Internal Ex-Post Evaluation for Technical Cooperation Project

conducted by Palestine Office: August 2021

Country Name	Technical Assistance and Capacity Building Project for the Jericho Sanitation Project
Palestine	

I. Project Outline

Background	There were no proper wastewater treatment facilities in Jericho Jordan Valley. Wastewater generated in urban areas was posing a serious concern for the contamination of groundwater, which was the primary source for the water supply in Jericho Municipality. For the effective use of the limited water source, treated wastewater was expected to be utilized as a new water source. A wastewater treatment plant (WWTP) was constructed by Japan's grant aid project "Jericho Wastewater Collection, Treatment System and Reuse Project" (2011-2014). Jericho Municipality did not have sewerage facilities before and had no experience in wastewater management. This technical cooperation project was to complement the grant aid project to develop capacity of Jericho Municipality in operation and management of sewerage facilities.		
Objectives of the Project	This project aims to establish a system for the operation and management of sewerage facilities in Jericho Municipality through the establishment of the departments for the operation and management of sewerage facilities and development of a management plan; capacity development in operation and management of WWTP; capacity development in maintenance of sewer networks; and capacity development in financial management of sewerage facilities, thereby contributing to their operation and management under sound financial conditions. 1. Overall Goal: Sewerage facilities in Jericho Municipality are operated and managed appropriately under sound financial conditions. 2. Project Purpose: System for operation and management of sewerage works in Jericho Municipality is established.		
Activities of the Project	1. Project site: Jericho Municipality 2. Main activities: 1) To establish a department for the operation and management of sewerage facilities in Jericho Municipality, to develop by-law for users of the sewerage facilities; and to develop a management plan. 2) To train staff in operation and management of WWTP; to develop an effluent regulation; and to promote utilization of treated wastewater and sludge for agriculture; etc. 3) To train staff in maintenance of sewer networks; to connect private sewers with public sewers. 4) To train staff in financial management of sewerage facilities; to establish user charge collection system; to develop a financial plan. 3. Inputs (to carry out above activities) Japanese Side 1) Experts: 12 persons 2) Trainees received: 11 persons 3) Equipment: Electric panel for pump, distribution pipe for treated effluent, oxygen & hydrogen sulphide meter, etc. 4) Local cost Palestinian Side 1) Staff allocated: 14 persons 2) Office, electricity, water, operation-maintenance cost for wastewater treatment plant, etc.		
Project Period	(ex-ante) May 2012-March 2016 (actual) December 2012-March 2018	Project Cost	(ex-ante) 394 million yen (actual) 549 million yen
Implementing Agency	Jericho Municipality, Palestine Water Authority (PWA)		
Cooperation Agency in Japan	NJS Consultants Co., Ltd., Yokohama Water Co., Ltd.		

II. Result of the Evaluation

<Special Perspectives Considered in the Ex-Post Evaluation>

- Achievement of Project Purpose Indicator 4 "Sewerage works are managed based on a Strategic Business Plan" is measured considering the achievement of the targets of the Business Plan; i.e., household connections, water bill collection, reuse of treated wastewater and use of sludge. They were among Output indicators, therefore the achievement at project completion is compared to the target values of these Outputs. To measure the continuous situation at the time of ex-post evaluation, the values are compared to the target values (in 2020) of the Business Plan.

1 Relevance

<Consistency with the Development Policy of Palestine at the Time of Ex-Ante Evaluation >

This project was consistent with Palestine's National Sector Strategy for Water and Wastewater (2011-2013). One of its priority areas was wastewater management including construction of wastewater treatment plants and reuse of treated wastewater for the improvement of hygiene and protection of water resources.

<Consistency with the Development Needs of Palestine at the Time of Ex-Ante Evaluation >

This project was consistent with the needs for capacity development in wastewater management as mentioned in "Background" above.

<Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation>

Promotion of civilian stability by provision of basic infrastructure, including sewerage systems, was one of the priority areas of Japan's

ODA policy for Palestine. Reuse of wastewater for agricultural use was also relevant to the sustainable economic growth, which was another priority area.[1]

<Evaluation Result>

In light of the above, the relevance of the project is high.

2 Effectiveness/Impact

<Status of Achievement of the Project Purpose at the Time of Project Completion>

The Project Purpose, "System for O&M of sewerage works in Jericho Municipality is established" was partially achieved at the time of project completion. Water and Sanitation Department in Jericho Municipality was officially established (Indicator 1), the regulation for users of sewerage facilities was enforced (without penalty clause) (Indicator 2), and operation and maintenance of sewerage facilities was conducted based on manuals and plans developed under the project (Indicator 3). Sewerage works were managed based on the Strategic Business Plan (Indicator 4), but some of the targets of the Plan (rate of water tariff collection and household connections) were not achieved. As these targets of the Plan are important indicators for the sound management, Project Purpose was judged to have been "partially achieved" at the Time of Project Completion, as was in the Terminal Evaluation.

<Continuation Status of Project Effects at the Time of Ex-Post Evaluation>

The project effects have been partially continued till the time of ex-post evaluation. Water and Sanitation Department is functioning, the status of the regulation for users of sewerage facilities is the same, and operation and maintenance of sewerage facilities is conducted based on manuals and plans. The Strategic Business Plan is expected to be updated. Rate of water tariff collection has not achieved the target values of the Plan (2020) mainly due to the absence of penalty against non-payment. A new by law called "Tariff System for Water and Sanitation No. (4) for the year 2021" including penalties will be enforced soon.

<Status of Achievement of the Overall Goal at the Time of Ex-Post Evaluation>

The Overall Goal, "Sewerage facilities in Jericho Municipality are operated and managed appropriately under sound financial conditions", has been achieved in terms of indicators. Annual income exceeds annual expenditure although by a small margin (Indicator 1) and effluent from wastewater treatment plant is below effluent standard (Indicator 2). However, water tariff collection rate is low mainly due to the absence of penalty and the municipality does not save the balance for the O&M or future investment in wastewater services. With this, it is hard to say at this moment that the service is financially viable and hence the Overall Goal "Sewerage facilities in Jericho Municipality are operated and managed appropriately under sound financial conditions" has been partially achieved.

<Other Impacts at the Time of Ex-Post Evaluation>

No negative impacts have been observed.

The implementing agencies pointed out positive impacts as follows:

- Groundwater pollution has been mitigated by treating the wastewater in the region where there was no wastewater treatment system before.
- WWTP accepts visitors from other municipalities and universities and shares technical knowledge on wastewater treatment.
- Water reuse for agriculture in the area where water is scarce generates income for the Municipality.

<Evaluation Result>

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

Achievement of Project Purpose and Overall Goal

Aim	Indicators	Results	Source
(Project Purpose) System for O&M of sewerage works in Jericho Municipality is established.	Indicator 1 Water and Sewerage Department is officially approved.	Status of the Achievement (Status of the Continuation): Achieved (Continued) (Project Completion) (Ex-post evaluation) The department (Water and Sanitation Department) was established in June 2013 and keeps functioning.	source：Terminal evaluation report and information from Jericho Municipality.
	Indicator 2 The by-law for users of sewerage facilities is enforced.	Status of the Achievement (Status of the Continuation): Partially achieved (Partially continued) (Project Completion) The Cabinet Resolution no. 16/2013 on "the House and Facilities' Connection System to the Public Sewage Network", which has a similar scope as the "draft by-law" for the Municipality of Jericho supported by the Project was enforced. The draft penalty clause was prepared, but was not approved by PWA and Ministry of Local Government (MoLG) as of February 2018. The Resolution was authorized as a law and was made public on the website of MoLG on January 28, 2014." This resolution is applied to all municipalities without exception. (Ex-post evaluation) Jericho Municipality follows the resolution above. The tariff collection for water and wastewater was merged. There is a new by law called "Tariff System for Water and Sanitation No. (4) for the year 2021" to be enforced soon, the penalties are mentioned there.	source：Terminal evaluation report, Project completion report Information from Municipality of Jericho, PWA.
	Indicator 3 Operation and Maintenance	Status of the Achievement (Status of the Continuation): Achieved (Continued) (Project Completion)	source：Terminal evaluation report,

[1] ODA country data collection (2012)

	of sewerage facilities is conducted based on manuals and plans.	The manuals of security control, operation & maintenance and troubleshooting for sewerage facility were prepared in 2014. The daily operation was conducted according to the manuals. (Ex-Post Evaluation) Manuals are properly and regularly used.	Project completion report, Interview of WWTP (Manager, Technicians, engineers, Lab manager - water quality & operators).
	Indicator 4 Sewerage works are managed based on a Strategic Business Plan.	Status of the Achievement (Status of the Continuation): Partially achieved (Partially continued) (Project Completion) (Ex-Post Evaluation) The Strategic Business Plan was developed in 2014 and revised in 2015 and 2016 (for 2016-2020). It has not been updated. Since March 2020, the Municipality's function is affected by COVID-19. The Municipality sees updating the business plan is their priority and looks to get technical support from the Japanese expert who will be dispatched in the second half of 2021. The status of important targets of the Strategic Business Plan are as follows: <u>Connection to sewer system</u> In 2018 (Project completion), 1,824 households were connected. As of April 2021, 2,114 households were connected. The connection is behind the schedule as the target as of end 2020 was set to be 2,733 in the business plan. <u>Sewer bill collection</u> Collection rate in 2018 (Project completion) was 53%. The 'Strategic Business Plan' aimed at 70% collection rate of 'sewer tariff' in 2020. The actual collection rate in 2020 was 36%. It should be noted that the water bill and sewer bill are combined and collected together. The low rates of sewer bill collection need to be addressed in conjunction with the water bill collection. Main users who do not pay the bill are reported to be the national government institutions. The military and security services' unpaid water tariff was 82% of total unpaid tariff in Dec 2017. As of today, the military and security services remain the top contributors of unpaid tariff. Users are taking advantage of the absence of strict penalty measures against users who do not pay water tariff. The collection rate is further deteriorated due to COVID-19. PWA does not have power to enforce the payment to the military and security services while they prepare reconcile file to be submitted to the National Reconciliation Committee. For customer level, introduction of pre-paid water meters and awareness efforts are supported by PWA. The Municipality has already started to replace the water meters with 'pre-paid water meters', which can improve the water and sewer bill collection. The Municipality is also looking at a) strengthening the billing system and increase of the number of collection service staff; b) strengthening policing of water thefts; c) legal actions against users who do not pay. <u>Reuse of treated wastewater</u> The percentage of reuse can be considered 100%, taking the figure from summer months when the demand peaks (100% in summer and 64% in winter (average 2018-2021)). The reuse rate in 2018 (Project completion) was 73%. Jericho Municipality signs an annual contract with each farmer who purchases the treated water and the farmer pays upfront. The Municipality is responsible for providing sufficient quantity of water during the summer months to all contracted farmers when the demand is high. In summer, 100% of water is used. In winter it is not possible to use all water as the demand is low, and the size of the pond to store the treated water is limited so the water needs to be discharged in wadi (dry riverbed). There are more farmers who are interested in purchasing the water but it is not possible to contract with more farmers unless the wastewater inflow increases. <u>Use of sludge</u> The sludge from the WWTP has not been used for agriculture. The Ministry of Agriculture has standards and regulations on sludge reuse, guided by the standards issued by Palestinian Standard Institute. Nonetheless, there is a safety concern over the reuse of sludge for agriculture. Jericho Municipality is keen to explore the possibility of reuse. Therefore, JICA plans to dispatch an expert of sludge reuse, who will support Jericho Municipality to conduct an experiment on sludge reuse on their own premises so that relevant data can be generated for	source：Project completion report, Jericho Municipality Questionnaire and Interview, "Monthly Report for Sewage Network Maintenance & Household Connection Report, Strategic Plan updated in July 2016. collection fee statement (financial department), Strategic Plan updated in July 2016.

<table>
<tr><td></td><td></td><td>further discussion and examination by MOA.</td><td></td></tr>
<tr><td>(Overall Goal)
Sewerage facilities in Jericho Municipality are operated and managed appropriately under sound financial conditions.</td><td>Indicator 1
Annual income exceeds annual expenditure</td><td>(Ex-Post Evaluation) Achieved
The income exceeds expenditure as the number of sewerage service users is increasing. The income is from the sewer service fee (which is collected with water tariff), connection service fee, and the sales of the treated water. The municipality does not save the balance from wastewater service for the O&M or future investment in wastewater services. The balance is used to meet other needs of the Municipality. The maintenance of the WWTP had not been costly as the facility was still new and was well maintained by the trained staff, however, in coming years, the Municipality will require to replace damaged equipment due to normal wear and tear.
<table>
<tr><td colspan="5">Income and expenditure of wastewater service (Unit: ILS)</td></tr>
<tr><td></td><td>2018
(1 year)</td><td>2019
(1 year)</td><td>2020
(1 year)</td><td>2021 (as of April)</td></tr>
<tr><td>Income</td><td>877,515</td><td>1,110,903</td><td>1,182,306</td><td>458,895</td></tr>
<tr><td>Expenditure</td><td>1,055,288</td><td>1,370,641</td><td>994,126</td><td>148,880</td></tr>
<tr><td>Balance</td><td>(177,773)</td><td>(259,738)</td><td>188,180</td><td>310,015</td></tr>
</table></td><td>source : Interview & Questionnaire with Jericho Municipality, Strategic Business Plan July 2016 Table 8.15 ‘Repair Cost’.</td></tr>
<tr><td></td><td>Indicator 2
Effluent from wastewater treatment plant become below effluent standard.</td><td>(Ex-Post Evaluation) Achieved
The quality of treated wastewater meets the standard.
<table>
<tr><td>Standards of Treated WW</td><td>Accepted Standard</td><td>2018 (April)</td><td>2019 (April)</td><td>2020 (April)</td><td>2021 (April)</td></tr>
<tr><td>Biochemical Oxygen Demand: BOD (mg/l)</td><td>20</td><td>5</td><td>4</td><td>6</td><td>5</td></tr>
<tr><td>Chemical Oxygen Demand: COD (mg/l)</td><td>50</td><td>18</td><td>15</td><td>19</td><td>17</td></tr>
<tr><td>Temp.(℃)</td><td>35</td><td>24</td><td>25</td><td>23</td><td>26</td></tr>
<tr><td>pH</td><td>6-9</td><td>8.1</td><td>8</td><td>8</td><td>8.2</td></tr>
<tr><td>Dissolved Oxygen: DO (mg/l)</td><td>1<</td><td>5.5</td><td>5.8</td><td>5.1</td><td>5.4</td></tr>
<tr><td>Turbidity (Nephelometric Turbidity Unit: NTU)</td><td>10</td><td>2.6</td><td>2.3</td><td>2</td><td>2.5</td></tr>
<tr><td>Electric conductivity: EC (micro Siemens/cm)</td><td>n/a</td><td>1,650</td><td>1,700</td><td>1,720</td><td>1,680</td></tr>
<tr><td>Total Dissolved Solids: TDS (mg/l)</td><td>1200</td><td>750</td><td>820</td><td>800</td><td>780</td></tr>
<tr><td>Total Nitrogen: TN (mg/l)</td><td>30</td><td>1.2</td><td>2</td><td>1.8</td><td>2.1</td></tr>
<tr><td>Total Phosphorus: TP (mg/l)</td><td>n/a</td><td>7</td><td>5</td><td>8</td><td>9</td></tr>
<tr><td>Total suspended solids: TSS (mg/l)</td><td>30</td><td>4</td><td>4</td><td>6</td><td>4</td></tr>
<tr><td>Fecal coliforms: FC</td><td>n/a</td><td>*</td><td>*</td><td>*</td><td>*</td></tr>
</table>
* No record / Not required as chlorine is added to the effluent.</td><td>source : Interview with Jericho Municipality, Project Completion Report.</td></tr>
</table>

3 Efficiency

Both the project cost and period exceeded the plan (ratio against the plan: 139% and 136% respectively). The project period was extended twice (1st extension in September 2016 (10 months extension until July 2017) and 2nd extension in July 2017 (8 months extension until March 2018)) because some output indicators (house connections, user fee collection rate, financial plan, income) were not achieved by the original (and the first extended) end dates of the project. There was no change in the planned outputs.
Therefore, the efficiency of the project is fair.

4 Sustainability

<Policy Aspect>
Palestine has the “National Water Sector Strategic Plan and Action Plan (2017-2022)” including “Strategic Objective for Wastewater Sector: Improving wastewater services and structure (collection, treatment, and reuse).” Wastewater treatment/management and reuse continue to be a priority of Palestinian Authority and PWA. Absence of penalty clause in the Cabinet Resolution on “the House and Facilities’ Connection System to the Public Sewage Network” is the main reason for low tariff collection rate. A new by law called “Tariff System for Water and Sanitation No. (4) for the year 2021” including penalties will be enforced soon.
<Institutional/Organizational Aspect>
The Water and Sanitation Department of Jericho Municipality was restructured in 2021 to achieve higher efficiency with limited number of staff. It has three sections: Domestic Water and Sanitation, Subscribers Services, Irrigation Water. While Jericho Municipality considers that they are understaffed, the facilities are operated without major problems. Additional staff would be necessary to respond to the increase of wastewater inflow and ensure sustainability of wastewater services.
<Technical Aspect>
During the project, all eight staff passed technical examination for O&M of the WWTP and all five staff passed technical examination for sewer maintenance. The staff sustain skills by self-learning, training by other staff, and participation in workshops. The Municipality

existing staff has the technical capacity to train new staff when assigned. Operation manuals are utilized in daily operation and guidance and lab test manual is utilized for assessment of inflow and outflow water quality. Some update in the manual was done by the staff. The quality of treated water of WWTP meets the standards.

<Financial Aspect>

The revenue of the Municipality on the wastewater treatment is from wastewater user tariff, connection fee, and sale of the reuse water, and it is operating with a surplus. User tariff collection rate is low due to absence of penalty clause. The surplus is used for other municipality needs and not saved for future needs of the wastewater services such as major repairs. There will be an evaluation on the strategic business plan and updating at the end of 2021.

<Evaluation Result>

In light of the above, some problems have been observed in terms of the institutional/organizational and financial aspects of the implementing agency. Therefore, the sustainability of the project effects is fair.

5 Summary of the Evaluation

The project partially achieved the Project Purpose, "System for O&M of sewerage works in Jericho Municipality is established", at the time of project completion, and the achievement status is more or less the same at the time of ex-post evaluation. The Overall Goal, "Sewerage facilities in Jericho Municipality are operated and managed appropriately under sound financial conditions", has been partially achieved as the service is not financially viable because water tariff collection rate is low mainly due to the absence of penalty while annual income exceeds annual expenditure by a small margin. Although the sewerage facilities have been operated and maintained based on manuals developed under this project and the staff retain related knowledge and skills, the municipality has not saved the balance for the O&M or future investment in wastewater services. The current level of staffing is just good enough to carry on the day-to-day operations to maintain the status quo, and falls short of implementing additional efforts to address persisting challenge of financial sustainability. As for the efficiency, both the project cost and period 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:

Jericho Municipality

1. The leadership should make a decision to keep aside the revenue from wastewater service for future O&M needs.
2. The Finance Department and the Water and Sanitation Department should review and update the business plan which will allow the Municipality to have a clearer strategy/target to improve the sustainability of the wastewater service.
3. As part of the effort to update the business plan, the Water and Sanitation Department in coordination with relevant departments should make a concrete plan and targets to reduce Non-Revenue Water (NRW) to enhance the sustainability of wastewater service. One of the actions could be to reactivate the effort to introduce penalty for users who do not pay for the services. It is recommended that the Department consult MoLG and relevant departments in the Municipality on the way forward. Impact of penalty on vulnerable people and their protection should be considered.
4. As part of the effort to update the business plan, the Water and Sanitation Department should work on a plan to expand the sewer network so that remaining unserved areas will have access to sewer service. This will also help mitigate negative impact on environment/ increase reuse of wastewater.
5. In order to implement the plans discussed in 3 and 4, the Water and Sanitation Department should make further effort to mobilize funds.
6. The Water and Sanitation Department should continue examination of sludge use.

PWA

1. PWA should continue advocating for ringfencing of water and wastewater revenues (i.e., separate the revenue from water services from the rest), and take necessary actions to implement this strategy.

2-1. PWA should continue to work with the Ministry of Finance, Ministry of Local Government, and if necessary, with Prime Minister Office to resolve the issue of non-compliance of PA institutions with the obligation to pay water tariffs.

2-2. PWA should continue to provide technical guidance for Jericho Municipality to reduce NRW

3. PWA should advocate for the need for the expansion of sewer network and its reuse program in Jericho among international donors and lead the fund-raising effort at the national level (while Jericho should make effort on its own).

JICA

JICA has an ongoing technical cooperation project with Jenin Municipality to improve the management of the water service with emphasis on the reduction of NRW. Jenin Municipality has been successful in this effort and notably in cultivating citizens' support for introducing Prepaid Water Meters. JICA could liaise between the two municipalities so that they can share experiences.

Lessons Learned for JICA:

- It had been taking a longer time than anticipated to connect houses with the sewer network. Facilitated by JICA, PWA received support from the Representative Office of Japan (RoJ) to implement house connections, finish manholes and procure pre-paid water meters. Coordination between JICA and RoJ contributed to enhancing the impact and sustainability of the project outcomes. Both JICA and RoJ were well aware of the challenges facing related to WWTP supported by the Government of Japan. In close communication and coordination, both were ready for the joint effort to increase the utilization of WWTP. The collaboration was especially useful when JICA was facing budget constraints.

Treated water is kept in the pool and is supplied to dates farmers, who installed pumps along the pool.

A garden is available to experiment sludge reuse

Well maintained facility by the staff trained by the Project