

Country Name	<b>The Project for Upgrading of Mechanical System for Sewerage and Drainage Services in Gujranwala</b>
Islamic Republic of Pakistan	

**I. Project Outline**

Background	Gujranwala City, the fourth largest city in Province of Punjab in Pakistan, was an important industrial city and an agricultural distribution center in the province. Due to rapid population inflow, upgrading of its socioeconomic infrastructure was indispensable. Sewerage and drainage system suffered from frequent flood damage caused by decrease in drainage capacity due to accumulation of silt, sediment, sludge or garbage in the pipes and aged deterioration of disposal pump stations. In addition, the pumps often stopped because of frequent power outage. Regarding rainwater drainage system, drainage capacity of gutters and side ditches and conduits was insufficient so that depressions and lowlands remained inundated for long hours (8 to 48 hours) during heavy rains. (Figures at the time of ex-ante evaluation.)			
Objectives of the Project	The project aimed to upgrade mechanical system for sewerage and drainage service in Gujranwala City in Pakistan by procuring equipment for maintenance of sewerage and drainage pipes and implementing technical assistance to prepare an efficient and sustainable cleaning work plan, thereby contributing to reduction of sewer and rainwater flooding and damage from flooding in the city.			
Contents of the Project	<ol style="list-style-type: none"> <li>1. Project site: Gujranwala City, Province of Punjab</li> <li>2. Japanese side: (1) Provision of grant necessary for procurement of cleaning/de-silting equipment (2 water jet cleaners, 4 suction machines, 1 wheel-type clamshell, 2 wheel-type backhoes, 10 dump trucks, 3 pick-up trucks, 1 set of safety equipment, 7 sets of winch machines, 15 traction type dewatering pumps) and 14 pumps and 14 generators for 8 disposal stations; (2) Technical assistance (soft component of Grant Aid) to Water and Sanitation Agency (WASA) Gujranwala.</li> <li>3. Pakistani side: Rehabilitation and maintenance of access roads to disposal stations, parking area for the equipment with storage warehouse and administration office for spare parts, etc.</li> </ol>			
Project Period	E/N Date	November 13, 2014	Completion Date	December 21, 2016 (Completion date of soft component)
	G/A Date	November 13, 2014		
Project Cost	E/N Grant Limit / G/A Grant Limit: : 1,031 million yen Actual Grant Amount: 847 million yen			
Executing Agency	Water and Sanitation Agency (WASA) Gujranwala			
Contracted Agencies	Main Contractors: Future Bud International Co., Ltd.; Torishima Pump Mfg. Co., Ltd. Main Consultant: CTI Engineering International Co., Ltd.			

**II. Result of the Evaluation**

## &lt;Constraints on Evaluation&gt;

- Field visit of site, equipment and machinery and face to face discussion and information collection from WASA Gujranwala (WASA-G) could not be achieved due to restriction of movement caused by spread of COVID-19. Information was collected through questionnaire, telephone and email etc.

## &lt;Special Perspectives Considered in the Ex-Post Evaluation &gt;

- In the Ex-ante Evaluation Sheet, the target year for Indicators of quantitative effects is 2020 that is three years after project completion (the project was planned to be completed in February 2017). Since the project was completed in December 2016, the actual target year is 2019. Therefore, the target year was set to be 2019 in this ex-post evaluation.
- Among the indicators set in the Ex-ante Evaluation Sheet to verify the quantitative effects, Indicator 4 (“Inundation time in the city in the monsoon season”) and Indicator 5 (“Number of complaints regarding flooding and sludge”) were considered to be a logical consequence of the outcome of this project, namely, “to upgrade mechanical system of sewerage and drainage services”. Therefore, Indicator 4 and 5 were used to verify the assumed impact brought by the project. As to quantitative effects, utilization level of the procured equipment was also examined (Supplementary Information 1).
- One of the qualitative effects mentioned in the Ex-ante Evaluation Sheet (i.e., “Improvement of sanitary environment by reduction of sewer and rainwater flooding”) consists of 2 parts: “Reduction of sewer and rainwater flooding” and “Improvement of sanitary environment”. “Reduction of flooding of sewerage and rainwater” is a logical consequence of the outcome of this project; therefore, it was considered as an assumed impact brought by the project. Meanwhile, “Improvement of sanitary environment” is a consequence of “Reduction of sewer and rainwater flooding”; therefore, it was considered as other positive impact expected at the time of ex-ante evaluation. Regarding qualitative effects, the following information was also used to verify the effects of the soft component of the project: “Utilization and update of the cleaning work plan” (Supplementary Information 2); and “Utilization of the equipment maintenance manual and the safety manual” (Supplementary Information 3).

**1 Relevance**

## &lt;Consistency with the Development Policy of Pakistan at the Time of Ex-Ante Evaluation&gt;

At the time of ex-ante evaluation, the project was consistent with development policy of Pakistan to prioritize safe water supply and improvement of sanitation, as set forth in the Vision 2025 (2014).

## &lt;Consistency with the Development Needs of Pakistan at the Time of Ex-Ante Evaluation&gt;

At the time of ex-ante evaluation, the project was consistent with development needs of Pakistan for upgrading of mechanical system for sewerage and drainage service in Gujranwala City as described in “Background”.

## &lt;Consistency with Japan’s ODA Policy at the Time of Ex-Ante Evaluation&gt;

At the time of ex-ante evaluation, the project was consistent with the Country Assistance Policy for Islamic Republic of Pakistan (2012), which includes assistance to “contribute to improving the poor conditions of water and sanitation especially in the urban areas” under one of the three Priority Areas, “Ensuring human security and improvement of social infrastructure”.

## &lt;Evaluation Result&gt;

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

## 2 Effectiveness/Impact

### <Effectiveness>

The project achieved its objective of upgrading mechanical system for sewerage and drainage service in Gujranwala City in the target year (i.e., 2019). As for quantitative effects, most of the major equipment items procured under the project (i.e., 67 out of 72 pieces procured<sup>1</sup>) were operated, and Indicator 1 and 2 achieved 86%-94% and Indicator 3 achieved 94% of the respective targets<sup>2</sup>. With respect to qualitative effects, effects of soft component of the project were produced and continued. WASA Gujranwala (WASA-G) prepared detailed cleaning work plan of sewers and drains based on the transferred methodology and implemented cleaning activities as per the prepared work plan. WASA-G also utilized the equipment maintenance manual and the safety manual developed under the soft component of the project. The water flow capacity of sewerage pipes and drainage channels was improved as a result of the project because the procured backhoes and clamshell were extensively used for desilting of drains and the installed 14 disposal pumps increased the draining capacity, which ultimately increased flow capacity of sewer lines.

### <Impact>

As assumed at the time of ex-ante evaluation, inundation time for depressions and lowland in the city in the monsoon season was decreased to 5 to 7 hours (target: 24 hours or less) in the target year because the procured dewatering sets were placed at depression points. The reduction of the inundation time coupled with the increased draining capacity of the target disposal stations and the increased amount of sludge removal contributed to decrease of the number of complaints regarding flooding and sludge to 5,500 cases/year (target: 5,000 or less). The mechanical system for sewerage and drainage services upgraded through the project contributed to reduction of sewer and rainwater flooding, and no immense urban flooding occurred in Gujranwala City after the project completion so that damage from flooding was decreased. As expected at the time of ex-ante evaluation, sanitary environment in Gujranwala City was improved by proper draining out of rainwater and cleaning of sewers through proper and timely pumping. Meanwhile, no negative impacts were observed.

### <Evaluation Result>

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

### Quantitative Effects

Indicators*	Baseline 2014 Baseline Year	Target 2019 3 Years after Completion	Actual 2017 1 Year after Completion	Actual 2018 2 Years after Completion	Actual 2019 3 Years after Completion
Indicator 1: Amount of sludge removed (sewerage pipes) (m <sup>3</sup> / year)	6,000	17,000	9,500	12,300	14,600
Indicator 2: Amount of sludge removed (drains) (m <sup>3</sup> / year)	0	12,000	8,600	9,800	11,300
Indicator 3: Drainage capacity in case of power outage (cusec)** <sup>3</sup>	115	289	215	235	273

Sources: Ex-ante Evaluation Sheet; WASA-G.

\* There was no description on calculation basis of baseline and target figures in the available documents.

\*\*Total drainage capacity (not actual amount discharge) of 8 target disposal stations (i.e., Alam Chowk; Khayali; Nowshera Sansi; People Colony; PMU; Rajkot; Samanabad; and Mughalpur) in case of power outage.

### Assumed Impact

Indicators	Baseline 2014 Baseline Year	Target 2019 3 Years after Completion	Actual 2017 1 Year after Completion	Actual 2018 2 Years after Completion	Actual 2019 3 Years after Completion
Indicator 4: Inundation time for depressions and lowland in the city in the monsoon season (hours)	8 to 48	24 or less	18 to 20	8 to 10	5 to 7
Indicator 5: Number of complaints regarding flooding and sludge (cases/year)	10,000 or more	5,000 or less	7,800	7,000	5,500

Sources: Ex-ante Evaluation Sheet; WASA-G.

## 3 Efficiency

Both the project cost and period were within the plan (ratio against plan: 82% and 96% respectively). The outputs of the project were produced as planned. Therefore, the efficiency of the project is high.

## 4 Sustainability

<sup>1</sup>For the status of the other equipment, please see <Current Status of Operation and Maintenance> of “4 Sustainability”.

<sup>2</sup>Indicator 1 and 2 did not achieve 100% of targets mainly because of insufficient manpower and machinery for it. Although the number of the staff was increased from the time of ex-ante evaluation (please see <Institutional/Organizational Aspect> of “4 Sustainability”) and most of the equipment procured under the project was in use, due to the expansion of the jurisdiction from 94 km<sup>2</sup> to 160 km<sup>2</sup> in 2018, they were still not sufficient to achieve 100% of targets. (For example, it took longer time to move within the jurisdiction, which decreased the work time for sludge removal.) The reason why Indicator 3 did not achieve 100% of target could not be confirmed.

<sup>3</sup> The reason why the total capacity changed every year could not be confirmed.

<Institutional/Organizational Aspect>

WASA-G continuously engaged in operation and management of water supply service and sewerage service in Gujranwala City. The management system was not specifically divided into two service sections to deal with their respective routines as expected at the time of ex-ante evaluation; however, there were no major problems with existing organizational structure. Two technical Directions (Engineering Direction and Operation and Management Direction) were still responsible for operation and management of water supply and sewerage services, and total of 450 staff members were assigned for operation and maintenance (O&M) of the procured equipment as of December 2020. Despite the continued deficiency of skilled/technical staff for O&M in general<sup>4</sup>, the minimum required personnel were allocated for O&M of the procured equipment because the number of allocated staff (i.e., 450 in total) was more than the plan at the time of ex-ante evaluation (i.e., 395 in total) and, as stated in “2 Effectiveness/Impact”, the objective of the project was achieved and the assumed impact was observed.

<Technical Aspect>

WASA-G had necessary technical capacity to sustain the effects of the project. Deputy Directors, Assistant Directors, and Sub-Engineers trained by the soft component of the project still worked for WASA-G and continuously prepare clearing working plans and preventive equipment management plans for the original service area (the service area at the time of ex-ante evaluation and during the project implementation), utilizing the acquired skills and knowledge and the manuals developed under the project. Other O&M staff members sustained the skills and knowledge to conduct proper O&M of the procured equipment by preparing and implementing preventive maintenance work schedule according to the manuals developed under the project. In addition, training on O&M was available at Punjab WATSAN (Water and Sanitation) Academy<sup>5</sup>, established under a technical cooperation project of JICA “Project for Improving the Capacity of WASAs in Punjab Province” (2015-2018). So far, about 15 staff members were trained at WATSAN Academy.

<Financial Aspect>

Budget for O&M of the procured equipment was provided by Housing, Urban Development and Public Health Engineering Department (HUD&PHED) of the Government of Punjab. In the last three years, the annual budget was more than the annual O&M cost estimate at the time of ex-ante evaluation (i.e., 32 million Rupees (Rs)) and covered the annual expenditure as shown in the table below. The sufficient budget was secured for O&M of the procured equipment despite overall financial situation of WASA-G was not good.

<Budget and expenditure of WASA-G for O&M of the procured equipment> (Unit: million Rs)

	2017/18	2018/19	2019/20
(1) Total budget for O&M of the procured equipment	38	41	35
(2) Total expenditures for O&M of the procured equipment	18	21	12

Source: WASA-G

<Current Status of Operation and Maintenance>

Most of the major equipment items procured under this project were operated and in good condition. The other items, which were not used at the time of ex-post evaluation, were under repair or the budget for the repair was included in budget estimate for FY 2020/21. Necessary spare parts and consumables were properly procured and managed.

<Evaluation Result>

Therefore, the sustainability of the project effect is high.

5 Summary of the Evaluation

The project achieved its objective of upgrading mechanical system for sewerage and drainage service in Gujranwala City and the expected impact of reduction of sewer and rainwater flooding and damages from flooding was observed. Regarding the sustainability, no major problems were observed in terms of the institutional/organizational, technical, and financial aspects of the executing agency because the minimum required personnel and the necessary budget for O&M of the procured equipment were secured and WASA-G had necessary technical capacity to sustain the effects of the project. Considering all of the above points, this project is evaluated to be highly satisfactory.

III. Recommendations & Lessons Learned

Recommendations to Executing Agency:

- It is recommended that WASA-G make sure to maintain the procured equipment properly and repair some malfunctioning equipment so that all procured equipment can be utilized until the end of its service life. WASA needs to continuously update and implement the preventive maintenance plan.
- It is recommended that WASA-G keep minimum required personnel allocated for O&M of the equipment procured under the project even skilled staff for O&M in general is insufficient. In addition, WASA should keep discussing with HUD&PHED for fulfilling skilled staff for O&M in general.
- It is recommended that WASA-G continue to make arrangements with Punjab WATSAN (Water and Sanitation) Academy so that their staffs can continuously participate in the trainings for O&M at the academy and strengthen their skills and knowledge for O&M through the trainings.
- It is recommended that WASA-G continuously secure necessary budget for O&M of the equipment procured under the project even their overall financial condition is severe. In addition, WASA-G should keep discussing with HUD&PHED for securing necessary budget for O&M in general. WASA-G should try to increase their revenue by raising tariff collection ratio. The tariff collection ratio was low before the project but now WASA-G can collect tariff from more customers since their service is much improved by the

<sup>4</sup> Although there was staff shortage, including technical staff, at the time of ex-post evaluation as well, WASA-G was planning to manage their operation with the existing staff members. The number of staff was increased after the project completion due to expansion of the service area but the skilled/technical persons remained in short in general. It is noted that WASA-G requested to Housing, Urban Development and Public Health Engineering Department (HUD&PHED) Government of Punjab for provision of budget for hiring skilled staff for proper O&M in general. It was under discussion at the time of ex-post evaluation.

<sup>5</sup> It is known as Al-Jazari Academy.

project.

- WASA-G should secure skilled staffs and budget to expand their service for the service area expanded after the project completion. WASA should develop proper cleaning desilting plans for the expanded service area using the transferred techniques.



Dump Trucks and Suction Machines procured to WASA-G under this JICA Grant Aid project in 2016



Project Handover Ceremony held on December 3, 2016