

Mongolia

FY2015 Ex-Post Evaluation of Technical Cooperation Project

“Strengthening the Capacity for Solid Waste Management in Ulaanbaatar City”

External Evaluator: Yukiko Sueyoshi, Global Link Management Inc.

0. Summary

This Project was implemented to improve Solid Waste Management (hereafter, SWM) in Ulaanbaatar City, after the Development Study in 2004 and the Grand Aid Project that followed. The Project aimed to enhance organizational capacity and human resources of relevant organizations in the SWM sector, mainly Environmental Pollution and Waste Management Department (hereafter, EPWMD) and City Maintenance and Public Utilities Agency (hereafter, CMPUA). Relevance is high, because improvement of SWM is consistent with the City’s policy, which focused on the improvement of SWM, and development needs of the country and with Japan’s ODA policy. Through this Project, EPWMD officers in charge of SWM were able to learn methods of compiling and analysing data on the composition and amount of waste, which had previously not been accurately grasped. The results have been utilized for formulating the new SWM policy. Moreover, technical assistance to CMPUA has strengthened their capacity for operation of final disposal sites constructed by the Grand Aid Project and maintenance of waste collection vehicles and other equipment. This helped to increase the frequency of waste collection in Ulaanbaatar City. The ex-post evaluation confirmed progress in improving SWM operations, such as the establishment of new regulations aiming at creating a society with recycling system in Ulaanbaatar City. Therefore, the effectiveness and impact of this Project are high. Efficiency is fair, since the Project period was within the plan, whereas the Project cost exceeded the plan. Sustainability is also fair, because there are some concerns about organizational aspects to conduct environmental monitoring in the final disposal sites and financial aspects to secure budget for upgrading final disposal sites and aged facilities.

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

1. Project Description



Project Location¹



Waste Separation by residence
and collection company

1.1 Background

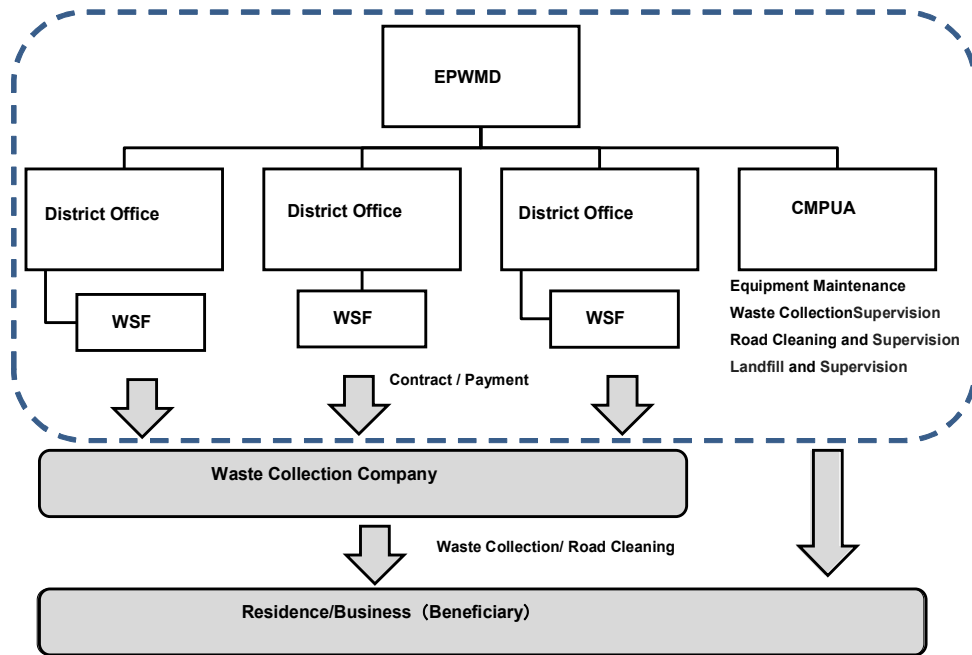
In Mongolia, approximately 40% of Mongolia's total population lived in Ulaanbaatar City, and the population was increasing. Ulaanbaatar City faced serious problems in SWM caused by an increase in the amount of waste due to the rapid growth of population. Waste collection and transportation services were unable to keep up with the increase in the amount of waste, and illegal dumping became a serious problem. It was a particularly serious issue in Ger areas², where nomadic people were beginning to settle after migrating from rural areas. Furthermore, it was reported that inappropriate landfill had negative impact on the surrounding environment in the final disposal site in Ulaanbaatar City. In order to address these problems, JICA implemented a Development Study for two years from 2004 and formulated a SWM Master Plan (hereafter, M/P) for Ulaanbaatar City to establish an environmentally sound SWM system by 2020. In addition, under a Japanese Grant Aid Project in 2008, the new sanitary landfill, Narangiin Enger Disposal Site (hereafter, NEDS) was constructed and related equipment such as waste collection vehicles and heavy machinery were procured. As a result, SWM system in Ulaanbaatar City improved rapidly after the Development Study. However, it was imperative to restructure SWM and enhance its human resource capacity to adopt the new system. Thus, Ulaanbaatar City requested JICA to carry out a technical assistance to improve capacities for SWM. Based on the request above, JICA implemented a technical cooperation named "Strengthening the Capacity for Solid Waste Management in Ulaanbaatar City" in the six districts of the central part of Ulaanbaatar City for three years from October 2009.

¹ Source : Ministry of Foreign Affairs (<http://www.mofa.go.jp/mofaj/area/mongolia/>) (as of May 20, 2016)

² Ger Areas' means the area where nomadic people settled with a portable house called 'Ger'. On the other hand, 'Apartment Areas' means the area where apartment buildings were constructed under the city plan.

1.2 Project Outline

Overall Goal		Deteriorated urban environment and sanitary conditions caused by uncontrolled solid waste will be improved in Ulaanbaatar City.												
Project Purpose		Capacity for SWM in Ulaanbaatar City is strengthened through human resource development.												
Outputs	Output1	Development of human resource in EPWMD for policy making and planning for solid waste management												
	Output2	Development of human resource in EPWMD and CMPUA for operation and maintenance of solid waste collection vehicles and heavy machineries.												
	Output3	Development of human resource of CMPUA for proper management of Narangiin Enger Landfill												
	Output4	Development of human resource in EPWMD and Waste Service Fund(hereinafter, WSF)s for administrative/financial management in SWM												
	Output5	Development of human resource of EPWMD and District Officers for promoting public awareness and participation in SWM.												
	Output6	Recommendation for the appropriate system of waste separation and recycling in Ulaanbaatar City												
Total Cost (Japanese Side)		277 million yen												
Period of Cooperation		October, 2009 – September, 2012												
Implementing Agencies		<table border="1"> <thead> <tr> <th>Plan</th> <th>Ex-post Evaluation</th> </tr> </thead> <tbody> <tr> <td>EPWMD</td> <td>City office, Public service department (hereafter, PSD)</td> </tr> <tr> <td colspan="2" style="text-align: center;">Partner Agencies</td> </tr> <tr> <td>CMPUA</td> <td>Ulaanbaatar Public Service Consortium (hereafter, Consortium)</td> </tr> <tr> <td>WSF</td> <td>The abolishment of WSF was decided at city council on December 2009, and it was officially abolished on May 2012.</td> </tr> <tr> <td>District Offices</td> <td>Same as plan</td> </tr> </tbody> </table>	Plan	Ex-post Evaluation	EPWMD	City office, Public service department (hereafter, PSD)	Partner Agencies		CMPUA	Ulaanbaatar Public Service Consortium (hereafter, Consortium)	WSF	The abolishment of WSF was decided at city council on December 2009, and it was officially abolished on May 2012.	District Offices	Same as plan
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Supporting company in Japan		Kokusai Kogyo Co.,Ltd.												
Related Projects		The study on SWM Plan for Ulaanbaatar City in Mongolia (Development Study 2004-2006) The Project for Improvement of Waste Management in Ulaanbaatar City (Grand Aid Project 2007-2008) Senior Volunteers (Automobile Maintenance 2010-2012, Waste Disposal 2012-2014)												



Note: Only three districts was shown in this figure, however, the Project covers 6 districts in Ulaanbaatar city
 Note: The Project scope is shown in a dotted line
 Source: Drawn up by the author

Figure 1. Project Implementation Chart(at the time of planning)

1.3 Outline of the Terminal Evaluation

1.3.1 Achievement Status of Project Purpose at the Time of the Terminal Evaluation

The SWM service was steadily strengthened by implementing the Project activities aiming at human resource development. In terms of indicators for the Project Purpose, the goals for “waste collection rate” and “collection rate of service fee” were achieved. On the other hand, the goal for “people’s satisfaction level on the SWM service in Ulaanbaatar City” was not achieved by the end of the Project. Therefore, it was concluded that the Project Purpose was partially achieved at the time of the Terminal Evaluation.

1.3.2 Achievement Status of Overall Goal at the Time of the Terminal Evaluation (including other impacts)

The indicator for the overall goal, “improve people’s satisfaction level for urban environment and sanitation,” was not fully achieved, but illegal dumping sites decreased and progress toward achieving the overall goal was confirmed. In addition, new disposal sites were in the process to be constructed and positive impacts of the Project such as technology transfers to other provincial cities were reported.

1.3.3 Recommendations at the Time of the Terminal Evaluation

The following recommendations were made at the Terminal Evaluation.

The recommendations to be implemented before the Project completion were as follows: (1) revise one of the indicators for the overall goal, “improve people’s satisfaction level on urban environment and sanitary conditions,” to an indicator that reflects the impact from the waste disposal sector more directly, since external factors tend to affect this indicator; (2) hold workshops to analyse the data obtained in public opinion surveys and waste amount and composition surveys; (3) prepare a strategy for public awareness raising that reflects the results of the Pilot Project; and (4) prepare a recommendation paper on waste separation and recycling. Furthermore, the following recommendations to be implemented after the Project completion by the Mongolian side were mentioned: (1) strengthen the organizational and institutional capacity of EPWMD and CMPUA based on the revised Law on Waste;³ (2) train officers of EPWMD and CMPUA in order to enhance their capacity on operational management, financial management and public awareness raising; (3) share the Project results with other cities; and (4) strengthen coordination with JICA volunteers.

2. Outline of the Evaluation Study

2.1 External Evaluator

Yukiko Sueyoshi, Global Link Management Inc.

2.2 Duration of Evaluation Study

Duration of the Study: October, 2015 -August, 2016

Duration of the Field Study: December 7 -December 18, 2015 / March 20 - March 25, 2016

3. Results of the Evaluation (Overall Rating : B⁴)

3.1 Relevance (Rating: ③⁵)

3.1.1. Relevance to the Development Plan of Mongolia

“The Action Plan of the Government for 2008- 2012”, the development plan for Mongolia during the Project’s planning stage, clearly specified ‘the introduction of new waste management system in city’ as one of the goals for improving the environment. In addition, “the Mayor’s Action Plan 2004-2008”, the development plan for Ulaanbaatar City, stipulated to ‘implement the series of projects covering waste collection, separation, transportation and landfill, based on the M/P on SWM, and resolve the City’s waste problems in stages’. “The Mayor’s Action Plan 2009-2012”, which was subsequently revised, listed improvements to

³ As of the Terminal Evaluation, the Law on Waste was being revised.

⁴ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

⁵ ③: High, ②: Fair, ①: Low

SWM as one of the objectives. The aforementioned Action Plan of the Government and Mayor's Action Plan were still effective at the time of the Project completion.

Accordingly, during the period from the planning stage to the completion, this Project, which aims to improve SWM, was consistent with the development plans of Mongolia and Ulaanbaatar City.

3.1.2. Relevance to the Development Needs of Mongolia

At the Project's planning stage, 1,190,000 people, or approximately 40% of Mongolia's total population, lived in Ulaanbaatar City (2009)⁶, and the population continued to increase. Waste collection and transportation services were unable to keep up with the increase in the amount of waste. Illegal dumping became a serious problem, particularly in Ger areas, where nomadic people were beginning to settle after migrating from rural areas. To address these issues, strengthening the SWM system by improving the organizational structure of SWM and its capacity of the human resources was urgently needed. When the Project was completed, Ulaanbaatar City still faced the problem of an increase in the amount of waste due to the population increase. However, this Project contributed to the improvements in the waste collection service. Meanwhile, new challenges emerged, namely, needs to increase the number of final disposal sites and to revise the fee collection system in accordance with the revisions of "Law on Waste".

Accordingly, from the planning stage to completion of the Project, the Project activities to improve SWM operations were essential, and this Project was consistent with the development needs of Ulaanbaatar City.

3.1.3. Relevance to Japan's ODA Policy

"Japan's Country Assistance Program for Mongolia" formulated in 2004 indicated countermeasures to address environmental protection, particularly environmental problems in Ulaanbaatar City. Inappropriate waste disposal (municipal solid waste, industrial waste) was listed as a factor behind the deterioration of the urban environment. In this sense, the Project was consistent with Japan's aid policy.

3.1.4. Relevance to Appropriateness of Project Planning and Approach

The Project plan was revised four times during the Project implementation. The main changes were to (1) set indicators for the overall goal and the Project purpose, which were not set when the Project was formulated, and (2) change activities because some of the Project counterparts were no longer functional due to political reasons. As regards to (1), after the Project started, Japanese experts and counterparts worked together on a baseline survey. They set and revised

⁶ Source: Ex-ante Evaluation document

appropriate indicators. Interviews with the Project counterparts during the ex-post evaluation showed that the implementation of the survey led to the understanding of the waste problems in Ulaanbaatar City. As a result, the counterparts were more interested in participating in this Project. As regards to (2), shortly after the Project launch, the City Council⁷ received a proposal to abolish the WSF which was in charge of fee collection and payments to operators. In response, Japanese experts and the counterparts identified new challenges in the selection of waste collectors and the setting of waste collection fees as a result of the abolishment of WSF in each district. Accordingly, activities were focused to create ‘Guideline on the Tender Procedure’ and ‘Manual on Setting Waste Collection Fees’. At the time of the ex-post evaluation, officers in PSD were using these manuals to supervise bids and to set waste collection fees, which indicate that changing the plan at that time was appropriate.

Looking back with a longer perspective, the Project was implemented when Ulaanbaatar City’s SWM system was in a fluid situation, as illustrated by the changes in the operational system for SWM in Ulaanbaatar City. The waste operation was previously managed with an integrated approach by Ulaanbaatar City and districts. However, since JICA’s development study in 2004, organizational and institutional reforms of SWM were conducted swiftly, such as the breakup of the waste operation system, and the establishment of CMPUA to manage waste disposal operations (2006), the establishment of WSF to manage finances (2006), the complete privatization of waste collection operators (2008) and the establishment of EPWMD as the coordinating organization for the waste sector (2009). In these circumstances, it is concluded that although the Project was affected by external factors including institutional reorganization in Ulaanbaatar City, the Project implementation system and activities were revised appropriately to achieve the Project objective.

In light of the above, the Project was highly relevant to the country’s development plan and development needs, as well as Japan’s ODA policy. Moreover, the project planning and approach is considered to be appropriate. Therefore, its relevance was high.

⁷ In accordance with an ordinance by Ulaanbaatar City Mayor issued in November 2006, WSF was established in stages as the parent organization responsible for collecting waste collection fees in each district. The waste collection operators who collected waste collection fees directly from residents and businesses up until that point signed waste collection agreements with WSF and were paid fees based on the amount of waste collected. However, the waste collection operators protested about delayed payment of waste collection fees and problems in receiving payment based on the amount of waste collected. They went on strike and blocked the entrance to the final disposal site. In December 2009, when the dispute between the waste collection operators and WSF intensified, the City Council adopted a resolution abolishing WSF (see page 13 of the terminal evaluation report). As of August 2012, just before the Project completed, WSF was about to be abolished, and administrative organizations such as district offices and khoroo collected the fees and paid the waste collection operators, or the district itself took responsibility for waste collection (from materials provided by JICA).

3.2 Effectiveness and Impact⁸ (Rating:③)

3.2.1 Effectiveness

3.2.2.1 Achievement of Project Purpose

This Project was carried out to improve SWM operations overall by strengthening the capacity of the major organizations involved in Ulaanbaatar City’s SWM in terms of policy formulation, financial management, operation and management of equipment, and promotion of recycling. When the Project was completed, the outputs had generally been achieved except Output 2 that aimed improving equipment operation and management (refer to the appendix for information on the achievement of each output). Output 2 was not achieved because its planned activities were delayed due to the CMPUA staff transfers during the Project, which led to various confusions within the organization. In addition, the Project plans for Output 4 and Output 5 were partially revised because the involvement of district office and WSF officers who were initially intended to be the counterparts were limited and technical transfer was also inadequate. This is because the City Council decided to abolish WSF, which was the Project counterpart, in December 2009. It was just after the Project launch and made WSF staff difficult to engage in the Project legally. As a result, activities targeting WSF and the districts could not be implemented as planned. As such, changes occurred in the external condition specified in the Project Design Matrix (PDM)—namely, “there are no changes in the measures, ordinances and organizational system related to SWM”. This prevented some outputs from being achieved and impeded the smooth implementation process. Japanese experts and EPWMD counterparts continued activities to improve SWM operations while revising the targets and activities for technical transfer as needed. The Table 1 shows the achievement status of the Project purpose at the time of Project completion. In the ex-post evaluation, the results of the organization’s capacity assessment that was carried out during the Project were additionally used as a reference indicator, because these results more directly indicate an enhancement of SWM capacity.

Table1 Achievement of Project Purpose by the Project Completion

Project Purpose	Indicator	Actual
	1. People’s satisfaction level (more than average ⁹) for the SWM service throughout the City reaches 60%.	People’s satisfaction level for SWM was decreased from 55.9 % in 2009 to 39.8% in 2012.
	2. Waste collection rate in Ger areas are increased to more than 90% . (waste collection cover rate in population)	According to baseline and end-line survey conducted under the Project, waste collection rate was about 90% in the Ger area and 100 % ¹⁰ in Apartment areas.
	3. Waste collection rate in	

⁸ Sub-rating for Effectiveness is to be put with consideration of Impact.

⁹ 5 level rating was used as follows: 1)very good, 2)good, 3)average, 4)poor, 5) very poor. The achievement of indicator means the ratio who answered between 1) and 3).

¹⁰ ‘Waste collection rate’ means ratio of households who receive periodic waste collection service in Ulaanbaatar city. It is different from Apartment areas and Ger areas. This figure was confirmed in the base-line (November 2009) and end-line (March 2012) survey conducted by the Project which covered only a part of the project target area.

	Apartment areas are kept at 100% in spite of population growth.	
	4. Collection rate of waste service fee from Ger areas are increased to 30%.	Fee collection rate in Ger areas were 61% in December 2011.
	【Reference indicator】 Results from capacity assessment of EPWMD/CMPUA	Capacity assessment was carried out by the Project. The assessment was divided into three categories: 1) management capacity, 2) technical capacity, 3) and working environment. Compared to the preliminary assessment, there were significant improvements in both counterpart organizations by the end of the Project.

Source: Documents provided by JICA, interview survey with counterparts

Indicator 1: People’s satisfaction level for the SWM service throughout the City reaches 60%.

The satisfaction level was about 40% in March 2012, six months before the Project was completed, and did not reach the target of 60%. According to the Japanese experts and counterparts, resident’s satisfaction in Ger areas relatively decreased because (1) residents were dissatisfied with the new fee collection system¹¹ where they had to pay waste fee across the board with an electricity fee every month in Ger areas, regardless of whether they put out waste or how much waste they had, (2) the frequency of waste collection lowered in some areas because of the waste collection operators’ strikes. However, the PSD officers stated that the changes to the new collection system resulted in an increase amount of collected waste fees and contributed to improvements in waste collection services.

Table 2 People’s Satisfaction Level for the SWM Service

Satisfaction level for the SWM service			
November 2009 (Base-line Survey)		March 2012 (End-line Survey)	
Apartment Areas	Ger Areas	Apartment Areas	Ger Areas
53.8%	58.1%	46.8%	33.3%
Average 55.9%		Average 39.8%	

Source: Documents provided by JICA

Indicator 2, 3: Waste collection rate is kept at 100% in Apartment areas, and 90% in Ger areas

As a part of the base-line survey carried out during the Project period, a questionnaire survey was conducted to approximately 800 households in Ulaanbaatar City to confirm the waste collection rate. The results showed that the waste collection rate was almost 100% in Apartment area and 90% in Ger areas. The end-line survey confirmed that these figures had been maintained. Given that a similar survey conducted in 2007 prior to the Project estimated that the

¹¹ The resident usually paid waste fee directly to the waste collection operators in the previous fee collection system.

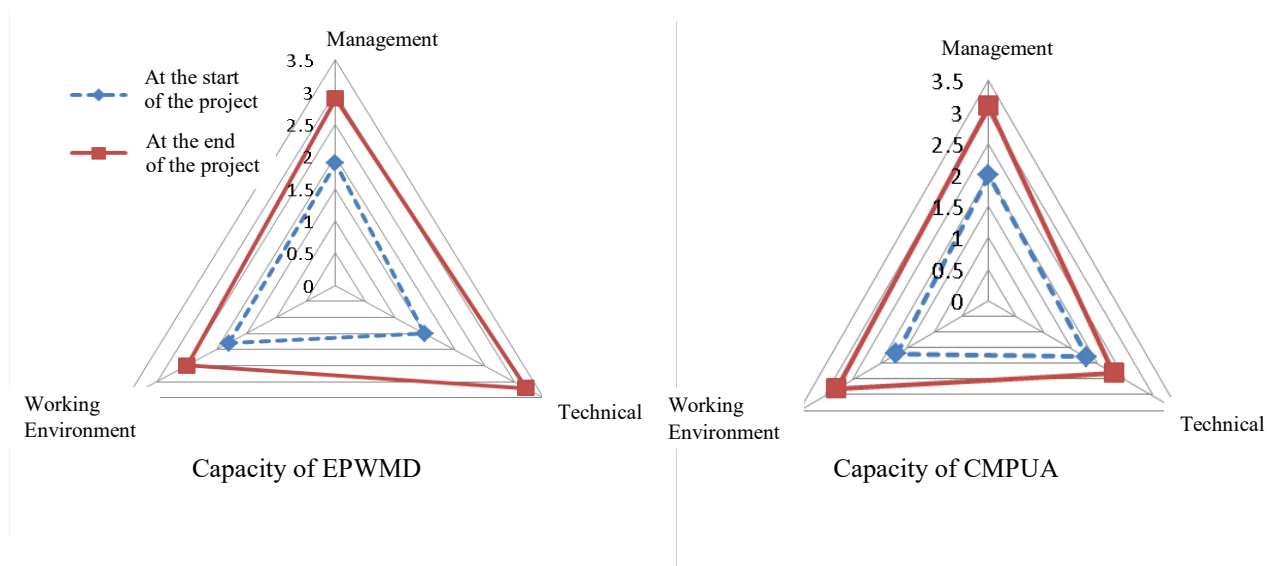
collection rate in Ger areas as 43%¹², this was a significant improvement. The provision of waste collection vehicles and the construction of NEDS through a Grant Aid Project, which was implemented before the Project, contributed to this improvement of waste collection rate. In addition to the above, the management structure of SWM was improved and technical support to relevant personnel was provided, so that equipment and facilities could be appropriately operated. This led to stable waste collection and transportation.

Indicator 4 : Collection rate of waste service fee from Ger areas is increased to 30%.

The waste service fee collection rate in Ger areas was estimated to be about 20% before the Project, but it ultimately improved to about 60%, far above the target of 30%. This can be attributed to the collection of electricity fees and waste collection fees together as a result of an ordinance issued by the City Mayor in July 2011.

Reference indicator: Results of Organizational Capacity Assessments

The Project carried out a total of five capacity assessments of the EPWMD and CMPUA organizations. The main assessment categories were (1) operational capacity, (2) technical capacity and (3) workplace environment, with detailed evaluation questions set for each category. Japanese experts interviewed the managers of each organization and gave its scores. Figure 2 shows changes in capacities of these organizations when the Project started (November 2009) and when the Project was completed (May 2012). There were significant improvements in both counterpart organizations by the end of the Project.



Source: Documents provided by JICA

Figure2 Results of Organizational Capacity Assessments

¹² Source : Documents provided by JICA

There were clear improvements in Ulaanbaatar City’s waste collection service as seen by the achievements of the indicators for the waste collection rate and the fee collection rate. Moreover, the capacity assessments implemented during the Project showed improvements in organizational capacities. The indicator related to residents’ satisfaction did not reach the target. It was likely to be influenced by the change of the waste fee collection system, which led to temporary discontent among the residents.

Therefore, the Project largely achieved its purpose.

3.2.2 Impact

3.2.2.1 Achievement of Overall Goal

In the ex-post evaluation, ‘the amount of waste collected after the Project completion’ was added as a reference indicator so that improvements in the urban environment could be assessed quantitatively. This is because ongoing waste collection and disposal are essential to achieve the Project’s overall goal to improve the urban environment and public sanitation in Ulaanbaatar City. Table 3 shows the achievement of the Project’s overall goal at the time of the ex-post evaluation. The overall goal was achieved because PSD (former EPWMD), which improved its capacity in terms of policy formulation and financial management through this Project, was providing good SWM services even after the Project and utilizing the Project outputs to pursue initiatives to promote recycling.

Table3 Achievement of Overall Goal

	Indicator	Actual
Overall Goal	1. People’s satisfaction level (more than average ¹³) for urban environment and sanitation throughout the City reaches 50%.	According to the results of the beneficiary survey, people’s satisfaction level for urban environment and sanitation of Ulaanbaatar City reached 64%.
	2. Six large scale illegal disposal sites out of 10 monitoring sites shall be eliminated.	A field visit conducted under the ex-post evaluation found that there was no further large-scale illegal dumping in the six sites out of the ten sites. As for the other four sites, interviews to PSD and Consortium confirmed there was no illegal dumping since the Project completion.
	【Reference indicator】 The annual waste collection amount of Ulaanbaatar City	The annual waste collection amount more than doubled from 478 ton in 2012 to 1,000 ton in 2014. This figure indicates that frequent waste collection and conveying to the final disposal sites were taking place even after the Project completion, which contributed to an improvement of urban environment.

Source: Interviews to PSD and beneficiary survey to residents

¹³5 level rating was used as follows: 1)very good, 2)good, 3)average, 4)poor, 5) very poor. The “satisfaction level” of the indicator in the overall goal is the ratio of people who answered between 1) and 3) against the total respondents.

Indicator 1: People’s satisfaction level for urban environment and sanitation throughout the City reaches 50%.

Surveys on residents’ satisfaction were not carried out by the counterparts after the Project. Thus, a beneficiary survey¹⁴ was conducted in order to assess the achievement of each indicator of the overall goal during the ex-post evaluation. The results of the beneficiary survey showed that 64% responded that Ulaanbaatar City’s urban environment was above the average level compared with other cities. When they were asked the most serious problem with Ulaanbaatar City’s urban environment, only 3% of the respondents answered waste disposal while 66% pointed to air pollution, 8% for safe water supply, and 7% for soil contamination. In addition to the above, PSD and district officers reported Ulaanbaatar City bought about 160 waste collection vehicles in 2012 enabling more frequent waste collection. As a result, there are positive changes such as reducing illegal dumping, improving sanitation conditions, and improvement of landscape in Ulaanbaatar City. Therefore, Indicator 1 is deemed to be achieved.

Indicator 2 : Six large scale illegal disposal sites out of 10 monitoring sites shall be eliminated.

In the ex-post evaluation, six large-scale illegal disposal sites whose locations were identified were inspected and no large-scale illegal disposals were found there. Large-scale illegal disposal was no longer taking place because PSD and Consortium officers regularly cleaned the disposal sites and the collection frequency was improved due to an increase in the number of waste collection vehicles. Moreover, former illegal disposal sites were converted to homes, parks, roads and schools due to growing land development needs in Ger areas along with the population growth. There was only one site where waste was still being dumped, but it was not a large-scale waste dumping and khoroo¹⁵ officers and resident volunteers regularly cleaned up the waste. According to PSD and Consortium officers, the status of illegal disposal sites other than these six sites did not have any report of large-scale illegal dumping in recent years. Accordingly, Indicator 2 is achieved.

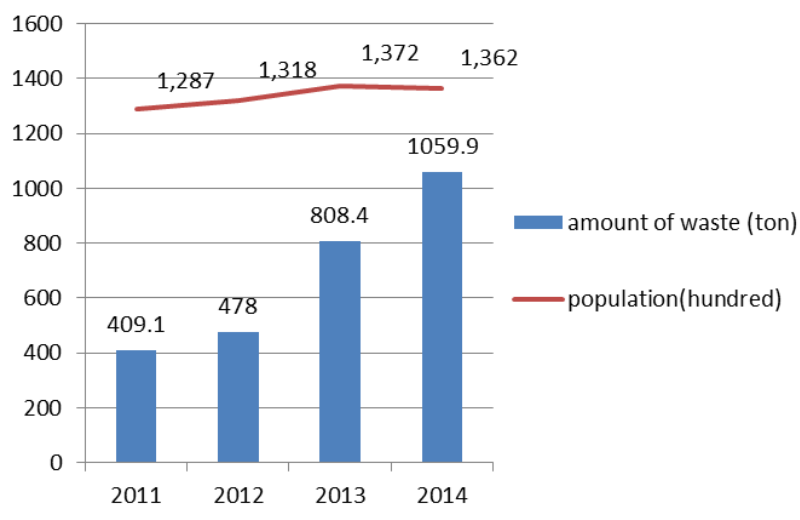
Reference indicator: Annual amount of waste collected

As shown in Figure 3, the annual amount of waste collected (amount of waste transported to the final disposal sites) in Ulaanbaatar City after the Project was increasing every year. In particular, the amount doubled between 2012 and 2013. PSD stated the increase of waste collection vehicles and the expansion of two additional final disposal sites is deemed to have improved waste collection and disposal capacity. Given this, in terms of waste disposal, the

¹⁴In the beneficiary survey stratified sampling based on the population in six districts was carried out in the target site, and face-to-face questionnaires were given using systematic sampling of residents whereby every fifth person who entered the district office was surveyed. The sample size was 100 and the response rate was 100% (31 men and 69 women; 40 lived in apartment area and 60 in Ger areas). No major discrepancies were confirmed by gender and by residence location.

¹⁵ This refers to Mongolia’s smallest administrative unit.

implementation of the Project and continued efforts of Mongolia counterparts contributed to the achievement of the overall goal of improving the urban environment and sanitation conditions.



Source: Data provided by Consortium

Figure3 Trend of the Waste Collection Amount of Ulaanbaatar City

Therefore, the Project has largely achieved its overall goal.

3.2.2.2 Continuation of Project outcomes after Project completion

The section below discusses (1) residents’ satisfaction with waste operations, (2) city budget for waste collection operations, (3) the nationwide dissemination of waste fee guidelines, and (4) the preparation of 3R¹⁶ Ordinance reflecting the results of the Pilot Project, as related to the continuation of the Project outcomes.

Residents’ satisfaction with waste operations

As part of this ex-post evaluation, a beneficiary survey was conducted. The survey confirmed residents’ satisfaction with Ulaanbaatar City’s SWM services at the time of ex-post evaluation, one of the indicators for the Project Purpose. According to the survey results, 99% of residents receive waste collection services. The 1% who responded that they did not receive waste collection services lives in the mountainous part of Ger areas where waste collection vehicles cannot reach. The respondent had to bring their wastes to collection sites on an irregular basis.

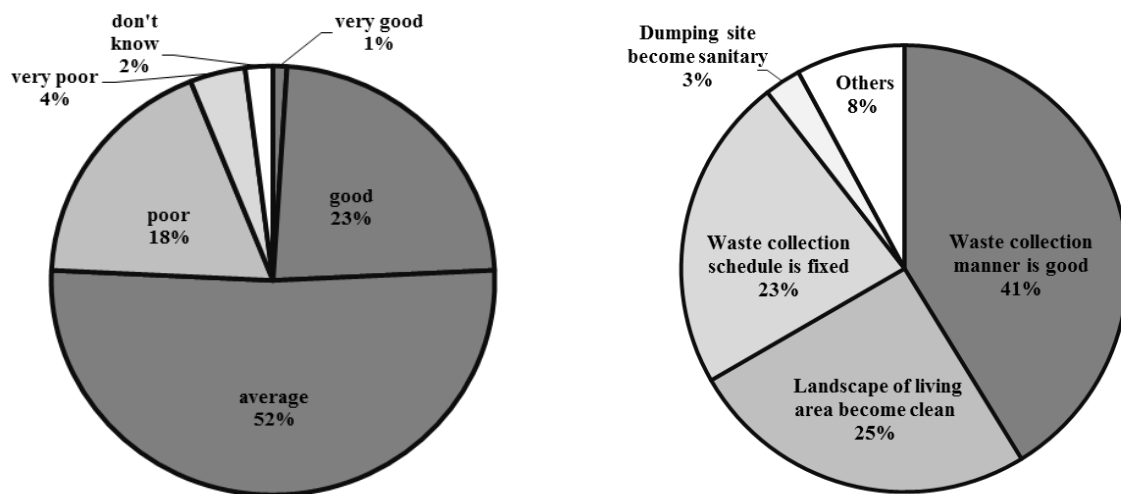
According to PSD and Consortium officers, there is no accurate data on the waste collection rate. However, the collection service covered all Apartment areas and almost all Ger areas at the

¹⁶ “3R” refers to “reduce,” “reuse” and “recycle.” 3R activities aimed at reducing waste as much as possible; thereby minimizing the negative environmental impact of waste incineration and landfill disposal, and creating a society that efficiently reuses the earth’s limited resources (a recycling-based society).

time of ex-post evaluation except mountainous areas that cannot be accessed by waste collection vehicles. The results of the beneficiary survey showed that the waste collection rate within Ulaanbaatar City was 100% in Apartment areas and 99% in Ger areas, although there was limitation with the sample size in this survey. The results also confirmed that waste was collected once or twice per week in Apartment areas and once or twice per month in Ger areas.

Figure 4 shows residents' satisfaction with waste collection services and their reasons. 76% of residents responded that services were above average compared to other cities. The most common reason for satisfaction with waste collection services was that "the manners of waste collectors are good" (41%), followed by "it contributes to cleaner streets" (25%) and "it has a set schedule" (23%).

The end-line survey conducted before the Project completion found that City residents' satisfaction was about 40% at that time. Since the sampling methods are different for the two surveys, a statistical comparison is not possible. However these surveys' results suggest that residents' satisfaction might have improved at the time of the ex-post evaluation.



Satisfaction level in waste collection service (n=100)

The reasons for satisfaction (n=76)

Source: Beneficiary survey

Figure4 People's Satisfaction with SWM Service and its Reasons

On the other hand, 22% of the beneficiary survey respondents stated that waste collection service was "poor" or "extremely poor." Particularly in Ger areas, there were requests for waste collection sites to be cleaned and for improvements in the manners of the waste collectors.

City budget for waste collection operations

In SWM, accurate data of the amount and composition of waste in each district is essential for drafting specific plans and securing the necessary budget. According to PSD officers, they could acquire techniques and knowledge to ascertain quantitative data on waste, and this

contributes greatly to improve their operation. The Project made it possible to calculate the operating costs needed for waste collection operations and to develop evidence-based plans for making budget requests. As a result, PSD succeeded in acquiring subsidies for the waste sector since 2013. These subsidies are used to supplement any shortfalls in waste collection fees.

Nationwide extension of waste collection fee guidelines

The Project aimed to improve the financial operations of SWM and supported the preparation of ‘Guideline on Calculating Appropriate Waste Collection Fees’ based on the data of collected waste amounts. After the Project, PSD and the Ministry of Environment and Green Development of Mongolia formed a working group and prepared ‘National Guideline on Calculating Appropriate Waste Collection Fees’ that could be applied nationwide based on guidelines prepared by the Project. The guideline was submitted to the Diet and is waiting for an approval.

Preparation of 3R Ordinance reflecting the result of Pilot Projects

There were Pilot Projects, which conducted waste sorting by residence and waste separation in the disposal site, implemented under the Project to establish the recycling system in Ulaanbaatar City. After the Project, PSD recognized that waste separation from recyclables at household level was essential to build a recycling society. It began to revise “Law on Waste” and regulations regarding recycling system by reflecting experience from the Pilot Projects.

3.2.2.3 Other Impacts

PSD officers who participated in the JICA Country Training or institution’s conferences had a chance to visit the Kitakyushu Eco-Town Center or Tokyo Super Eco Town¹⁷ in Japan. Based on these experiences, they started setting up an Eco Town Project in Ulaanbaatar City. The officers who were counterparts of the Project participated in the Eco Town Project by offering their knowledge on recycling in Japan. Land for the Eco Town was purchased near a final disposal site in Ulaanbaatar City. It is observed that PSD is taking an active role in planning the construction of a recycling factory and a processing plant for waste to recycle and reduce the amount of waste.

As for the impact on the natural environment, Ulaanbaatar City’s Environmental Auditor confirmed there have been no reports of negative impact from the Project. It was, however, indicated that environmental considerations based on Mongolia’s Law on the Environment were not adequate in the three current waste disposal sites in Ulaanbaatar City. For this matter, the

¹⁷ Eco Town Projects are carried out by corporate parks primarily in the recycling industry, and by companies and universities building experimental research areas, and aims at resolving waste problems and promoting environmental industries.

Project assisted preparing ‘Environmental Monitoring Guideline’ for the disposal sites. NEDS was designed based on a plan that prevents leachate from seeping into the ground. The guideline stipulated that water quality testing should be undertaken regularly in the monitoring pond of NEDS and two wells downstream of NEDS in order to monitor water contamination due to unforeseen events. The site inspection at the ex-post evaluation found water quality monitoring could not be conducted because there was no seepage at the disposal site. The water quality in the wells downstream was not monitored either. The guidelines also stipulated that air pollution caused by the waste and the transportation vehicles should also be monitored. Waste disposal sites have taken measures to eliminate gas generated from waste by using a sanitary landfill approach and to prevent a fire by installing gas venting pipes. No problems have been reported, but regular monitoring has not taken place. Although no negative impact had been reported as of the ex-post evaluation, it is important that water and air quality monitoring is regularly conducted in accordance with Mongolia’s laws and regulations, in view of the medium- and long-term impacts of water or air pollution on surrounding areas.

As a result of the Project, the SWM capacity in Ulaanbaatar City has been generally enhanced and the Project Purpose was mostly achieved. Urban environment was also improved, which was part of the overall goal and the expected effects of the project were observed. Therefore, effectiveness and impact of the Project are high.

3.3 Efficiency (Rating: ②)

3.3.1. Inputs

The plan for the Project’s inputs and the actual inputs are shown in the table below.

Table4 Project Input (Plan and Actual)

Inputs	Plan	Actual
Experts	NA	8 Short Term Experts (62.28MM)
Trainees received	NA	19 trainees
Equipment	Training material, Equipment for the waste separation and recycling, Portable gas detector	Office equipment, Equipment for the waste separation and recycling, Spare parts of bulldozer, Portable gas detector, etc
Japanese Side Total Project Cost	260 million yen	277 million yen
Mongolian Side Operational Expenses	Counterpart personnel Project office Land for waste separation and recycling	Counterpart personnel Project office Operational cost for the Project (about 640 thousand yen)

* MM stands for man month.

Source: Documents provided by JICA

3.3.1.1 Elements of Inputs

There were no data on the dispatch of experts and Japanese training when the Project was planned, which makes comparisons difficult. Some equipment (ex. spare parts for a bulldozer) was purchased, which was not in the Project plan. The Mongolian side provided offices and land needed for the Project operations. At the same time, the City Council decided to abolish WSF in December 2009, when the Project just started which made the roles of WSF and the district offices in waste operations ambiguous. This resulted in limited participation in the Project by WSF and district office. Accordingly, activities targeting WSF and district offices had to be revised, which impeded the smooth implementation of the Project.

3.3.1.2 Project Cost

The planned project costs on the Japan side were about 260 million yen, but the actual costs were 277 million yen, exceeding the plan by 6%. This was due to the purchase of spare parts for a bulldozer used at NEDS, which was not anticipated at the time of project planning. This increase was essential for technical instruction in the appropriate landfill management at NEDS, planned as Output 3.

3.3.1.3 Period of Cooperation

The project period was set as three years from October 2009 to September 2012 in the plan, and the actual project period was the same (100%).

As seen above, although the project period was within the plan, the project cost exceeded the original plan. Therefore, efficiency of the Project is fair.

3.4 Sustainability (Rating : ②)

3.4.1. Related Policy and Institutional Aspects for the Sustainability of Project Effects

In the “Action Plan of the Government for 2012-2016”, the section on “ensuring a safe environment” describes comprehensive engagement with air pollution, waste, and traffic congestion in Ulaanbaatar City. It also states promoting waste sorting and recycling in the waste sector. The “Mayor’s Action Plan 2012-2016”, which outlines the policies of Ulaanbaatar City, also lists the improvements in waste collection operations, cleaning of public facilities, construction of additional disposal sites, and promotion of the 3R as targets for its SWM program.

Therefore, the direction of these policies is consistent with the establishment of a recycling society, and with the M/P revised in this Project. This indicates that it will bolster the effects of this Project going forward. Accordingly, sustainability in terms of policy is maintained.

3.4.2. Organizational Aspects of the Implementing Agency for the Sustainability of Project Effects

The local election held after the Project led to reorganization of the City's departments. As a result, EPWMD, which was a counterpart of this Project, was consolidated with PSD that is in charge of policy and supervision of urban infrastructure in January 2013. However, EPWMD's responsibility for managing and monitoring waste discharge, collection, and disposal remained the same. At the time of the ex-post evaluation, four out of nine officers in PSD were in charge of SWM, and all four of them were engaged in the Project. According to the interviews to PSD, current officers are able to handle the operations without problem, while PSD recognises that the number of staff should be increased so that new responsibilities such as promotion of 3R can be implemented.

In addition, CMPUA, which was responsible for the administration of the final disposal site, was merged with two public corporations that are in charge of road maintenance and water supply in September 2013. After the merger, CMPUA's original duties were mostly transferred. However, Consortium's responsibility on waste collection and transportation in residential areas was outsourced to private operators and cleaning operations for public facilities and roads were newly added as their duty. Waste collection vehicles previously owned by Consortium are then planned to be transferred to the districts that need a new agreement with the contracted waste collection operators to manage the vehicles.

As for the final disposal sites in Ulaanbaatar City, NEDS was the only site in Ulaanbaatar City at the end of the Project, but two more were constructed by the time of the ex-post evaluation. According to Consortium officers, the numbers of employees at these disposal sites were below the original plan at some sites, but this is not impeding their disposal operations. At the same time, the Environmental Impact Survey implemented by the City Hall's Environmental Auditor revealed that water quality and methane gas monitoring around the disposal sites required by Mongolia's environmental laws have not been conducted. Moreover, some disposal sites had no fence to identify the sanitary zone. Consortium, which is responsible for the administration of the disposal sites, should clarify the responsible department within its organization and set up a monitoring system, including specifying the environmental-friendly operation measures and designating a person in charge at each site.

3.4.3. Technical Aspects of the Implementing Agency for the Sustainability of Project Effects

Some of the counterparts at PSD who received technical training in the Project continued working in the same office at the time of ex-post evaluation. The bidding of waste collection operators was carried out as a result of the revision of the Law on Waste after the Project 'The Tender Documents for the Selection of Waste Collection Operators' and 'the Guidelines for Administering Tender Offers' produced by the Project were used in this bidding processes.

These guidelines required tender documents specifying the amount of waste generated and the cost of waste collection in each district. PSD officers reported that having more specific tender documents led to a more rigorous selection of waste collection operators and resulted in improvement of collection and transportation services. Moreover, as noted in the section on impact, the level of the capacity to draft policies or regulations was high since the PSD counterparts successfully revised guidelines prepared under the Project, produced ‘the National Guideline on Calculating Appropriate Waste Collection Fees’ and prepared 3R Ordinance draft reflecting the results of the Pilot Project.

No problem with technical sustainability was observed with the Consortium, considering that final disposal sites were additionally built and the necessary equipment was bought after the Project. SWM operations were being carried out without major problems at the time of the ex-post evaluation, and the sanitary landfill method, which was introduced for the first time under the Grand Aid Project, were being continuously utilized at each disposal site.

3.4.4. Financial Aspects of the Implementing Agency for the Sustainability of Project Effects

The City’s budget for waste operations is managed by PSD. The waste collection fees from resident, private companies and public organizations are transferred to the City’s treasury first and subsequently distributed to all districts so that waste collection operators can be paid. In addition, budgets for final disposal sites and funding to clean up wastes have been allocated to the Consortium.

Table 5 The Budget Disbursement for SWM - Ulaanbaatar City

unit : million Mongol tugrik

Items	2012	2013	2014	2015
SWM related income				
Waste collection fee	3,297	9,890	11,355	12,367
SWM related subsidy	0	576	5,800	8,700
Total income	3,297	10,466	17,155	21,067
SWM related expense				
Waste collection and transportation cost	12,310	9,270	17,053	21,010

Source : Questionnaire survey to Ulaanbaatar City

Note : Waste collection from private businesses and governmental organizations were partially collected by 2012, however, it has been fully collected by the City since 2013.

Previously, waste collection fees charged to private companies and public organizations were paid directly to the districts or waste collection operators. Thus, waste collection system was not unified in the City. However, those fees were paid together with city taxes after the reform. As a result, the amount of waste collection fees almost tripled during 2013, and tends to be increasing since then. PSD stated that the sharp rise could be due to the tax reforms in 2013. Moreover, subsidies for the waste sector were started from 2013. The Project provided technical methods

to analyse the amount of the waste generated and collected and this made it possible for PSD to calculate the necessary funding and budget shortfalls for its operation. As a result, requests for subsidies to PSD based on the analysis were approved. Up until 2012, the shortfall of waste transportation and collection cost was covered using the waste collection fees from companies and public organizations by districts. After 2013, PSD began to manage the waste collection budget and use subsidies to make up for the shortfalls.

On the other hand, funds to operate the final disposal site and to clean public facilities are allocated to the Consortium from Ulaanbaatar City. According to the Consortium and disposal site officers, there are no problems in allocating the funding for daily operations, maintenance and management. However, their concern is that the final disposal sites will have to be expanded and aged equipment will have to be replaced in the near future. There is no clear plan to secure adequate funds for this.

Table 6 The Budget Disbursement for SWM - Consortium

unit : Mongol tugrik

Items	2013	2014	2015
	Actual	Actual	Plan
Total Income	9,691,181	27,510,787	26,728,243
Road Cleaning	838,920	7,363,836	7,495,425
Road Maintenance	0	5,756,434	3,000,000
Landfill Management	1,264,392	1,490,787	1,330,700
Others	7,587,869	12,899,730	14,902,118
Total Expense	10,659,366	27,479,191	25,956,937
Employment cost	3,408,573	9,179,616	10,703,199
O&M for Equipment, Fuel cost	1,469,379	2,502,429	2,440,584
Others	5,781,414	15,797,146	12,813,154
Annual Balance	-968,184	31,597	(to be confirmed)

Source : Questionnaire survey to Consortium

As seen above, some minor problems have been observed in terms of the organizational and the financial aspects of the implementing agency. Therefore, sustainability of the Project effects is fair.

4. Conclusion and Lesson Learned and Recommendations

4.1 Conclusion

This Project was implemented to improve Solid Waste Management (hereafter, SWM) in Ulaanbaatar City, followed by the Development Study and the Grand Aid Project after 2014. The Project aimed to enhance organizational capacity and human resources of relevant organizations in SWM sector, mainly Environmental Pollution and Waste Management

Department (hereafter, EPWMD) and City Maintenance and Public Utilities Agency (hereafter, CMPUA). Relevance is high, because improvement of SWM is consistent with Ulaanbaatar City's policy, which focused on the improvement of SWM, and development needs of the country and with Japan's ODA policy. Through this Project, EPWMD officers in charge of SWM were able to learn methods of compiling and analysing data on the composition and amount of waste, which had previously not been accurately grasped. The results have been utilized for formulating new SWM policy. Moreover, technical assistance to CMPUA has strengthened their capacity for operation of final disposal sites constructed by the Grand Aid Project and maintenance of waste collection vehicles and other equipment. This helped to increase the frequency of waste collection in Ulaanbaatar City. The ex-post evaluation confirmed progress in improving SWM operations, such as the establishment of new regulations aiming at creating a society with recycling system in Ulaanbaatar City. Therefore, the effectiveness and impact of this Project are high. Efficiency is fair, since the Project period was within the plan, whereas the Project cost exceeded the plan. Sustainability is also fair, because there are some concerns about organizational aspect to conduct environmental monitoring in the final disposal sites and financial aspects to secure budget for upgrading final disposal sites and aged facilities.

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

4.2 Recommendation

4.2.1 Recommendations to the Implementation Agency

To PSD:

PSD and Consortium reported that the amount of waste was increasing together with the population growth. Three disposal sites within Ulaanbaatar City are expected to reach the limits of their capacities within a few years. Plans to build new disposal sites and update existing equipment will be needed in the near future. The construction plan for the disposal sites must be based on medium- and long-term projections of the waste volume. At the same time, the target year for the current master plan is 2020, so base-line data should be updated and made to prepare for a new master plan in the next term.

To Consortium:

Results of an environmental monitoring survey conducted by Ulaanbaatar City every year showed monitoring tests on water quality and methane gas around all disposal sites in Ulaanbaatar City were never conducted and no fences were built in some of the disposal sites, required by Mongolia's environment laws. An environmental monitoring operation system should be established including specifying the environmental measures and designating a person in charge at each site to clarify the responsible department within Consortium.

4.2.2 Recommendations to JICA

JICA should follow-up to ensure that Consortium promptly and appropriately start conducting an environmental monitoring at NEDS which was built by a Japanese Grant Aid Project.

4.3 Lesson Learned

Need to analyse risks when a newly established organization becomes a counterpart

EPWMD, as a main counterpart of the Project, was just established, and its organizational and institutional capacities were to be strengthened through the Project. However, one of the Project's preconditions was that 'EPWMD continue to function appropriately as a coordinating organization'. The precondition was, however, not secured and the appropriate countermeasures were not taken. As a result, EPWMD could not adequately function as a coordinating organization and activities targeted for WSF and districts officers to strengthen their financial capacities and raise public awareness had to be modified. As such, when a newly established organization is designated as a main counterpart, a risk assessment should be carried out to analyse the organization's operating capacity at the planning stage. Activities to mitigate the risks (for example, adding consensus-building and facilitation to the project implementation process and adding experts in contract management with private companies) should be included in the plan.

Need to consider the implementation starting point for projects included in cooperation programs

WSF, which was one of the counterpart organizations, was abolished during the Project and the implementation system and related activities were forced to be revised. In the background, Ulaanbaatar City's policies related to the SWM system were in a reforming process and the operation system was not fixed. The reform process, privatization of waste collection operators and revision of the waste collection fee system was ongoing as a result of the Development Survey carried out by JICA prior to the Project. When providing a new project in conjunction with a previous cooperation program, the timing of inputs should be carefully discussed when it is determined that the target country's policy and the organizations are not mature enough or are changing

Attachment : Achievement of Outputs at the Project Completion

Output	Indicators	Achievement
Output 1	1-1. Proposals of draft policy, draft regulation(s) and draft guideline(s) on SWM prepared by EPWMD.	Achieved : Total 13 laws, regulations and guidelines related to SWM were drafted in 2010 and 2011 by EPWMD. (Four policies for national level, 9 regulations for municipality level)
	1-2. Draft updated Master Plan prepared by EPWMD.	Achieved : The waste amount and composition surveys was implemented in 2010 and 2011 in order to revise M/P. The revision of M/P was completed in May 2012.
	1-3. Action Plan for the organizational development of EPWMD.	Achieved : The annual action plan of EPWMD had been formulated since 2010. It was personal plan in 2010, but revised to organizational plan after 2011. Finally, action plan from 2013 to 2016 was formulated..
Output 2	2-1. Report on operation of SWM equipment (collection vehicles and heavy machineries) is submitted by CMPUA to EPWMD 4 times a year.	Partially Achieved : An operation reporting format of SWM equipment was formulated and shared with CMPUA and the waste collection companies through the workshop under the Project in March 2010. However, the reports were submitted twice in 2010, 6 times in 2011 and none in 2011 because of internal problem of CMPUA caused by personnel transfer.
	2-2. Report on maintenance of SWM equipment is submitted by CMPUA to EPWMD 4 times a year.	
	2-3. CMPUA and each district prepare and submit the waste collection plan to EPWMD once a year.	Not Achieved : Each Districts were expected to prepare waste collection plans, however, the participation of district officers were limited because of the decision of City Council to abolish WSFs which was part of district offices. Therefore, this indicator was not achieved.
Output 3	3-1. Landfilling monitoring committee assesses landfilling operation as sanitary landfilling.	Achieved : The first landfilling monitoring committee was conducted based on monitoring guidelines formulated under the Project in October 2010. The second committee was conducted in May 2012. The committee confirmed that sanitary landfill with consideration of environment protection was implemented in the landfill site.
	3-2. Report of waste composition survey is prepared by CMPUA.	Achieved : A waste composition survey was conducted at the waste separation factory of NEDS in August 2010. Another survey was conducted at the belt conveyor-sorting factory of NEDS from April to July 2011. CMPUA took an initiative in conducting these surveys.
	3-3. Environmental monitoring including gas emission survey at landfill site is conducted regularly by CMPUA.	Achieved : The Project gave guidance on the operation of gas detector in October 2010 and March 2011. Monitoring of underground water quality has been conducted by CMPUA since April 2012.
Output 4	4-1. Common financial management rule for all WSFs is established.	No activities with WSF were implemented.
	4-2. Financial condition of each WSFs is monitored regularly by EPWMD	No activities with WSF were implemented.
	4-3. EPWMD strengthens understanding about	Achieved : Based on recommendations of the Mid-Term Review, bi-monthly meetings were held

	administrative/financial management of SWM.	with the directors of EPWMD and CMPUA to share the progress and effects of the Project activities. Important data was shared in order to decide policies regarding waste sorting and recycling and formulate a common understanding regarding SWM.
	4-4. EPWMD can design necessary waste generation fee based on the appropriate waste collection tariff to the waste collection organizations.	Achieved : After the Mid-Term Review, “Guideline on Calculating Appropriate Waste Collection Fees” was formulated using the weighbridge ¹⁸ data. This guideline enabled EPWMD to estimate costs of waste collection and transportation to be paid to waste collection companies and to do a trial calculation of waste collection fees for dischargers.
	4-5. EPWMD can prepare standard tender procedure and standard tender document for selection of waste collection organizations.	Achieved : “Standard Tender Document” was prepared by EPWMD receiving technical guidance from Japanese experts. EPWMD staff gained the knowledge on formulating waste collection plans from Japanese experts during preparation of the standard tender documents.
	4-6. Control system of selected waste collection organizations will be developed.	Partially Achieved: “Guideline on the Tender Procedure” was prepared by the Project, although a tender to select waste collection companies was never conducted before the Project completion.
Output 5	5-1. Personnel who are in charge of Public Awareness in EPWMD and District offices are able to conduct the public awareness activities by taking initiatives.	Achieved (Except District offices) : A guideline on Public Awareness was formulated through the Pilot Projects. Based on knowledge gained through the Pilot Project, EPWMD staff took initiative in planning, implementation, monitoring, and coordination with relevant organizations during the 2 nd phase of the Pilot Project. The district officers partially participated in the Pilot Projects.
	5-2. Public awareness campaign will be conducted in 4 khorooos through Pilot Project and another 4 khorooos by the Counterpart.	Partially Achieved : Public awareness campaign was implemented in total of seven khorooos while the target number of khorooos was eight. To disseminate information on the current waste situation and 3R promotion efficiently, the public awareness campaign was carried out through various ways, such as resident meeting household visiting, calendar and brochure, TV programs.
	5-3. Awareness of residents on waste separation and discharging manner is improved at the Pilot Projects sites	Achieved : According to the results of the Public Opinion Survey conducted at the beginning and end of Pilot Project, the proportion of the residents who answered ‘always sorting their waste’ and ‘not always, but sorting their waste’ increased from 38.0% in 2010 to 64.7% in average.
Output 6	6-1. Waste separation facility is examined in NEDS and report on necessary extra cost, efficiency, sanitary conditions of separation operation is submitted.	Achieved : A waste separation factory was constructed in NEDS in July 2010, and waste pickers were hired for sorting and recycling operation. The operation started from August 2010, and the straight conveyor was installed in April 2011.
	6-2. Valuable collectors (former waste pickers) will cooperate for sorting operation at sorting yard according to the manual and	Achieved : About 20 waste pickers had contracts with CMPUA for sorting operation, and demonstrated that they were able to work at the waste separation factory.

¹⁸ Facility to measure the weight of waste collection trucks.

	guidelines.	
	6-3. Recommendation paper on waste separation and recycling system is officially submitted to Ulaanbaatar City authority.	Achieved : Based on the Pilot Project, the Project summarized a recommendation paper on 3R. Also, the paper was compiled in the Project completion report by EPWMD.

(End of the report)