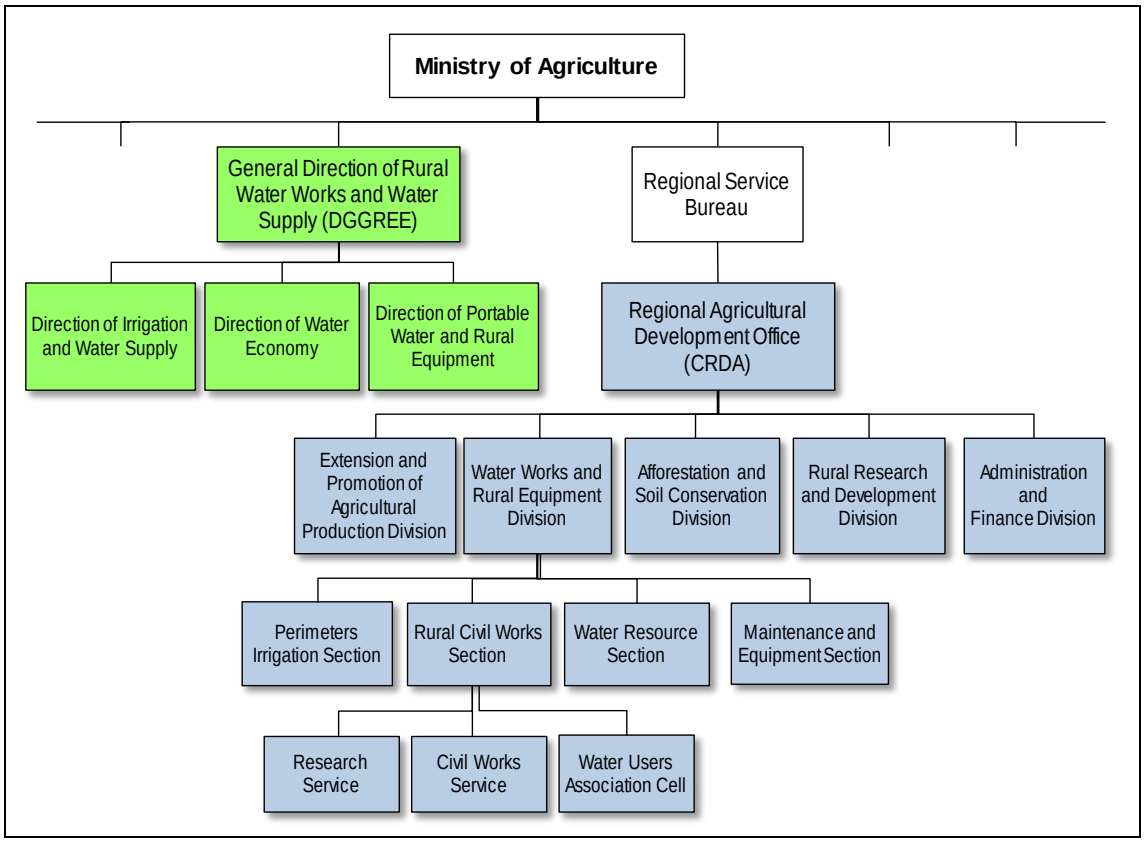
In the light of the above, although the project cost was within the plan, the project period slightly exceeded the plan; therefore the efficiency of the project is fair.

3.5 Sustainability (Rating: ②)

3.5.1 Structural Aspects of Operation and Maintenance

The operation and maintenance (O&M) of this project is conducted on two levels: the Regional Agricultural Development Office (CRDA), a regional branch office of Ministry of

Agriculture in each Governorate, and the Water User's Association (GDA) organized by the representatives of local residents. CRDA and GDA signed the management contract, and each is responsible for the operation and management of water supply facilities based on the tasks and responsibilities stipulated in the contract. The organization chart of CRDA is shown in Figure 1 below.



Source: CGGREE, Ministry of Agriculture
Note 1: The names of the departments and sections of Ministry of Agriculture directly involved in the operation and maintenance of this project are provided in this organization chart.
Note 2: The above organization chart of CRDA is a standardized formation. The formation of divisions and sections varies according to the size of each CRDA.

Figure 1: Organization Chart of CRDA

(1) CRDA

The main role of CRDA in O&M is the major rehabilitation of water supply facilities and support for GDA. In particular, the Maintenance and Equipment Section is in charge of the repair and rehabilitation of water supply pipes in the case of breakage and leakage, pumping equipment, and all the malfunctions that are relatively large and cannot be handled by GDA. Usually CRDA carries out rehabilitation of the pumping equipment every 7 years and of the water supply pipes every 25 years. On the other hand, the Rural Civil Works Section, consisting of Research Service, Civil Works Service, and Water User's Association Cells, is in charge of supporting GDA from various aspects, such as establishing GDA, supporting the general

assembly meetings, advising and training on the O&M method of water supply facilities, collecting water bills, supporting the creation of annual budget plans, supporting record management, and mediating and giving advice for solving social issues. CRDA is also responsible for the management of the water quality in water supply facilities.

Although it varies depending on each Governorate, there are approximately 100 GDAs per Governorate for the rural water supply[21] and one member of CRDA staff of each Water User's Association Cell is to be in charge of supporting the activities of 20-30 GDAs. However, the rural water supply facilities are scattered extensively in each Governorate and in recent years there have been quite a few CRDA which experience difficulties in making the rounds of all GDA regularly due to the inconvenience of transportation because of undeveloped road infrastructures, a limited number of staff and a lack of vehicles and fuel.

(2) Water User's Association (GDA)

GDA is an organization with a juridical personality, which has the approval of the governor from each Governorate. The Ministry of Agriculture and Ministry of Home Office are the administrative bodies in charge of them. Each GDA is composed of three or six elected directors[22] (a chairman, treasurer, directors who are unpaid), as well as general association members (water users). In addition, a technical director (in charge of collecting water bills and the overall administrative management work, including financial management), a pump operator and a tap keeper (who manages the public water tap) are hired and paid by the GDA. However, some small-scale GDA do not have paid staff such as the technical director or pump operator due to a limited budget.

The role of GDA in O&M includes routine maintenance of water supply facilities, minor repair works including the changing of spare parts, controlling the operation inventory of the pump station, issuing and collecting water bills, and preparing financial reports and the annual budget plan[23].

3.5.2 Technical Aspects of Operation and Maintenance

(1) CRDA

The Ministry of Agriculture conducts technical training for newly hired CRDA engineers on the O&M of water supply and irrigation systems twice a year. Furthermore, CRDA conducts training for GDA on the O&M of water supply systems.

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[21] In Tunisia, GDAs for the irrigation facilities are also organized as O&M organizations with the participation of irrigation users. Although there are some exceptions, GDAs for rural water supply and GDAs for irrigation are separately established.

[22] The term for a director is 3 years and 1/3 of the directors are replaced annually. In other words, there is an executive election in the annual meeting and 1/3 of the directors are reelected.

[23] Some of the rural areas that were located relatively near to an urban area and received their water supply from the water pipes of SONEDE, a water supply company in urban areas, have transferred the O&M of their water supply facilities from GDA to SONEDE at the residents' will.

(2) Water User's Association (GDA)

GDAs are in charge of routine maintenance, mainly preventive maintenance, based on an annual maintenance plan. Technical training by CRDA for GDA is conducted once during the startup of the organization, and then each GDA member shares and hands over their technical knowledge thereafter. If problems are too difficult to be handled by GDA, it is possible to outsource to a private repair company although there are some regions where this option is not available as there are no private maintenance companies. In these cases CRDA provides repair support upon the request of a GDA[24].

The revolution in 2011 caused dramatic changes in Tunisian society and had a negative influence on the O&M of the rural water supply system nationwide. For example, the water charge collection rate decreased as the rate of water bill arrears increased after the revolution. This has had a negative influence on the financial capacity of GDA. According to the executing agency, there are many GDAs which are in debt to SONEDE or to electric companies and the number of GDA that can conduct necessary preventive maintenance is low. Furthermore, there are many cases where local residents connect individual water pipe connections without the approval of GDA and this had a negative influence on the efficiency of the water supply system; there is an increase in water leakages as well as insufficient water volume and water stoppages[25]. The increase in water bill arrears or illegal individual water pipe connections are thought to be related to a change in awareness on the part of local residents after the revolution, a distrust towards the directors of GDA[26], moral hazards, and the decreased authority of administrative and law enforcement agencies. Although GDA reminds and persuades individuals with water bill arrears to pay water bills as well as giving warnings and taking legal action against illegal connections as much as it can, GDA are voluntary-based community organizations without legal force and it is difficult for them to take effective measures[27].

[24] Support by CRDA for GDA rehabilitation may include the repair of water supply facilities by CRDA staff where outsourcing to a private maintenance company is difficult, in addition to mediation with private maintenance companies and procurement support for the replacement of parts. The repair of water pipes is carried out by CRDA free of charge, but the repair costs for electric equipment such as pump equipment and the actual cost of replacement parts are paid by GDA.

[25] In cases where residents have connected an individual water pipe without the approval of CRDA or GDA, this is ignored as long as the connection is made appropriately with the main pipe, with a proper water meter, and as long as residents pay the water bill. The largest problem is when the connections result in a decrease in water supply system efficiency due to low water pressure or a water leakage caused by inappropriate connection work, or when there is underreporting of water usage due to a deterioration of water meters .

[26] According to interviews with selected GDA at the time of the ex-post evaluation, before the revolution in 2011, there was political intervention in the election of board members and politically-connected people tended to be those elected. After the revolution, people distrusted the existing board members, and now almost a half of the entire GDA have re-elected their directors.

[27] According to interviews with selected GDAs, it was difficult to take measures such as a suspension of the water supply to recoup water bill arrears because of the possible bad influence on personal relationships within the rural society. Prior to the 2011 revolution, regulating offenders with the support of local police or administration was an effective means of problem solving where there had been an illegal connection. However, after the revolution, as the authority of the police or local government and people's trust in them decreased, they tend to avoid getting involved in problems like this.

Table 6: Performance Evaluation of All GDA in Tunisia by the Ministry of Agriculture

	2007	2008	2009	2012
Good	23%	22%	26%	21%
Moderate	58%	60%	49%	44%
Weak	19%	18%	24%	35%

Source: DGGREE, Ministry of Agriculture
Note: Ministry of Agriculture evaluates the performance and capacity of all GDA in Tunisia according to three criteria: Financial capacity (3 components), Technical capacity (4 components) and Organizational management capacity (9 components).

Table 6 shows the results of the performance evaluation of all GDA in Tunisia[28] which is conducted annually by the Ministry of Agriculture. When compared to the results of 2009, the rate of GDA evaluated as "Good" in 2012 decreased by 5 points while the rate of GDA evaluated as "Weak" increased by 11 points. The performance level of GDA has shown a declining trend nationwide due to changes in the social environment after the revolution of 2011.

3.5.3 Financial Aspects of Operation and Maintenance

(1) CRDA

Table 7 below shows the actual O&M budget for rural water supply facilities (2012) in the target CRDA in 20 Governorates.

Although the O&M budget allocated to each CRDA by the Ministry of Agriculture depends on regional characteristics or the number of GDA, the O&M budget for rural water supply facilities is allocated with the basis of 8,000 Tunisian dinar per GDA annually. In principle, the operation and maintenance budget is covered partly by water prices and each GDA is responsible for its execution and management. The operation and maintenance fee covered by CRDA are mainly for the repairs of pumping equipment and the mending of water pipes[29]. According to the executing agency, the budget allocation for each CRDA has been on a decreasing trend after the 2011 revolution, and there is a shortage of labor costs as well as costs for supporting activities for GDAs including visiting each GDA in particular.

[28] The Ministry of Agriculture conducts a performance evaluation of all GDA nationwide through CRDA every year based on the annual report submitted by GDA. However, annual reports were no longer submitted after 2009, therefore the Ministry of Agriculture has conducted a GDA performance evaluation based on the new rating standard since 2012.

[29] For those GDA that have financial difficulties and are unable to pay the operation and maintenance fee, there are cases where CRDA has given financial support as an exception.

Table 7: Actual Operation and Maintenance Budget for Rural Water Supply Facilities (2012) in the Target CRDA

Governnorate	Amount (1,000 Dinar)	Governnorate	Amount (1,000 Dinar)
Ariana	214	Sousse	356
Beja	661	Kairouan	4,801
Bizerte	1,162	Mahdia	2,620
Manouba	3,258	Kasserine	3,255
Nabeul	3,999	Sfax	4,230
Ben Arous	403	Sidi Bouzid	6,766
Jendouba	3,519	Gafsa	2,800
Le Kef	4,483	Gabes	649
Siliana	1,752	Medenine	1,844
Zaghouan	2,353	Tataouine	510
Total			**49,635**

DGGREE, Ministry of Agriculture
Note: The above actual operation and maintenance (O&M) budget of CRDA is the O&M of all small-scale rural water supply facilities including the sub-projects of this project.

(2) Water User's Association (GDA)

Since the 2011 revolution, many GDA have faced financial difficulties due to an increase in overdue water bills. Many GDA have had trouble in reserving O&M expenses, which had led to delays in paying in electricity bills as well water bills to SONODE, for those receiving their water supply from SONODE. In addition, some GDA have made cuts in the water price after being pressed by the local residents, and quite a few GDA have been forced to set their water price below the water production/purchasing cost price[30]. For this reason, the cost recovery rate of the rural water supply project in Tunisia has significantly worsened, from 83% in 2009 to 66% in 2012 (Table 8).

Table 8: Cost Recovery Rate

	Average of All Rural Water Supply Projects in Tunisia				Average of this Project
	2007	2008	2009	2012	2012
Cost Recovery Rate (%)	80	77	83	66	106

Source: DGGREE, Ministry of Agriculture
Note 1: Cost recovery rate (%) = Water production cost per 1 m^3 / Water revenue per 1 m^3 x 100
Note 2: Cost recovery rate of this project is based upon the average cost recovery of 102 sub-projects in 14 Governorates

In this situation, the fact that the cost recovery rate in the target 102 sub-projects maintains an average of 106% is significant and this should be rated highly.

The reasons for the relatively high performance of the 102 sub-projects from this project as

[30] The water production and purchasing price vary in each water supply facility depending on the type of water source. The water production and purchasing price are generally more expensive in a water supply facility that purchases water from SONODE than for those with a water source that uses a well within or in a nearby area.

compared to the national average are thought to be: (i) a higher capability of GDA as the results of an effective awareness program for local residents and support for GDA and (ii) a higher satisfaction rate for local residents regarding the water supply services of these sub-projects as there are few breakdowns and malfunctions in the water supply system. However, the executing agency estimates that the minimum required O&M expenses are approximately 25% of the annual budget while for the target 102 sub-projects in 14 Governorates, the percentage of O&M expenses within the GDA overall expenses was 11% in 2012. There is, therefore, room for continuing improvements in assuring optimal O&M expenses through measures such as raising the water bill collection rate.

3.5.4 Current Status of Operation and Maintenance

There was no major issue in its O&M status of the water supply facilities in 7 rural areas in 4 Governorates that were visited during the field survey of the ex-post evaluation. According to the Ministry of Agriculture, there are also no major issue in the current status of the O&M of water supply facilities from the sub-projects. However, 10 out of 127 sub-projects in 14 Governorates provided by the executing agency have stopped operating due to the issue of water source capacity. In order to solve this problem, some of them are currently under construction for rehabilitation.

As described earlier, there have been many problems in O&M since the revolution in 2011, and countermeasures, which include the status of conventional GDA, are being discussed within the Ministry of Agriculture. In relation to this, a technical cooperation project by KfW is in progress targeting 264 GDA in 8 Governorates. This is a pilot project in Tunisia (the sub-projects of this project are excluded). KfW is a major donor that has been providing support for rural water supply projects through a participatory approach in Tunisia since the 1990's. This technical cooperation project aims at strengthening the O&M capacity of rural water supply facilities by enhancing the legal framework of GDA, also at strengthening the O&M support system of the private sector and improving the financial management capacity of GDA.

In Summary, the 2011 revolution caused political and social changes in Tunisia as well as changes in people's awareness and attitudes, and it has had a negative influence on the organizational capacity of the GDA that were in charge of the O&M of this project. In particular, increases in water bill arrears have weakened the financial foundation of GDA and have had a negative influence on the implementation of appropriate O&M activities. However, despite such difficulties, O&M activities such as minimum preventive maintenance have continued within the sub-projects of this projects and the finance has been reserved. For each CRDA, although they are not sufficient, a certain level of O&M activities have been implemented within the rural water supply facilities under their supervision. There are some issues in the structural,

technological and financial aspects of O&M of this project, and therefore the sustainability of the project effect is fair.

4. Conclusion, Recommendations and Lessons Learned

4.1 Conclusion

The objective of this project was to improve the coverage of the rural water supply by constructing small scale water supply facilities in 20 Governorates, thereby contributing to an improvement in people's living standards.

This project matched the Tunisian national development policy and development needs and Japan's ODA policy, therefore its relevance is high. Based on data analysis of 102 sub-projects in 14 Governorates (out of 270 sub-projects in 20 Governorates) obtained from the executing agency, it can be seen that the main operation and effect indicators such as water supply coverage, water production volume per person/day, water supply volume per person/day, accounted-for-water rate, and water price have achieved their target values. The water quality of the water source, which was newly developed by this project, met the Tunisian environmental standards. The beneficiary survey conducted with local residents revealed that residents were highly satisfied with the water quality and that there had been an improvement in the water quality of water supply facilities. There were some positive impacts which improved the living standards of local residents such as decreases in the labor of drawing water, improved convenience of living, and improved hygiene and health conditions. No negative impact on the natural environment was observed, and there was no land acquisition or resettlement. Therefore, the effectiveness and impact of the project is high.

Although the project cost was within the plan, the project period slightly exceeded the plan, therefore the efficiency of the project is fair. The Jasmine revolution in 2011 caused political and social reform and a change in people's awareness and attitudes throughout Tunisia. It also had some negative influence on the capacity and organization management of the Water User's Association (GDA) which was mainly in charge of the operation and maintenance of the project. For this reason, there were some issues observed in the structural, technical and financial aspects of the project's operation and maintenance. Thus, the sustainability of the project is fair.

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

4.2 Recommendations

4.2.1 Recommendations for the executing agency

Strengthening the Capacity of GDA

This project had issues in its sustainability. In particular, the problems of water bill arrears and illegal individual water pipe connections need to be worked on as a priority. In the background to this, there are external factors that have had a significant influence such as the

changes in local residents' awareness and attitudes and political and social changes that came after the 2011 revolution. For example, it is now difficult to control those in arrears or other violators due to an increase in distrust that local residents feel towards GDA board of directors, changes in the awareness that residents have of their rights, moral hazards, and a decrease in the power of the administrative/law enforcement agencies. On the other hand, the water supply system is shifting from the public water tap system to an individual water pipe connection system. The water supply pipe network is expanding and the burden of operation and maintenance is increasing. This means that a situation arising cannot be handled sufficiently by the conventional GDA capability. It has been revealed that the structure and capacity of GDA based on residents' volunteer work are reaching their limits.

As a countermeasure to the above issues, a technical cooperation project by KfW is in progress targeting 264 GDAs in 8 Governorates. This is a pilot project focusing on strengthening the capacity of GDA. It is desirable that the General Direction of Rural Water Works and Water Supply, Ministry of Agriculture shares the outcomes of this project with the CRDA from each Governorate and the GDA of the sub-projects of the project, and that they are utilized in reviewing feasible countermeasures against water bill arrears and illegal individual water pipe connections, as well as in improving the capacity GDA.

The Rehabilitation of Non-Operating Water Supply Facilities

There are at least 10 sub-projects currently not operating due to problems such as water source capacity. It is desirable that these non-operating water supply facilities take necessary countermeasures such as rehabilitation.

4.2.2 Recommendations for JICA

From the point of view of sustainability, it is desirable that JICA closely collaborate with the Ministry of Agriculture and share information on the KfW technical corporation project in progress. The Ministry should be advised to provide feedback on the outcomes of the KfW project to the GDA of the sub-projects. In addition, JICA is expected to consider the possibility of further assistance to improve the capacity GDA in the future.

4.3 Lessons Learned

This project was implemented in collaboration with JBIC and JICA at that time. Prior to the project, the design and construction of rural water supply facilities were based on the design guidelines of the General Direction of Rural Water Works and Water Supply. However under these guidelines, there was the possibility of triggering malfunction of water supply equipment from output errors or excessive loads on the public water taps. Therefore, the JICA survey team suggested a design method based on a new hydraulic calculation that replaced the conventional design guidelines. This new method has been used as the standard for rural water supply project

design in Tunisia. In addition, this project introduced the design of an earthquake resistant water supply tower utilizing Japanese experience of earthquake countermeasures. The effects of technology transfer, as well as the quality of the survey and design of the JICA survey team were highly appreciated in Tunisia. From this, it can be seen that it is desirable that an elaborate survey is conducted prior to project implementation, and if technology or information is lacking in the partner country, that specialists and consultants are actively used to cover such insufficiencies. This can secure the sustainability of a project and encourage the partner country to acquire new techniques and information and to gain the effects of technical.

End

Comparison of Original and Actual Scope

Item	Plan	Actual
(1) Project Outputs [Phase I] a) New construction of small-scale water supply systems • Construction of water source developments, pumping stations, reservoirs, public water taps • Laying of water pipes • Procurement and installation of pumping machines	84 sub-projects (17 governorates)	104 sub-projects (17 governorates)
b) Consulting services • Assistance with construction supervision • Environmental monitoring and advice of countermeasures. • Technical assistance for sensitization • Assistance in O&M of the facilities	Foreign experts: 21 M/M Local experts: 110.5 M/M	Foreign experts: 16.13 M/M Local experts: 110.82 M/M
[Phase II] c) New construction of small-scale water supply systems • Construction of pumping stations, disinfection facilities, reservoirs, public water taps • Laying of water pipes • Procurement and installation of pumping machines	161 sub-projects (19 governorates)	133 sub-projects (19 governorates)
d) Rehabilitation of existing small-scale water supply systems • Rehabilitation of pumping stations and machines, public water taps • Protection work for pipelines • Replacement of aged water pipes • Installation of chemical injection pumps	85 sub-projects (16 governorates)	33 sub-projects (12 governorates)
e) Procurement of equipment for civil works	Vehicles: 22 units Measuring instruments: 20 sets (1 set x 20 governorates) Computer software: 1 set	Vehicles: as planned Measuring instruments: N.A. Computer software: N.A.
f) Consulting service • Assistance with project management • Review of sensitization programs and advice on countermeasures • Technical assistance for the management of GDA and the O&M of the facilities • Assistance in monitoring of the Human Deprivation Index	Expert A: 13 M/M Expert B: 93 M/M	Expert A: 9.95 M/M Expert B: 79.2 M/M

Item	Plan	Actual
(2) Project Period (Phase I and Phase II)	March 2000 – December 2008 (106 months)	March 2000 – November 2010 (129 months)
(3) Project Cost (Phase I and Phase II) Amount paid in Foreign Currency Amount paid in Local Currency Total Japanese ODA Loan Portion Exchange Rate	 602 million yen 10,062 million yen (112 million dinar) 10,664 million yen 7,874 million yen TND 1=JPY 104.7 (Phase I) (As of May 1999) TND 1 = JPY 88.91 (Phase II) (As of September 2002)	 N.A. N.A. (N.A.) 9,030 million yen 7,604 million yen TND 1 = JPY 82.44 (Phase I) (Average between 2000 and 2010) TND 1 = JPY 81.95 (Phase II) (Average between 2003 and 2010)