

Tunisia

Ex-Post Monitoring of Japanese ODA Loan Project
“Agricultural Sector Investment Project”

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Field Survey: June, September 2009

1. Outline of the ODA Loan Assistance



Project Area Map



Kseub Hill Dam

1.1 Objective

The objective of this project is to promote a policy reform by determining the directions of the policy reform and public investment in the agricultural sector and by strengthening the institutions of the Ministry of Agriculture and Hydraulic Resources (hereinafter referred to as the Ministry of Agriculture) through the implementation of a series of sub-projects in the agricultural sector, thereby contributing to sustainable development of the sector in Tunisia.

1.2 Outline of the Loan Agreement

Approved Amount/ Disbursed Amount	4,421 million yen / 4,377 million yen
Loan Agreement Signing Date/ Final Disbursement Date	February 1996 / June 2001
Ex-post Evaluation Year	Fiscal Year 2004
Executing Agency	Ministry of Agriculture and Hydraulic Resources Commissariat Régional au Développement Agricole (CRDA)
Main Contractor (Over 1 billion yen)	—
Main Consultant (Over 100 million yen)	—

1.3 Background and reasons to conduct the ex-post monitoring of the project

In the ex-post evaluation report significant gaps between the planned and the actual irrigated areas of five out of 19 hill dams were identified. The report indicated that this was mainly caused by a drought that continued for four years until 2002 and forced the postponement of improvement of the irrigation facilities. Due to the fact that the expected development effects of part of the sub-projects could not be identified, this project became a candidate for an ex-post monitoring. Conclusions were derived through the review of the results obtained during the field surveys, which were conducted based on the evaluation criteria of effectiveness, impact and sustainability.

2. Monitoring Results

2.1 Effectiveness (Impact)

2.1.1 Quantitative Effects

This project was co-financed by JICA and the “Agricultural Sector Investment Program” which was implemented by the World Bank, and aimed to assist in the following three areas: Policy Reform, Capacity Building in the Ministry of Agriculture and Improvement of Public Investment. A series of sub-projects was conducted in each of these three areas. The following sub-projects were financed by the Japanese ODA loan: Hill Dams (19 locations), Rural Water Supply (61 locations) and Exploratory Wells (96 locations). This section presents the quantitative effects of the above-mentioned three areas and sub-projects.

2.1.1.1 Policy Reform

In regard to the Policy Reform, the following objectives were identified at the time of appraisal: revision and correction of irrigation water charges and promotion of water users’ associations. For the former, a real-term increase of water charges per annum was used as an indicator. There was a 9% increase at the time of the ex-post evaluation as compared to the time of the project completion. Thus, it was concluded that irrigation water charges were in fact in the process of revision and correction. As for the current ex-post monitoring, since no specific information on the irrigation water charges was available, an alternative indicator was used instead based on the information contained in the Annual Report on the Associations for Agriculture Development (Groupement de Développement Agricole, GDAs, which is currently the main form of the water users’ associations). According to the data on the status of water charges provided in the Annual Report, the percentage of GDAs that use the metered water rates, i.e. where users are

levied according to the amount of water actually consumed, increased from 56% in 2003 to 83% in 2007, while the percentage of GDAs that use the flat rates decreased from 25% to 5% during the same period¹. Therefore, from the view point of revision and correction of water charges, it can be confirmed that efforts are being made in this area.

As for the promotion of water users' associations², the number of associations was used as an indicator at the time of the ex-post evaluation. This number increased from 2002 to 2006. However, reorganization of associations from Associations of Collective Interest (Groupement d'Intérêt Collectif, GIC) to GDAs took place afterwards and thus the number of associations decreased in 2007 (Table 1). It is worth mentioning that currently the Ministry of Agriculture emphasizes operational effectiveness of these associations rather than their number.

Table 1. Promotion of Water Users' Associations

(Unit : number of associations)

	2002 (Ex-post evaluation)	2006	2007
Rural water supply	1,581	1,610	1,284
Irrigation	1,022	1,064	980

Source : Ministry of Agriculture

2.1.1.2 Capacity Building in the Ministry of Agriculture

No indicators were set for Capacity Building in the Ministry of Agriculture. However, through the field surveys during the ex-post monitoring, it was confirmed that seminars and training were being conducted in the Ministry of Agriculture for its personnel as well as for the personnel working for CRDAs to build their capacities.

2.1.1.3 Improvement of Public Investment

The objective of the improvement of public investment was to enhance the operation and maintenance of irrigation as well as water supply from the financial point of view. The indicator used in the ex-post evaluation was the cost recovery rate of water charges. The ex-post evaluation report indicated that this rate increased from 73% prior to the project to 97% following the implementation of the project and therefore the operation and maintenance strengthened financially. For the current ex-post monitoring, a comparable indicator was difficult to obtain. Therefore, the cost recovery rates of GDAs were used as an alternative indicator. For both the irrigation and the water supply GDAs,

¹ There are the so-called combined GDAs that use both the metered rates and the flat rates; in addition, some GDAs still do not collect water charges although these decreased from 18% in 2003 to 12% in 2007.

² The term "water users' association" includes all associations of beneficiaries of irrigation and water supply projects as well as rural development water supply associations.

the percentage of GDAs that reached the cost recovery rate³ of more than 80% has been on the rise since 2003, while the percentage of GDAs with the cost recovery rate of less than 50% has been decreasing. Therefore, it was verified that irrigation and water supply operations continue to strengthen financially (Table 2).

Table 2. Distribution of GDAs by cost recovery rate

(Unit : number of GDAs)

	2000	2001	2002	2003	2004	2005	2006	2007
Irrigation GDAs								
More than 80% cost recovery rate	57	60	62	—	70	76	69	69
Cost recovery rate under 50%	25	42	19	9	—	9	8	11
Water supply GDAs								
More than 80% cost recovery rate	18	21	38	35	42	60	62	54
Cost recovery rate under 50%	34	28	19	22	18	17	14	16

Source : Annual Report prepared by the Ministry of Agriculture on GDAs (*Rapport de Synthèse de la Situation des GDA/PPI*)

2.1.1.4 Sub-projects

1) Hill Dams

The hill dams that were financed by the Japanese ODA loan were in 19 locations in total and the effect indicator for these hill dams used in the ex-post evaluation was the irrigated area. Data on the irrigated area was provided by the Ministry of Agriculture and indicates only the area that is actually irrigated directly from the respective hill dam for that particular year; therefore, the indicator fluctuates significantly from year to year⁴. Although this indicator does not represent the actual benefited area from the installation of irrigation facilities and equipment, the same indicator was used in this ex-post monitoring following the ex-post evaluation. In addition, the value of the benefited area

³ The cost recovery rate of the O&M costs is defined by the ratio of the revenues per liter and the estimated cost per liter (taking into account the fuel and electricity costs, salaries, water charges, costs of administration and maintenance)

⁴ Data on the irrigated area of five sample hill dams, for which annual data from 2003 to 2009 was available and was provided by the Ministry of Agriculture, is shown below.

(Unit: ha)

Hill Dam	Location (Governorate)	Planned	2003	2004	2005	2006	2007	2008	2009
Zitoun	Bizerte	170	—	92	102	127	126	132	102
Khouitra	Jendouba	275	84	106	90	44	91	67	125
M'sila	Beja	275	—	50	225	178	48	71	44
Kassar	Kef	285	—	16	48	34	44	0	0
Saadine	Zaghuan	140	—	8	20	31	28	29	40

Source: Ministry of Agriculture

was used as the planned irrigation area for comparison purposes.

The irrigated area of the hill dams at the time of ex-post evaluation totaled 2,012 ha, corresponding to 76% of the planned irrigated area. The estimated irrigated area in 2009, according to the information obtained during the current ex-post monitoring, was 1,036 ha, even less than the ex-post evaluation value, representing only 39% of the planned value (Table 3).

Table 3. 19 Hill Dams: Irrigated Area⁵

Indicator	Planned	2002	2005	2009 estimation
Irrigated area (ha)	2,647	2,012 (76% of planned)	2,142 (81% of planned)	1,036 (39% of planned)

Source: Ministry of Agriculture and Ex-post Evaluation Report. The data of 2005 are based on the survey report of 19 Hill Dams as of November 2005 prepared by JBIC.

During the ex-post monitoring, it was verified that water supply systems from the hill dams to the agricultural fields were installed with finance from the government of Tunisia as planned; however, data on the irrigated area by means of installation of irrigation facilities by the farmers themselves, as well as the cropping rate could not be verified. Therefore, it is difficult to analyze the reasons for the fluctuation of the area that was irrigated directly from the hill dams for each year, and further research may be necessary to analyze in detail.

Although judging from the fact that the irrigated area reached 76% of planned area (2,647 ha) in 2002, and 81% in 2005, it could be estimated that more than 80% of planned area can be regarded as the area where irrigation facilities had been installed, however, the estimated irrigated area in 2009 was only 39%. According to interviews to the Ministry of Agriculture, one of the factors that caused this situation is the lack of diffusion and understanding of irrigation technology among farmers. However, it was difficult to identify the factors behind this situation could be conducted during the ex-post monitoring.

In addition to the above, a close monitoring of the five hill dams (Kseub, H'mila, Saadine, El Khil, and Khouitra) was conducted during this ex-post monitoring, as the ex-post evaluation report identified that the gap between planned and actual irrigated area was considerably wide.

The benefited area of these hill dams were small in number of beneficiary farmers from the beginning, and both the benefited area as well as the irrigated area of these fill dams are limited. However, the irrigation facilities and ditches installed by the Tunisian side

⁵ The "irrigated area" as an indicator provided by the Ministry of Agriculture, is used in the same way as in the ex-post evaluation. The indicator is collected by the Ministry and includes only the area that is actually irrigated directly from the respective hill dam for that year

were confirmed to be fully operational during the ex-post monitoring.

Data on the area improved with irrigation facilities by the farmers themselves in these five hill dams were not obtained in the ex-post monitoring. According to the Ministry of Agriculture, the factors that prevent installation and improvement of irrigation facilities are drought -which the country suffered from 1999 to 2002-, followed by unstable amount of rainfall, which increased concerns on climate change inducing to retrench investments in irrigation by the farmers. However, it was not able to determine the effect of each of the specific causes of the gap between the planned and actual irrigated area.

Nevertheless, according to the information obtained through the ex-post monitoring, the following issues could be considered as some of the main factors that caused the above-mentioned gap.

[Factors that prevent farmers from introducing irrigation]

- (1) A beneficiary farmer who finances its own irrigation facility within the agricultural field could have concerned about the cost recovery including loans, from the agricultural revenues (i.e. the profitability) within hard accessibility of the market, by increasing in transportation costs of agricultural products, equipment and materials due to the escalation of fuel prices. Therefore, farmers retrench their investments on irrigation.
- (2) A beneficiary farmer might not have sufficient assets for collateral to obtain a loan from the bank in order to install irrigation facilities.
- (3) A beneficiary farmer might not have sufficient skills and knowledge of irrigation.

In order to promote irrigation agriculture and investment on irrigation facilities, providing training on agricultural management that would help improving the profitability of farmers would be necessary. In addition, assistance to improve the understanding and technical skills among farmers by emphasizing the role of irrigation as a way to be prepared against climate change could also be considered.

At the time of appraisal, the main objective of the five hill dams was to promote irrigation. According to the Ministry of Agriculture, the role of the hill dams was revised in 2005, from being not just for irrigation purposes, but also as an important water source for recharging ground water, protecting other dams against sedimentation and so on by considering the various environmental problems including the drought that the country is constantly facing nowadays. Based on this revised roles, the five hill dams do contribute in their respective locations (Table 4).

Table 4. Current Status of the Five Hill Dams

Name of the Hill Dam	Kseub	H'mila	Saadine	El Khil	Khouitra
Location (Governorate)	Ben Arous	Nabeul	Zaghouan	Kairouan	Jendouba
Main role	Water supply to other dams Protect other dams against sedimentation Livestock drinking water	Livestock drinking water Irrigation	Ground water recharge Irrigation	Ground water recharge Livestock drinking water	Irrigation Livestock drinking water
Reservoir capacity (thousand m ³)	665	930	4,556	850	1,240
Pondage (thousand m ³)	640	489	1,250	644	744
Irrigated area (ha)					
Planned	88	73	140	50	275
Actual	20	6	40	20	125
Number of beneficiary farm households ⁶	1	5	22	5	52
Method of financing of the irrigation facilities	One pump installed by private investor	Six pumps installed by private investors	One pump installed by CRDA	One pump installed by CRDA, 3 pumps and respective pipelines installed by private investors	Pipeline installed by CRDA
Other	Main role is water supply to El Hama Dam (irrigated area: 1,100ha)	Difficulties in securing profitability due to accessibility problems. A pipeline is planned to be installed by CRDA in 2010	Main role is ground water recharge. GDA already established. Collection of water charges as well as information exchange are already conducted	Difficulties in securing profitability due to accessibility GDA already established but currently not active.	Constant problems of water leakage due to aging of existing irrigation facilities

Source : Ministry of Agriculture, and site surveys (as of August 2009)

A major case where a hill dam's main role is to supply water to another dam is the Kseub Hill Dam. Although the irrigated area of this hill dam is only 20 ha (22% of the originally planned irrigated area) belonging to one beneficiary farm, Kseub Hill Dam

⁶ The number of beneficiary farm households decreased from the time of the ex-post evaluation. The main factor was that farmers abandoned farming due to the difficulty for them to recover the cost of initial investment on irrigation facilities and the escalating fuel expenses from the agriculture revenue.

supplies water to El Hama Dam located downstream. The total irrigated area, including taking water from El Hama Dam become 1,120 ha.

An example of a hill dam as a source of ground water recharge is Saadine Hill Dam. According to the most recent data available, this hill dam accounted for 48% of the ground water recharge of Zaghouan Governorate in 2006 and thus its indirect contribution is significant (Table 5).

Table 5. Ground Water Recharge in Zaghouan Governorate by Hill Dam

Year	Hill dams in Zaghouan Governorate						Total Zaghouan Governorate	
	El Ogla		Essahel		Saadine		Total amount of ground water recharge (Mm ³)	Total %
	Amount of ground water recharge (Mm ³)	% of total	Amount of ground water recharge (Mm ³)	% of total	Amount of ground water recharge (Mm ³)	% of total		
1995	1.025	74%	0.368	26%	—	—	1.393	100%
1996	2.340	94%	0.159	6%	—	—	2.499	100%
1999	0.860	84%	0.161	16%	—	—	1.021	100%
2003	0.879	58%	0.184	12%	0.440	29%	1.503	100%
2004	1.682	45%	0.460	12%	1.615	43%	3.757	100%
2005	—	—	—	—	2.540	100%	2.540	100%
2006	1.415	41%	0.399	11%	1.675	48%	3.489	100%

Source : Based on data provided by the Ministry of Agriculture

As can be seen, when a hill dam is constructed and to properly supply water to a dam located downstream and recharge ground water, the farmers who irrigate by taking water from the downstream dam or the recharged ground water could also be considered as beneficiaries. When this fact is taken into account, the benefited area (i.e. the area of the farmland that is benefited from the project) should have been considered as an alternative effect indicator of small-scale hill dams. In addition, because the main role of each hill dam is different, it is fair to say that it would have been proper to consider other possible indicators (such as the annual total volume of water release through intake facilities) in assessing the effect of the hill dams instead of using only one indicator.

2) Rural Water Supply

Since both the volume of drinking water supplied and the number of beneficiaries surpassed the planned level, there were no problems in this area at the time of the ex-post evaluation. Based on the most recent data, both indicators continue to increase. Thus, the volume of drinking water supplied in 2007 was 130% compared to the planned level, while the number of beneficiaries reached 126%, verifying the fact that no particular

problems existed in this area at the time of the ex-post monitoring (Table 6).

Table 6. Construction of Rural Water Supply Facilities

Indicators	Planned	2002	2007
Volume of drinking water supplied (m ³ /year)	909,494	936,779 (103% of planned level)	1,186,882 (130% of planned level)
Number of beneficiaries (persons)	56,839	64,796 (114% of planned level)	71,790 (126% of planned level)

Source: Ministry of Agriculture and Ex-Post Evaluation Report.

3) Exploratory Wells

Among the 96 locations that were financed by the Japanese ODA loan, 69 actually had hit water vein by 2002. The number has increased to 71 by 2009. The statuses of water levels in the developed locations were continuously monitored by the Directorate of Water Resources in the Ministry of Agriculture, and two locations that had not been hit by 2002 were ensured to be usable in 2009 as a result of the measurement of the water level (Table 7).

Table 7. Development of Exploratory Wells

Indicator	2002	2009
Number of wells (those that actually hit a water vein)	69 wells out of 96 locations	71 wells out of 96 locations

Source: Ministry of Agriculture and Ex-Post Evaluation Report.

2.1.1.5 Internal Rate of Return (IRR)

Due to the fact that the internal rate of return (IRR) was not calculated at the time of the ex-post evaluation and thus no comparable IRR exists, IRR was not calculated in the ex-post monitoring either.

2.1.2 Qualitative Effects

Qualitative effects in the three above-mentioned areas, namely the Policy Reform, Capacity Building in the Ministry of Agriculture and Improvement of Public Investment, were already present. No particular problems were identified during the ex-post monitoring either (Table 8).

Table 8. Qualitative Effects

	Ex-post Evaluation Results	Ex-post Monitoring Results
Policy Reform		
Revision of the Code for Conservation of Soils and Water	Approval of public works carried out by private companies	Conservation of soils and water, and promotion of investment by the private sector continues to be part of the 10 th and 11 th Development Plans. According to analysis of the status of the 10 th Development Plan, although the public and private investment in the agricultural sector as a whole was 89% and 82% of the planned level, respectively, the private sector investment in irrigation surpassed the planned level (105%). In reference to conservation of soils and water, watershed management also surpassed the planned level (120%, 299,000 ha), with most of which being financed by the private companies.
Improvement of Public Investment		
Improvement in the capacity building of Water Users' Associations	Improved	Capacity building of GDAs is conducted by both CRDAs and the unit in charge of GDA assistance within the Ministry of Agriculture. As can be seen, improvement and enhancement of operational and management capacity of GDAs is being implemented continuously.
Strengthen the operation and management system of irrigation water as well as water supply for domestic use	Strengthened	The system of operation and management is being reinforced by the assistance to GDAs.
Capacity Building in the Ministry of Agriculture		
Promotion of decentralization from the Ministry of Agriculture to CRDAs by drawing up mid-term plans involving personnel, budget and investment.	Promoted	Since 1993, the country's policy for promotion of decentralization has continued and responsibilities of CRDA have been increasing. On the other hand, increasing private sector involvement is also being emphasized.
Improvement of the capacity of the Ministry of Agriculture in planning, preparing and implementing investments	Improved	No major problem identified. With promotion of decentralization, CRDAs propose specific projects that reflect the local needs. Necessary budget is requested as well. CRDAs plan projects utilizing private companies as needed.
Improvement of the skills required for socio-economic impact assessments and Environmental Impact Assessments (EIA)	Improved	At the time of the preliminary study of the project, a basic socio-economic as well as an environmental assessment study is conducted.

Source: Ex-post Evaluation Report and field survey

2.1.3 Impact

1) Increase of Total Agricultural Production and Improvement of Agricultural

Productivity

The ex-post evaluation used the countrywide agricultural production and agricultural productivity as indicators to assess the impact of the project. Both indicators were on an upward trend compared to the levels seen before the project was conducted. Since comparable statistics at the country level could not be obtained during the ex-post monitoring, the same indicators were collected from the CRDAs that were the executing agencies of the Japanese ODA loan portion, and their total values were used as alternative indicators. As indicated in Table 9, even when data is limited to the Japanese ODA loan portion (excluding the World Bank portion), an increase can be seen in each of the indicators.

Table 9. Impact of the Japanese ODA Loan on the Agricultural Sector

Indicator	2002	2009*
	Ex-post Evaluation	
Farmers benefited (number of persons)	808	877
Total agricultural production (million US dollars)	2.66	3.17
Agricultural productivity (US dollars per farmer)	3,292	3,614

Source: Ministry of Agriculture (*=estimation)

In addition to the above, a survey was conducted to the beneficiary farmers of the hill dams. According to the results, approximately 50% of the farmers have begun to cultivate horticultural crops that have a higher market value, in addition to traditional crops. Approximately 90% of the farmers have begun some form of livestock breeding as well. About 80% of the beneficiaries responded that their income was higher compared to the income they had earned before the hill dams were constructed, thus indicating that to some extent, there was an improvement in the income level of the beneficiaries⁷.

2) Improvement in the Living Standards

During the ex-post evaluation, a beneficiary survey was conducted at two rural water supply sub-project sites (Oued Damous and Ain El Beidha). The total number of respondents was 103. During the ex-post monitoring a similar survey was conducted in the same areas in order to follow-up their living standards after the ex-post evaluation (Table 10). Although several comments in regard to the quality of water were heard (e.g. drinking water needs chlorination), as a whole, it was verified that the positive impacts that were identified in the ex-post evaluation still exist. However, 57% of the respondents in Ain el Beidha replied that the price of water was still high, although the current price

⁷ Beneficiary studies of hill dams were conducted for three out of five hill dams mentioned in 2.1.1.3 (1). The hill dams were H'mila, Saadine and Khouitra. The total number of respondents was 56.

was only a half of that when the ex-post evaluation was conducted.

Table 10. Improvement in the Living Standards: Rural Water Supply

Item	Prior to project	2002 Ex-post evaluation	2009 Ex-post monitoring
Water drawing labor	Respondents had to travel approximately 8km from the household to the well	- Almost 100% of the respondents have access to drinking water in or near their houses. - Water drawing labor has significantly decreased. With the saved time, some respondents have started other economic activities	Water drawing labor used to be a household chore specific to women. With the project, women were released from this task enabling them to start new economic activities which have helped them to improve their living standards.
Quality of water, water supply conditions, operation and maintenance of facilities	All respondents said “water quality is bad”	Almost 100% of the respondents said “water quality is very good”	Almost 100% of the respondents said “water quality is good”. However, in regard to operation and maintenance, many of them consider that currently, drinking water needs chlorination; that water pipes need repair and/or replacement and the tanks need to be cleaned more often.
Health and sanitation	—	Infectious diseases that originate from consuming non-treated water, such as diarrhea and cholera have decreased.	Water continues to be used mainly as drinking water, as well as for bathing, washing and cleaning. Health and sanitation status of the respondents continues to be good.

2.2 Sustainability

2.2.1 Entity in Charge of Operation and Maintenance

2.2.1.1 Structural Aspects of Operation and Maintenance

Operation and Maintenance (O&M) of hill dams is under responsibility of CRDAs, while O&M of small irrigation facilities is being shifted to GDAs. Secondary pipelines connected to the main pipeline should be operated and maintained privately by farms at their own expense.

As for the O&M of drinking water facilities, in principle, it should be conducted by GDAs; however, actually 80% of GDAs outsource O&M activities to CRDAs or to

private companies. CRDAs provide direct assistance only to the GDAs with financial problems.

Regarding the exploratory wells, in case of the wells that actually hit a water vein, depending on its use, O&M is passed on from the Directorate General of Water Resources to each CRDA's Water Resource Department, Irrigation Department and so on, as well as to the Société Nationale d'Exploitation et de Distribution des Eaux: (SONEDE).

The structure of the O&M team varies considerably among CRDAs: some CRDAs have teams consisting of an engineer, a technician and four to five workers, while other CRDAs have only one technician or no O&M personnel at all.

2.2.1.2 Technical Aspects of Operation and Maintenance

No major problems exist in the O&M technical skills at the CRDA level. However, the same cannot be said for GDAs, as their technical skills significantly vary from one GDA to the other. Basically, GDAs should conduct O&M, but when a major technical problem occurs, the Department of Maintenance of the CRDA takes over and offers assistance.

The Ministry of Agriculture recognizes the importance of improving the O&M capacity of GDAs through CRDA, and that in order to attain such an objective it is necessary to enhance GDAs organizational structure. However, due to the lack of funds, training of the O&M teams of CRDAs, which are the entities in charge of providing capacity building to GDAs, is insufficient (for example, training in respect of irrigation is non-existent; there are two general training programs for personnel related to the area of drinking water). From the survey conducted in CRDAs, it became clear that there is a shortage of capacity building in this area. It became clear that all CRDAs face common problems: lack of personnel with high O&M knowledge, skills and know-how. Thus, although there is a pressing need to upgrade the skills of the O&M personnel, the conducted training is insufficient.

2.2.1.3 Financial Aspects of Operation and Maintenance

Each CRDA submits to the Ministry of Agriculture an annual budget requirement that includes the O&M expenses for the following year. In case a major repair or replacement is necessary, the estimated expense is submitted separately. According to a survey conducted in CRDAs, there are no particular concerns in relation to budget implementation since no problems had been reported such as the obstacles in the procedure or the delay in the procedure during the process of budget approval and execution, but there is a shortage of tools, equipment and replacement parts necessary

for proper O&M due to the budget shortfall.

In relation to GDAs, in principle, their operation expenses are covered by water charges. On the other hand, administration of water quality is under responsibility of each CRDA. When GDA is unable to cover all O&M expenses, CRDA provides assistance.

Every year GDAs submit a report, which includes their financial statements, to the General Directorate of Regional Civil Engineering and Water Supply Regional of the Ministry of Agriculture, via CRDA. The said General Directorate aggregates the data and prepares the Annual Report. CRDAs also use the report to check several financial indicators, especially concerning the income, such as the ratio of income to operation and administration expenses. CRDAs also keep a close relation with GDAs to avoid any possible problems such as interruptions in the supply of drinking water due to GDAs delinquency in regard to the payment of electricity bills.

2.2.2 Current Status of Operation and Maintenance

According to the survey as well as interviews conducted in several CRDAs, it became clear that there is a significant difference in the current status of O&M among CRDAs. Even for the five hill dams that were visited during the field survey, differences were apparent: while in some of the sites, respective GDAs were implementing O&M procedures, in some others GDAs did not have any O&M procedures, or simply there were no GDAs established at all, resulting in significant lack of maintenance.

2.3 Others

After the ex-post evaluation, the executing agency was requested to maintain continuous records on the operation and effect indicators, as well as to follow up the lessons learned and recommendations derived from the evaluation. In this respect a “Monitoring Sheet” was provided and its active use was recommended. However, due to the fact that the said sheet was provided only in English and not in French, or that there was no proper handover of files during personnel rotations, a thorough follow-up of the above-mentioned indicators, lessons learned and recommendations was not conducted.

The recommendation of the ex-post evaluation was that, in order to secure sustainability of this project, it was necessary to continuously educate farmers through sensitization activities on water conservation, and providing training on irrigation. The Ministry of Agriculture has been making some efforts in these areas. For example, for the 80% of new projects on installing drinking water facilities, external consultants have been hired in order to conduct sensitization activities on water conservation to the beneficiaries even from the project appraisal phase. As for the remaining 20%, CRDAs conduct these

activities instead, and special events at the national level are organized each year on the “World Day for Water”. Thus, it was possible to verify that conservation of water has already taken root in the country.

On the other hand, activities related to promotion and training on irrigation have just started. Since 2004, the Ministry of Agriculture has started to recognize the importance of securing the understanding and participation of the beneficiaries of the hill dams from the project planning phase, and started to conduct sensitization activities in regard to the beneficiaries through providing training to GDAs. However, in addition to the fact that the level of understanding of irrigation techniques differs enormously among farmers, they also face several difficulties in capital procurement (especially for the initial investment). From now on, it is necessary to tackle all the above issues at the same time in order to promote irrigation.

3. Conclusion, Lessons Learned and Recommendations

3.1 Conclusion

The Rural Water Supply as well as Exploratory Wells are operated and administered satisfactorily in general terms. No major problems were observed during the ex-post monitoring.

However, in relation to the five hill dams that were identified as the “development effects non-present” in the ex-post evaluation report based on the only indicator of their irrigated area, even today their planned irrigated area has not been accomplished. During the ex-post monitoring, it was difficult to specify the causes behind this situation, since data of the actual irrigated area where the irrigation facilities had been installed was not been verified. According to the Ministry of Agriculture, one of the factors that caused this situation is the lack of diffusion and understanding of irrigation technology among farmers.

In fact, the Ministry of Agriculture revised in 2005 the role of hill dams from one centered on irrigation, to one that include various other roles such as water source for recharging ground water, protecting other dams against sedimentation, supply water for livestock and so on, by considering the particular situation existing in each. Based on this revised roles, it can be said that each of hill dams played an important role in the development of the respective locality, by re-evaluating from this new perspective..

The condition of the irrigation facilities that were installed by the Tunisian side, which take the water from the five hill dams, was confirmed to be fully operational through the ex-post monitoring. The introduction of agricultural irrigation and installment of irrigation facilities can be expected to be improved by assisting the promotion of

irrigation through the improvement of skills and knowledge among farmers and by enhancing financial assistance that would relieve concerns on profitability.

3.2 Lessons Learned

Assessment of the operational efficiency of the hill dams based on a single indicator, namely the irrigated area, resulted in a partial evaluation which led them to be considered as “not presenting the expected development effect”. By considering other possible operational and effect indicators (such as the total benefited area, the annual total volume of inflow to the hill dams, the annual total volume of water release through intake facilities, etc) during the mid-term monitoring and ex-post evaluation, it would have been possible to assess the effect of each hill dam with the appropriate indicator which would be in accordance with its respective purpose. In future similar projects it is necessary to consider thoroughly the proper operational and effect indicators that should be used to measure the effect of the projects.

3.3 Recommendations to the Executing Agency

No common organizational structure of CRDAs exists at the national level. Since the O&M task belongs to different departments of CRDAs, differences in securing sufficient budget and personnel are arising among CRDAs, resulting in disparities in the level of O&M. In order to close the gap, it is necessary to provide O&M training to all CRDAs equally, as well as to take firm steps to secure distribution of the budget sufficient to procure tools, equipment and parts for proper maintenance.

In relation to promotion of irrigation, it is necessary for the Executing Agency to strengthen the irrigation training of farmers. As was observed during the field survey, farmers tend to base their decision on whether to invest in irrigation or not only after seeing other successful experiences. Therefore, it can be said that promotion activities based on real cases are effective. On the other hand, even if farmers understand and are interested in investing in irrigation, if the obstacles to capital procurement continue to be serious, it will be difficult to promote irrigation. Thus, improvements in measures of financial assistance to farmers should be implemented in parallel with the promotional activities on irrigation.

Comparison of the Original and the Actual Scope

Item	Original	Actual
1) Output (Sub-projects only)		
<u>Hill dams</u>		
World Bank	6 locations	15 locations
JICA	14 locations	19 locations
<u>Regional waterworks facilities</u>		
World Bank	130 locations	185 locations
JICA	90 locations	61 locations
<u>Exploratory wells</u>		
World Bank	150 locations	318 locations
JICA	90 locations	96 locations
<u>Irrigation facilities</u>		
World Bank	30 locations	47 locations
(Irrigated Area)	4,809 ha newly established	2,750 ha newly established, 4,809 ha improved
<u>Other (pastureland improvement, etc.)</u>		
World Bank	15,500 ha	15,500 ha
2) Project period		
L/A Exchange of Notes	December 1995	December 1996
Hill dams	September 1996 - June 1999	September 1996 - December 2000
Regional waterworks facilities	September 1997 – June 1998	June 1997 – November 2000
Exploratory wells	Sept. 1997 – December 1997	February 1997 – December 1998
Irrigation facilities	N/A	N/A
Other (pastureland improvement, etc.)	N/A	N/A
3) Project cost		
World Bank	211 million dollars	177 million dollars
JBIC	38 million dollars	37 million dollars
Total	249 million dollars	214 million dollars
Exchange rate	1 dinar = 85.758 yen (1995)	1 dinar = 99.071 yen (average from January 1996 to January 2002: IFS)