NO.

Ex-Post Monitoring Report of Japanese ODA Loan Projects 2008 (Botswana, Kenya, Tunisia, Guatemala)

January 2010

JAPAN INTERNATIONAL COOPERATION AGENCY

Ernst & Young SN Global Solution Co., Ltd.

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Preface

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

This volume shows the results of the ex-post monitoring for four Japanese ODA loan projects that were mainly completed seven years ago and were given ex-post evaluation five years ago. The ex-post monitoring was entrusted to external evaluators to review the projects' effectiveness, impact, and sustainability, to follow up the recommendations made in the ex-post evaluation, and to make further recommendations for future sustainability.

The lessons and recommendations drawn from these monitoring will be shared with JICA's stakeholders in order to apply to the planning and implementation of similar projects in the future.

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

January 2010
Atsuo KURODA
Vice President
Japan International Cooperation Agency (JICA)

Disclaimer

This volume of evaluations shows the result of objective ex-post evaluations made by external evaluators. The views and recommendations herein do not necessarily reflect the official views and opinions of JICA.

Botswana

Ex-Post Monitoring of Japanese ODA Loan Project

"North-South Carrier Water Project"

External Evaluator: Keisuke Nishikawa

Ernst & Young SN Global Solution Co., Ltd.

Field Surveys: June and August 2009

1. Project Profile and Japan's ODA Loan

Project Location Map

Mmamashia Water Treatment Works

1.1 Objective

The objective of the project is to develop water resources in the northern region of the country by constructing a dam, water transmission systems and water treatment works, thereby contributing to relieve high water demand in the southeast and to supply water to the central regions that are dependent on groundwater[1].

1.2 Outline of loan agreement

Loan Amount / Disbursed Amount	4,685 million yen / 4,685 million yen
Loan Agreement/Loan Completion	December 1995 / February 2001
Ex-Post Evaluation Survey	FY2003
Executing Agency	Water Utilities Corporation (WUC)
Main Contractors (Over 1 billion yen)	DEGREMONT, LTA (France, South Africa) ABB Industry, GRINAKER (both South Africa)
Consulting Services (Over 100 million yen)	BURROW BINNIE Botswana LTD (Botswana)

[1] This project was co-financed with European Investment Bank, Nordic Development Fund, and African Development Bank. The Yen Loan was provided for the construction of Water Treatment Works, Pump Stations and Break Pressure Tanks.

1.3 Background and Reasons for conducting Ex-Post Monitoring Survey

The reason why this project is subject to ex-post monitoring is that, in the ex-post evaluation, the achievement rate of water supply at Water Treatment Works was low and that the financial position with deficit spending was pointed out. Therefore, there was a necessity to investigate how these points have been improved. Specifically, effectiveness and sustainability of the project were concluded as follows.

(Effectiveness) The achievement rate of water supply in 2001 stayed at 54% of the projected rate. It was particularly low in Mahalapye and Palapye, located in the rural area, being 16% and 12% respectively[2]. The major causes were the low water storage rate of Letsibogo Dam and the slower-than-expected population growth in the covered areas of this project.

(Sustainability) There were no problems identified for operation and management. However, in terms of finance, repayment of liabilities became a burden and this led to the financial position with expenditures continuously in excess of revenues.

Thus, this project became subject to ex-post monitoring, and the reviews based mainly on the results of the field surveys were conducted in accordance with the evaluation criteria, and the conclusion was finally led.

2. Monitoring Results

2.1 Effectiveness (Impact)

2.1.1 Quantitative Effects

2.1.1.1 Water Supply Volume / Facility Utilization Rate[3]

The water supply volume and facility utilization rate of each water treatment works, which were obtained in the ex-post monitoring survey, are shown in Table 1 and Figure 1. A comparison of the data obtained in the ex-post evaluation and in the ex-posting monitoring reveals that some improvements were recorded for Mmamashia Water Treatment Works. However, water supply conditions deteriorated at Mahalapye and Palapye Water Treatment Works. As described in detail below, all the water treatment works were affected by two major factors, which are water supply stoppage due to water leakage / repair of the water transmission pipes, and the slower-than-expected population growth.

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[2] During the ex-post monitoring, the latest set of data on the water supply volume of the three water treatment works was obtained. It was found that the data had been maintained incompletely during the early period of this project operation, around 2001. Therefore, the data are corrected as shown in Table 1.

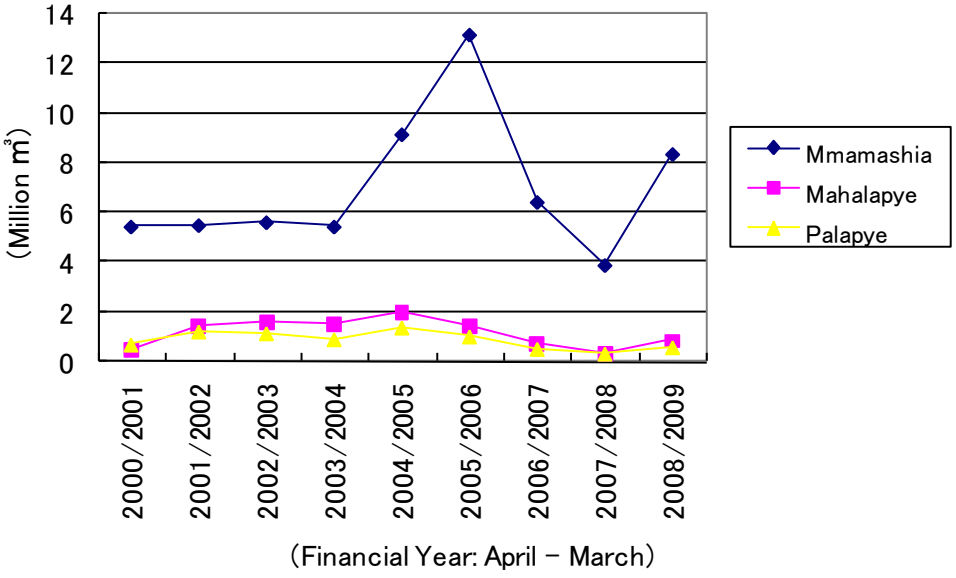
[3] It was found that “Supply Achievement Rate” that had been calculated in the ex-post evaluation was the rate of water supply volume against the maximum capacity of the facilities that were developed in this project. This is identical to “facility utilization rate”. Thus, in this ex-post monitoring report, the term “Facility Utilization Rate” is used.

Table 1: Change in Water Supply Volume / Facility Utilization Rate

	Ex-post Evaluation (Actual, in FY2001/02)				Ex-post Monitoring (Actual, in FY2008/09)	
	Supply volume (mil. m^3)		Facility Utilization Rate		Supply volume (million m^3)	Facility Utilization Rate
	Before Correction	After Correction	Before Correction	After Correction		
Mmamashia Water Treatment Works (maximum water treatment capacity: 33.58 million m^3)	22.00	5.50	66%	16%	8.35	25%
Mahalapye Water Treatment Works (maximum water treatment capacity: 4.38 million m^3)	0.72	1.42	16%	32%	0.84	19%
Palapye Water Treatment Works (maximum water treatment capacity: 5.11 million m^3)	0.60	1.23	12%	24%	0.60	12%

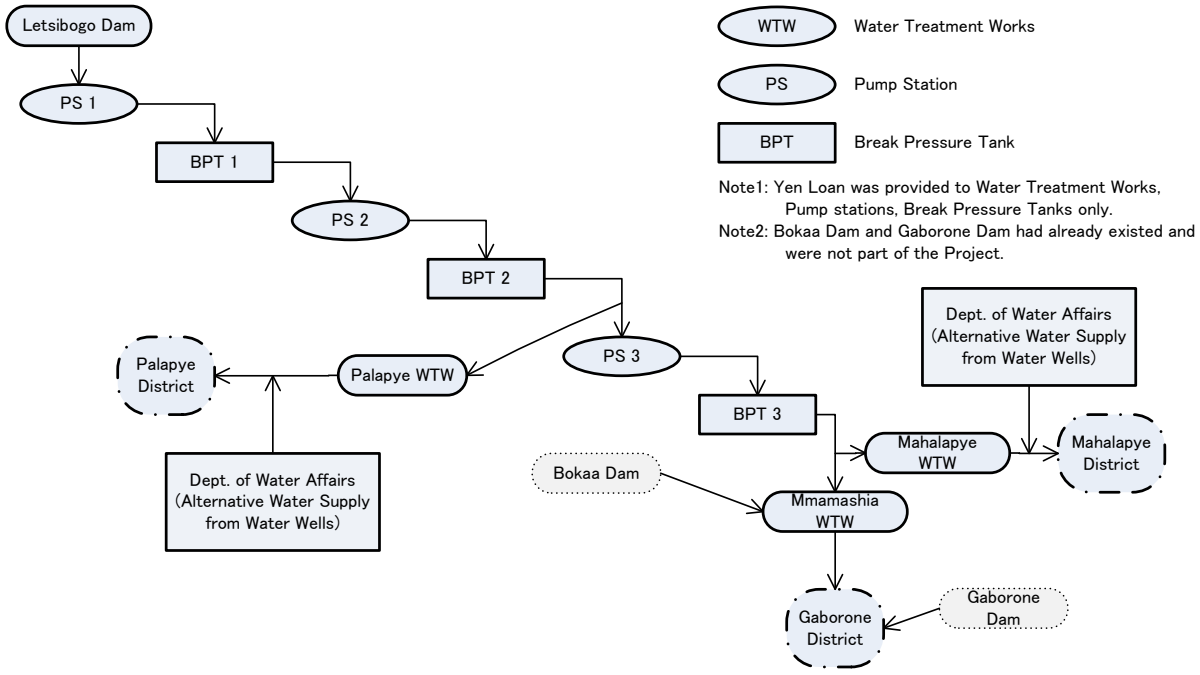
Note: The data before corrections are the figures from January to December, 2001. However, the figures from April to March are currently used as the annual data, due to the change to the data collection method based on the financial year system. Therefore, there is a difference of three months between the figures of "Before correction" and "After correction," which means that these two set of data cannot be simply compared. In this report, comparisons are made based on the financial year.

Figure 1: Water Supply Volume from Water Treatment Works



Source: Data supplied by WUC

Figure 2: NSC Water Supply System



2.1.1.1.1 Mmamashia Water Treatment Works (WTW)[4]

With regard to the "Supply volume (Appraisal projection for 2001)" shown in Table 2 of the Ex-post Evaluation Report, another review of the project appraisal document has revealed that these figures were actually the "Projected supply volume for 2010", which considers the factors such as population increase. These figures corresponded with the maximum capacity of the water supply scheme developed in this project. Therefore, it is natural that the actual figures for 2001, recorded immediately after the completion of the project, are lower than the projected figures for 2010.

However, the latest data of water supply volume for FY2008/09 was 8.35 million m^3 as shown in Table 1, and this is only 25% of the projection for 2010. As described later, the largest factor was the frequent water supply stoppages due to water leakage/ repair of the water transmission pipes that were used in this project. Also, the slower population growth was another major factor. At the time of the project appraisal, the population in Gaborone District was projected to increase up to 559 thousand in 2010 from 244 thousand in 1999. However, contrary to the projection, it still stood at 351 thousand in 2006.

[4] The maximum water supply capacity of Mmamashia Water Treatment Works is 92 thousand m^3 per day (33.58 million m^3 per year). However, the actual water supply volume is 70 thousand m^3 per day (25.55 million m^3 per year) due to the capacity issue of the transmission pipe (pipe's bore) in the south of Palapye.

The existing Bokaa Dam (maximum capacity: 18.5 million m^3) in the northern Gaborone is used as the alternative water source during the period when the water is not transmitted from Letsibogo Dam (maximum capacity: 100 million m^3), which is the normal source of water. The water is purified at Mmamashia Water Treatment Works along with the water from Letsibogo Dam. When the water supply system, which was developed by this project (North-South Carrier, hereinafter referred to as NSC), undergoes repairs in the north of Mmamashia, this dam, as well as Gaborone Dam (maximum capacity: 141.4 million m^3) in the southern Gaborone, is used as a valuable source of clean water supply.

Thanks to these alternative water sources, water was supplied smoothly to Gaborone during the large-scale repair of NSC.

2.1.1.1.2 Mahalapye / Palapye Water Treatment Works

As in the case of Mmamashia Water Treatment Works, the projected water supply volume for 2001 in the Ex-post Evaluation Report was the projection actually calculated for 2010, and these figures conformed to the ones of the maximum water supply capacity of the facilities developed in this project. As shown in Table 1, according to the latest data, the facility utilization rates of these water treatment works in FY2001/02 were higher than the figures for 2001 that had been obtained during the ex-post evaluation. They are 32% for Mahalapye and 24% for Palapye. However, according to the latest data in FY2008/09, the rates become lower, 19% for Mahalapye and 12% for Palapye.

One of the largest factors that caused the low facility utilization rate was the frequent water leakage of the transmission pipes, which were observed shortly after the commencement of the operation. Because of this, WUC was forced to suspend water supply repeatedly. On the contrary, an alternative dam for both Mahalapye and Palapye Dam does not exist and in the case of the stoppage of water supply from NSC, Department of Water Affairs (DWA) has to pump up groundwater from the well and distribute it to each house. As indicated in the result of the beneficiary survey[5], there were some problems felt in terms of the quality of water, and it also incurs an extra cost of electricity for DWA.

Another major factor which prevented the increase in demand was the growth of population being lower than what was projected, as seen in the case of Gaborone. The population in Mahalapye decreased from 49,450 in 2001 to 47,774 in 2006 (70%

[5] The beneficiary survey was conducted in Mahalapye and Palapye districts, as in the case of the Ex-post Evaluation. A total of 100 residents, 50 from each districts, respond to the questions.

of the projection for 2010). In Palapye, there was a minimal change in the number of population, which is, from 26,340 in 2001 to 26,792 in 2006 (70% of the projection for 2010).

2.1.1.1.3 Water Leakage[6]

Water leakage has been a huge problem for the realization of project objectives, as mentioned above. This survey has revealed that the leakage has been a major problem since the commencement of the operation, though the problem had not been mentioned in the Ex-post Evaluation Report.

For the materials of the water transmission pipes, Grass-fiber Reinforced Polyester (hereinafter referred to as GRP) was used, as it was thought to be more economic. Many leakage cases that frequently occurred were found in the joint sections where the steel pipes were connected with GRP pipes in the chamber with the bore of 140cm. These leaks were spotted in the relatively upstream sections between Pump Station 2 and 3.[7] They occurred quite frequently: 24 times in 2002, 20 times in 2005, 30 times in 2003, and 20 times in 2005. Every time the leakages occurred, the water supply system was forced to stop for repairs for a few days up to a week and all the districts located in the downstream of those sections were affected by the stoppages. The two-time major full stoppages of water supply, which lasted for 8 months starting from June 2006 and for 12 months starting from June 2007, to conduct overall inspections and repairs had a significant impact on the decrease in the water supply volume.

Despite the two-time major repairs, the leakage problems were not fully solved and it is expected that there will be similar needs of repairs from now on. However, during the second major repair in 2007 and 2008, more chambers were installed on the transmission pipes, in parallel with the replacement of GRP pipes with steel pipes, in order to reduce water losses during the repairs and the number of days required for such repairs.

2.1.1.2 Water Storage Rate (Letsibogo Dam)

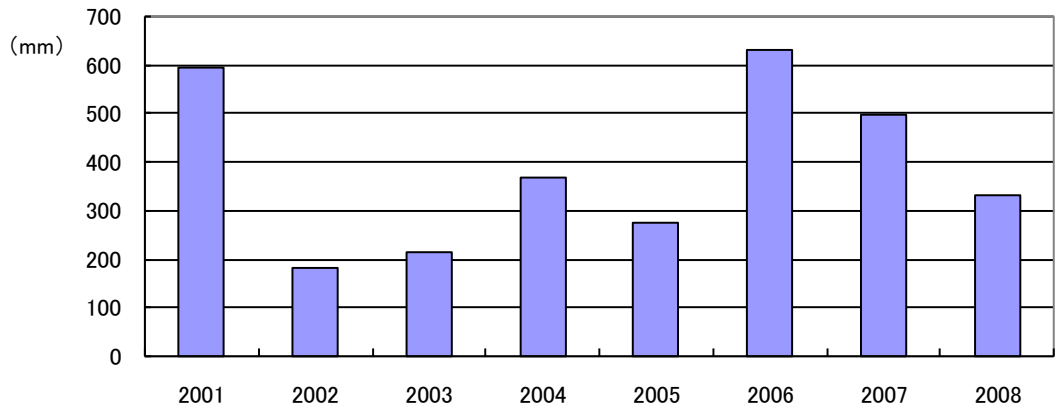
In the Ex-post Evaluation Report, it was concluded that one of the causes of the low water level in Letsibogo Dam was the trend of low rainfall. Indeed, the water storage volume was low soon after the completion of the project, and accordingly the water

[6] The report that shows the leakage condition and the technical countermeasure was prepared by WUC in 2008, and it highlighted future issues.

[7] Through the investigation of the external consultant outsourced by WUC, it was pointed out that the structure of the parts that connect GRP pipes and steel pipes could not withstand various underground pressures, and that there were a lot of ruptures of the GRP pipes. Also, there have been few leakages in the sections structured only with steel pipes.

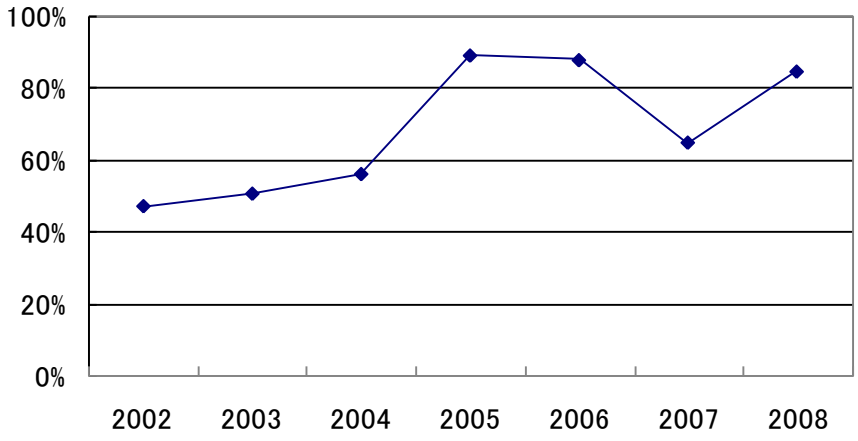
supply was limited. However, since 2004, when there was a recovery of rainfall (Figure 3) leading to an increase in the water level at Letsibogo Dam (Figure 4), the water supply has not been constrained by the Dam. It is only the repair of the water transmission pipes that has been the major factor for any supply restrictions. During the on-site inspection, the water storage volume was at 75% of the full capacity, and in the following week, it reached 100% as a result of the rainfall. As such it is believed that there has been no concern about the water storage volume.

Figure 3: Annual Rainfall Level in the Area near Letsibogo Dam
(Observation Point: Selebi-Phikwe)



Source: Data supplied by Department of Meteorological Services

Figure 4: Water Storage Rate of Letsibogo Dam



Source: Data supplied by WUC

2.1.1.3 Internal Rate of Return

In this monitoring survey, sufficient data, ranging from the past to the future projection, were not available. Therefore, the Financial Internal Rate of Return (FIRR) was not recalculated.

2.1.2 Qualitative Effect

2.1.2.1 Master Balancing Reservoir

The Master Balancing Reservoir was constructed for absorbing the daily fluctuation of water demand, and it temporarily reserves purified water by using two control chambers. Since the commencement of operation, it has been utilized as originally planned and the reservoir can be said to have a sufficient capacity.

2.1.2.2 Pump Station

It has been nine years since the project was completed. Some pumps are in need of repairs, but since there are no repairing shops in Botswana, they are transported out to South Africa for repairs. The pump stations are generally operating without problems, and there have been no cases of impacting the water supply in a negative way. Also, the operations of pump stations are automatically controlled by managing the upstream flows with the computer system.

2.1.2.3 Break Pressure Tank

All the tanks have been operating without any problems.

2.1.3 Impact

2.1.3.1 Development of Commercial / Industrial Activities by Securing Water Supply

According to 2006/7 Census of Enterprises and Establishments, released by the Central Statistics Office, registrations of new enterprises and establishments increased gradually but steadily (Table 2). However, it is difficult to come to a definite conclusion as to the question on whether the number of entities shows substantive growth or not, since there are a lot of entities that are registered but have no business operations. In the data for 2001-2005, the total number of operating enterprises and establishments, which was counted by each district, remained steady in Gaborone and Palapye, while it decreased in Mahalapye (Figure 5).

However, in the 2000s, industrial parks such as Commercial and Industrial Park, Millennium Office Park, Game City (commercial facilities), and also the residential areas called Block 6-10 were developed. These development projects would not have

been fully realized without water supply. In this regard, it is believed that this project has made some contributions in the areas. Also, designing and building of several facilities, such as Botswana International University of Science and Technology, Morupule Coal Thermal Power Plant in Palapye, and along the transmission pipe, Coal Thermal Power Plant in Mmamabula, have been started. It is only with the stable supply of purified water that these large-scale developments have been realized, and this project has become the foundation for the economic activities of the districts located alongside of the coverage area.

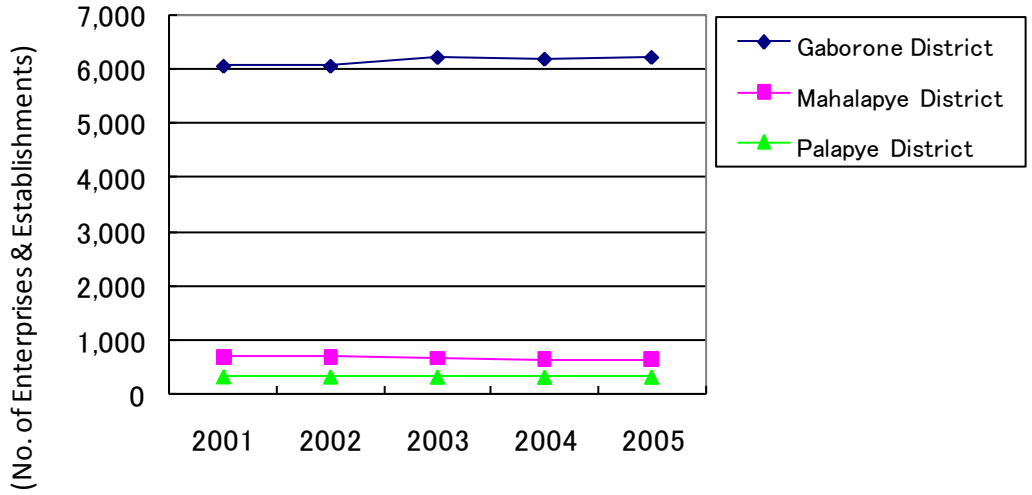
Table 2: Changes in the Number of New Enterprises and Establishments Registrations

(unit: entity)

	2002	2003	2004	2005	2006
Gaborone City	111	108	141	122	165
Mahalapye Village	8	8	18	23	26
Palapye Village	2	12	3	16	23

Note: The data of the three districts above cover only the smaller city and village areas.
Source: 2006/7 Census of Enterprises and Establishments, Central Statistics Office

Figure 5: Number of Operating Enterprises and Establishments



Source: Enterprises and Establishments Register Digest (April-September 2005), Central Statistics Office

2.1.3.2 Improvement in Public Health and Living Environment by Using Clean Water

Water has been supplied to the residents in Mahalapye and Palapye districts through aqueducts and stand pipes, even when they relied totally on well water. Although there

were few problems at that time in regard to the health hazards and the deterioration of living environment etc, the commencement of water supply under this project has enabled the supply of high-quality tap water classified as Class 1, which is the highest rank under National Standard for Drinking Water Quality BOS32:2000. However, there were complaints from 20% of the residents interviewed in the beneficiary survey. It was due to the fact that during the water supply stoppage from NSC, well water is supplied by DWA and the water quality fluctuates shortly after heavy rains. Regarding the usage of tap water, more than 90% of the residents in the beneficiary survey were using water from faucets and only one family used well water for washing clothes, sprinkling, and so on. With regard to the water quality, while some residents complained about well water after heavy rains, 75% of them were satisfied with the quality. Also, 95% of the residents were satisfied with the water supply volume, and WUC's water supply services were hailed by 75% of the residents commenting that the services have been improved over the past five years. Therefore, it can be said that WUC has generally provided good services. By early 2010, the water supply services to Mahalapye and Palapye districts will be transferred from DWA and will be the responsibility of WUC[8]. Hence, more improvement efforts are expected to be made continuously in order to supply stable water from NSC.

2.1.3.3 Impact on Society and Natural Environment

Compensations were provided to the residents who were forced to relocate due to this project, in accordance with the guidelines issued by the Land Board. Since then no complaints from them have been filed and thus it can be said that necessary measures were implemented. Regarding the environmental conservation, WUC implements an environment management system in accordance with ISO14001. In addition, there were no particular environmental burdens noted in the surrounding areas of the project sites.

2.2 Sustainability

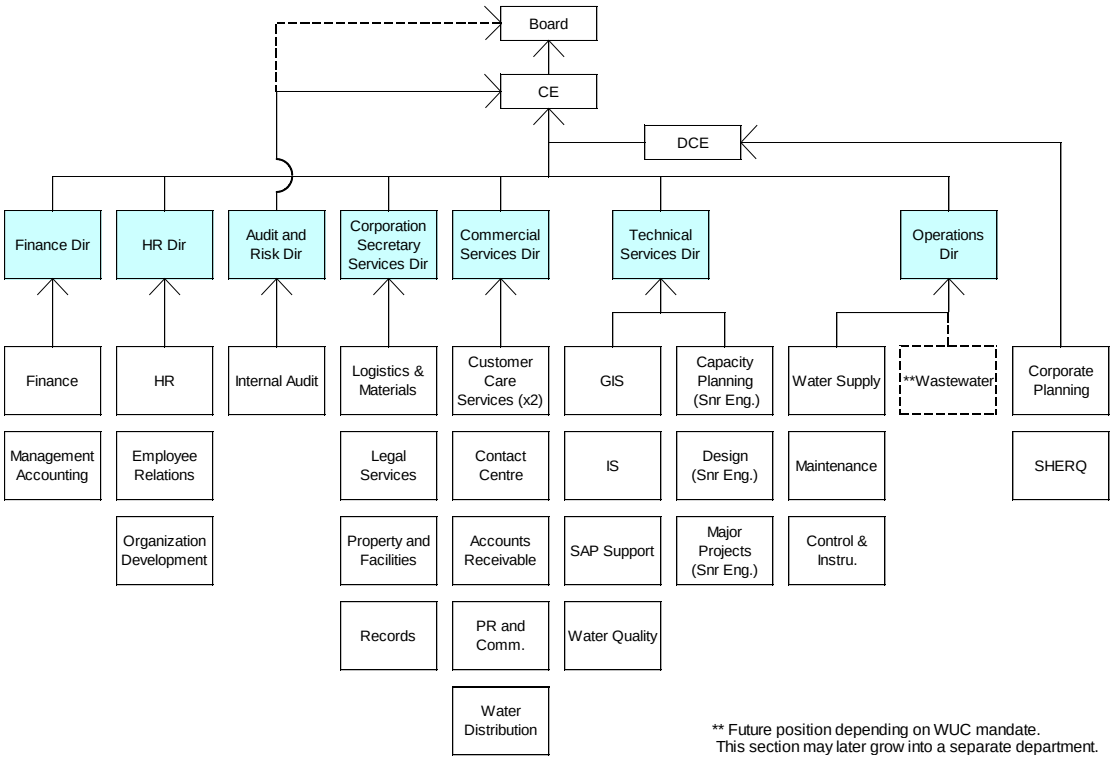
2.2.1 Operation and Maintenance System

There was a major change in the organizational structure of WUC. The department that had administered this project was integrated from an independent entity to one of the units under the Operations Department. Seven departments are set up under the Chief Executive, and within the Operations Department three divisions are set up; (1)

[8] As the Government of Botswana has implemented a reform program of the water sector, significant changes are being made including the reallocation of roles among the government ministries and public corporations.

Water Supply, (2) Maintenance and (3) Control and Instrumentation. In each division, sections that conduct the operation and maintenance of this project are placed and the staff are assigned at each water treatment works. For relatively large-scale repairs, planning and implementation are undertaken mainly by the staff from Mmamashia Water Treatment Works. The number of staff assigned for operation and maintenance purposes increased from 39 to 52 in Mmamashia, from 22 to 31 in Mahalapye and from 19 to 32 in Palapye, since the Ex-post Evaluation. Although only the outsourced security guards are stationed at the pump stations and at the break pressure tanks, the staff at each water treatment works go on duty and conduct regular operation and maintenance. No problems were found in terms of the overall number and composition of the staff.

Figure 6: Organization Chart of WUC



Source: Information supplied by WUC

2.2.2 Technology for Operation and Maintenance

Advanced repairs, such as the large-scale repairs of the pumps, are arranged and conducted in South Africa due to the lack of repairing facilities as described earlier. However, periodical inspections and repairs of the facilities, equipment and devices are conducted by the in-house engineers of WUC. During the on-site survey, it was found that almost all the facilities were maintained in good conditions and no technical

problems were observed. WUC also allocates necessary budget every year for long and short term trainings of the staff at home and abroad. Regarding the trainings abroad, as of August 2009, 16 officers were pursuing degree programs in the engineer-related fields at the universities in South Africa. As for home / domestic training, short courses on the issues such as maintenance of equipment, are regularly conducted for the relevant staff members.

2.2.3 Finance for Operation and Maintenance

WUC sets different water tariffs by region on a cost-recovery basis. The water tariffs in Gaborone and Francistown, which are urban districts, are the highest in Botswana. However, no particular complaints from the users have been filed. Also, in the beneficiary survey, it was found that 92% of the residents of Mahalapye and Palapye districts thought that the water tariff was set at a reasonable level.

The Finance Department is now divided into 5 divisions, as the Jwaneng Division has been added since the Ex-post Evaluation. This project is continuously administered by the NSC Division (North South Carrier Division).

With regard to the financial position of this project, according to the income statement, net losses were posted soon after the completion of this project. However, net profits have been recorded since 2004 (Table 3), driven by the increase in water sales. Operating cash flows also have positive balances except the financial year 2005/06, when there was an impact from the severe drought. Therefore, it can be said that it has stayed in a financially sound condition. Other factors which support the corporation's good financial conditions can be derived from the fact that this project has been given preferential treatment with the consideration of the social importance of this project, i.e. only the 'interest' is paid by the NSC Division[9], and that a certain amount of revenues is transferred from the Gaborone Division regardless of the water supply volume. The overall balance of WUC has stayed in surplus and good condition. In the financial year 2005/06, the surplus was reduced due to the decrease in water sales caused by the drought and the exchange loss. However, the percentage of water operation surplus has never fallen below 40% of the revenue of water sales and the trend remains in a stable manner (Table 4).

[9] Amortization of principal is undertaken by the Government as WUC is not obliged to do so.

Table 3: Income Statement of NSC Water Supply

	2001	2002	2003	2004	2005	2006	2007	2008
Water Sales	0	57,400	146,719	170,838	223,909	257,883	206,321	261,823
Operating Exp.	8,473	43,684	63,017	64,647	71,408	74,513	76,918	79,416
Operating Profit / Loss	-8,473	13,716	83,702	106,191	152,501	183,370	129,403	182,407
Other Income	61	20,517	-13,250	136	167	188	204	189
Finance, net	0	-67,563	-80,799	-100,357	-77,856	-114,178	-64,911	-58,759
Net Profit/Loss	-8,412	-33,330	-10,347	5,970	74,812	69,380	64,696	123,837

Note: One Financial Year is from April to March.

Source: Income Statement prepared by WUC

Table 4: Income Statement of Water Utilities Corporation

	2004	2005	2006	2007	2008
Water Sales	465,934	492,829	416,288	444,722	469,506
Water treatment & Distribution Exp.	79,114	120,084	114,817	76,394	114,022
Administration & Other Expenses	48,673	70,924	65,146	76,114	78,830
Depreciation & Amortisation	64,338	64,459	63,244	59,363	60,833
Total Operating Exp.	192,125	255,467	243,207	211,871	253,685
Water Operation Surplus	273,809	237,362	173,081	232,851	215,821
Other Income	1,844	1,748	2,387	1,710	1,395
Operating Surplus	275,653	239,110	175,468	234,561	217,216
Finance Income	22,011	33,179	10,766	57,867	71,559
Finance Costs	-125,538	-97,021	-93,243	-86,244	-80,808
Finance, net	-103,527	-63,842	-82,477	-28,377	-9,249
Surplus for the year	172,126	175,268	92,991	206,184	207,967

Source: Water Utilities Corporation Annual Report (Audited by PricewaterhouseCoopers)

3. Conclusion, Lessons and Recommendation

3.1 Conclusion

This project was co-financed by several donors, and the Yen-loan components have been operating in good conditions, without any significant problems. However, the water leakage issues of the transmission pipes have been a significant obstacle to the achievement of the overall project effects. During the stoppages of water supply from NSC, the demand is still met by the supply from the alternative dams in the Gaborone district. On the other hand, in the Mahalapye and Palapye districts, where there are no

alternative water supply sources, DWA supplies water to individual households by pumping up underground water. This practice not only leads to extra expenditures for the repairs but also to the losses of revenue opportunities. In this regard, it can be said that the achievement level of this project is lowered by the length of the stoppages of the NSC system.

WUC conducted the large-scale repairs of the transmission pipes over the total period of 20 months between 2006 and 2008. However, it is expected that further repairs are to be performed, although each repair may be relatively on a smaller-scale. On the other hand, the financial position can be commended in that the condition has been improved significantly since the Ex-post Evaluation and has been in stable conditions. Looking ahead, it is desirable that this project be well coordinated with the Second North-South Carrier Water Project[10], and that the stable water supply services be realized by implementing fundamental repairs to the problematic sections while keeping the current water supply in operation.

3.2 Lessons

During the project planning period, a multifaceted examination of the transmission pipes should have been made. In this project, while there were no issues on operation and maintenance for the Yen-loan components, i.e. water treatment works, pump stations and break pressure tanks, the adoption of GRP pipes led to significant losses as a result. In a similar project in the future, it is important that not only the initial costs but also the long-term maintenance costs are taken into consideration when selecting the materials and equipment.

The problem that the facilities developed in this project have not been utilized as originally planned was caused by slower-than-expected population growth and by the frequent breakages of the pipes. As the low utilization level can lead to a financial burden it is necessary, when forecasting demand for a similar project, that the projections are based on deliberate calculations by considering social trends, so that the overestimation can be avoided.

3.3 Recommendations

3.3.1 Recommendations to Implementing Agency

In addition to the thorough maintenance to be conducted continuously, it is important that intensive repairs should be made on the sections where the problems frequently

[10] A project to enhance water supply capacities by constructing another dam in the north of Letsibogo Dam and installing new transmission pipes alongside the current pipes. A part of the entire project has already commenced, such as the construction of the dam

occur so that the stable water supply to Mahalapye and Palapye districts will be achieved. Also, since the Second NSC Project is on a larger scale and there could generate larger financial burdens, designing and construction should be conducted with an emphasis on the ease of maintenance, as well as the considerations on the initial costs during the planning phase.

Comparison of Original and Actual Scope (Yen Loan Components)

Item	Plan	Actual
(1) Output		
I. Water Treatment Work		
1) Mmamashia	92,000m^3/day	92,000m^3/day
2) Mahalapye	12,000m^3/day	12,000m^3/day
3) Palapye	14,000m^3/day	14,000m^3/day
II. Master Balancing Reservoir	Capacity: 78,000m^3(Mmamashia) 5,000m^3(Mahalapye) 6,000m^3(Palapye)	Capacity: 78,000m^3(Mmamashia) 5,000m^3(Mahalapye) 6,000m^3(Palapye)
III. Pump Station		
1) Letsibogo	1.01m^3/Second	0.82m^3/ Second
2) Mahalapye	1.51m^3/ Second	0.93m^3/ Second
3) Palapye	1.33m^3/ Second	1.03m^3/ Second
IV. Break Pressure Tank: 1. Moralane 2. Thoti-Hill 3. Lose-Hill	Capacity: 4,500m^3×3	Capacity: 4,500m^3×3 Thoti-Hill and LoseHill were changed to Dikalate and Tewane.
(2) Period:		
1. Water Treatment Work	Feb 1996 - Sept 1998	Jan. 1997 – May 2000
2. Master Balancing Reservoir	Oct 1996 – Sept 1998	Jan 1997 – May 2000
3. Pump Station	Feb 1996 – Sept 1998	Nov 1996 – June 2000
4. Break Pressure Tank	Jan 1997 – Sept 1998	April 1997 – March 1999
(3) Project Cost:		
Foreign Currency	JPY 31, 071 million (BWP 840 million)	JPY 24,093 million (BWP 901 million)
Local Currency	JPY 13,725 million (BWP 371 million)	JPY 13,085 million (BWP 489 million)
Total	JPY 44,796 million (BWP 1,211 million)	JPY 37,178 million (BWP 1,390 million)
ODA Loan Portion	JPN 4,685 million (BWP 127 million)	JPN 4,685 million (BWP 175 million)
Exchange Rate	BWP 1 = JPY 37.0 (1995)	BWP 1 = JPY 26.75 (IFS[11]-based period average)

[11] International Financial Statistics by IMF

Kenya

Ex-Post Monitoring of Japanese ODA Loan Project

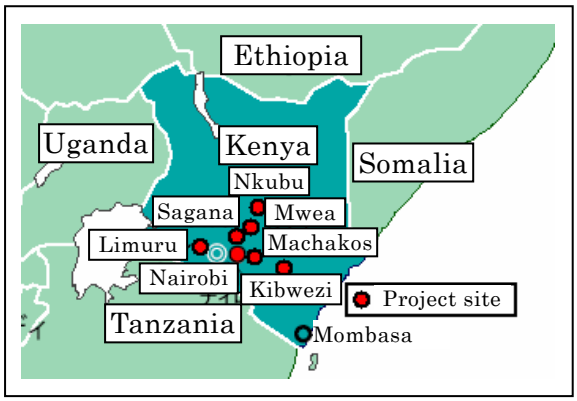
"Horticultural Produce Handling Facilities Project"

External Evaluator: Keisuke Nishikawa

Ernst & Young SN Global Solution Co., Ltd.

Field Surveys: June, August 2009

1. Project Profile and Japan's ODA Loan



Project Location Map

Nairobi Horticultural Center

1.1 Objective

The objective of the project is to improve post-harvest processing of horticultural produce by constructing quality preservation facilities, thereby contributing to increase of incomes, poverty alleviation of small-scale horticultural farmers, as well as development of Kenya's foreign exchange earning capacity.

1.2 Outline of loan agreement

Loan Amount / Disbursed Amount	2,016 million yen / 2,016 million yen
Loan Agreement/ Loan Completion	October 1993 / July 2001
Ex-Post Evaluation Survey	FY2003
Executing Agency	Horticultural Crops Development Authority: HCDA
Main Contractors (Over 1 billion yen)	Marubeni Corporation
Consulting Services (Over 100 million yen)	Sanyu Consultants Inc.

1.3 The Background and Reasons for conducting Ex-Post Monitoring Survey

In this project, pre-cooling and cold rooms were not utilized at all except Machakos

depot at the time of Ex-post Evaluation and there was a concern over the realization of project effectiveness. In the Ex-post Evaluation it was proposed that HCDA would continue to implement a number of recommendations proposed in the Special Assistance for Project Implementation (SAPI) and the Special Assistance for Project Sustainability (SAPS) surveys conducted by JBIC. Those recommendations are: to build trust with horticultural farmers and exporters, to lease the facilities out to the exporters for better utilization, to strengthen agricultural extension services, to improve the efficiency of finance / accounting, and so on. It was also recommended that JBIC (currently JICA) monitor implementation of the recommendations by HCDA.

Therefore, the project is subject to Ex-post Monitoring and the reviews based mainly on the results of the field surveys were conducted in accordance with the evaluation criteria, and the conclusion was derived.

2. Monitoring Results

2.1 Effectiveness (Impact)

2.1.1 Utilization of Facilities

The facility utilization level varies from year to year, or seasonally, as the changes in the business environment and harvest conditions have substantial influences on it. The utilization of each facility at the time of the Ex-Post Monitoring (June and August 2009) is shown in Table 1 (p.5). The utilization of each facility is individually described as follows.[1]

2.1.1.1 Pre-cooling and Cold Storage Rooms[2]

- Facilities utilized as planned: Nairobi, Limuru, Sagana, Kibwezi
- Facilities partially utilized as storage rooms (without utilization of cooling functions): Yatta, Machakos
- Facilities not utilized: Mwea, Nkubu

Nonetheless, Mwea and Nkubu depots, which were not utilized at the time of the Ex-post Evaluation, were already under lease agreements between HCDA and exporters and were to be used in late 2009, and the preparatory work, i.e. distribution of seeds to the farmers, was being conducted.

2.1.1.2 Weighing / Packing Spaces

- Facilities in which weighing and packing spaces were both utilized: Nairobi, Limuru, Yatta, Sagana, Kibwezi

[1] This is not the change in the status of utilization during a certain range of time, but it is the utilization status at the time of the field surveys.

[2] In this project, cold storage rooms were introduced only into Nairobi Horticultural Center, and all other facilities with the cooling equipment installed are regarded as pre-cooling facilities.

- Facilities in which only the weighing space was utilized: Machakos
- Facilities in which neither the weighing nor the packing spaces were utilized: Mwea, Nkubu

The spaces at Mwea and Nkubu depots were to be utilized by exporters, as in the case of the pre-cooling facilities.

2.1.1.3 Office Space

- Facilities utilized by exporters: Limuru, Yatta, Machakos, Sagana, Kibwezi
- Facilities utilized by NGO: Machakos, Kibwezi
- Facilities not utilized by anyone: Mwea, Nkubu

Office spaces at Machakos and Kibwezi depots were leased out and utilized by NGOs, in order to promote the effective use of the facilities when the exporters or groups using other equipment are not utilizing the office spaces.

2.1.1.4 Insulated Trucks

- Facilities normally utilizing the trucks: Kibwezi, Nairobi, Limuru, Sagana
- Facilities not utilizing the trucks: Yatta, Machakos, Mwea, Nkubu

Facilities not utilizing the insulated trucks at the time of the field surveys also had some records of leasing them between 2008 and 2009. When the trucks were not in use by the private companies, the staff at each facility used them in some cases as one of the means of transportation to patrol for technical assistance. At Kibwezi, all the three 3-ton trucks that had been owned by the depot in 2008 were all transferred to Nairobi Horticultural Center. Instead, one 8-ton truck that had been stationed in Nairobi was transferred to Kibwezi for the exporter's use.

2.1.2 Changes since the Ex-post Evaluation

2.1.2.1 Change in Business Model

This project was planned in the 1980s and was implemented between 1993 and 2001. During this period, the horticultural industry developed outstandingly under private-sector initiatives. As a result, major private companies had their own cold storages and packing facilities, and this led to competitions with the operations of HCDA. Also, the government sector reform was implemented in the 2000s, under the policy of market liberalization with the idea that the public sector should not expand their operations that would lead to competitions with the private sector.

Prior to the implementation of the project, HCDA prioritized the extension of assistance to small-scale farmers who tended to be alienated from the market and aimed to purchase the produce from the farmers, pack and export them by keeping the quality in the pre-cooling and cold rooms. However, as the demand for horticultural crops

increased, the small-scale farmers started having alternative options to sell their produce elsewhere. With these environmental changes considered, leasing of the facilities to the private sector was judged to be conducive to the improvement of facility utilization, to the vitalization of horticultural produce distribution, and to the benefit of the small-scale farmers as a result. The consequence was the change in HCDA's business model in 2005 in that the direct collection and sales model was abolished and the leasing of the facilities was introduced.

Table 1 Status of Utilization of Each Facility (As of June and August 2009)

Facility	Nairobi Center	Limuru	Yatta*	Machakos	Sagana	Mwea	Kibwezi	Nkubu
Pre-cooling / Cold Storage Room	○【Cold Storage】(Utilizing 8 of 9 rooms)	○【Pre-cooling】(Utilizing all 4 rooms)	⌂【Utilized without pre-cooling function】(Utilizing 1 room as a storage of hot peppers)	⌂【Utilized without pre-cooling function】(Utilizing 1 room as a storage of bulbs)	⌂【Pre-cooling】(Utilizing all 4 rooms)	×(Not utilized. 1 room was broken)	○【Pre-cooling】(Utilizing all 2 rooms)	×(Not utilized)
Weighing / Packing Space	○	○	○	○(Weighing space only)	○	×	○	×
User**	Exporters 26	Exporter 1 Farmer Groups 15 Individual Farmers 20	Exporter 1 Farmer Groups 10 Individual Farmers 50	Exporter 1 NGO**** 1 Farmer Groups 16 Individual Farmers 35	Exporter 1 Farmer Groups 6 Individual Farmers 20	(Exporter 1)*** Farmer Groups 50 Individual Farmers 8	Exporter 1 NGOs**** 2 Farmer Groups 8 Individual Farmers 320	(Exporter 1)*** Farmer Groups 29 Individual Farmers 5
Office Space	―	○	○	○	○	×	○	×
Refrigerated Truck	○ (3t)	○ (3t)	×	×	○ (3t)	×	○ (8t)	×
Changes since the Ex-post Evaluation	After the completion of this project, HCDA made an effort to improve the environment for the use of the exporters, by adding hand-wash basins and restrooms.	In recent years, this facility has been fully utilized thanks to an advantage of its proximity to Nairobi.	An exporter has run its operation on a small scale. However, the exporter is planning to discontinue the operation because of smaller profits after low rainfall.	Its pre-cooling room is not utilized, and only a part of the room is used for storage.	An exporter fully utilizes this facility, and its level has significantly improved since the Ex-post Evaluation.	Little improvement has been observed as the unstable production volume has prevented the exporters from the continuous utilization.	An exporter started to fully utilize this facility, and its level has significantly improved since the Ex-post Evaluation.	Little improvement has been observed as the unstable production volume has prevented the exporters from the continuous utilization.

Note: ○－Fully utilized, ⌂－Partially utilized ×－Not utilized

*The hot pepper exporter in Yatta depot was scheduled to leave in late 2009 to consolidate their operation in another district.

**The utilization of the facilities by farmers means 'the number of farmer groups/ individual farmers who receive the services', i.e. technical assistance from HCDA at the time of field surveys, not the utilization of facilities.

***While these facilities were not utilized at the time of the field survey in June, there were lease agreements between the exporters and HCDA from the end of June. (After that, it was confirmed that the preparations toward utilization had gradually been started.)

****The utilization by NGO is limited to the use of office spaces.

2.1.2.2 Results of Change in Business Model

[Facility Utilization]

Since 2005, a lot of exporters, large or small, have utilized the facilities, depending on the business environment and harvest volumes. Nairobi Horticultural Center, whose locational inconvenience had been pointed out in the Ex-post Evaluation, is currently utilized in full. Also, Limuru, Sagana, Yatta and Kibwezi, not being used at the time of Ex-post Evaluation, were utilized by the exporters. This is the positive result of the change in the business model. At the same time, however, some exporters also expressed their views that it would be more efficient to collect the produce directly from the farms to their facilities around Nairobi Airport for packing.

[Relationship between HCDA and Farmers]

Since 2005, the role of HCDA has changed substantially from the body to collect and sell on behalf of the farmers to the entity that leases the facilities to the private exporters and offers technical trainings on cultivation and market information to foster small-scale farmers. Their technical services are offered to the farmers free of charge. According to the interviews conducted during the field surveys with the representatives of the farmer groups and with 70 individual farmers, more than 80% of the farmers responded that they were satisfied with the services offered by HCDA (especially technical services and trainings). They also responded that the reasons why they had not used HCDA facilities by themselves are that the production volume was low, that they could not afford the rent of the facilities, and that they were not large enough to do the collection and sales instead of the exporters.

2.1.3 Implementation Statuses of Recommendations in JICA Surveys

2.1.3.1 Efforts by Kenya

After the completion of this project, JICA conducted SAPS twice, during 2002 and 2003, and provided advices for realizing the better collection and selling of crops, and leasing the facilities to exporters. In this monitoring survey, implementation statuses of the recommendations proposed in the Ex-post Evaluation as well as the statuses of the recommended points that had been proposed in other past surveys but had not been tackled at the time of Ex-post Evaluation, were all confirmed as shown below in Table 2.[3]

[3] At the time of the Ex-post Evaluation, HCDA had separately developed concrete plans for the establishment of a subsidiary for the purpose of promotion of utilization of each facility and better operational management. The subsidiary was actually incorporated and registered once. However, HCDA Board of Directors eventually decided to abandon the operation of the subsidiary after the State Corporation Advisory Committee of the Government decided that public corporations should not undertake pure business activities.

Table 2 Recommendations from the Ex-post Evaluation, Advice from SAPI, SAPS, and the Implementation Statuses at the Time of Ex-post Monitoring

	Recommendations from Past Surveys	Current Status (Ex-post Monitoring)
Recommendations from Ex-post Evaluation	HCDA has made an effort to increase the opportunities for bringing crops into Nairobi Horticultural Center by going around the horticultural farms to collect crops at the depots by pick-up trucks. They are expected to continue such efforts.	With the change in the business model in 2005, HCDA no longer conducts direct collection and selling. Many exporters located in Nairobi collect crops by directly sending their own trucks from Nairobi.
	Rather than having HCDA operating the depots, leasing the depots to exporters for their operation as originally planned would be another option. Also, marketing activities targeting the exporters are important.	After the change in the business model of HCDA, leasing of the depots to exporters has been promoted. Operations of the depots have been conducted by HCDA itself so far, but it is being considered as one of the options that all the facilities are wholly leased to an exporter organization. Also, HCDA is making an effort to strengthen the marketing system, and have recently focused on the recruitment from the private sector.
	Make a marketing progress in the domestic market as well as export markets.	Since the domestic market is significantly larger than the export market, HCDA provides guidance for the cultivation of crops that have comparative advantages in each region for domestic sales.
	Make a progress in securing its own financial resources	HCDA is currently operated with the subsidies from the Government, making it having a role as a public entity. Therefore, it is not expected to secure its own financing by operating the facilities for profit.
	Make a progress in fostering human resources for marketing etc.	Recently, some personnel recruited from the private sector have worked as the managers of some depots or have been assigned in the marketing section. HCDA has made an effort to improve the utilization of facilities in this regard. Also, short- and long-term trainings are conducted every year, among which are the training programs by JICA.

	Recommendations from Past Surveys	Current Status (Ex-post Monitoring)
Advice that had not been implemented at the time of Ex-post Evaluation	Build the relationship of trust with farmers at the depot level (payments without delays, and marketing activities for exporters)	Very good relationships between HCDA and farmers have been established, not through collection and selling but through the trainings and technical assistance. According to the interview survey with farmer groups, however, it was also heard that some farmers hope to reintroduce the collection and selling activities as previously conducted by HCDA.
	Improve accounting by utilizing computers	With regard to the improvement of accounting operations, HCDA continues to ensure the account processing and reporting to the headquarters by the depot managers, to perform internal audit and to conduct trainings. Also, the introduction of the ERP (Enterprise Resource Planning) information system to link all the facilities was in progress. At the headquarters, computers were introduced and they perform the account processing by using software. However, due to the change in the business model, the separation of accounts between the entire Authority and this project has not been conducted recently. In the future, this project will be separately treated in terms of account processing.
	Strengthen marketing activities for exporters etc., who would be the potential customers	Since the change in HCDA's business model, they have strengthened the marketing department and recruited some depot managers from the private sector to promote the utilization of the facilities.
	Improve the action plan schedule and familiarize the employees with it	In addition to the preparation of the action plans at the headquarters and the depots, HCDA as a whole is drafting the "Strategic Plan (2009-2013)".
	Create a website of HCDA	While the website was initially set up in 2004, it had not been available since April 2009 due to a problem of the outsourced company. However, the renewed website became partially available from August 2009.
	Introduce an employees' performance evaluation system	Every year, Staff Performance Appraisal Report covering 9 sections is prepared to evaluate the achievement of the targets set up at the beginning of the year. It has been operated over the last 6 years and has become an important mechanism.
	Further technical assistance by the Ministry of Agriculture and Livestock	Ministry of Agriculture, along with HCDA, conducts seminars regarding Good Agriculture Practice in Europe (major export market) and Kenya and the standards for the concerned parties.

2.1.4 Efforts by JICA

Although JICA conducted SAPI (2000) and SAPS (2002 & 2003) to promote the utilization of the facilities, some recommendations were difficult to be implemented due to the complete change of the business model. On the other hand, as the importance of making efforts in improving the utilization level of the facilities remains the same, JICA Kenya Office has checked the utilization levels by visiting the Authority as well as the facilities, and undertakes follow-ups of the improvement measures.

2.1.5 Internal Rate of Return

The FIRR will be negative as the operating expenses have consistently been larger than the revenues from the facilities since the completion of the project.

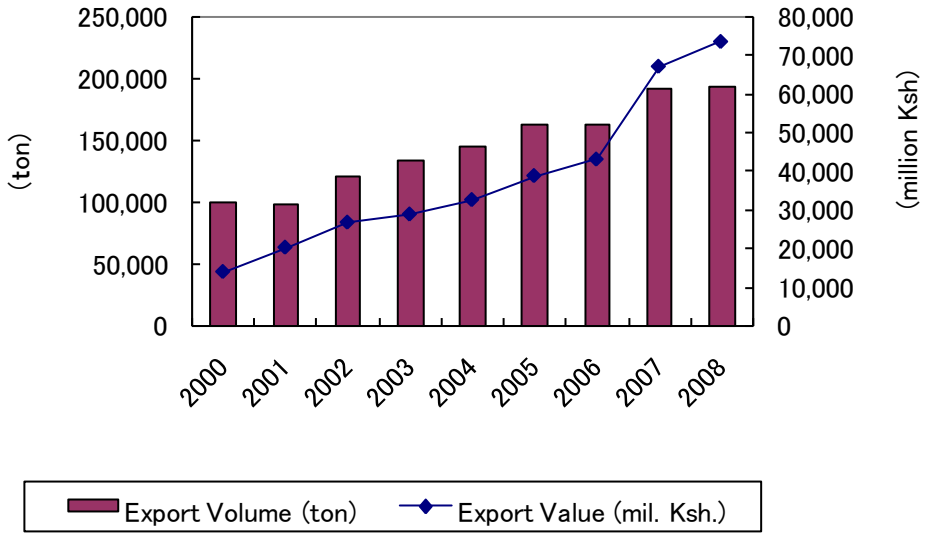
2.1.6 Impact

2.1.6.1 Export Promotion of Horticultural Crops

The horticultural industry is the fastest growing industry in the agricultural sector in Kenya. Export value, volume, and the number of exporters increased substantially, as shown in Figure 1 and 2. While the direct contribution of this project to the increase in export is limited as this project is only a part of the industry that grew under the initiatives of the private exporters, HCDA's major work is to provide technical assistance to farmers and small-scale exporters, and it can be said that HCDA is contributing to the increase in exports through the technical assistance for the increase in production by farmers, as is obvious in the results of the beneficiary survey. Also, the facilities are used for technical assistance workshops, thus it can be said that increase in the farmers' income would be resulting from the existence of these facilities. About 70% of the farmers answered that their income had increased. More than 80% of them answered that they were satisfied or, very satisfied with the technical assistance services provided by HCDA. Although the facilities are not currently utilized by them, nearly 80% of the farmers responded that the facility could be an important base as a hub for the distribution of their produce in the future.

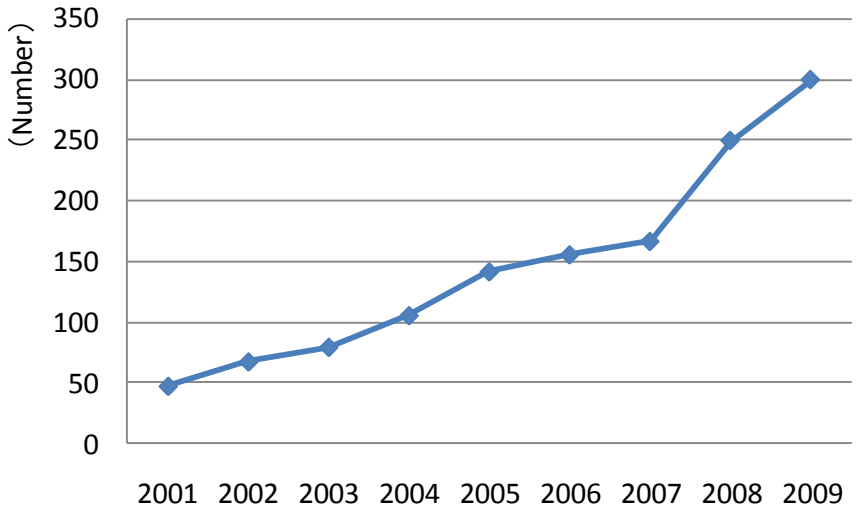
Nairobi Horticultural Center, almost fully operated, is utilized mainly by small-scale exporters, thus it can be said that it is contributing to the expansion of the horticultural industry base by providing the location for their operations. Around Nairobi Airport, there were some exporters that expanded their businesses and became independent after getting the support from HCDA.

Figure 1 Export Volume / Value of Horticultural Crops



Source：Data supplied by HCDA

Figure 2 Number of Exporters in Operation



Source：Data supplied by HCDA

2.1.6.2 Environmental / Social Impact

2.1.6.2.1 Impact on Environment

Since the completion of this project, no soil analysis has been performed. However, no abnormality has ever been reported. The hand-wash basins are the only places where some sort of detergent is always drained, and no particular problems have been observed. HCDA plans to conduct an environmental impact assessment of all the

facilities from next year as part of their annual inspection program.

2.1.6.2.2 Impact on Society

Almost all the workers employed by the exporters for sorting crops in accordance with the quality standards at Nairobi Horticultural Center are women. As all the exporters that utilize the Center are small-scale, provision of the operating base to those companies would lead to the securing of employment of women workers.

No particular problems have ever been reported as to the resettlement of residents required in this project.

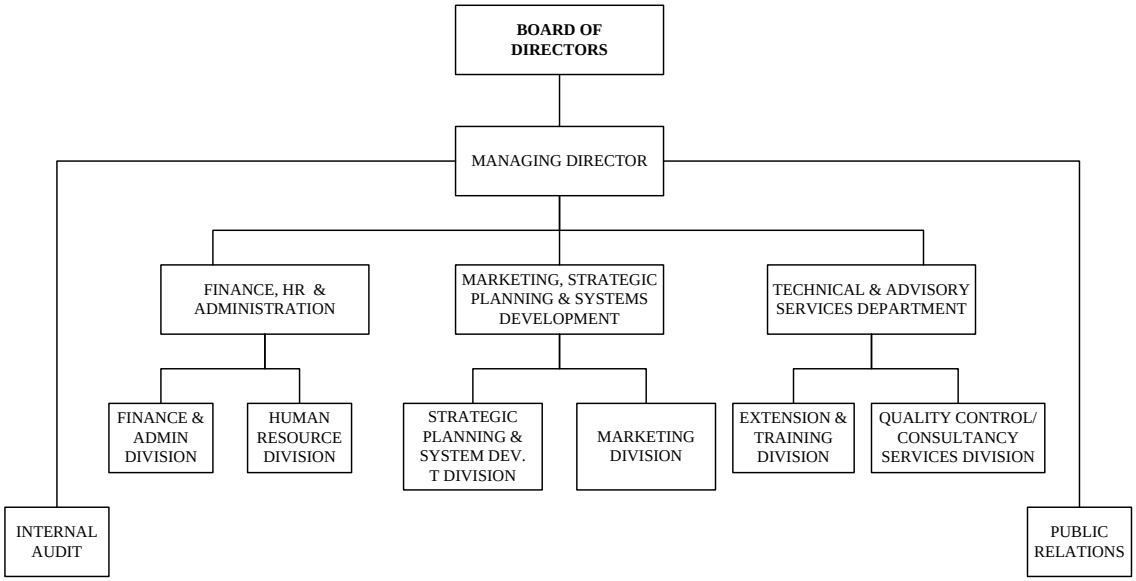
2.2 Sustainability

2.2.1 Organizational Structure

The organization of HCDA, consisting of 216 employees as of August 2009, is divided into 3 departments under the Managing Director (Figure 3), i.e. Finance, HR & Administration Department (138 staff) [4], Marketing, Strategic Planning & Systems Development Department (20 staff) and Technical & Advisory Services Department (57 staff). HCDA is planning to consider restructuring the Authority for more efficient operations as specified in the " Strategic Plans for 2009-2013".

Maintenance is assigned to 4 staff in the Technical & Advisory Services Department. They undertake the repairs based on the requests received from each depot.

Figure 3 Organization Chart of HCDA



Source : HCDA "Strategic Plan for 2009-2013"

[4] Including the staff in the offices/depots located in various parts of the country

2.2.2 Technology

No particular problems were identified, as the facilities developed in this project are not technologically complex. According to HCDA, in case they had any troubles with the equipment, the maintenance staff mentioned above would deal with the troubles without any problems.

2.2.3 Finance

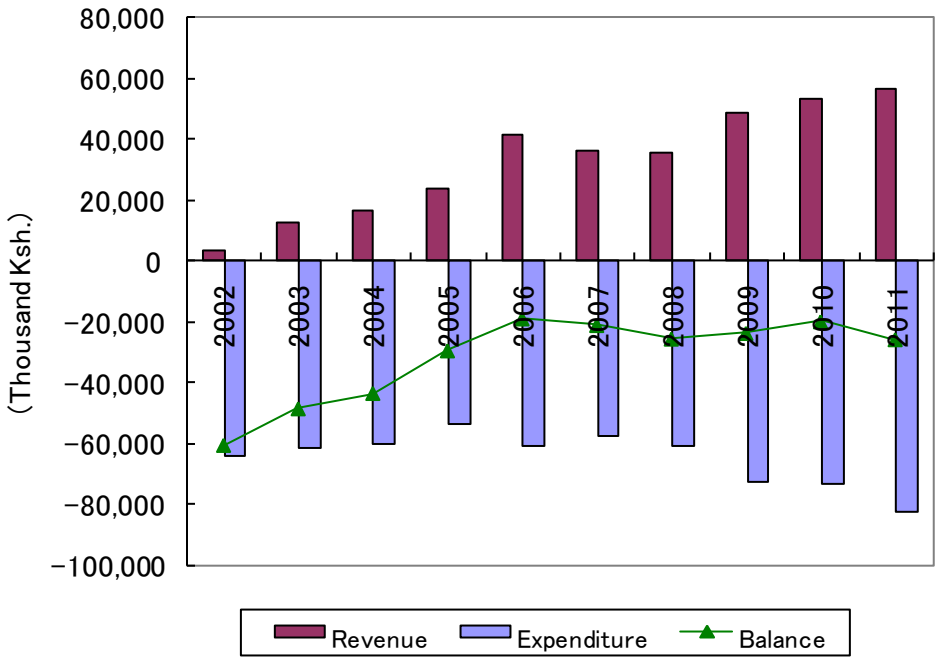
As shown in Figure 4, the expenses have always been larger than the revenues in this project since the construction was completed. However, as HCDA's current top priority is to promote the utilization of the facilities, fee levels have been set in accordance with the guideline of the Ministry of Public Works and have not been raised to make profits. The majority of HCDA's budget is provided in the form of subsidies from the Government at the moment and the Authority is expected to perform as a public entity.

Also, as described in Table 2, the account of this project is treated as part of the overall account of HCDA.

2.2.4 Maintenance Conditions

With regard to maintenance, no particular problems that would hamper the proper use of the facilities were identified.

Figure 4 Changes in Revenues and Expenditures of the Project



Note: Post-2009 data are the figures projected by HCDA.
Source: Income Stattement specially prepared by HCDA for this survey

3. Conclusion, Lessons and Recommendations

3.1 Conclusion

During the period of planning and completion of this project, the surrounding business environment changed substantially: the horticultural industry, which rapidly grew with the private sector initiatives, led to the ownership of the facilities by the exporters etc. Under such circumstances, HCDA changed their business model from the direct collection and sales to the leasing of the facilities. It can be said that this was an appropriate decision, considering the social environment of that time, with a viewpoint that the subsidized public entities should not compete with the private sector.

There was room for improvement regarding the efforts to be made by HCDA for the improvement in the utilization statuses of the facilities and in supporting the expansion of marketing channels of the farmers when the collection of the produce from the farmers was halted in 2005. However, HCDA made various efforts such as the provision of technical assistance to the farmers on the sales of crops to private companies. Also, the farmers' income generally increased through the industry-wide growth led by the private sector.

As the yields of horticultural produce changes due to the risks of seasonal and annual fluctuations, not all facilities have yet secured the users in a continuous manner. But the utilization status of the facilities is on the improving trend in that the number of facilities

where the cooling / pre-cooling functions were utilized increased from 1 at the time of Ex-post Evaluation to 4 in this monitoring survey.

3.2 Lessons

3.2.1 Understanding of Problems in each Facility

It is expected that the formulation of a strategy toward further utilization of the facilities will become possible by understanding the problems of each facility from their utilization records and the financial conditions. In the project similar to this in the future, it is desirable that a mechanism to grasp the utilization records and the financial conditions of each facility be established at the time of project planning, and the appropriate, facility-specific strategy be formulated.

3.2.2 Prompt Understanding of Market Environment

The market environment changed substantially during the long period when the project was planned, implemented and completed. However, the surveys and researches to investigate the effects and lessons of this project, as well as the data maintenance etc., have been insufficient. As this is a project with a large financial deficit, it is necessary to analyze the current causes objectively and logically. In the future project that may deal with the market, it is desirable that the market environment be monitored regularly and its result be reflected into the organizational management as much as possible.

3.3 Recommendations

3.3.1 Recommendation to the Executing Agency

One of the viable plans to promote the utilization of the facilities by farmers is to encourage farmers groups, separately located in the areas around each facility, to coordinate with each other, thus organizing the larger farmer groups. Individual groups produce only a small volume of crops and they are always in a disadvantaged position against exporters when negotiating. However, it is possible to secure a stable volume of crop yields and strengthen their bargaining power against exporters, by organizing an association of farmer groups for the purpose of strengthening marketing capacities.[5] In light of the objective of this project as well as the role of HCDA to support small-scale farmers, it is desirable that HCDA support the concrete actions by providing further marketing assistance to such farmer groups, coordinating the representatives of the farmer groups, providing meeting spaces, and assisting them with the process of formation of the associations. As the associations could use the facilities as the places for cooling and

[5]According to interview survey with the farmer groups, many of them expressed strong interests in this idea, and some of them actually completed the procedure for organization.

packing the produce and for negotiating with exporters and middlemen to hand over the produce, it is possible for HCDA to increase revenues.

The formation of associations of farmer groups may not progress as planned in some regions. In that case, it would be possible, in light of the project objective, to promote the comprehensive use of all facilities by exporter companies, which is under consideration at HCDA as one of the options. HCDA will need to continuously undertake various efforts toward the improvement of the farmers' living standards by taking into consideration that the roles of exporters and middlemen vary across the regions. As the first step, it will be important to conduct the analysis of the current situations regarding the market environment and the conditions the farmers are facing.

Also, in the technical cooperation project, "Smallholder Horticulture Empowerment Project (SHEP), which was separately implemented from 2006 with the assistance of JICA, organizing of horticultural farmer groups was supported. It is also possible that the findings and outcome of this technical cooperation will be utilized / applied.

Comparison of Original & Actual Scope

Item	Plan	Actual
1. Output Pre-cooling facilities (tons/day)	Sagana: 20 tons twice a day Limuru: 10 tons twice a day Kibwezi: 15 tons twice a day Nairobi: 10 tons twice a day Total: 110 tons (4 locations)	Sagana: 20 tons Limuru: 15 tons Kibwezi: 10 tons Kubu: 10 tons Mwea: 20 tons Yatta: 10 tons Machakos: 10 tons Total: 95 tons (7 locations)
Cold storage facilities (tons/day)	Nairobi: 110 tons Sagana: 20 tons Limru: 10 tons Kibwezi: 15 tons Total: 155 tons (4 locations)	Nairobi: 100 tons Total: 100 tons (1 location)
Related equipment	Forklift trucks Weighing scales Insulated trucks (4-ton × 3) Management-use vehicles (2), etc.	8.5-ton insulated trucks × 17 3-ton dry van truck × 27 Pickup vehicles × 7 Motorbikes × 7 Four-wheeled vehicle × 1 Total: 8 vehicles Crates / carts for crate movement
Consulting services	124M/M	82M/M
2. Project period	L/A conclusion: Oct. 1993 Consultant selection: Dec. 1993 Contractor selection: Feb. 1995 Equipment procurement: Mar. 1995 - Jun. 1996 Consulting services: Jan. 1994 - Dec. 1996	L/A conclusion: Oct. 1993 Consultant selection: Dec. 1994 Contractor selection: Jul. 1999 Equipment procurement: Aug. 1999 - Mar. 2001 Consulting services: Dec. 1994 - Jul. 2001
3. Project cost Foreign currency Local currency Total ODA loan portion Exchange rate	 1,491 mil. yen (877 mil. Ksh) 881 mil. yen (518 mil. Ksh) 2,372 mil. yen (1,395 mil. Ksh) 2,016 mil. yen (1,185 mil. Ksh) 1Ksh (Kenyan shilling) = 1.7 yen	 2,016 mil. yen (1,134 mil. Ksh) 2,404 mil. yen (1,353 mil. Ksh) 4,420 mil. yen (2,487 mil. Ksh) 2,016 mil. yen (1,134 mil. Ksh) 1 Ksh = approx. 1.78 yen* (*IFS[6]-based simple average during the project period)

[6] International Financial Statistics by IMF

Tunisia

Ex-Post Monitoring of Japanese ODA Loan Project

"Agricultural Sector Investment Project"

External Evaluator: Hiromi Suzuki S.

Ernst & Young SN Global Solution Co., Ltd.

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 Développment 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 period[1]. 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' associations[2], 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'Intéret 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 Pubic 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 indictor. For both the irrigation and the water supply GDAs, the percentage of GDAs that reached the cost recovery rate[3] of more than 80% has been

[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.

[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

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 year[4]. 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 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,

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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	Zaghouan	140	—	8	20	31	28	29	40

Source: Ministry of Agriculture

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 Area[5]

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 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

[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

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 Actual	 88 20	 73 6	 140 40	 50 20	 275 125
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

	Hill dams in Zaghouan Governorate						Total Zaghouan Governorate	
	El Ogla		Essahel		Saadine			
Year	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	Total amount of ground water recharge (Mm^3)	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 10th and 11th Development Plans. According to analysis of the status of the 10th 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 Ex-post Evaluation	2009*
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 beneficiaries[7].

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

[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.

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 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)		
Hill dams		
World Bank	6 locations	15 locations
JICA	14 locations	19 locations
Regional waterworks facilities		
World Bank	130 locations	185 locations
JICA	90 locations	61 locations
Exploratory wells		
World Bank	150 locations	318 locations
JICA	90 locations	96 locations
Irrigation facilities		
World Bank	30 locations	47 locations
(Irrigated Area)	4,809 ha newly established	2,750 ha newly established, 4,809 ha improved
Other (pastureland improvement, etc.)		
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)

Guatemala

Ex-Post Monitoring of Japanese ODA Loan Project

"Social Investment Fund Project"

External Evaluator: Hiromi Suzuki S.

Ernst and Young SN Global Solution Co., Ltd

Field Survey: July, September 2009

1. Outline of the ODA Loan Assistance

Project area map

Small-scale irrigation-system development in the village of Chichicana

1.1 Objective

The objective of this project is to improve basic social services for the local people and to develop a foundation for economic activities in rural society by improving socioeconomic infrastructure and by implementing a number of small-scale sub projects through the Social Investment Fund (Fondo de Inversión Social (FIS)), thereby contributing to the economic development of Guatemala in all parts of the country excluding the Metropolitan Area of Guatemala City.

1.2 Outline of the Loan Agreement

Approved Amount/ Disbursed Amount	3,112 million yen / 2,962 million yen
Loan Agreement Signing Date/ Final Disbursement Date	December 1995 / December 2000
Ex-post Evaluation Year	Fiscal Year 2002
Executing Agency	Fondo de Inversión Social (FIS)
Main Contractor (Over 1 billion yen)	Lizarralde & Lara CPA, Consultoría en Ingeniería y Construcción among others
Main Consultant (Over 100 million yen)	TUBOFORT, S.A., REGA Consultores, Maquinaria, Asesoría y Construcción, S.A., among others

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

The ex-post evaluation conducted in fiscal 2002 noted the need for improvements to operation and management (O&M) as a whole, identifying issues concerning the sustainability of manifestation of effectiveness, stating, "Sustainability of sub project results and effectiveness remain in doubt." It identified the following points that should be improved: development of an O&M organization, thorough O&M, and raising the level of ownership among communities and beneficiaries. Therefore, this project was selected for an ex-post monitoring. Conclusions were derived through the review of the results obtained during the field survey, which were conducted based on the evaluation criteria.

2. Monitoring Results

2.1 Effectiveness (Impact)

A total of 16,211 sub projects have been implemented since the establishment of FIS[1] in 1993 through 2006, cofinanced with numerous donors including the World Bank, Kreditanstalt für Wiederaufbau (KfW) of Germany, and the International Development Bank (IDB) of the United States. It is estimated that from 1995 through 2000, more than 20% of the total population enjoyed the benefits of FIS projects each year.[2] (Fig. 1)

Sub projects eligible for ODA loans belonged to FIS Phase I, accounting for 5.6% of all FIS sub projects (904 projects, Table 1) and approximately 7% by value. While geographically these covered the whole of the country, about 60% of investment took place in Huehuetenango, Petén, Alta Verapaz, Jalapa, and San Marcos, known to be particularly impoverished regions.

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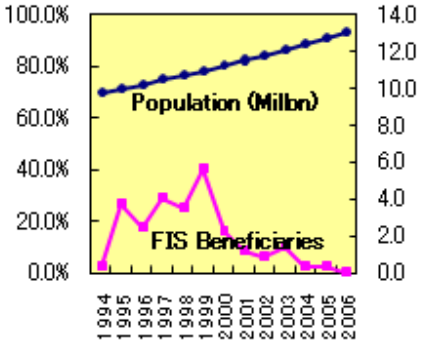
[1] The Fondo de Inversión Social (FIS) was an organization established under limited-time legislation, dissolved in May 2006 with the expiration of the law. However, the FIS liquidation committee (Comisión Liquidadora del FIS) was established within the Secretaría de Coordinación de la Presidencia (SCEP) under Ordinance 276-2008, to manage projects underway and the FIS database. The FIS was managed independently under the direct authority of the President, and its primary role was to manage the series of processes from appraisal to completion of each sub project. The FIS's responsibilities concerning O&M following completion of each project were to make clear the O&M organizations for each project during appraisal, to set fees, and to record this content clearly on the ex-post evaluation reports (FIS Informe de Evaluación). For these reasons, FIS was not in charge of implementation of O&M itself, paying costs, or similar matters. While basically it had been decided that O&M should be conducted at a community level, the FIS and the central government concluded a cooperative agreement stating that the government agency responsible would pay O&M costs if the community could not bear them.

[2] ZEA, Miguel y Osmar Velasco. *Informe final de la evaluación de impacto del FIS.(IDB,* Washington June 2007 / OVE0223 / Social-Fondos de Inversión Social)

Fig. 1: FIS Beneficiaries by Year



Source: UNDP, *Informe Nacional de Desarrollo Humano,2007/2008*

Table 1: FIS Sub Projects by Sector
(Yen portion)

Sector	Sub Projects
Water and Sewage	255
Basic latrines	292
Roads and Bridges	135
Small-scale irrigation	26
Farm silos	29
Occupational training	13
Others	154
Total	904

Source: See Footnote 2

Since it involved a wide range of sub projects and participation of numerous donors including Japanese ODA loan as described above, it is difficult to identify the degree of contribution of Phase I of the FIS project to economic growth and poverty elimination in Guatemala. For this reason, in this monitoring, matters such as the manifestation of project effectiveness through obtaining performance indicators for the five case studies covered during ex-post evaluation, and comparing planned with actual values were done to the extent possible. In addition, trends for the country as a whole from movements in typical socioeconomic indicators for all of Guatemala were analyzed as well. While this project covers all of Guatemala except for Guatemala City, due to limitations on available statistics we selected to use indicators for Guatemala as a whole. Also, for results and impacts that could not be ascertained quantitatively, an attempt to ascertain project results based on interviews with the Secretaría de Coordinación de la Presidencia (SCEP), local governments, other donors, researchers, and former FIS personnel, and on ex-post evaluation reports were made.

Other donors' ex-post evaluation reports conclude that FIS has contributed to alleviating poverty[3], as a result of assessment based on the number of sub projects implemented, subject sectors, and project implementation based on poverty maps. They also conclude that while some development issues that should be addressed in the future remain, all socioeconomic indicators are in an improving trend, and as such the project has contributed to raising the level of economic conditions of Guatemala as a whole. This fact was possible to confirm also from the interviews conducted in this ex-post monitoring as well.

[3] For details of each donor's ex-post evaluation methods and other information, see: FIS, *Evaluación Ex-Post de los Proyectos Financiados por el FIS con Recursos de Préstamos BIRF, KfW y OECF* (2002), KfW, *Programa FIS-KfW II Quiché* Informe Final (May 2008), ZEA, Miguel y Osmar Velasco. *Informe final de la evaluación de impacto del FIS.(IDB,* Washington June 2007 / OVE0223 / Social-Fondos de Inversión Social), IDB *La Utilización de Fondos de Invesión Social como Instrumento de Lucha Contra la Pobreza* (December 1998).

2.1.1 Quantitative Effects

During ex-post evaluation, effects were evaluated based on ascertaining the general conditions of the project, since it was judged that it would be difficult to ascertain quantitative effects, primarily for the following two reasons. The first reason that this is a dispersed project, made up of a wide range of small-scale sub projects totaling 904 in number. The second reason is that as a cofinancing project the results expected from the ODA loan component were unclear during appraisal. Since these conditions would remain unchanged in ex-post monitoring as well, it was judged that it would be difficult to ascertain quantitative effects. For this reason, together with analysis of five case studies brought up during ex-post evaluation, in this monitoring it was decided to check on trends in the main socioeconomic indicators across Guatemala as a whole, while taking into consideration that there are limits to how much the cause-and-effect relationship between results derived from socioeconomic indicators and this project can be clarified.

2.1.1.1 Case Studies

The five sub projects shown in Table 2 were covered as case studies during ex-post evaluation. However, these were addressed in ex-post evaluation to survey beneficiaries or examine qualitative effects, and project effectiveness indicators were not collected. In this ex-post monitoring, it was attempted to collect planned values and current project effectiveness indicators to the extent possible, to ascertain the operating conditions of each infrastructure project. While in ex-post evaluation no indicators of effectiveness of sub projects had been established during appraisal, in ex-post monitoring some indicators and planned values, while limited, were established since the ex-ante evaluation reports (FIS Informe de Evaluación) had been obtained from SCEP for each case study. (Table 2)

Table 2: Project Effectiveness Indicators for Case Studies

Sector	Locations	Indicator	Planned value*	Ex-post monitoring (vs. planned values)
Small-scale irrigation works	Huehuetenango Dept. San Sebastián Pueblo Viejo Chemiche	Irrigated surface area	21.08 ha (2000 effective value)	33.45 ha (158%)
	Huehuetenango Dept. San Sebastián Pueblo Viejo Chichicana	Irrigated surface area	23.96 ha	31.84 ha (133%)
Water supply system	Zacapa Dept. Gualan Bethel	Water supply penetration rate	100%	100% (125 households)
		Per-capital water supply	100 liters/day	170 liters/day (170%)

Sewage, sewage treatment facility	Chimaltenango Dept. Santa Cruz Balanyá	Sewage penetration rate	100%	100%
		Sewage treatment rate	100%	0%
Bridge	Guatemala Dept. San José del Golfo	Monthly average traffic volume	N/A	893 vehicles
		Time required from San José del Golfo to national highway	1 hour	20 - 25 minutes

* Planned values are based on the ex-ante evaluation report (FIS Informe de Evaluación) for each sub project. Since this report could not be obtained for Chemiche, for it alone 2000 effective values were compared.

As is clear from Table 2, with the exception of sewage and sewage treatment facilities four sub projects met or exceeded planned values. As such, manifestation of effectiveness could be confirmed within the scope of available indicators. Regarding sewage and sewage treatment facilities, while drainage ditches and sewage pipes have been developed, with the exception of the settling pond the sewage treatment facilities suffered a collapse within one year after construction. When the cause of the collapse was confirmed in the field survey conducted in ex-post monitoring, it was determined that while soil analysis had been conducted during appraisal, subsequent continual heavy rains led to a landslide that caused the collapse. Since Santa Cruz Balanyá has no other sewage treatment facilities, the current sewage treatment rate is 0 percent.

2.1.1.2 Socioeconomic Indicators

1) Poverty

The national average shows that, despite a decreasing trend in poverty there still are large gaps between rich and poor, as is clear from the Gini coefficient. While all main donors have assessed the FIS project to be contributing to alleviation of poverty as described above, since differences persist between urban and rural communities, between indigenous and non-indigenous populations, and by gender, they also note that these are issues that should be addressed in the future.

Table 3: Basic Statistics on Guatemala Human Development

	1989		2000		2006	
	Female	Male	Female	Male	Female	Male
Population (millions)	4.5	4.2	5.8	5.6	6.8	6.2
Percentage of population employed (%)	25.5	74.5	36.0	64.0	38.3	61.7
Per-capita GDP (USD)	682.2	3,823.6	1,518.3	6,712.1	2,271.1	7,311.7
Literacy rate (%)	51.7	69.7	60.2	77.2	68.9	81.8
Average life expectancy at birth (years)	62.2	57.3	68.7	63.0	74.2	67.2
Poverty rate (%)	62.0		56.2		50.9	
Extreme poverty rate (%)	-		15.7		15.2	
Gini coefficient**	-		0.476*		0.448	
Human Development Index (HDI)***	0.538		0.634*		0.702	

* 2002

** The Gini coefficient is an indicator of factors such as inequality of income distribution in society. The Gini coefficient can range from 0 to 1 in value, with values closer to 0 indicating smaller gaps in income and values closer to 1 indicating larger gaps. An important fact to be noted is that the Gini coefficient tends to be different amongst institutions, due to the differences in the method to gather and use basic data. For example, according to the World Bank, the Gini Coefficient for 2006 is 0.537 indicating that there income inequality is larger than the one indicated in the table.

*** The Human Development Index (HDI) measures each country's degree of human development in the three fields of lifespan, knowledge, and humane standard of living. It takes a value between 0 and 1. The closer the value is to 1, the greater the degree of advancement of human development.

Source: UNDP, *Informe Nacional de Desarrollo Humano*, 2007/2008

2) Education

While the literacy rate averaged 60% for males and females in 1989, in 2006 it had risen to 75%. However, the gap between males and females still has not improved, with males having a literacy rate of 82% and females a rate of 68.9% in 2006. Similarly, the gap remains large between urban and rural communities, with the former having a literacy rate of 86% while the latter had a rate of 62% in 2006. While the literacy rate among indigenous peoples has risen from 35.6% in 1989 to 60% in 2006, the gap with non-indigenous peoples (with a rate of 83%) remains large.

However, as Table 4 shows, when looking only at population aged 15 through 24, the gaps between genders, urban and rural communities, and indigenous and non-indigenous population all show decreases, indicating that results of education are apparent among the younger generation.

Table 4: Comparison of Literacy Rates between Population Aged 15 and Above and Youth

(Unit: %)

	Population Aged 15 and Above			Youth Population (Aged 15 - 24)		
	1989	2000	2006	1989	2000	2006
Nationwide	60.3	68.2	74.8	74.8	81.7	87.8
Male Female	69.7 51.7	77.2 60.2	81.8 68.9	82.8 67.5	87.7 76.3	91.4 84.8
Urban Rural	79.6 48.2	83.5 56.9	86.0 62.3	89.8 65.8	93.1 74.1	94.5 81.1
Indigenous Non-indigenous	35.6 73.8	50.1 79.4	59.6 83.4	54.2 85.9	69.8 89.0	80.3 92.2

Source: UNDP, *Informe Nacional de Desarrollo Humano*, 2007/2008

3) Health and Welfare

While the infant mortality rate was high in 1989 at 73 per 1000, over the six-year period from 2000 through 2005 it has decreased from 32 to 27. Regarding malnutrition among children aged five or younger, the rate of chronic malnutrition had fallen from 57.9% in 1987 to 46% by 1999, but then worsened slightly in 2005 to 49% and has since remained unchanged. Similarly, the gap between indigenous and non-indigenous population is large, with the rate among indigenous population trending largely in the range 70% - 71% from 1987 through 2002, with no improvement. On the other hand, the rate among the non-indigenous population improved considerably over the same period, from 49% to 36 percent.

4) Sanitation (Water and Sewage)

While the percentage of households with access to water supply systems improved from 71% in 2002 to 77% in 2006, in the impoverished region of Alta Verapaz the rate even in 2006 was much lower than the national average, at 41%, and the percentage relying on sources such as rivers and lakes was the highest in all of Guatemala at 22%.

While no statistics are available on development of sewer systems, data on latrine development shows an overall improving trend. While the percentage of households with flush toilets fell from 42% to 40% from 2002 through 2006 use of manual cleaning toilets has increased, and the percentage of households with no toilets has fallen from 14% in 2002 to 9% in 2006.

5) Roads

While development of main roads is advancing nationwide on average (Fig. 2), there

are considerable gaps between regions (Fig. 3). Based on 2006 road-density data by region, road development is advanced in the southwest, central, northeast, and southeast parts of the country, partly because these regions produce agricultural produce for export. On the other hand, roads still are undeveloped in the impoverished regions of Petén Dept., the north, and the northwest.

Fig. 2: Road Development

(Unit: km)

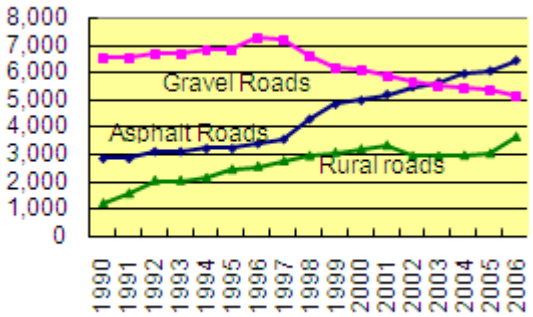
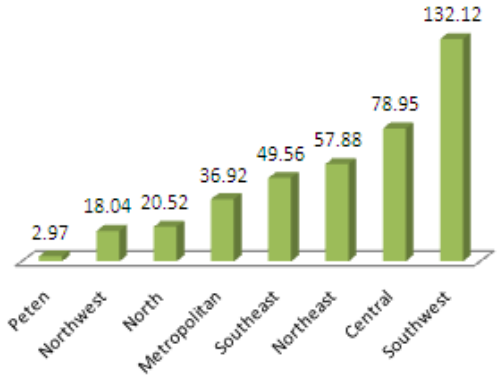


Fig. 3: Road Density by Region (2006)

(Unit: Km/100 Km$^{2)}$



Source: UNDP, *Informe Nacional de Desarrollo Humano, 2007/2008*

6) Improving the Position of Women

All FIS Project donors have identified "improving the position of women" as a goal. While data such as gender development indicators shows an improving trend, there is a need for further effort. In response, the Secretaría Presidencial de la Mujer (SEPREM) was established in 2000. The SEPREM directly advises and assists the President on policies toward securing and improving women's rights and position in society.

Table 5: Advancement of Women in Society

	1989	2000	2006
Percentage of women members of congress (%)	6.0	10.2	8.9
Percentage of women in management positions (%)	32.2	41.1	32.6
Percentage of women in specialist/technician positions (%)	45.2	41.5	48.8
Gender Development Indicator (GDI)	0.502	0.609	0.684
Gender Empowerment Index (GEI)	0.389	0.461	0.442

Source: UNDP, *Informe Nacional de Desarrollo Humano, 2007/2008*

2.1.1.3 Internal Rate of Return (IRR)

In ex-post evaluation, the EIRRs for the water supply project (in Gualan and Bethel of

Zacapa Dept.) and the small-scale irrigation project (in San Sebastián and Chichicana of Huehuetenango Dept.), were 11.9% and 63.2%, respectively. In ex-post monitoring, the EIRRs of these same projects were re-estimated using the same assumptions as in ex-post evaluation. The results were high for both projects, at 22.1% for the water supply project and 73.9% for the small-scale irrigation project, due to increased benefits.[4]

2.1.2 Qualitative Effects

In ex-post evaluation, community participation was addressed as an indicator of the qualitative effects of the implementation process of this project. However, since residents were unaccustomed to such participation, it was deemed that the results were inadequate. The interviews and case studies used in ex-post monitoring showed that while participation in the sub-project implementation process in fact was low, it cannot be said that community participation is inadequate as a whole since there were cases of subsequent O&M being conducted on a community basis, as seen for example in the small-scale irrigation works and water supply projects described below.

In addition, from interviews with other donors it has been reported that community participation directly impacts sub-project sustainability, based on experiences in FIS Phase I as described above. As such, in Phase II and later, a greater focus has been given to community participation and governance improvements. In this way, it can be said that experiences in FIS Phase I have been put to use in Phase II.[5]

2.1.3 Impact

During ex-post evaluation, case studies were conducted for five sub projects. In this ex-post monitoring, beneficiary surveys were conducted for the same sub projects.[6] As was done in ex-post evaluation, regarding improvement of the standards of living of residents and revitalization of economic activities the increases in income levels between before and after

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[4] Assumptions of EIRR estimation: For the water-supply sub project, benefits are savings/day in time required to draw water and benefits from increased volume of water available compared with prior to the project, costs are investment and operation and O&M costs, and project life is 20 years. For the small-scale irrigation sub project, benefits are revenues from sale of produce and costs and project life are identical to those of the water-supply sub project.

[5] The KfW's aid is restricted to Quiche Dept., in which a community-development committee (Consejos Comunitarios de Desarrollo) is formed in each village and the community and local government take part in all stages of the project cycle. This has shown substantial improvement in project and fund-management capabilities. Later, 2064 community leaders have proposed 70 new projects to regional government, NGOs, and other government agencies (according to the KfW's FIS Phase II ex-post evaluation, May 2008). The IDB has worked on community empowerment and production-capacity improvements through technical cooperation. This model has become the foundation of the community organization and capacity-building program (Programa de Organización y Capacitación Comunitaria (POCC)), which still is active in communities with numerous poverty-related problems

[6] The beneficiary survey was conducted from July through September 2009, with sample sizes ranging from 30 to 50 persons per sub project.

each sub project was conducted, and for any positive impact on health and sanitation conditions. While ex-post evaluation noted that some communities showed a strong inclination to form their own community-led projects following project completion, as one example of confirmation of improvements to citizen governance, ex-post monitoring discovered no particularly noteworthy facts relating to this matter.

Table 6: Revitalization of Economic Activities and Improvements in Residents' Standards of Living (From Beneficiary Survey Results)

Sub-project location/sector	Improvements in residents' standard of living Revitalization of economic activities
Huehuetenango Dept. San Sebastián Pueblo Viejo Chemiche Chichicana Small-scale irrigation works	• Main agricultural products have shifted from traditional produce such as corn to garden produce such as green beans that can be sold with high levels of value added. Beginning four years ago, the village of Chemiche has participated in ASOMAM, selling green beans to exporters at wholesale. • At present, average monthly income per household in the village of Chemiche is 2600 quetzals. (While no data is available on income prior to this development, average monthly income from going to work at a coffee farm is approximately 700 quetzals.) At the same time, average monthly income per household in the village of Chichicana has approximately tripled from a level of 216 quetzals before this development (1995) to 710 quetzals today. Since consumer prices have risen by approximately 2.5 times over the same period, real average monthly income can be said to have increased as well. • In both villages, residents' standards of living have improved as a result of rising incomes, and both child health and literacy rates among residents have improved as well.
Zacapa Dept. Gualan, Bethel Water supply systems	• All respondents said that the sub project had improved the living environment and that its results continued. • While previously there were numerous cases of illness, primarily concerning the digestive organs, the skin, and the bronchial tubes, at present all beneficiaries reported no illness. • Average monthly income per household has increased 2.6 times from 320 quetzals prior to the development (1997) to 852 quetzals today. Since this is a little more than the rate of increase in consumer prices (which have doubled), real average monthly income has increased as well. • With the time saved from drawing water, almost all the respondents considered that they "have more time to focus on working", and among the women, there was a case in which she started her own small business, thus indicating that the project has had an effect on economic activity
Chimaltenango Dept. Santa Cruz Balanyá Sewage, sewage treatment facilities	• Ninety percent of residents responded that development of sewage pipes had improved sanitary conditions in the village and that residents' health conditions had improved. While prior to sewage pipe development 84% of residents suffered from conditions related to the skin or digestive organs, incidence of these illnesses has decreased since just after development of the sewage pipes, and at present 70% reported "occasional" illnesses due to sewage.
Guatemala Dept. San José del Golfo	• While prior to bridge construction it took one hour to get to Guatemala City, now this time has been shortened to 20-25 minutes.

El Chato Bridge	• While immediately after bridge construction the majority of beneficiaries went to Guatemala City to work, at present 54% of beneficiaries go to Guatemala City to sell local products in wholesale markets in the city. • Average monthly income per household has approximately doubled from 1064 quetzals prior to construction (1995) to 2026 quetzals today. However, when the 2.5 times increase in consumer prices over the same period is taken into account, real average monthly income has decreased. • Seventy-three percent of residents responded that their standard of living had improved due to income increase. In particular, they now have access to high-quality healthcare.

In addition to the above, when a survey was conducted on improvements in the standard of living of women, major changes could be seen as a result of the water supply and small-scale irrigation sub projects in particular. Prior to these infrastructure developments, collecting water was women's job, consuming several hours each day. In addition, traveling back and forth on mountain roads with numerous cliffs resulted in many accidents and injuries, and both women's health and their standard of living have improved markedly thanks to being freed from this heavy labor.

Regarding environmental impact, negative impacts on the environment from two projects were monitored: the Santa Cruz Balanyá sewage and sewage treatment facilities project, which was a case study examined during ex-post evaluation, and the Sayakuche water supply project in Petén Department. In this ex-post monitoring, in order to ascertain the current conditions of these two projects, site observations and interviews were conducted with beneficiaries for the sewage and sewage treatment facilities project and interviews with local government through SCEP for the water supply project.

First of all, regarding the Santa Cruz Balanyá sewage and sewage treatment facilities project, while the ex-post evaluation report noted that the local government was considering construction of a new sewage treatment facility, even today no new sewage treatment facilities have been constructed. Also, while it was reported that at the time of the ex-post evaluation sewage was released into a nearby river, in the site observation it was not possible to confirm that sewage was released into the river. Rather, it was discharged down the cliff from the settling pond. Since soil erosion due to sewage has advanced on the cliff, currently the farmers who own neighboring land are attempting to stabilize the soil through planting trees on their own. Furthermore, sanitary problems such as foul odors and large numbers of flies have arisen near the cliff, and negative impacts on the environment are thought to have worsened in comparison with the time of the ex-post evaluation. While this project has no direct negative impact, the cliff is used as a dumping ground for garbage. Local government has not come up with any measures for improving current conditions.

In addition, regarding the Sayaxche waterworks sub project in Petén Dept., while at the time of the ex-post evaluation the project was considered a cause of a worsening of the water quality of the Pasión River, in this ex-post monitoring it was verified by the local government that the cause had been illegal sewage dumping by residents in the rainwater pipes installed by the local government in 1996, and not the waterworks covered by ODA loans.

2.2 Sustainability

2.2.1 Entity in Charge of Operation and Maintenance (O&M)

2.2.1.1 Structural Aspects of Operation and Maintenance

While at the time of the appraisal it was expected that responsibility for O&M of sub projects in this project would be borne by beneficiary communities, with related central government agencies and local governments providing funding only when the community was unable to handle this responsibility (see Footnote 1), during ex-post evaluation it was noted that it was thought that related central government agencies and local governments were covering O&M costs, instead of communities. According to interviews conducted during this ex-post monitoring to clarify this point, current structure of the O&M organization is generally as shown in Table 7.

Table 7: Sub Project O&M Organizations and Groups

Sector	Responsible
Education, healthcare, roads and bridges	Related central government agencies, such as the Ministry of Education
Water and sewage systems, basic latrines, small-scale irrigation works	Local governments, communities

It is clear from interviews with other donors, local governments, and former FIS personnel that when O&M have been taken over by related central government agencies, small-scale infrastructure developments like this project are given low priority in many cases and the O&M structure is not developed sufficiently. At the same time, for sub projects with strong community ownership, such as waterworks and small-scale irrigation works, cases also have been confirmed in which O&M committees are established in communities, fees collected from residents, and O&M structures were developed. (Table 8)

Table 8: O&M Organization Structure and Details, From Case Studies

Sector	Location	O&M Organizations and Details
Small-scale irrigation work	Huehuetenango Dept. San Sebastián Pueblo Viejo Chemiche	• An O&M committee made up of eight beneficiaries is in charge. Committee members are chosen by majority vote every two years. • Two persons handle O&M, patrolling the main pipeline daily, in shifts. • The O&M committee monitors whether beneficiaries conserve water and water actually is used in production of garden produce and manages matters such as the order in which irrigation water is distributed among all farmers and hours of use.
	Huehuetenango Dept. San Sebastián Pueblo Viejo Chichicana	• An O&M committee made up of 11 beneficiaries is in charge. Committee members are chosen by majority vote by the community, every two years. Seven of these 11 members also are in charge of pipeline upkeep and inspection in the districts in which they live. • Two committee members inspect the pipeline from the village of Chichicana to the water source daily, in shifts. When repairs are needed, they report such to the committee, which decides on how to respond.
Water supply system	Zacapa Dept. Gualan, Bethel	• A community development committee made up of beneficiaries is in charge. Committee members are replaced every two years. • One trained O&M technician is stationed at the project permanently. He/she patrols the main pipeline daily with two others.
Sewage, sewage treatment facility	Chimaltenango Dept. Santa Cruz Balanyá	• The planning department of the local government (Oficina Municipal de Planeación (OMP)), is in charge.
Bridge	Guatemala Dept. San José del Golfo	• While the Ministry of Communications, Infrastructure and Housing (Unidad Ejecutora de Conservación Vial (COVIAL)) is in charge of O&M of roads and bridges, actual operations are outsourced to private-sector firms through an annual bidding process. Two companies are chosen: one to assess the bridge and one to conduct O&M based on this assessment. O&M personnel number roughly 9-10 persons.

It was noted in the ex-post evaluation that in interviews with the World Bank, there were scattered cases of inadequate O&M since related central government agencies and local governments did not take part in the project formation and implementation processes. Similar conditions were confirmed in field surveys during ex-post monitoring as well. It is thought that the feasibility of O&M by the community should have been examined more carefully in the initial stage of formation of this project.[7]

[7] FIS specialist René Rodiguez Heredia has analyzed FIS at this time as a "project factory" that did not consider sustainability through efforts such as true community empowerment and strengthening local government. (Rodíguez Heredia, René .*Muera el FISDL, Viva el FISDL: Potencialidades de los fondos socials de promover una lucha contra la pobreza con desarrollo local, descentralización, participación ciudadana y gobernanza*. Guatemala, 2008)

2.2.1.2 Technical Aspects of Operation and Maintenance

There is no notable change since ex-post evaluation. O&M technologies continue to vary by project, and overall they cannot be said to be sufficient. A look at the case studies shows that even though it is a same small-scale irrigation project, the project in the village of Chemiche involves various types of periodic training, including training on O&M technologies, thanks to the participation of the Asociación Mam de Agricultores para el Desarrollo Integral (ASOMAM), an agricultural cooperative selling green beans to exporters wholesale.[8] On the other hand, the project in the village of Chichicana is not connected to any cooperative. For this reason, there are no opportunities to undergo training or similar programs, and only the minimal level of O&M needed to maintain current conditions of the project is conducted. Also, in the cases of the water supply sub project, in which community training was conducted, and the small-scale irrigation sub project, in which the infrastructure itself leads directly to increases in income, it was clear in this monitoring that the community was conducting O&M more proactively than in other projects.

Reflecting on the fact that O&M training was inadequate and that became a major threat to sustainability in FIS Phase I, to which this project belongs, O&M training, particularly training that can be conducted at the community level, was strengthened in FIS Phase II and later. [9]

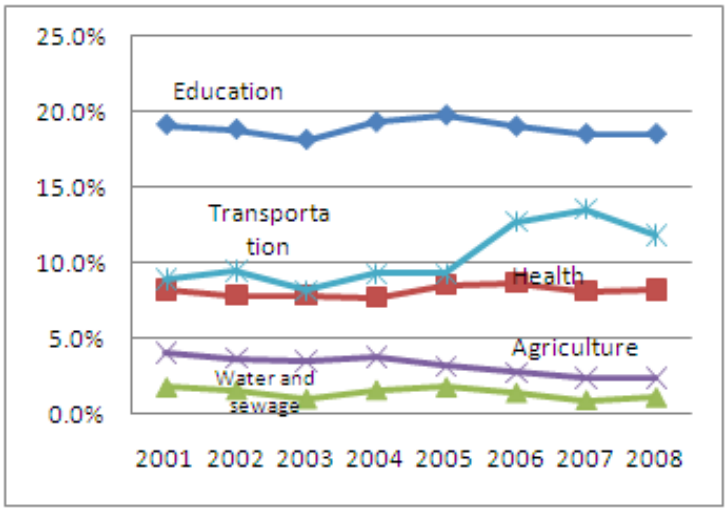
2.2.1.3 Financial Aspects of Operation and Maintenance

While it was impossible to monitor the financial conditions of O&M for 904 sub projects eligible for ODA loans, government expenditure by sector shows that while the education and health sectors accounted for just less than 20% and 9% of the total, respectively, from 2005 through 2008, the percentages of water and sewage systems and agriculture are in a decreasing trend. In the case of small-scale infrastructure projects such as the FIS sub projects, the extent to which O&M costs have been covered by expenditures from the central government is unclear. Therefore, concerns remain about securing funding for O&M costs.

[8] Since ASOMAM has been certified by the Global Partnership for Good Agricultural Practice (GLOBALGAP), it is required to conduct periodic training of members. For this reason, the village of Chemiche undergoes training several times a year on subjects such as irrigation works, O&M, fertilizers, and use of agricultural chemicals.

[9] See the literature cited under Footnote 3. The IDB is a typical example of experiences in FIS Phase I being reflected in Phase II. The IDB conducted community empowerment and production capacity improvements through technical cooperation. This model is the foundation of the community organization and capacity building program (Programa de Organización y Capacitación Comunitaria (POCC)), being used even now in communities faced with numerous poverty-related problems.

Fig. 4: Distribution of Government Expenditures by Sector



Source: Guatemala National Institute of Statistics

In the case of local governments, Article 257 of the constitution calls for the central government to provide local governments with subsidies for shortages in public expenditures. For this reason, when the O&M organization for a sub project is a local government, such as in the case of water supply and sewage projects, there seems no apparent problems in sustainability from a financial perspective alone. However, it cannot be asserted that there are no problems at all since local governments would be in the red if no subsidies were provided.

"El Chato" Bridge

In the case of roads and bridges, as shown in Table 7, the Unidad Ejecutora de Conservación Vial (COVIAL) of the Ministry of Communications, Infrastructure and Housing is the O&M organization. The Dirección General de Caminos and COVIAL, together account approximately for 70% of the Ministry's budget[10]. However, since high priority is given to O&M of national highways and large-scale bridges, it cannot be said that the required O&M costs necessarily are allocated to small-scale infrastructure projects such as the FIS sub projects. For example, the priority given to O&M of the El Chato Bridge, which is covered by a case study, is in a decreasing trend, and the frequency of O&M, which had been conducted once monthly previously, had decreased to once every three months at the time of ex-post monitoring. The

[10] Guatemala Ministry of Finance, *Ministerio de Finanzas, Presupuesto General de Ingresos y Egresos del Estado*, (2002 -2009)

content of such O&M also is limited primarily to the degree of cleaning and painting.

Water supply project in Bethel village

At the same time, examples observed in this monitoring also included cases in which the community had established O&M committees, collecting fees and handling O&M for small-scale irrigation works and water supply systems. In the water supply sub projects in the villages of Gualan and Bethel in Zacapa Dept., each of a total of 150 households pays 30 quetzals (approximately 380 yen) four times a year as O&M charges. In this O&M committee, one woman is in charge of bookkeeping, and an accountant totals the books monthly. As of the end of June 2009, the balance was 17,200 quetzals (approximately 200,000 yen). O&M costs include daily wages for O&M specialists and accountants, as well as purchase of tools and components needed in O&M. Water supply is cut off to households not paying O&M charges. Among the case studies conducted in this monitoring, this example is a sub project with strong community participation from the start of project formation, and in which O&M personnel underwent little training. From beneficiary surveys and site observation as well, this example appears to involve strong community ownership of the water supply infrastructure and to have a functioning O&M structure.

2.2.2 Current Status of Operation and Maintenance

As shown in Table 9 below, O&M conditions of these case studies show variation in the O&M conditions of each sub project. While the water supply sub projects are examples of projects with strong O&M conditions, the sewage sub projects are examples of projects in which problems have arisen in O&M conditions.

Table 9: Case Study O&M Conditions

Sector	Location	O&M Conditions
Small-scale irrigation works	Huehuetenango Dept. San Sebastián Pueblo Viejo Chemiche	• Pipes frequently crack when pressure increases rapidly, since the diameter of the main pipeline changes from six to four inches and there are no pressure tanks. • While the irrigation infrastructure has deteriorated overall, only day-to-day inspection and repairs are conducted.
	Huehuetenango Dept. San Sebastián Pueblo Viejo Chichicana	• The state of O&M of the water source (about 5.5 kilometers from the village) is good. The river water level rises in winter and during the rainy season, making maintenance a little more difficult. • The state of O&M of the water storage tanks is good. Every day, debris such as tree branches and leaves is removed. Mud is common during the rainy season, and the mud needs to settle before the water can be used.

		• The state of O&M of the primary and secondary distribution pipes is good. While landslides occur several times each year, requiring relatively large-scale maintenance, there are no major problems with purchase of tools etc. for O&M use, particularly with regard to PVC pipes and other materials.
Water supply systems	Zacapa Dept. Gualan, Bethel	• Since completion, water supply has been stopped only a few times, ranging from several hours to a maximum of three days in length. While pipes have been damaged by cold in the winter, these already have been repaired. • The only problem is the fact that drinking water is not chlorinated, since no supplier of chlorine tablets has been found since about four years ago. In the future the planning department of the local government will seek a supplier.
Sewage, sewage treatment facilities	Chimaltenango Dept. Santa Cruz Balanyá	• There are problems with O&M of the sewage system, such as drainage ditches getting clogged with garbage. Without thorough improvements to the O&M structure, these could lead to breakdown of the sewage system. • With the exception of the settling pond, the sewage treatment facilities have been damaged by landslides. There is a possibility that the settling pond too could be damaged in the future if nothing is done, since soil erosion has advanced.
Bridges	Guatemala Dept. San José del Golfo	• Garbage has been left at the base of the bridge and in the drainage ditches, and rainwater collects in the bridge during the rainy season in particular. This could speed up wear on the bridge. As such, there is room for improvement in O&M. • A number of damaged spots were confirmed on the pedestrian railings. While these do not cause any problems with the structure of the bridge itself, out of consideration for pedestrian safety they need to be repaired.

As was true at the time of ex-post evaluation, today too the state of O&M of the FIS project as a whole varies greatly by sector and by type of infrastructure. In this ex-post monitoring these matters were verified based on interviews with local governments and other donors and on the ex-post evaluation reports of each donor. This information can be summarized with the following three points concerning average O&M conditions of the FIS project as a whole.

1. Where related central government agencies are responsible for O&M, as in the cases of roads and bridges, O&M is limited to maintaining current conditions, due to low budgeting priorities.
2. As was true at the time of the ex-post evaluation, O&M is not conducted for basic latrine facilities, and in many cases these already are unusable.
3. For projects such as small-scale irrigation works, which are linked directly to increased income, community ownership is strong, and community-led O&M structures are in place. For these reasons, the current conditions of such infrastructures are relatively good.

As is clear from the above information, whether project results are expected to be maintained or improved in the future can be said to vary widely depending on factors such as the O&M structures and ownership of each sub project.

3. Conclusions, Lessons Learned and Recommendations

3.1 Conclusions

In FIS Phase I, a total of 16,211 sub projects were conducted throughout Guatemala, with the exception of the capital. While it is difficult to ascertain the degree of contribution, it is the shared conclusion among donors that the project has contributed not insignificantly to improving the infrastructure of Guatemala. Although it is impossible to identify the degree of contribution of the project, it can be said that a certain degree of results has been achieved according to the Guatemalan socioeconomic indicators and the project effectiveness indicators of the five sub projects covered by case studies.

Regarding O&M of each sub project after completion, it was clear in ex-post monitoring that while it had been assumed at the time of appraisal that each community would be in charge of such tasks, in fact related central government agencies and local governments have taken over in many cases. Particularly where related central government agencies handle O&M, concerns remain about future O&M, since small-scale infrastructure projects like these tend to be given low priority in budgeting and in conducting O&M itself. However, the above case studies and interviews with local governments, other donors, and former FIS personnel show that in cases such as irrigation projects that lead to visible improvements in income and water supply projects that lead to improvements in community health conditions and standards of living, continuing the achievement of project effectiveness of infrastructure improvements include proactive establishment of committees by communities themselves, who also conduct O&M. In addition, examples such as the water supply development sub projects in the villages of Gualan and Bethel in Zacapa Dept., which involved community participation from the project proposal stage, reflected residents' needs in project formation, and provided training on O&M, the communities independently have developed systems for securing sustainability and these are functioning appropriately.

3.2 Lessons Learned

While FIS had been expected to serve as an O&M organization, at the time of each project appraisal its responsibility was to confirm whether or not an O&M structure had been established. While the communities were initially designated to be in charge of O&M of each sub project, results varied by the sector of sub project. It is thought that the reason for this is because the activities required to secure project sustainability, such as increasing ownership

through promoting community participation and thoroughly conducting training on O&M, were not conducted adequately during formation of each sub project. In addition, it is thought that the assumption that communities faced with various poverty issues would cover O&M costs, acquire technologies, and conduct O&M needed to be considered more carefully.

In the future, for projects in which the O&M organization differs from the executing agency, it will be necessary to make O&M organizations clear at the time of appraisal and discuss and reach agreement on specific, detailed responsibilities. In addition, it also is important to increase ownership through having O&M organizations (i.e., related central government agencies, local governments, and communities) take part in projects from the time of project formation, to secure sustainability following project completion.

In the case of small-scale infrastructure projects, even when the related central government agency takes over O&M for reasons such as inaccessibility of villages or small scale of the infrastructure itself, in many cases low priority is given to such tasks, and as a result O&M is not conducted sufficiently. As a result, the community handled day-to-day O&M. For this reason, there is a need to secure community participation in all stages of the project cycle and, similarly, to foster ownership. Also, in cases in which beneficiaries handle O&M, such as the small-scale irrigation and water supply sub projects, training beneficiaries on O&M is also needed for project sustainability. On the other hand, in cases such as roads, bridges, and sewage systems, in which beneficiaries do not necessarily handle O&M, activities to raise awareness among beneficiaries (such as teaching the consequences of throwing away garbage near the basement of the bridge and drainage ditches, and promoting cleanup activities among beneficiaries) also are important to securing sustainability.

3.3 Recommendations to Related Ministries and Local Governments

In the future, training on O&M and technology transfer, both targeting the community, will be needed to secure sustainability. Specifically, there is a need to strengthen the capabilities of the organizations in charge of O&M of regional infrastructure within related central government agencies and the planning department of the local government (Oficina Municipal de Planeación (OMP)) in each local government in charge of O&M as well as community guidance on O&M. It is conceivable that training and technical guidance could be outsourced to private-sector businesses and educational institutions. However, since examples from other donors confirm numerous cases in which, in indigenous Mayan communities, subcontracted engineers were not accepted by the community since they were unfamiliar with specific community languages and customs, thus impeding manifestation of effectiveness. It is important to assign engineers familiar with the communities to ensure the achievement of project effectiveness.

Comparison of the Original and the Actual Scope

Item	Original	Actual
(1) Output	1) Social services (medical, educational, food supply, occupational training, etc.) 2) Social infrastructure (water and sewage systems, basic latrine facilities, schools, and health centers, etc.) 3) Economic infrastructure (roads, bridges, small-scale irrigation works, farm silos, etc.) 4) Manufacturing sector (loans to small and medium-sized enterprises) Of the above, the ODA loan was to cover 2) and 3).	As left
(2) Dates	December 1995 - December 1998	December 1995 - December 2000
(3) Project cost Foreign currency Domestic currency Total ODA loan (included above) Exchange rate	 31.5 million dollars 15.61 million dollars 130.7 million dollars 3,112 million yen $1 = 98.79 yen = 5.9 quetzals (December 1995)	 24.4 million dollars 12.8 million dollars 120.4 million dollars 2,962 million yen $1 = 116 yen = 6.6 quetzals (average from December 1995 to December 2000)