Evaluation Results

<table>
<tr><td colspan="3">1. Outline of the Project</td></tr>
<tr><td colspan="2">Country: The Hashemite Kingdom of Jordan</td><td>Project title: The Capacity Development Project for Non-Revenue Water Reduction in Jordan (Phase 2)</td></tr>
<tr><td colspan="2">Issue/Sector: Waterworks</td><td>Cooperation scheme: Technical cooperation project</td></tr>
<tr><td colspan="2">Division in charge: Water Resources Division 1, Global Environment Department</td><td>Total cost (as of the time of evaluation): Approximately 250 million yen</td></tr>
<tr><td rowspan="3">Period of cooperation</td><td>(R/D): November 26, 2008</td><td>Partner country’s implementing organization: Ministry of Water and Irrigation (MOI)</td></tr>
<tr><td>(Extension):
(F/U):</td><td>Water Authority of Jordan (WAJ)
Supporting organization in Japan: Ministry of Health, Labour and Welfare</td></tr>
<tr><td>(E/N) (Grant aid)</td><td>Related cooperation:</td></tr>
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1-1 Background of the Project

In Jordan, 75% of the national land is located in desert area with annual rainfall of 200mm or less. Precipitation is concentrated in areas along the Jordan Valley. With an increase in demand due to water resource shortages and population growth, and the high rate of Non-Revenue Water (NRW) that is said to be between 40% and 60%, water supply restrictions (time-restricted supply of water) are applied throughout the country. Water is supplied only about 50 hours a week in the capital city of Amman, about 24 to 30 hours a week in areas along the Jordan Valley, and sometimes less than 10 hours a week in small villages.

JICA has been implementing the Capacity Development Project for Non-Revenue Water Reduction in Jordan (technical cooperation project) from August 2005 to August 2008 with an aim to improve the capacity of the Water Authority of Jordan (WAJ) in terms of its symptomatic measures taken against NRW. Through this project, it was confirmed that there is a necessity to take measures against the excessive burden on water supply pipes posed by high-pressure water distribution, and to take preventive measures against NRW related to problems such as the coarse construction of supply pipes and water meters. In August 2007, Jordan requested a technical cooperation project on preventive measures against NRW, and JICA decided on the implementation of a technical cooperation project with the aim of (i) the improvement of the ability to manage water distribution networks, (ii) the development of a system to install water supply pipes and water meters, and (iii) reinforcement of the relations between the WAJ and residents, together with the main office of the WAJ and its local offices in each governorate.

1-2. Project Overview

The objective of this project is to improve the capacity of WAJ and waterworks service organizations throughout the country in terms of taking preventive measures against NRW. Specifically, the project aims to enhance the ability to manage water distribution networks considering the hydraulic rationality and to design and manage the construction of adequate water supply devices (water supply pipes, water meters, etc.). In addition, the project intends to raise the awareness of residents on water theft prevention and conserving

water, as well as to reinforce the relationship between WAJ and residents so as to promote the cooperation of residents on measures taken by WAJ against NRW.

(1) Overall Goal

NRW of WAJ is reduced.

(2) Project Purpose

WAJ utilities' capability of taking preventive measures against NRW is improved.

(3) Outputs

1. WAJ utilities' capability of water network management is enhanced.
2. The mechanism for service pipe and meter installation is developed.
3. Relationship between WAJ and people for reduction of NRW is strengthened.

(4) Inputs (as of the time of evaluation)

Japanese side: Total input of approximately 250 million yen

Short-term experts: 10 persons (seven areas, 63.3M/M in total)

Equipment: Approx. 13.7 million yen (total of those procured in Japan and procured locally)

Accepted trainees: 17 persons

Jordan's Side:

Counterpart: 37 persons (WAJ main office: 12 persons, branch offices at central and southern governorates: 25 persons)

Local cost: Traveling expenses for C/P to participate in training, some of equipment expenses, etc. (approx. 35,000 dinar)

2. Evaluation Team

Members of Evaluation Team	(Job title, name, occupation) Leader of the team: Fumihiko Okiura, Director, Water Resources Division 1, Water Resources and Disaster Management Group, Global Environment Department, JICA Waterworks planning: Sadanobu Sawara, Senior Advisor, Global Environment Department, JICA Cooperation planning: Ryusuke Ikeda, Water Resources Division 1, Water Resources and Disaster Management Group, Global Environment Department, JICA Evaluation analysis: Nobuhisa Iwase, Partner, IMG Inc.	
Period of evaluation	From February 13 to February 25, 2011	Type of evaluation: Terminal Evaluation

3. Results of Evaluation

3-1. Confirmation of achievements

It is likely that the project purpose and the three outputs were achieved in general according to the indicators.

The project purpose sets three indicators. "1. In the six (6) middle and southern governorates, each Governorate Water Administration (GWA) prepares a realistic action plan for taking active and preventive measures against NRW based on all the trainings of the project" is likely to be achieved. "2. In the six

governorates, procedures to realize their action plans are reviewed with each GWA's staff in reference to the three guidelines prepared in the project, which are on overall NRW reduction, distribution network management, installation of service pipes and water meters" were achieved. "3. WAJ headquarters establishes its mechanism to implement preventive measures against NRW and disseminate them to GWAs" is likely to be achieved.

3-2. Summary of evaluation results

(1) Relevance

The relevancy of this project is high.

The project is consistent with the "Water for Life: Jordan's Water Strategy 2008-2022," which is the focused policy measure of the national government of Jordan, the needs for improving the capacity of WAJ on preventive measures against NRW, the ODA policy of Japan, and the country assistance policy for Jordan.

(2) Effectiveness

The effectiveness of the project is moderate.

The action plan was mostly formulated by five GWAs (governorate offices of WAJ), and guidelines necessary for its review are also being formulated. A certification system related to the designing and construction supervision of service pipes and water meters was also newly formulated. On the other hand, it is possible to further raise the level of project purpose achievement through enlightening activities for residents and the further implementation of training targeted to contractors under the newly launched certification system.

(3) Efficiency

The efficiency of this project is moderate.

Input from both Jordan and Japan is being converted into the three outputs and the project purpose in a generally adequate manner. On the other hand, reorganization of the WAJ, transfer of the operational management of Ma'an GWA to Aqaba Water Company (AWC), and the frequent transfer of directors and engineers within WAJ had inhibited the efficiency of the project to a certain degree.

(4) Impact

The project has a sufficient potential to make a significant impact.

The capacity of WAJ staff to take measures against NRW is being reinforced through Phase 1 and Phase 2 projects. By effectively utilizing such improved capacity and experiences also in supporting projects by other donors, it is expected to result in the stable reduction of the ratio of NRW in Jordan.

Various guidelines, educational materials, handouts for lectures and pamphlets for NRW activities developed by this project have all been prepared in both English and Arabic, so they can be sufficiently utilized in other English or Arabic speaking countries.

(5) Sustainability

Although the sustainability of the project is moderate, it has uncertainty.

Although this project is considered as relatively sustainable from institutional and technical perspectives, it is necessary to consider and clarify countermeasures on the organizational and financial structure of the WAJ in order to ensure comprehensive sustainability.

3-3. Factors that promoted the realization of effects

(1) Factors related to planning

A major factor that contributed to the achievement of project purpose is the high importance of resolving the problem of NRW in Jordan. The high relevancy of the project brought a strong commitment among relevant personnel of the project on Jordan side, inside and outside of the WAJ, and resulted in winning effective cooperation from the society, represented by religious leaders and the Ministry of Education in activities to raise the awareness of residents. One example of high-level commitment by the WAJ can also be found in the fact that a proactive measure of refurbishing Marka Training Center for the training on construction control of water supply pipes and water meters was taken.

(2) Factors related to the implementation process

With the adequate combination of various technology transfer methods including OJT, training in classrooms, workshops, and training in Japan, WAJ staff were able to understand preventive measures against NRW in terms of both theory and practice. Knowledge provided through the project was effectively shared among C/P and the relevant personnel of the project. Project activities were adequately modified according to the actual situation on-site. A technical council (operations committee) on provisions related to the certification of private business operators and its procedure was organized, and water business operators including Miyahuna, Al-Yarmuk (NTWA) and AWC, and multiple contractors from the private sector actively participated, which functioned effectively.

3-4. Factors that impeded realization of effects

(1) Factors related to planning

Setting the target of cooperation

With the transfer of the operational management of the Ma'an Governorate GWA to AWC, its position as the target of cooperation for this project became unclear. C/P of Ma'an were unable to participate in activities such as training for instructors of training sessions on water supply pipe and water meter facilities construction, activities to enlighten residents, and the formulation of an action plan by each governorate, which is considered to have partly affected the impact of the project.

(2) Factors related to the implementation process

Reorganization of the WAJ in March 2010

According to the reorganization of the WAJ, positioning of the personnel in charge of the project on the Jordan side within the WAJ became unclear, which posed an obstacle to the decision-making on the Jordan side related to the project until JCC in June 2010.

In addition, although some GWAs continued with their activities to raise awareness among residents, implemented by resident-enlightening coordinators, even after the dissolution of the Resident-Enlightening Division in the main office of the WAJ, there had been no support or guidance from the main office of the WAJ including allocation of a budget, and it was difficult to implement the activities effectively.

Delay of pilot project due to the defect of pressure reducing valve

There had been troubles related to the pressure reducing valve set at the pilot area of Tafilah Governorate, such as a delay in delivery due to the problems of the manufacturer and malfunctioning of the equipment, which caused a delay in the implementation of project activities.

3-5. Conclusion

This project is likely to achieve the project purpose within the project period, and it is adequate to be terminated as scheduled.

The three outputs and the project purpose defined in the PDM2 are likely to be achieved in general before the termination of the project. In terms of the implementation of the project, although there had been some difficulties mainly during the early period, all of the personnel related to the project including C/P and experts exercised efforts towards the success of this project. As a result, the awareness, motivation and the capacity of the WAJ staff, mainly in the GWAs of six governorates and in Marka Training Center, improved and were reinforced significantly.

The theoretical and practical knowledge and skills of water supply network management were reinforced. In the pilot area in Fuheis, Balqa Governorate, water distribution pressure was reduced, which resulted in actual reduction of NRW and a possible reduction of risk of damage to water distribution networks and infrastructure. The system of installing sevice pipes and water meters was clearly developed, and with the full-fledged formulation and implementation of the licensing system of private business operators, it is ensured that the construction quality will increase and the risk of water leakage is reduced accordingly. Through the public awareness activities implemented in the project, the relationship between the WAJ and the regional residents was reinforced. As a result, a systematic and realistic action plan for each GWA to take both symptomatic and preventive measures against NRW was prepared for the first time. This will serve as the basis for the WAJ to take concrete measures on an ongoing basis, together with fiscal measures necessary for the WAJ to realize the NRW reduction goal by 2035, and it is expected that the main office of the WAJ will take adequate and concrete actions in order to make the maximum use of the output of this project.

This project had built the foundation for the WAJ to take necessary measures for reducing NRW. In order to maintain and expand the project outputs, it is necessary for the WAJ to further solidly its commitment in taking concrete measures and reinforce its organizational structure. Because it is considered that this project achieved the best possible success in the changing project environment, it is reasonable to terminate the project as scheduled. It is important that the WAJ will maintain its self-efforts in improving its capacity with a strong commitment. Especially, adequate organizational and fiscal actions taken by the main office of the WAJ, with the implementation of the formulated GWA action plan in mind, are essential for realizing the fundamental success of this project.

3-6. Recommendations

Recommendations on the project

(1) Pilot project being implemented in Tafilah Governorate

- In the pilot area of Tafilah Governorate, the troubles of the pressure reducing valve introduced causes delay in some of the activities, but the planned activities should be completed within the project period.

(2) Preparation of the NRW countermeasures action plan in each governorate

- The project should provide support for the completion of a realistic action plan on countermeasures against NRW, including both symptomatic and preventive measures against NRW, prepared by each governorate.

Recommendation to the WAJ

(1) Clarification of the positioning of the NRW countermeasures action plan within WAJ's budget

- The President of the WAJ should instruct each governorate to complete a comprehensive action plan on countermeasures against NRW within the project period, and to implement a budgetary request for NRW countermeasures based on the NRW countermeasures action plan. In addition, each governorate should review its NRW countermeasures action plan according to the finalized amount of the budget.
- The budget for implementing NRW action plan should be clearly stated within the budgetary request from each governorate submitted to the main office of the WAJ.
- The main office of the WAJ should reinforce its system to evaluate and monitor whether the allocated budget is adequately used for implementing the NRW countermeasures action plan.

(2) Effective use of WAJ staff following the technology transfer

- WAJ staff to which technology transfer is implemented through the project are not necessarily utilized effectively. WAJ should allocate these staff (including those who are dispatched to public corporations and others) to departments related to NRW countermeasures, and effectively utilize their knowledge/experience.
- WAJ should implement the program related to countermeasures against NRW, which is similar to those implemented for governorates, also to WAJ staff. Staff to which technology transfer is implemented should be utilized effectively also as training lecturers.

3-7. Lessons leaned

(1) **Necessity of the selection of the target groups according to the organizational form of C/P and appropriate project designing and implementation technique:**

This project was implemented by setting the main office of the WAJ and the six central and southern GWAs in total that are under the direct administration of the WAJ. However, WAJ has three more affiliated water service providers (public corporations), namely Miyahuna, Al-Yarmuk (NTWA) and AWC. In this project, relevant personnel at the above three organizations served as members of the technical council (operations committee) on provisions related to the certification of private business operators and its procedure was organized, contributing to the realization of effective discussion and the launch of the licensing system.

As lessons for the future, it will be necessary to select adequate target groups by taking into consideration the mid-term changes in the organizational form of the water service businesses, and to flexibly implement

the appropriate designing of the project purpose, output and specific activities as well as effective implementation technique thereof.

(2) **Necessity of prioritized technology transfer when there is a large number of target groups:**

The number of C/Ps that participated in this project reached 40 persons from seven organizations in total, namely, the main office of the WAJ and six GWAs. When there is a wide scope of the target of technology transfer and the basic ability and the ability to comprehend and absorb transferred technology vary largely among C/Ps and trainees, there may be adverse effects in terms of the effectiveness and efficiency of the project. Therefore, by fully understanding and analyzing the abilities of the organizations and C/P candidates to which the technology transfer is implemented in the project, it is necessary to add some changes for effectively implementing the project, such as making distinctions by organization in the achievement level of indicators for some outputs, or partly introducing supplementary training activities on basic knowledge/skill so as to further facilitate the transfer of certain technology.