

Country Name	The Project for Advancing NRW Reduction Initiative (PANI) of Chittagong WASA
People's Republic of Bangladesh	

I. Project Outline

Background	In Chittagong city, the largest commercial and industrial city in Bangladesh, the Chittagong Water Supply and Sewerage Authority (CWASA) has been operating water supply services. Constructions, extensions and rehabilitations of water treatment plants have been implemented in the city in order to expand water supplied population since the water supply coverage remained at below 50%. Besides, the rate of non-revenue water (NRW) was around 30% and any effective countermeasures were not executed. There were various issues in the water transmission and distribution system of pump stations and water distribution networks, including aged pipes, water leakage due to low quality pipes, improper pipe connection works, lack of technology and equipment for leakage control and prevention, and underinvoicing of water bill due to illegal connections and water meter failures, and so on.										
Objectives of the Project	Through developing capacity to formulate NRW reduction plan and strengthening management and techniques in implementing NRW reduction activities through pilot projects, the project aimed at enhancing CWASA's capability to reduce NRW, thereby contributing to reducing NRW in Chittagong City.										
	<ol style="list-style-type: none"> 1. Overall Goal: To reduce Non-Revenue Water (NRW) in Chittagong City. 2. Project Purpose: To enhance CWASA's capability to reduce NRW. 										
Activities of the Project	<ol style="list-style-type: none"> 1. Project Site: Chittagong City 2. Main Activities: <ol style="list-style-type: none"> 1) To develop capacity to formulate NRW reduction plan, 2) To strengthen management and techniques in implementing NRW reduction activities through pilot projects. 3. Inputs to carry out activities. <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Japanese Side</td> <td style="width: 50%;">Bangladesh Side</td> </tr> <tr> <td>1) Experts: 5 persons</td> <td>1) Staff Allocated: 25 persons</td> </tr> <tr> <td>2) Trainees received: 11 persons</td> <td>2) Land and Facilities: project office</td> </tr> <tr> <td>3) Equipment: leak detection equipment, Geographic Information System (GIS) software, etc.</td> <td>3) Local Cost: for utility of office (electricity, water, telephone) and operational cost</td> </tr> </table> 			Japanese Side	Bangladesh Side	1) Experts: 5 persons	1) Staff Allocated: 25 persons	2) Trainees received: 11 persons	2) Land and Facilities: project office	3) Equipment: leak detection equipment, Geographic Information System (GIS) software, etc.	3) Local Cost: for utility of office (electricity, water, telephone) and operational cost
Japanese Side	Bangladesh Side										
1) Experts: 5 persons	1) Staff Allocated: 25 persons										
2) Trainees received: 11 persons	2) Land and Facilities: project office										
3) Equipment: leak detection equipment, Geographic Information System (GIS) software, etc.	3) Local Cost: for utility of office (electricity, water, telephone) and operational cost										
Project Period	July 2009 - January 2014 (extension: July 2012 - January 2014)	Project Cost	(ex-ante) 240 million yen, (actual) 572 million yen								
Implementing Agency	Chittagong Water Supply and Sewerage Authority (CWASA)										
Cooperation Agency in Japan	NJS Consultants Co., Ltd.										

II. Result of the Evaluation

<Special Perspectives Considered in the Ex-Post Evaluation>

- Realization of the project effects, their continuation status and sustainability of the project were influenced by the constructions, extensions and rehabilitations of water treatment plants by the Japanese ODA loan of "Karinaphuli Water Supply Project (Phase 1) (KWSP-1) (2006-2010) and the phase 2 (KWSP-2) (2013-2022) and other projects implemented in Chittagong City, and it's difficult to extract the sheer results of this particular project. Therefore, the evaluation results below included the influence of KWSP-2.

1 Relevance
<p><Consistency with the Development Policy of Bangladesh at the Time of Ex-Ante Evaluation and Project Completion></p> <p>The "National Water Management Plan" (2004) set targets in eight areas including water supply in large cities. The Plan targeted the water supply coverage of 75% by the year 2010 and 90% by 2025 for the four big cities including Chittagong. And the "Sector Development Plan" (2011-2025) for water supply and sanitation planned to reduce NRW to 20% by 2020. Therefore, the project was consistent with the development policies of Bangladesh at the time of ex-ante evaluation and project completion.</p> <p><Consistency with the Development Needs of Bangladesh at the Time of Ex-Ante Evaluation and Project Completion></p> <p>Due to lack of technologies and skilled staff for leakage prevention measures, NRW of CWASA was 33% at the time of ex-ante evaluation. Also, water supply capacity was limited to 48% of water demand in the service areas of CWASA at the time of project completion. Therefore, the project was consistent with the development needs of Bangladesh at the time of ex-ante evaluation and project completion.</p> <p><Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation></p> <p>The "Japan's Country Assistance Program for Bangladesh" (May 2006) prioritized social development with human security particularly environmental issues such as ensuring safe and stable water supply in populous urban areas. Therefore, the project was consistent with the Japan's ODA policy for Bangladesh at the time of ex-ante evaluation.</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 partially achieved by the time of project completion. The overall action plan for NRW reduction was not</p>

finalized by the time of project completion and handed over to KWSP-2 (Indicator 1). Functions of the action teams have been incorporated into the routine works of the Maintenance, Operation and Distribution Divisions in charge of leak detection, service connection and pipe repairing (Indicator 2). While the action team members have applied techniques developed by the project, the management team has not sufficiently functioned due to frequent changes of senior management officials (Indicator 3).

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

The project effects have continued. The overall action plan for NRW reduction has been updated and revised in KWSP-2. The action teams keep functioning for leak detection, service connection and pipe repairing applying the techniques learned in the project using equipment provided by the project.

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

The Overall Goal has been achieved at the time of ex-post evaluation. The NRW ratio once reduced from 25% in 2011 to 17% in 2016. However, it increased again to 25% in 2018 because the old distribution lines were adversely affected by the water pressure increased by the project effects of KWSP-1. The distribution lines have been under replacement by KWSP-2 and NRW is reducing again at the time of ex-post evaluation. It is expected that the completion of KWSP-2 will further reduce the NRW ratio.

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

According to the interviews with CWASA staff, as a result of a variety of public relations activities and service improvement including meetings with customers and establishment of customer centers, customers' awareness on the issues of water waste and resource conservation has improved and the customers have preferred meter connections to fixed billing without meter. No negative impact on natural, social and economic environment has been observed at the time of ex-post evaluation.

<Evaluation Result>

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

Achievement of Project Purpose and Overall Goal

Aim	Indicators	Results
Project Purpose: To enhance CWASA's capability to reduce NRW.	Indicator 1: The overall action plan for NRW reduction is periodically updated.	Status of the Achievement: Not achieved (Partially achieved) (Project Completion) The overall action plan was not finalized by the time of project completion due to the project's scope changes caused by the unexpectedly unreliable data of water supply network CWASA had and the delay of works caused by the frequent changes of senior management officials of CWASA. (Ex-post Evaluation) The overall action plan was updated and revised in the Japanese ODA loan project of KWSP-2 implemented in Chittagong City but has not been periodically updated.
	Indicator 2: The functions of the action teams are incorporated into the routine work of CWASA.	Status of the Achievement: Achieved (Continued) (Project Completion) The action teams were formed in the project and their functions have been incorporated into the routine works of the Maintenance, Operation and Distribution Divisions in charge of leak detection, service connection and pipe repairing. (Ex-post Evaluation) The position and functions of the action teams have not changed and continued their works of leak detection, service connection and pipe repairing.
	Indicator 3: CWASA officers/staff apply appropriate techniques developed by the project on leak detection, service connection and pipe repairing.	Status of the Achievement: Partially achieved (Continued) (Project Completion) While the action team members have applied techniques developed by the project, the management team did not sufficiently function due to frequent changes of senior management officials and caused the delay of project activities. (Ex-post Evaluation) The action teams have been applying the techniques learned in the project using equipment provided by the project including listening rods, ultrasonic water leak detector.
Overall Goal: To reduce Non-Revenue Water (NRW) in Chittagong City.	Indicator: By 2016, the NRW ratio is reduced compared to the level at the Project completion in 2011.	(Ex-post Evaluation) Achieved While the NRW ratio was once reduced from 25% in 2011 to 17% in 2016, it has increased to 25% in 2018. This was because the water pressure has been increased by the project effects of KWSP-1 resulting the increase of water leakage from old distribution lines. However, the old distribution lines are in the process of replacement by KWSP-2 and NRW in the city is reducing again at the time of ex-post evaluation.

Source: questionnaires to and interviews with CWASA and project staffs of KWSP-2.

3 Efficiency

Because of the significant delay of works due to unexpectedly unreliable data of water supply network CWASA had, considerable delay of the assignment of counterparts, frequent changes of senior management officials of CWASA, and for adjusting activities to align with KWSP-2, the terminal evaluation (December 2011) recommended the extension of the project period. The project was extended according to the recommendation and, therefore, the period and the project cost were exceeded the original plan (the ratio against the plan was 239%

and 153% respectively) The outputs were produced as originally planned by the end of extension period of the project. Therefore, efficiency of the project was low.

4 Sustainability

<Policy Aspect>

No new policy has been formulated after the completion of the project. The “Sector Development Plan” (2011-2025) stated above for water supply and sanitation in Bangladesh planned to reduce NRW to 20% by 2020 mainly through strengthening of technology and management efficiency.

<Institutional Aspect>

CWASA has divided the city into 4 zones and placed a Maintenance, Operation and Distribution Division in each zone. The action team has been organized as a NRW reduction group in the Division and properly functioning as stated above. The number of staff assigned to the action team has been 4 from 2007 to 2018 but increased to 8 in 2019. No negative response to the questions about sufficiency of the number of staff was shown in the questionnaire and interviews. However, the activity of GIS section has been very limited because the staffs are concurrently served and occupied with other jobs. The GIS database improved by the project is outsourced for data-update to a private company at the time of ex-post evaluation.

<Technical Aspect>

The action teams keep using the skills and knowledge learned in the project and maintain them through their daily operations. The basic skills for GIS database operation have been transferred from the Japanese experts to the technical staff of CWASA during the extension period of the project. Training materials and handouts prepared by the project have been utilized for the works of the action teams as the manuals for operation including GIS.

<Financial Aspect>

The total revenue of CWASA increased from 641 million Bangladesh Taka (BDT) in 2013 to 1,405 million BDT in 2018 due to the service extension and the NRW reduction with the assistance of KWSP-2. Along with this, the budget for NRW reduction activities has also increased from 7 million BDT in 2013 to 10 million BDT in 2018.

<Evaluation Result>

In light of the above, some problems have been observed in terms of institutional aspect of the implementing agency. Therefore, the sustainability of the project effect is fair.

5 Summary of the Evaluation

The Project Purpose was partially achieved but the Overall Goal was achieved through the continuous efforts for the NRW reduction activities under the overall action plan revised with the assistance of KWSP-2 and the improved capacity of the action teams. As for sustainability, limited function of the GIS section has remained as an issue. As for efficiency, the project period and cost significantly exceeded the plan. Considering all of the above points, this project is evaluated to be partially satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- It is recommended CWASA to assign dedicated staff to the GIS section and revitalize its activities for improving monitoring and detection of water loss and leakage. Integration of GIS information with the “Supervisory Control and Data Acquisition (SCADA)” system of KWSP-2, which is the monitoring system for water supply-demand gap, water pressure requirement, and water loss and leakage, would realize the real-time geographic information provisions by SCADA. Therefore, the integration of the GIS section’s activities with SCADA could be a strategy for the revitalization of the GIS section.

Lessons Learned for JICA:

- One of the causes of considerable delays of the project activities, which had resulted the extension of the project period, was the adjustment and restructuring of project scope and activities to align with related projects of KWSP-1 and 2 after the project started. In order to implement a project in efficient and timely manner, a holistic consideration on factors affecting the project implementation is indispensable to overview potentially related plans and projects, and to formulate a program¹ if necessary, at an initiation stage of project formulation.



Leak detection using a mobile ultrasonic flow meter



Map making using a GPS device after leak detection

¹ A group of related projects implemented in a coordinated way to obtain benefits not available from implementing them individually.