

The Capacity Development Project for Non Revenue Water Reduction in Jordan Summary Sheet for Result of Evaluation Study after the Project

I. Outline of the Project		
Country: The Hashemite Kingdom of Jordan		Project title: The Capacity Development Project for Non-Revenue Water Reduction in Jordan
Issue/Sector: Water and sewage		Cooperation scheme: Technical cooperation
Division in charge: Water Resources Management Team 2, Group 3, Global Environment Department		Total cost (including the cost up to the project termination estimated at the time of evaluation): 480M yen
Period of Cooperation	(R/D): 2005/06/15	Partner Country's Implementing Organization: Project Management Organization: Ministry of Water and Irrigation (MoWI) Project Implementation Organization: Water Authority of Jordan (WAJ)
	2005/08/01-2008/07/31	
Related Cooperation Project: Individual Project (Long-term Experts) "Water Resource Advisor"		
1-1. Background of the Project		
<p>The annual precipitation in the Hashemite Kingdom of Jordan (hereinafter called Jordan) is less than 100 mm in over 80% of its land and the population has been increasing every year (increased by 500,000 from 2004 to 2005). To address the issues of water shortage and increasing water demand, the country has adopted water rationing. Despite such situation, the rate of Non-Revenue Water (NRW) of the Water Authority of Jordan (WAJ) is over 50% as of 2002 and its accumulated deficit has reached 723.98 million JD (as of 2003), which is as much as 10% of the country's GDP. Realizing the importance of the problem, WAJ tried to take necessary measures but was not able to take adequate measures due to the insufficient number and low technical level of the personnel who were addressing the issue of non-revenue water.</p> <p>Considering the urgency of the problem and the increasing importance of the human resource development to address the problem, the government of Jordan requested a comprehensive technical cooperation project from JICA, who had been supporting the country in dealing with the issue of non-revenue water through technical transfer from long-term experts. In response to the request, the Project was started in August 2005 and midterm evaluation was carried out in January 2007. Terminal evaluation was conducted 6 months before the planned termination of the Project.</p>		
1-2. Project Overview		

<p>(1) Overall Goal NRW of WAJ is reduced</p> <p>(2) Project Purpose Capacity Development of WAJ on NRW reduction measures.</p> <p>(3) Outputs</p> <ol style="list-style-type: none"> 1. The Preparation for the formulation of the Project is completed 2. WAJ Engineers and Technicians acquire essential concept and technology for NRW reduction 3. WAJ senior personnel and Engineers acquire the implementation capacity of internal training courses on NRW reduction. 4. WAJ Engineers and Technicians acquire the practical technology on NRW reduction through field work in pilot areas. 5. WAJ strengthens public awareness activity on NRW countermeasures. <p>(4) Inputs</p> <p>Japanese side:</p> <table style="width: 100%; border: none;"> <tr> <td style="padding-left: 20px;">Short-term Expert</td> <td style="padding-left: 40px;">8 persons, 74.19 man-months</td> <td></td> <td></td> </tr> <tr> <td style="padding-left: 20px;">Equipment</td> <td style="padding-left: 40px;">54,338 (thousand) Yen</td> <td></td> <td></td> </tr> <tr> <td style="padding-left: 20px;">Trainees received</td> <td style="padding-left: 40px;">24 persons</td> <td style="padding-left: 40px;">Local cost</td> <td style="padding-left: 40px;">35,887 (thousand) Yen</td> </tr> </table> <p>Jordan's Side:</p> <p>Counterpart: 19 persons</p> <p>Land and Facilities:</p> <p>Local Cost: 160, 223 Jordanian Dinar (about 26,710K yen)</p>		Short-term Expert	8 persons, 74.19 man-months			Equipment	54,338 (thousand) Yen			Trainees received	24 persons	Local cost	35,887 (thousand) Yen
Short-term Expert	8 persons, 74.19 man-months												
Equipment	54,338 (thousand) Yen												
Trainees received	24 persons	Local cost	35,887 (thousand) Yen										
II. Evaluation Team													
Members of Evaluation Team	<p>(Job title: Name, Occupation)</p> <p>Leader of Japanese Team: Mr. Kazuo Sudo Senior Advisor, Global Environment Department, Japan International Cooperation Agency</p> <p>Non-Revenue Water Reduction: Mr. Shozo Yamazaki Advisor, Ductile Iron Pipe Division, Kubota Co, Ltd.</p> <p>Cooperation Planning: Mr. Terumasa Matsuzaki Water Resources Management Team 2, Group 3, Global Environment Department, Japan International Cooperation Agency</p> <p>Evaluation and Analysis: Ms. Yoshie Yamamoto Researcher, Social Development Department, Global Link Management</p>												
Period of Evaluation	<table style="width: 100%; border: none;"> <tr> <td style="width: 60%;">2008/01/12-2008/02/01</td> <td style="width: 40%;">Type of Evaluation: Terminal</td> </tr> </table>	2008/01/12-2008/02/01	Type of Evaluation: Terminal										
2008/01/12-2008/02/01	Type of Evaluation: Terminal												

III. Results of Evaluation

3-1. Project Performance

(1) Project Purpose – Overall Evaluation: A

It is confirmed that budget for NRW reduction measures will increase, starting with allocation of budget for NRW reduction measures to 5 Governorates in 2009. Reference values for project operation indicators will be set by the end of January 2008.

Improvement of the organizational capability is confirmed based on the followings.

- a) Each governorate is now able to conduct issue analysis and formulate an action plan and budget.
- b) Roles of the NRW department of each governorate have expanded and necessary human resources have been assigned.
- c) Engineers and technicians have been trained to have essential technologies concerning NRW.
- d) Training materials for NRW measures have been developed and training of trainers has been conducted. As a result, their capability to conduct internal training has improved.

(2) Outputs

Output 1 – Overall Evaluation: A

Output 1 is about formulation of PO and other documents, which was carried out before other Outputs.

Output 2 – Overall Evaluation: B

The numbers of engineers and technicians who have mastered essential technologies are 11 and 27 respectively, exceeding the targeted numbers of 10 and 25. 90% of the engineers who have accomplished training have become trainers and the percentage also greatly exceeded the target value of 50%. On the other hand, the implementation of the final achievement test for technicians is delayed although the outline and the contents have been prepared. The operation and management system (proposal) has not been clearly defined. It has just started and is expected to be completed by the time of the project termination.

Output 3 – Overall Evaluation: A

6 people have been qualified as trainers as planned. Development of training materials has also been almost completed. The curriculum for the basic level has been completed and implemented.

Output 4 – Overall Evaluation: A

Although there were delays in budget formulation and facility construction in some areas, the amount of NRW has reduced to half in 7 areas. Water distribution control area maps in non-pilot areas have been developed in all 9 areas of 5 governorates except Ma'an governorate, where the position of the engineer is vacant.

Output 5 – Overall Evaluation: A

Despite low experts' input, significant results have been achieved through public awareness activities

because they are easily accepted in the local areas with the use of a local NGO, the Jordan Aqua Conservation Association (JACA).

3-2. Summary of Evaluation Results

(1) Relevance

Overall Evaluation: A

- Considering the fact that the country is suffering from water shortage, there is no doubt that NRW reduction is an urgent task, as the National Agenda 2006-2015 states that the country will reduce the rate of NRW from the current 46% to 30% by 2012 and 20% by 2017.
- The target group is WAJ personnel. The Project met the needs to improve the technical level of WAJ engineers and technicians engaged in the improvement and dissemination of NRW measures.
- The Project is relevant to one of the development issues in the priority fields for JICA's cooperation activities in Jordan; Effective Use of Limited Water Resources and Capacity Development for Environmental Management, in the field of 1) Improvement of Infrastructure for Self-Reliant and Sustainable Economic Growth.

(2) Effectiveness

Overall Evaluation: A

- The Project purpose has been mostly achieved.
- Synergetic effects have been confirmed, e.g., all the 5 outputs contributed to the achievement of the purpose.
- The contributing factors are the above-stated synergetic effect and the improvement of learning effect generated through the combination of lectures and practical training.
- There were no special adverse factors.

(3) Efficiency

Overall Evaluation: B

- Although the Jordan side made efforts, there was a significant delay in inputs. The assignment of counterpart personnel was conducted as planned. However, in Ma'an governorate, the position of the engineer has been vacant since the resignation of the former engineer for career change. Although a technician has been acting as an engineer, there is still the sense of stagnation.
- Although the inputs from the Japanese side have been generally appropriate, it was pointed out that the timing of expert dispatch could be improved. Compared with the summer months when water shortage is more severe, the months from February to May are more suitable for NRW activities as the water volume is more stable. However, as it is the time of contract renewal in Japan, there is no expert dispatch and local operation cost cannot be paid.

•

(4) Impact

Overall Evaluation: B

- The following unexpected impacts have been confirmed.
- Third country training and technology exchange have been positively accepted and the training materials developed by the Project have been utilized and improved.
- The GIS introduced for the support to GTZ was made more elaborative in the Project and then utilized by another aid organization for water system improvement. Thus synergetic effect on cooperation is confirmed.
- Engineers of different governorate branches have developed a sense of unity and started exchanging information at their own initiative. Governorate branches have also developed a sense of rivalry, which has made the activities even more active.
- WAJ personnel have become more motivated and developed cooperation with the Ministry of Education, town assemblies, etc. through activities to raise awareness among residents.

(5) Sustainability

Overall Evaluation: B

(Political aspect)

As the direction is relevant and the commitment level is high, there is no doubt that political support will continue.

(Financial aspect)

The water rates have to be raised to the appropriate level to reduce the accumulated deficit, but the rates have not been revised since 1998 as it requires political decisions. As a result, they have been dependent on loans and technical support from overseas. Large reduction of WAJ's regular budget has been suggested. However, as MoWI and WAJ are highly concerned with the problem, it seems very likely that the budget for activities to maintain and expand the impacts of the Project will be secured.

(Organizational aspect)

The Programme Management Unit (PMU) was established within WAJ with the support from EC and the NRW manager and the engineer are employed under contract with EC. EC's support will be terminated at the end of 2009, and it has to be ensured that they will not leave the positions due to organizational change in the NRW department or decline in salary level. On the other hand, the 6 governorate branches that cover pilot areas are developing capacities to plan and implement NRW measures and will be able to continue activities on their own.

(Technical aspect)

Although the system to conduct NRW measure training at the basic and intermediate levels has been established, technical support from JICA and other external personnel is still required for the implementation of the advanced course. The technical level of each governorate is likely to be maintained as NRW measures have started in other areas than the original pilot areas. As for the public awareness

activities, although the importance and methodology are understood to some extent, they will still have to be led by MoWI and the NRW department of WAJ main office because governorates do not have enough knowhow to carry out activities on their own.

3-2. Factors that Promoted Realization of Effects

Interconnection of outputs has generated synergetic effects. It was also good that practical training followed lectures.

3-3. Factors that Impeded Realization of Effects

N/A

3-4. Conclusion

As stated above, the achievement level in the 5 categories, purpose and outputs is high. Therefore, we propose that the Project should be terminated in August 2008 as planned.

However, in order to reduce the rate of NRW as much as possible, efforts will still have to be made to 1) improve the water distribution system to solve the high pressure issue that increases water leakage, and 2) improve technologies for piping and water supply works. The NRW measure training and budget system also need to be mainstreamed.

3-5. Lessons Learned

(1) Period till the Project Termination

- (i) Each governorate should establish a collaborative structure with related departments including GIS department, O&M department and customer information management department as well as the departments for fieldwork.
- (ii) In Ma'an governorate, the position of the engineer has been vacant after the resignation of the former engineer. The successor needs to be appointed as soon as possible.

(2) Period after the Project Termination

- (i) In order for the NRW measure activities in the areas designated by each governorate as equivalent to pilot areas to be successful, appropriate amount of budget needs to be allocated to each governorate exclusively for NRW measures.
- (ii) If the activities spread to the whole governorate, the current organizational structure of each governorate will not be sufficient. It is necessary to conduct cost benefit analysis based on the data from the pilot areas, formulate a NRW measure plan for the whole governorate and allocate human resources, equipment and budget accordingly.
- (iii) Meter accuracy can be improved and error can be reduced by replacing customer meters at 2,000 m³ or 5 years of age.

- (iv) To further reduce NRW, tools for water pressure adjustment, zoning, etc. are necessary.
- (v) Personnel at the level of technician and below tend to have low morale because the promotion opportunities are limited due to their academic qualifications and their technical level varies. Establishment of a certification system and raising salary for those with good skills will improve their morale.
- (vi) For further NRW reduction, it is desirable to measure MNF on a daily bases in small plots (less than 300 households).