

Country Name	The Project for Improvement of Management Capacity of Operation and Maintenance for SHAPWASCO
Arab Republic of Egypt	

I. Project Outline

Background	<p>In Egypt, a reform of the water and wastewater utility sector had been undertaken since the 1990s to tackle inefficient management and accumulated debts. Aiming at improving financial health of the sector, management of respective utilities had been transferred from direct control under governorate administrations to newly established public companies. However, the majority of utilities was still far from achieving cost-recovery, and Sharkia Potable Water and Sanitation Company (SHAPWASCO), which provides water supply service in Sharkia Governorate, was not an exception. It had been suffering from financial deficit due to high ratio of unaccounted-for water (UFW: potable water that cannot be billed due to leakage, illegal taps and so on), inefficient operation and maintenance (O&M) of water facilities, and low water tariff.</p>												
Objectives of the Project	<p>Through reducing the UFW ratio in pilot project areas and strengthening O&M capacity of water supply facilities, the project aimed at improving management capacity of water supply facilities in target areas, thereby improving management capacity of water supply facilities in Sharkia Governorate as a whole.</p> <ol style="list-style-type: none"> Overall Goal: Management capacity of operation and maintenance of water supply facilities is improved in Sharkia Governorate. Project Purpose: Management capacity of operation and maintenance of water supply facilities is improved in target areas. 												
Activities of the Project	<ol style="list-style-type: none"> Project Site: Sharkia Governorate ((1) target areas for UFW reduction activities: Zagazig city (east and west), Zagazig markaz (1 and 2), Hihya markaz, Ibrahimiya markaz (1 and 2), Diarb Nigm markaz, Abu Hamad markaz, Bilbais markaz, Menia Alqamah markaz) (2) model facilities for Standard Operational Procedure (SOP) activities: Zagazig water treatment plant (WTP), Abbasa WTP, Kafir Farag Fe/Mn removal plant, Bilbais booster pump station, Asloughi well) Main Activities: (1) Conduct training for project counterparts (C/Ps), surveys on leakage (minimum night flow), distribution network and working conditions of water meters etc. and water balance analysis, and repair leaking parts in pilot sites; and (2) Develop SOPs, examine water distribution control practice in the network, formulate O&M plans, and develop water quality control program etc. Inputs (to carry out above activities) <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Japanese Side</td> <td style="width: 50%;">Egyptian Side</td> </tr> <tr> <td>1) Experts: 10 persons</td> <td>1. Staff Allocated: 91 persons</td> </tr> <tr> <td>2) Trainees Received: 5 persons</td> <td>2. Project office and facilities</td> </tr> <tr> <td>3) Equipment: leak detection devices, ultrasonic water flow meters, and office equipment necessary for GIS application etc.</td> <td>3. Local operation cost</td> </tr> <tr> <td>4) Local operation cost</td> <td></td> </tr> </table> 			Japanese Side	Egyptian Side	1) Experts: 10 persons	1. Staff Allocated: 91 persons	2) Trainees Received: 5 persons	2. Project office and facilities	3) Equipment: leak detection devices, ultrasonic water flow meters, and office equipment necessary for GIS application etc.	3. Local operation cost	4) Local operation cost	
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Project Period	November 2006 – October 2009	Project Cost	(ex-ante) 330 million yen, (actual) 374 million yen										
Implementing Agency	Sharkia Potable Water and Sanitation Company (SHAPWASCO)												
Cooperation Agency in Japan	Osaka Municipal Waterworks Bureau, Yachiyo Engineering Co., Ltd.												

II. Result of the Evaluation

1 Relevance
<p><Consistency with the Development Policy of Egypt at the Time of Ex-Ante Evaluation and Project Completion></p> <p>The project was consistent with Egypt's development policy such as "reduction of UFW" and "cost recovery in water projects" as set forth in the "Fifth Five-Year Plan of Egypt (2002-2007)" and the "Sixth Five-Year Plan of Egypt (2007-2012)" at the times of both ex-ante evaluation and project completion.</p> <p><Consistency with the Development Needs of Egypt at the Time of Ex-Ante Evaluation and Project Completion></p> <p>The project was consistent with Egypt's development needs for improving the operational efficiency and financial situation in SHAPWASCO at the times of both ex-ante evaluation and project completion.</p> <p><Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation></p> <p>The project was consistent with Japan's ODA policy as stated in the "Country Assistance Program for Egypt" (2000), which included "improvement of the living environment such as the stable supply of safe drinking water".</p> <p><Evaluation Result></p> <p>In light of the above, the relevance of the project is high.</p>
2 Effectiveness/Impact
<p><Status of Achievement of the Project Purpose at the time of Project Completion></p> <p>The Project Purpose was achieved by the time of project completion. The Performance Indicator (PI) for the Indicator 1 was set at the percentage of the measured production to the total estimated production of water in WTPs. The PI was improved from 0% to 54% on average in all of seven WTPs in Sharkia Governorate at the end of the project (Indicator 1). Measurements of water flows and supply were undertaken and recorded at model WTPs and as a result, SHAPWASCO became able to obtain sufficient data to set optimum targets for PIs</p>

on electricity and chemical consumption. For example, at Zagazig WTP, targets of PIs were set at 0.28kWh/m³ for electricity consumption, 26.7mg/m³ for aluminum sulfate consumption and 5.37mg/m³ for chlorine consumption. As the PI related to manpower standard working hours, the unit production water volume per person was set, and the number and category of required staff in each facility were incorporated into SOPs (Indicator 2). As for UFW reduction activities, in addition to the original six pilot project areas, three areas were added during the mid-term monitoring, and two more areas were also added by the time of project completion. As for SOP activities, the filter washing method was incorporated into the routine work at two model WTPs and started its application at the non-model facility, Kafr Saqr WTP. SOPs on chlorine usage control were also developed at the non-model facility, Qenayat Fe/Mn removal plant. Monitoring and collection of flow data were regularly conducted at all WTPs in Sharkia Governorate except for those under rehabilitation (Indicator 3).

<Continuation Status of Project Effects at the time of Ex-post Evaluation>

The project effects have partially continued to the time of ex-post evaluation. UFW reduction activities through leakage detection and repairing leakages have continued in the pilot project areas and expanded to the whole governorate since project completion. SOP activities have also continued at the model WTPs and expanded to four other WTPs. However, SOP activities have not continued at the model facilities other than WTPs, as facilities such as Fe/Mn removal plants and wells have not been operated at the time of ex-post evaluation due to deterioration of water quality in wells and the increased number of WTPs in SHAPWASCO.

<Status of Achievement for Overall Goal at the time of Ex-post Evaluation>

The Overall Goal has been partially achieved by the time of ex-post evaluation. Five PIs were set for the Overall Goal at six WTPs (Hihya WTP, Zagazig WTP, New Faqus WTP, Kafr Saqr WTP, Huseinia WTP and Abbasa WTP) before project completion, i.e. (1) the UFW ratio, (2) power consumption per unit production water volume, (3) chlorine consumption per unit production water volume, (4) alum consumption per unit production water volume and (5) the ratio of production water volume to intake water volume. The target for UFW reduction has been achieved, however, targets for SOP such as electricity and chemical consumption have only partially been achieved as shown in the tables below. According to SHAPWASCO, the possible reasons for not achieving targets for electricity consumption in many WTPs would be deteriorated conditions of pumps after project completion. The possible reasons for not achieving targets for chemical consumption in many WTPs would be more chemicals having been required due to the change of raw water quality. In addition, rehabilitation works were on going in New Faqus WTP, Kafr Saqr WTP and Huseinia WTP at the time of ex-post evaluation, and SOP activities were not implemented until rehabilitation works are completed in these WTPs, which could be another reason for not achieving targets.

<Other Impacts at the time of Ex-post Evaluation>

According to SHAPWASCO, UFW reduction activities through leakage detection and repairing leakages have expanded to the whole governorate, which have increased water pressure in the water supply networks, leading to an increase of customers' satisfaction. This further led to increased cooperation from customers for repairing and replacing in-house connection pipes.

<Evaluation Result>

Therefore, the effectiveness/impact of the project is fair.

Achievement of Project Purpose and Overall Goal

Aim	Indicators	Results												
(Project Purpose) Management capacity of operation and maintenance of water supply facilities is improved in target areas.	1. Performance indicators in the field of management capacity of operation and maintenance are improved in target areas.	Status of the Achievement: achieved (continued) (Project Completion) The PI (the percentage of the measured production to the total estimated production of water in WTPs) was improved as in the table below. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Before Project</th> <th>At Project Completion</th> </tr> </thead> <tbody> <tr> <td>Zagazig WTP (model WTP)</td> <td style="text-align: center;">0%</td> <td style="text-align: center;">85%</td> </tr> <tr> <td>Abbasa WTP (model WTP)</td> <td style="text-align: center;">0%</td> <td style="text-align: center;">84%</td> </tr> <tr> <td>Average of seven WTPs in Sharkia Governorate</td> <td style="text-align: center;">0%</td> <td style="text-align: center;">54%</td> </tr> </tbody> </table> (Ex-post Evaluation) See the indicator for the Overall Goal.		Before Project	At Project Completion	Zagazig WTP (model WTP)	0%	85%	Abbasa WTP (model WTP)	0%	84%	Average of seven WTPs in Sharkia Governorate	0%	54%
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2. Setting (targets for) indicators for optimum electricity and chemical consumption and manpower standard working hours is conducted at model facilities for SOP activity.	Status of the Achievement: achieved (partially continued) (Project Completion) SHAPWASCO became able to obtain sufficient data to set optimum targets for PIs and incorporated targets into SOPs. (Ex-post Evaluation) See the indicator for the Overall Goal.													
3. Activities on UFW and SOPs are incorporated into the routine work. - Activities on UFW reduction are expanded to other sites than the pilot project sites. - Activities on SOPs are expanded to other facilities than the model facilities.	Status of the Achievement: achieved (partially continued) (Project Completion) UFW reduction activities were expanded from the original six pilot project areas to 11 areas. SOP activities were also expanded to non-model facilities. (Ex-post Evaluation) UFW reduction activities have continued in the pilot project areas and expanded to the whole governorate. SOP activities have continued at the model WTPs and expanded to four other WTPs, however, they have not continued at other model facilities such as Fe/Mn removal plants and wells.													
(Overall Goal) Management capacity of operation and maintenance of water supply facilities is improved in Sharkia Governorate.	Performance indicators in the field of management capacity of operation and maintenance are improved for all branches in the Governorate.	(Ex-post Evaluation) partially achieved The target for UFW reduction has been achieved, however, targets for SOP such as electricity and chemical consumption have only partially been achieved. (1) UFW ratio: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Area</th> <th>Target for 2018</th> <th>Actual in 2018</th> </tr> </thead> <tbody> <tr> <td>Pilot project areas</td> <td style="text-align: center;">-</td> <td style="text-align: center;">23%</td> </tr> <tr> <td>Sharkia Governorate</td> <td style="text-align: center;">24.66%</td> <td style="text-align: center;">23%</td> </tr> </tbody> </table> (2) Power consumption per unit production water volume:	Area	Target for 2018	Actual in 2018	Pilot project areas	-	23%	Sharkia Governorate	24.66%	23%			
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WTP	Averaged Annual Target	Actual in 2018
Hihya	Not more than 0.30 kWh/m ³	0.30 kWh/m ³
Zagazig	Not more than 0.30 kWh/m ³	0.35 kWh/m ³
New Faqus	Not more than 0.25 kWh/m ³	0.35 kWh/m ³
Kafr Saqr	Not more than 0.25 kWh/m ³	0.39 kWh/m ³
Huseinia	Not more than 0.42 kWh/m ³	0.48 kWh/m ³
Abbasa	Not more than 0.30 kWh/m ³	0.35 kWh/m ³

(3) Chlorine consumption per unit production water volume:

WTP	Averaged Annual Target	Actual in 2018
Hihya	Not more than 4.5 g/m ³	6.6 g/m ³
Zagazig	Not more than 4.5 g/m ³	6.5 g/m ³
New Faqus	Not more than 5.0 g/m ³	8.0 g/m ³
Kafr Saqr	Not more than 5.0 g/m ³	6.4 g/m ³
Huseinia	Not more than 4.5 g/m ³	6.3 g/m ³
Abbasa	Not more than 4.5 g/m ³	6.3 g/m ³

(4) Alum consumption per unit production water volume:

WTP	Averaged Annual Target	Actual in 2018
Hihya	Not more than 20 g/m ³	25 g/m ³
Zagazig	Not more than 23 g/m ³	21 g/m ³
New Faqus	Not more than 20 g/m ³	26 g/m ³
Kafr Saqr	Not more than 20 g/m ³	20 g/m ³
Huseinia	Not more than 15 g/m ³	19 g/m ³
Abbasa	Not more than 38 g/m ³	20 g/m ³

(5) Ratio of production water volume to intake water volume:

WTP	Averaged Annual Target	Actual in 2018
Hihya	Not less than 0.98	0.98
Zagazig	Not less than 0.93	0.92
New Faqus	Not less than 0.93	0.92
Kafr Saqr	Not less than 0.93	0.92
Huseinia	Not less than 0.93	0.94
Abbasa	Not less than 0.95	0.90

Source: Project Completion Report, questionnaire survey and interview with SHAPWASCO

3 Efficiency

The project cost exceeded the plan, while the project period was within the plan (ratio against plan: 113%, 100%, respectively). The outputs of the project were produced as planned. Therefore, the efficiency of the project is fair.

4 Sustainability

<Policy Aspect>

The needs for reducing water losses in water supply networks and improving the water management system are stated in the sustainable development strategy, "Egypt Vision 2030".

<Institutional Aspect>

There are departments responsible for UFW reduction and SOP in SHAPWASCO. For UFW reduction, there are three engineers and three technicians at the headquarter and two technicians each at 15 branches of SHAPWASCO. For SOP, there are three engineers at the headquarter and one engineer and two technicians each at 15 WTPs in total in Sharkia Governorate. According to SHAPWASCO, the number of staff is sufficient to manage UFW reduction and SOP activities in the governorate.

<Technical Aspect>

Most staff for whom necessary technical skills were transferred under the project still work at SHAPWASCO. According to SHAPWASCO, the skill level of staff is sufficient to manage UFW reduction and SOP activities in the governorate, as staff training is regularly conducted. For UFW reduction, classroom based training and on-the-job training (OJT) are conducted approximately every three months, and for SOP, OJT on SOP activities is conducted approximately every six month. For example, in 2018, training on UFW reduction was conducted in January, April, August and December, and ten staff each participated, and training on SOP was conducted in April and October, and 15 to 20 staff each participated. SOPs and manuals produced under the project have continuously been utilized, and most equipment procured under the project is also utilized except for three portable ultrasonic water flow meters. These devices had a problem in downloading data, and as the local branch of the manufacturer was unable to repair them, SHAPWASCO replaced them with new ones with its own budget.

<Financial Aspect>

In SHAPWASCO, approximately 13 to 16 million EGP per year was allocated for replacing and renewal of water pipes, approximately 620 to 700 thousand EGP per year was allocated for procuring necessary equipment, and approximately three to 21 million EGP per year was allocated for rehabilitation and maintenance of water supply facilities (WTPs) in the fiscal years of 2016/17, 2017/18 and 2018/19. According to SHAPWASCO, the budget amount is sufficient to manage UFW reduction and SOP activities in the governorate.

<Evaluation Result>

In light of the above, no problem has been observed in terms of the policy, institutional, technical and financial aspects. Therefore, the sustainability of the effectiveness through the project is high.

5 Summary of the Evaluation

The project had achieved the Project Purpose at project completion, and it partially achieved the Overall Goal at ex-post evaluation: the PI was improved, SHAPWASCO became able to set optimum targets for PIs, both UFW reduction and SOP activities were expanded to other areas and non-model facilities by project completion. The target for UFW reduction has been achieved by ex-post evaluation,

however, targets for SOP have only partially been achieved. Regarding the sustainability, no problem has been observed. Regarding the efficiency, the project cost exceeded the plan.

Considering all of the above points, this project is evaluated to be satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- As stated above, the raw water quality has been deteriorated after project completion, resulting in not achieving targets for chemical consumption in many WTPs. SHAPWASCO should periodically revise targets, particularly when external factors such as a change of raw water quality is affecting outcomes/performance of WTPs, to further improve its operations.

Lessons Learned for JICA:

- As stated above, three portable ultrasonic water flow meters could not be repaired by the local branch of the manufacturer and SHAPWASCO replaced them with new ones. When procuring equipment in future projects, JICA should consider either choosing locally available equipment, which makes it easier to find someone to fix them, or training staff in the implementing agency so that they could handle the maintenance issues on their own.



SOP-Operation Instructions in Zagazig WTP (model facility)



SOP-Operation Instructions in Abbasa WTP (model facility)