

Country Name	<b>Project for Strengthening of Solid Waste Management in Dhaka City</b>
People's Republic of Bangladesh	

**I. Project Outline**

Background	<p>The capital city of Bangladesh, Dhaka, had faced a huge social challenge of Solid Waste Management (SWM) due to its rapid population and economic growth. Although Dhaka City Corporation (DCC) was in charge of SWM of the city, SWM was not conducted adequately due to its weak institutional capacity and lack of planning, equipment, and awareness of residents on sanitation. The Government of Bangladesh requested to the Government of Japan for a study and formulation of a master plan on SWM in 2002. Japan International Cooperation Agency (JICA) conducted a development study from November 2003 to March 2006, and Clean Dhaka Master Plan (M/P) with a target year of 2015 was formulated. DCC actively promoted in its own ways to implement the proposals made in the M/P. However, there were problems in technical, institutional and management aspects as DCC officers did not have enough capacity and experiences for planning and implementing despite their willingness to implement the programs.</p>																
Objectives of the Project	<p>Through improving capacities for management and coordination of SWM activities and Waste Management Department (WMD) of DCC, participatory SWM program and Ward Based Approach (WBA)<sup>1</sup>, solid waste collection and transportation, operation and management of final disposal and financial management on SWM, the project aimed at improving SWM services of DCC, thereby contributing to improving the sanitary environment of Dhaka city. The project objectives set forth are as follows:</p> <ol style="list-style-type: none"> <li>1. Overall Goal: The solid waste management services of Dhaka City Corporation are sustained and the sanitary environment of the city is improved.</li> <li>2. Project Purpose: The solid waste management services of Dhaka City Corporation are improved.</li> </ol>																
Activities of the project	<ol style="list-style-type: none"> <li>1. Project site: Dhaka City</li> <li>2. Main activities<sup>2</sup>: (1) Prepare Annual Activity Plans, review and modify Clean Dhaka M/P, conduct public relations campaigns on SWM and develop SWM network among city corporations; (2) Develop Ward SWM Guideline, organize community people and support community level SWM activities and support Primary Collection Service Providers (PCSP) to improve their services; (3) Conduct surveys and analyses for improvement of collection efficiency and improve the system of repair and maintenance of equipment; (4) Conduct environmental monitoring and evaluate landfill operation improvement; (5) Develop financial reports, prepare proposal of financial plans and improve procurement and payment processes; and (6) Conduct trainings/seminars for staff of WMD, PCSP, communities and others and establish external monitoring system for SWM activities etc.</li> <li>3. Inputs (to carry out above activities) <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Japanese Side</td> <td style="width: 50%;">Bangladeshi Side</td> </tr> <tr> <td>1) Experts: 15 persons</td> <td>1. Staff allocated: 145 persons</td> </tr> <tr> <td>2) Trainees received in Japan: 30 persons</td> <td>2. Office space</td> </tr> <tr> <td>3) Training in the third countries: 16 persons</td> <td>3. Local cost</td> </tr> <tr> <td>4) Equipment: desktop computers, printers, gas measure equipment, water quality measure equipment etc.</td> <td></td> </tr> <tr> <td>5) Local cost</td> <td></td> </tr> </table> </li> </ol>					Japanese Side	Bangladeshi Side	1) Experts: 15 persons	1. Staff allocated: 145 persons	2) Trainees received in Japan: 30 persons	2. Office space	3) Training in the third countries: 16 persons	3. Local cost	4) Equipment: desktop computers, printers, gas measure equipment, water quality measure equipment etc.		5) Local cost	
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Ex-Ante Evaluation	2006	Project Period	February 2007 – February 2013 (Extension Period: February 2011 – February 2013)	Project Cost	(ex-ante) 300 million yen (actual) 601 million yen												
Implementing Agency	Dhaka City Corporation (DCC) (Waste Management Department (WMD))																
Cooperation Agency in Japan	Yachiyo Engineering Co., Ltd.																

**II. Result of the Evaluation**

<b>1 Relevance</b>
<Consistency with the Development Policy of Bangladesh at the time of ex-ante evaluation and project completion> The project has been consistent with Bangladesh's development policy on 'improving SWM' as set forth in "Poverty Reduction Strategy Paper (PRSP) (2005)" and "Sixth Five Year Plan (2011-2015)".
<Consistency with the Development Needs of Bangladesh at the time of ex-ante evaluation and project completion>

<sup>1</sup> Ward is the smallest unit of local administration. WBA is an approach to strengthen SWM by each ward. Components of WBA: (WBA 1) Construction/renovation of ward SWM offices and strengthening of their functions; (WBA 2) Provision of safety gears and workers' manual to improve working environment; (WBA 3) Promotion of participatory SWM (planning and implementation of SWM activities by the community); and (WBA 4) Introduction of new collection system/improvement of existing collection system.

<sup>2</sup> In parallel with the technical cooperation activities, the Government of Japan supported other SWM activities in DCC. Improvement and expansion of Matuail landfill site and the construction of Amin Bazar landfill site were implemented using the Japan Debt Cancellation Fund (JDCAF). Japan Overseas Cooperation Volunteers (JOCVs) have been dispatched for environmental education and waste management. For improving transportation of waste material, 100 collection vehicles and the construction of a workshop for them has been provided by Environmental Grant Aid Program (EGAP).

At the time of ex-ante evaluation, various problems were found in primary disposal of waste, collection and transport of waste and final disposal of waste. At the time of project completion, environmental and sanitary issues caused by the waste were still prevailing widely in Dhaka city and threatening the health and sound living environment of residents. Therefore, there has been a high demand for the improvement of the SWM services of DCCs.

<Consistency with Japan's ODA Policy at the time of ex-ante evaluation>

The project was consistent with Japan's ODA policy on SWM, as stated in the Country Assistance Program for People's Republic of Bangladesh (2006).

<Evaluation Result>

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

## 2 Effectiveness/Impact

<Status of Achievement for the Project Purpose at the time of Project Completion>

The Project Purpose was mostly achieved by the time of project completion. According to the results of the Waste Amount Survey conducted by Dhaka North City Corporation (DNCC), Dhaka South City Corporation (DSCC)<sup>3</sup> and Japanese Expert Team (JET), the waste amounts transported to the landfill sites were 98% of the target in June 2012 and 94% of the target in September 2012.

<Continuation Status of Project Effects at the time of Ex-post Evaluation>

The project effects have been partially maintained since project completion. The waste amounts transported to the landfill sites have been more than the target since project completion<sup>4</sup>. WBA has still been an official approach of SWM, and nine wards SWM offices have been additionally constructed since project completion, which means there are 26 wards SWM offices among 92 wards in total at the time of ex-post evaluation (WBA1). While DSCC has occasionally provided safety gears (uniforms, gloves, and masks etc.) to cleaners, DNCC has not provided them as cleaners rarely wear them (motivating cleaners to wear gears is still a continuous process) (WBA2). While data on how many wards have practiced participatory community-based SWM since project completion is not available, many wards have continued, some wards have discontinued and some wards (at least nine wards) have newly started participatory community-based SWM (WBA3). The waste collection system has significantly been improved after project completion, due to well-functioning of nearly all the collection vehicles and compactors, secondary transfer stations<sup>5</sup> having been constructed and operated, Community Action Plans<sup>6</sup> (CAP) having been formulated and strict and regular monitoring having been conducted by Conservancy Inspectors/ Conservancy Officers in some wards etc. (WBA4). Revision of Clean Dhaka M/P based on the actual population of service areas after the split of DCC to DNCC and DSCC in 2011, which was recommended in the terminal evaluation of this project, has not been done yet. It is expected that under a new technical cooperation project "Project for Strengthening of Solid Waste Management in Dhaka North City, Dhaka South City and Chittagong City" (2016-2019) would include the revision of the M/P.

<Status of Achievement for Overall Goal at the time of Ex-post Evaluation>

The Overall Goal has been achieved by the time of ex-post evaluation. As stated above, the amount of wastes transported to the landfill sites has been more than the target (the waste amounts transported to the landfill sites in 2015 was 106% of the target for Overall Goal). During the extension period, the project promoted (1) Waste collection vehicles maintenance and management, (2) Landfill site management system, (3) Management system and function of the Waste Management Department and (4) Segregation of waste. Those supports contributed to strengthen organizational abilities of WMD and WBA implementation system, and contributed to achieve the overall goal. Factors contributed to the achievement are the synergic effects of various cooperation including JDCF, EGAP and JOCV as well as this technical cooperation project, which were implemented in coordination with each other.

<Other Impacts at the time of Ex-post Evaluation>

No negative impact on natural environment has been observed and no land acquisition and resettlement has been occurred under the project, though DSCC has only partially conducted environmental monitoring and DNCC has not conducted environmental monitoring for landfills since project completion as newly recruited/ transferred DNCC landfill management staff have their hands full managing increased waste distribution in the remaining limited area of the landfill sites.

As the primary collection system improved, many road side dustbins/ containers/ compactor/open trucks are moved to the secondary transfer station. As a result, less wastes are being dispersed all over the city, and the sanitary environment of Dhaka city has been improved. The establishment and operation of WMD, capacity development of staffs, and SWM systems/approaches developed and introduced by the project etc. have contributed to the improvement.

<Evaluation Result>

In light of the above, through the project, the target set in the indicator for the Project Purpose was mostly achieved by the time of project completion, and while the project effects have not been fully maintained since project completion, the target set in the indicator for the Overall Goal has been achieved by the time of ex-post evaluation. Therefore, the effectiveness/impact of the project is high.

### Achievement of project purpose and overall goal

Aim	Indicators	Results
(Project Purpose) The solid waste management services of Dhaka City Corporation	More than 2,540 ton/day (or 58% of total amount of waste) of wastes is transported to landfill sites and disposed properly by the end of extension period.	Status of the achievement: mostly achieved (continued) (Terminal Evaluation) Both DCCs and JET conducted a series of surveys to count incoming vehicles at both landfills (Waste Amount Survey) in July 2010, February 2012, June 2012 and September 2012. The waste amounts transported to the landfill sites were estimated by the number of trips and the

<sup>3</sup> On the 29th of November 2011, the parliament passed a bill to split DCC into two city corporations - North and South - with a view to ensuring 'better service delivery' to approximately 1.2 million persons living in the metropolis.

<sup>4</sup> DNCC has been able to ensure all the collection vehicles to pass through the weighbridge in the landfill, while DSCC has been able to ensure only partial (28%) collection vehicles to use the weighbridge. DSCC estimated the total amount of waste transported to the landfill daily as sum of weighbridge records and the amount of waste carried by bypassing vehicles. The waste amount carried by bypassing vehicles is estimated from the sample measurement of each type of vehicles in different seasons at the weighbridge.

<sup>5</sup> A confined space where secondary collection vehicles or containers collect waste from primary collection and street sweeping.

<sup>6</sup> CAP should be prepared by the DNCC and DSCC officials for their wards to manage the waste in an organized way with the participation of the community.

are improved.		<p>unit loading amount. The waste amount in June 2012 is 98% of the target and that of September 2012 is 94% of the target.</p> <p>[Waste Amount at Matuail and Amin Bazar Landfills] (Unit: ton/day)</p> <table border="1" data-bbox="775 129 1517 192"> <tr> <td>2005</td> <td>Jul 2010</td> <td>Feb 2012</td> <td>Jun 2012</td> <td>Sep 2012</td> </tr> <tr> <td>1,193</td> <td>2,004</td> <td>2,244</td> <td>2,492</td> <td>2,385</td> </tr> </table> <p>(Ex-post Evaluation) The amount of wastes transported to landfill sites in jurisdiction areas of DNCC and DSCC has been more than the target since project completion. As for the percentage of transported amount of waste, it requires a full-fledged study to estimate the current generation. However, BRAC<sup>7</sup> Institute of Governance and Development (BIGD) carried out a study in 2015 that shows the waste generation amount of Dhaka is 6,110.47 ton/day. That results present collection is close to 74%.</p> <p>[Waste Amount in Landfills in Jurisdiction Areas of Both DCCs] (Unit: ton/day)</p> <table border="1" data-bbox="775 472 1517 674"> <tr> <td>Year</td> <td>2013</td> <td>2014</td> <td>2015</td> <td>2016</td> </tr> <tr> <td>Matuail Landfill (DSCC)</td> <td>1,838</td> <td>1,991</td> <td>1,788</td> <td>2,047</td> </tr> <tr> <td>Amin Bazar Landfill (DNCC)</td> <td>958</td> <td>1,356</td> <td>1,450</td> <td>2,456</td> </tr> <tr> <td>Total</td> <td>2,796</td> <td>3,347</td> <td>3,238</td> <td>4,503</td> </tr> </table>	2005	Jul 2010	Feb 2012	Jun 2012	Sep 2012	1,193	2,004	2,244	2,492	2,385	Year	2013	2014	2015	2016	Matuail Landfill (DSCC)	1,838	1,991	1,788	2,047	Amin Bazar Landfill (DNCC)	958	1,356	1,450	2,456	Total	2,796	3,347	3,238	4,503
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	(Supplemental Information 1) Whether the number of wards which practice participatory community-based SWM has increased since project completion and whether DNCC and DSCC have used knowledge/experience gained from this project to promote participatory community-based SWM.	<p>Status of the achievement: (partially continued)</p> <p>(Ex-post Evaluation) The data on how many wards have practiced participatory community-based SWM since project completion is not available. Many wards have continued, some wards have discontinued and some wards (at least nine wards) have newly started participatory community-based SWM with the help of NGO, DNCC and DSCC. Both DNCC and DSCC commented that they are using knowledge/ experience gained from this project to promote participatory community-based SWM.</p>																														
	(Supplemental Information 2) Whether the waste collection system has improved at ward level after project completion and whether DNCC and DSCC have used knowledge/experience gained from this project to improve the collection system.	<p>Status of the achievement: (continued)</p> <p>(Ex-post Evaluation) The collection system has significantly been improved after project completion, as nearly all the vehicles provided under EGAP are still functional, higher primary collection triggers higher secondary collection of waste, DSCC and DNCC have newly formulated CAPs in some wards<sup>8</sup> and conducted strict and regular monitoring, secondary transfer stations have been constructed and operated, etc. Both DNCC and DSCC commented that they are using knowledge/ experience gained from this project to improve the collection system through collection planning, allocating necessary budget, involving the communities, better management of vehicles, using weighbridge etc.</p>																														
(Overall goal) The solid waste management services of Dhaka City Corporation are sustained and the sanitary environment of the city is improved.	More than 66% (or 3,054 ton/day) of wastes is transported to landfill sites and disposed properly by 2015.	(Ex-post Evaluation) achieved As stated above, the amount of wastes transported to landfill sites in jurisdiction areas of DNCC and DSCC has been more than the target.																														

Source: Project Completion Report, questionnaire survey and interview to relevant persons, site visit

Note: Continuous implementation of WBA, the SWM approach introduced by this project, is an important factor to show contribution of this project to increase in the amount of wastes transported to landfill sites and disposed properly. Thus, use of WBA after project completion is checked as supplemental information in this ex-post evaluation.

### 3 Efficiency

Expected goal and outputs were almost achieved by the end of the original period. Additional activities such as collaboration with JDCF, EGAP increased project cost for the original period (100% and 150% against the plan, respectively). Project period extension further increased both project period and project cost (150%, 200% against plan, respectively). Those additional inputs incurred during the extension period highly contributed to achievement of the overall goal and further secured sustainability of project outputs that had been mostly achieved during the original period. Inputs for the extension period can be thus assumed to have been for pursuing additional outputs, and evaluation judgment for the efficiency does not consider the extension period's term and cost. Overall, the efficiency is judged as fair.

### 4 Sustainability

#### <Policy Aspect>

The policies that are effective at the time of ex-post evaluation, such as "The Seventh Five Year Plan (2016-2020)", "Sector Development Plan, Water Supply and Sanitation in Bangladesh (2011-2025)" and "Perspective Plan of Bangladesh 2010-2021, Making Vision 2021 a Reality" etc., state the need for improvement of SWM.

<sup>7</sup> Bangladesh Rural Advancement Committee (an NGO).

<sup>8</sup> DSCC, DNCC and ward officials have formulated CAP in total 9 wards as mentioned in "4 Sustainability" in addition to 5 wards where CAP was formulated during the project implementation.

#### <Institutional Aspect>

There have been no major changes in organizational structures of SWM in Dhaka city since project completion. The number of staffs assigned in WMDs in DNCC and DSCC is not sufficient, as there are vacant posts in WMDs at the time of ex-post evaluation (approximately 22% and 68% of posts are vacant at DNCC and DSCC, respectively). The number of staffs assigned in Landfill Management Unit (LMU) of Matuail (DNCC) and Amin Bazar (DSCC) landfill sites is also not sufficient, as approximately 26% and 54% of posts are vacant at these sites, respectively. Moreover, regarding the recommendation made in the terminal evaluation that drivers of collection vehicles need to be transferred from Transport Department to WMD, while drivers have been transferred to WMD in DNCC, DSCC has not been able to ensure yet. Staffs are not recruited or assigned properly due to lack of leadership to solve recruitment related problems stemming from frequent changes of top management, complexity in organogram, qualification and scale inconsistency etc. Nonetheless, targeted amount of waste has been transported to landfill sites and disposed properly since project completion, and thus both DCCs have made efforts to maintain project effects with limited number of staffs. On the other hand, there is sufficient number of staffs in workshops of DNCC and DSCC, especially mechanics who maintain and repair collection vehicles. While it is not clear how many Community Unit Working Groups (CUWGs)<sup>9</sup> are functional in jurisdiction areas of DNCC and DSCC at the time of ex-post evaluation, almost all wards have several types of associations or organizations that can be recognized as CUWGs.

#### <Technical Aspect>

Almost all the project counterparts, except for those who have retired, still work in WMDs of DNCC and DSCC at the time of ex-post evaluation. Trainings were confirmed to be provided to workshop mechanics only, and the skill level of staffs in workshops of DNCC and DSCC (especially mechanics) is sufficient to maintain and repair collection vehicles, as almost 100% of vehicles are functional with sufficient spare parts, repair and maintenance. While no training was confirmed to be provided to staffs in WMDs, the skill level of staffs in WMDs in DNCC and DSCC is mostly sufficient to manage and coordinate SWM activities including periodically collecting and analyzing landfill weighbridge data and promoting WBA activities etc., as shown in the regular undertakings of those activities and the management staffs' good understanding of the waste management situation that was revealed from the interviews with them. Similarly, based on the observation and interviews the skill level of LMU staffs can be considered to be mostly sufficient to properly operate and maintain landfill sites. With assistance from NGOs, DNCC formulated CAPs in five wards and DSCC formulated CAPs in four wards during 2015 to 2016, in which similar methodologies were used as those used in the project. Manuals and guidelines developed by the project are partially utilized. For example, DSCC follows instructions in the landfill operation manual for vehicle flow control, leachate treatment and disposal operation etc., and both DNCC and DSCC collect weighbridge records regularly as stipulated in the landfill operation manual.

#### <Financial Aspect>

DNCC and DSCC have sufficient amount of SWM budget, as the budget allocation and expenditure are increasing every year and the allocated budget is always more than the expenditures.

#### <Evaluation Result>

In light of the above, slight problems have been observed in terms of the institutional and technical of the implementing agency. Therefore, the sustainability of the effectiveness through the project is fair.

#### 5 Summary of the Evaluation

Through the project, the target set in the indicator for the Project Purpose was mostly achieved by the time of project completion, and while the project effects have not been fully maintained since project completion, the target set in the indicator for the Overall Goal has been achieved by the time of ex-post evaluation. As for sustainability, slight problems have been observed in terms of the institutional, technical and financial aspects. As for efficiency, project cost against the original period highly exceeded the plan. Considering all of the above points, this project is evaluated to be Satisfactory.

### III. Recommendations & Lessons Learned

#### Recommendations for Implementing Agency:

1. All the vacant posts in WMDs, particularly executive level officers such as Additional Chief Waste Management Officer (CWMOs), Deputy CWMOs, Executive Engineers and zone level management officers of Assistant CWMOs, need to be filled with permanent staffs, and transfer of drivers and equipment from Transport Department to WMDs also needs to be confirmed.
2. The number of permanent LMU staffs in Matuail and Amin Bazar landfills needs to be increased.
3. Clean Dhaka M/P must be revised immediately, and both DNCC and DSCC need to prepare middle to long term master plans in a collaborative manner.
4. Ward SWM offices should be constructed in all wards.
5. Planning and periodical implementation of environmental monitoring for both Matuail and Amin Bazar landfills are highly recommended.
6. WMDs should provide safety-gears to cleaners timely and continuously, and confirm that they are properly used.
7. In order to further promote community awareness raising and participatory approach for SWM, mass media should be utilized.

#### Lessons learned for JICA:

This project has integrated other cooperation schemes such as EGAP, JDCF and JOCV into its activities and it became to constitute a program resulting in significantly better achievements based on "Clean Dhaka Master Plan". However, it was not formally and strategically designed as a program. To address any sector long term program approach as necessary, it may start with a short and long term planning of improving any sector followed by preparation of an umbrella implementation plan incorporating all kinds of schemes i.e., Technical Cooperation, Grant and Loan to efficiently address different issues of a certain sector and achieve the maximum project effect.

<sup>9</sup> CUWG is a community unit which is a central actor of WBA3.

**Before the Project**



**Present Situation**



**Matuail Landfill**



**Meeting with Primary waste collectors**