Internal Ex-Post Evaluation for Grant Aid Project

conducted by Bangladesh Office: January 2014

Country Name	Project for the Improvement of the Storm Water Drainage System in Dhaka City (Phase II)
Bangladesh	

I. Project Outline

Background	Dhaka City is located on the flat delta of three major international rivers and it has been seriously damaged by flood of river overflow and heavy rainfall in the rainy season. In response to this problem, Japanese Grand Aid "Project for the Improvement of the Storm Water Drainage System in Dhaka City (Phase I)" was implemented in 1991-1993 in order to mitigate the flood damage in the high priority drainage area, namely Drainage Zone F and H by construction of Kallyanpur Pumping and improvement of existing drainage channels. However, serious flood damage had still taken in place due to decrease of retention capacity in the city and the flow capacity of drainage channel caused by recent rapid urbanization. Therefore, improvement of drainage system in the target area was still necessary.		
Objectives of the Project	To mitigate the flood damage in the high priority drainage area, namely Drainage Zone H by improvement of the functions and operation of the existing drainage facilities, thereby contributing to improve the urban health and the safety conditions in the target area.		
Outputs of the Project	1. Project Site: Drainage Zone H (about 17.60 km^2) in Dhaka City. Direct beneficiaries of this project are about 870,000 people in Drainage Zone H. 2. Japanese side 1) Expansion of Kallyanpur Pumping Station (drainage capacity: 10 m^3/second) ➢ Civil work facilities (intake structure, surge tank, box culver, intake fore-bay, side path, etc.) ➢ Pump house ➢ Pump facility and equipment (vertical axial flow pump 1,500 mm: 5 m^3/second x 2 units) 2) Procurement of sludge removal equipment (4 types, 6 units) ➢ Sludge vacuum loader (1 units) ➢ High water pressure jetting machine (1 unit) ➢ Sludge transportation truck with crane (1 unit) ➢ Sludge transportation truck (3 units) 3. Bangladesh side: 1) Removal of accumulated sludge in open channels and drainage pipes in Drainage Zone H 2) Preparation of the warehouse and parking space with roof for sludge removal equipment 3) Preparation of Land for the pumping station		
E/N Date	February 11, 2007 (Detailed Design) June 12, 2007	Completion Date	August 1, 2009
Project Cost	E/N Grant Limit: 951 million yen, Contract Amount: 797 million yen		
Implementing Agency	Implementing Agency: Dhaka Water Supply and Sewerage Authority (DWASA) Operating Agency: DWASA		
Contracted Agencies	CTI Engineering International CO., Ltd, OBAYASHI Corporation		
Related Studies	Basic Design Study: February 2006 – August 2006 / Detailed Design: February 2007 – May 2007		
Related Projects (if any)	Japan's Cooperation: • Project for the Improvement of the Storm Water Drainage System in Dhaka City (Phase I) (Grant aid, 1991-1993) Other Donors' Cooperation: • Dhaka Water Supply and Sanitation Project (construction of storm water pumping stations at Kamlapur and Rampura) (World Bank, 2012-2015)		

II. Result of the Evaluation

1 Relevance

This project has been highly relevant with Bangladesh development policy ("floods control" in the Poverty Reduction Strategy Paper (2005) and the Sixth Five Year Plan (2011-2015)), development needs ("To mitigate the flood damage in the high priority drainage area in Dhaka), as well as Japan's ODA policy for Bangladesh with the priority area of social development and human security including disaster management, at the time of both ex-ante evaluation and project completion. Therefore, relevance of this project is high.

2 Effectiveness/Impact

The project has somewhat achieved its objective of "to mitigate the flood damage in the high priority drainage area, namely Drainage Zone H by improvement of the functions and operation of the existing drainage facilities" as shown in the improvements in the quantitative effects. All 5 pumps at Kallyanpur Pumping Station including 3 existing pumps provided by the Phase I of this project have been operational without any problems. and the water level at Kallyanpur Pumping Regulating Pond has been regulated less than 5 meters after project completion in 2009. The flood duration at Kallyanpur Pumping Regulating Pond was improved from 6 days in 2006 to 1 day in 2009, and none in 2013. Also the flood duration at low-lying land in Drainage Zone H was improved from average 7 days in 2006 to Average 3-4 days in 2009, and less than 6-8 hours in 2013.

All above three indicators met their target values. This is mainly because after the project completion, Dhaka city has not experienced the heavy rain with 5-year probability rainfalls floods (i.e. either rainfall with 192 mm/day or rainfall with 245 mm/two days) except July 27, 2009 when rainfall was recorded as 333 mm/day. The capacity of pumping station (total 20 m^3/second for Phase I and II) was designed on the basis that the regulating pond (total storage capacity: 2 million m^3) with 227 acre (about 918,700 m^2) of land was to be constructed by the Government of Bangladesh. However, 56 acre (about 226,600 m^2) of land (private land) has not been acquired yet and current capacity of regulating pond does not reach the target. It means that if 5-year probability rainfall flood happens, the Pumping station would not mitigate the damage by shortening the flood duration due to limited storage capacity of regulating pond. DWASA has conducted removal of sludge by utilizing sludge removal equipment provided by this project, and according to DWASA, they removed 7,000 m^3 of sludge from open channels and 16,000 m^3 of sludge from drainage pipes in 2010 as planned. The sludge removal of drainage pipes has been conducted by DWASA and the works for sludge removal of open channel has been contracted out to private company. In every year before the monsoon season, the sludge removal works are conducted. Despite this, the water flow and width of canal has been reduced due to the illegal encroachment and inappropriate sludge dumping by private contractors (Note1).

As for the impacts, according to DWASA, there was a decrease in accidents associated with sludge removal works after the introduction of the automated sludge removal equipment. At the same time, they pointed out that the introduction of sludge removal equipment by the project contributed to the improvement of safety in sludge removal works.

.The Government of Bangladesh has taken several initiatives to restore the ecosystem of the rivers flowing by the city as a whole. For example, projects for the removal of the sludge from the river beds, enforcement of environment compliance (acts and rules) are being implemented. Illegal encroachments and dumping of wastes were also evicted several times after 2007. As stated earlier, the land acquisition for the regulating pond is still pending issue. DWASA has already submitted the Development Project Proposal (DPP) for the acquisition of rest 56 acre of land in the planning commission. Embassy of Japan and related agencies including the Economic Relations Division (ERD) under the Ministry of Finance had meetings for several time to resettle this issue, and the agencies have shown their commitment to expedite the process. Although functions and operation of the drainage system has been improved, the risk of flood damage seems not to be mitigated as completely as planned since the necessary storage capacity of the regulating pond is not secured at the time of ex-post evaluation.

Therefore, effectiveness/impact of this project is fair.

Quantitative Effects

Indicator	Baseline value (2006)	Target value (2009)	Actual value (2009)	Actual value (2013)
Indicator 1 Water level at Kallyanpur Pumping Regulating Pond in less than 5-years probability rainfall flood (Note 2)	More than 5 m	Less than 5 m	Less than 5 m	Less than 5 m
Indicator 2 Flood duration (Note 3) at Kallyanpur Pumping Regulating Pond in more than 5-years probability rainfall flood	6 days	3 days	1 day	None (0 day)
Indicator 3 Flood duration at low-lying land in Drainage Zone H	Average 7 days	Average 4-5 days	Average 3-4 days	Less than 6-8 hours
Indicator 4 Sludge volume removed from the open channels and drainage pipes in Drainage Zone H by DWASA	7,000 m^3 (open channels) 16,000 m^3 (drainage pipes)	7,000 m^3 in 2010 (Note 4) (open channels) 16,000 m^3 in 2010 (Note 4) (drainage pipes)	7,000 m^3 in 2010 (open channels) 16,000 m^3 in 2010 (drainage pipes)	N.A.

Source: DWASA

Note1: Sludge removed by the private contractors is dumped at the bank of open channels and not transported to the dumping ground designated by Dhaka city. Due to this, major share of the sludge returned to the cannel during the rainy season.

Note 2: 5-years probability rainfall is defined as either rainfall with 192 mm/day or rainfall with 245 mm/2 days.

Note 3:Flood duration means no. of days when the water level of Kallyanpur Pumping Regulating Pond exceeds 5 meters

Note 4: It was expected that DWASA would remove sludge accumulated in the open channels and drainage pipes in Drainage Zone H by 2010. Therefore, target year of indicator 4 should be 2010.

3 Efficiency

Although the project cost was within the plan (ration against the plan: 80%), the project period was slightly exceeded the plan (ration against the plan: 113%) because of delay associated with the custom's clearance and land acquisition issue. The project inputs were appropriate for producing the outputs of the project. Therefore, efficiency of this project is fair.

4 Sustainability

The operation and maintenance (O&M) of the Kallyanpur Pumping Station and sludge removal equipment have been carried out by DWASA. Regarding the institutional aspect, there is a shortage of manpower for O&M of the pump stations as well as for sludge removal equipment, however, it is supplemented by utilizing the private service providers by contracting out a part of maintenance works. Regarding the technical aspect, necessary maintenance has been conducted for pumping stations and sludge removal equipment. There is an O&M manual for the pump machines but it is not available in the pumping station for use of the pump operators because the manual is prepared only in English and kept at the O&M Division of DWASA HQs. In this respect, DWASA plants to prepare the manual in Bengali language to be available at pump stations, so that the pump operators will be able to utilize the manual for their reference on site. DWASA organizes training for the staff in different Divisions, however most of the technical staffs get training from their workplace, no training for the operators were provided yet.

This issue needs to be improved. Regarding the financial aspects, the sufficient O&M budget has been allocated. The project facilities have not experienced any major problems and breakdown so far and they have been maintained in a good condition.

This project has some problems in technical aspect, hence sustainability of this project effect is fair.

5 Summary of the Evaluation

The project has somewhat achieved the project objectives of "to mitigate the flood damage in the high priority drainage area, namely Drainage Zone H by improvement of the functions and operation of the existing drainage facilities". All quantitative indicators achieved the target values. However, the ex-post evaluation is difficult to verify whether the project is able to respond to floods caused by 5-year probability rainfalls because Dhaka city has not experienced it after project completion except one day in 2009. In addition, the important precondition of the project which is construction of the regulating pond (total storage capacity: 2 million m^3) has not been fully functioning due to the land acquisition issue. It will be also a risk for achieving the project objective. Sludge in the open channels and drainage pipes in Drainage Zone H were removed by DWASA as planned.

As for the impacts, the project has partly contributed to a decrease in accidents associated with sludge removal work. The land acquisition of 56 acre (about 226,600 m2) of private land for regulating pond is an important pending issue. Therefore, effectiveness/impact of this project is fair.

As for sustainability, the project has some problems in technical aspect since the trainings for operators are not sufficient .and pump operator cannot refer the Bengali manuals on site at the time of the ex-post evaluation. This situation would be improved once the planned translation of O&M manuals into Bengalese language are completed. . For efficiency, the project period slightly exceeded the plan because of delay associated with the custom's clearance and land acquisition issue.

In light of the above, this project is evaluated to be partially satisfactory.

III. Recommendations & Lessons Learned

Recommendations to implementing agency:

- Since the operators have small chance to receive the training, it is recommended to increase the training opportunities for the operators as same as the technical staff, which may contribute to further strengthen the sustainability of this project.
- In order to prohibit dumping of removed sludge from the pond and drainage canal on the bank, it is recommended to strengthen the monitoring activities for sludge removal works done by the private contractors during their contract period by frequent patrol to the sites. Also it is suggested to consider the following additional counter measures such as penalizing violators by collection of penalty charges and elimination of violated contractors from the sludge removal works in the future in order to strengthen compelling force to violated actions if it is appropriate.

Lessons learned for JICA:

- Despite that the difficulty of the land acquisition caused by rapid urbanization had been considered at the planning stage and necessary measures have been taken by the Bangladesh side, insufficient capacity of a regulating pond is still a pending issue at the time of ex-post evaluation. In this regard, it would be preferable that land ownership situation, social risks associated with resettlement of residents, and the implementation capacity of related authorities are clarified before the implementation of the project.

Water level measurement scale

some part of the existing regulating pond
some part of the existing regulating pond