Republic of Djibouti

2017 External Ex-Post Evaluation of Japanese Grant Aid Project

"The Project for the Provision of Waste Management Equipment"

External Evaluator: Shima Hayase, IC Net Limited

0. Summary

This project, conducted in the capital of Djibouti, aimed to strengthen the capability of waste management capability of the Cleansing Department of Djibouti City through provision of waste collection and disposal equipment, thereby contributing to improve the environment and sanitation of the city, and basic life of the citizens.

The project is in line with the national development plans of Djibouti which aimed at improving the environment by strengthening the capability of waste management, the development needs of Djibouti, and Japan's ODA policies at the time of planning. Thus its relevance is high.

Procurement of the equipment was carried out as planned, and the project cost was within the plan. However, the project period exceeded the plan. Thus its efficiency is fair.

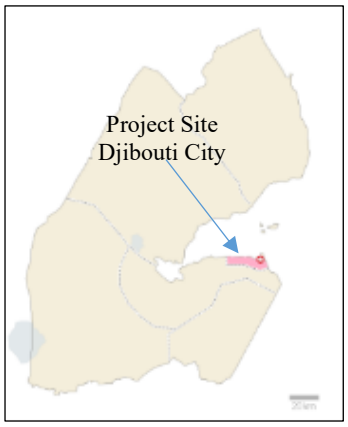
Since quantitative data needed to assess effectiveness was not provided, a comparison between the targets and actual was not able to make. However, it can be said that the project achieved a certain result for the following reasons: the subject areas for domestic refuse collection were wider than the target areas; the amount of waste collected in all city areas was above the estimate; the waste management site operation was carried out as planned; and the equipment improved by this project demonstrated the expected capability.

According to a qualitative survey, the result was that almost all the respondent could now dispose of waste on collection every day since collection service was widely carried out. The result also show that dumped waste volumes were declined, noxious odors were reduced, the numbers of open garbage fires were reduced, and the numbers of harmful domestic insects was reduced. Thus, there are project's contribution on environmental and sanitation improvement in the area, and also the impact of the project has appeared. In summary, its effectiveness and impacts are fair.

There were no major issues with the institutional and financial aspects of the executing agency. However, in the field study, there were some problems observed with technical aspect and with status of equipment maintenance. Therefore the project's sustainability is fair.

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

1. Project Description



Project location

A Compactor Truck Collecting Waste in Djibouti City

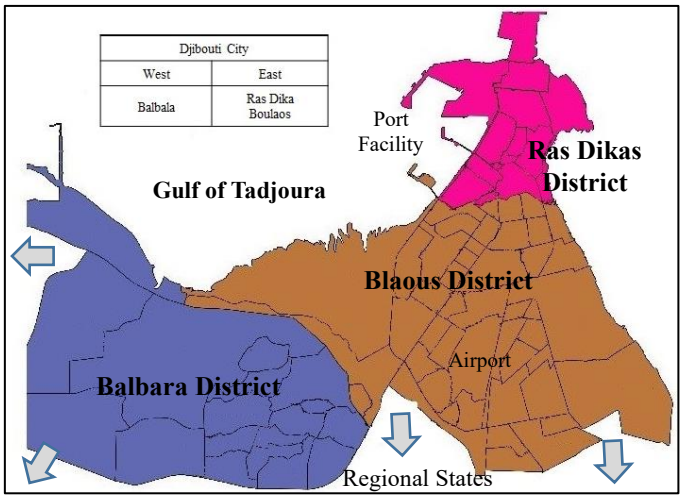
1.1 Background

Djibouti City, the capital of Djibouti, used to be a small commercial city in the 1960's where Ras Dikas District was the city center. With economic development, the population of the city had increased from approximately 340,000 in 1994 to approximately 470,000 in 2009.[1] The amount of discharged waste in a day in the city was expected to double from 170 ton in 1994 to 340 ton in 2015.[2]

Due to shortage of waste collection and disposal equipment, the waste collection rate was only 60% in 2011.[3] Moreover due to aging equipment, the collection rate declined farther. In the city, dumped waste and illegal disposal caused soil and water contamination. Also burning of waste caused smoke pollution and the generation of hazardous substances. This negatively affected the environment and sanitation of the city.

Thus the Cleansing Department of Djibouti City (Office de la Voirie de Djibouti, hereafter referred as "OVD") made a request to the Government of Japan to implement a grant project to upgrade waste collection and disposal equipment in order to improve the environment and sanitation of the city.

[1] The Ex-ante Evaluation Study Report
[2] The Preparatory Survey Report (January, 2013)
[3] The Preparatory Survey Report (January, 2013)



Source: created with the material provided by JICA

Figure 1: Location of the Waste Collection Area in Djibouti City

1.2 Project Outline

The objective of this project is to strengthening waste management capabilities of the Cleansing Department of Djibouti City through provision of waste collection and waste disposal equipment,[4] thereby contributing to improve the environment and sanitation of the city, and its citizens' basic life.

Grant Limit / Actual Grant Amount	1,346 million Yen / 1,070 million Yen
Exchange of Notes Date /Grant Agreement Date	December, 2012 / December, 2012
Executing Agency	The Cleansing Department of Djibouti City
Project Completion	September, 2014
Main Contractors	Waste Collection Equipment : Toyota Tsusho Corporation Waste Disposal Equipment: ITOCHU Corporation
Main Consultant	Japan Techno Co., Ltd.
Outline Design	February, 2012
Detailed Design	February, 2013
Related Projects	**Grant Aid Project:** " The Project for the Improvement of Waste Management Equipment" (April, 1994)

[4] The project's objective as at the ex-ante evaluation was "to improve the environment and sanitation of Djibouti city and to contribute to the improvement of its citizens' basic life. This was done through improving and upgrading waste collection equipment and waste disposal equipment of the city's Cleansing Department. However, the logic was incomplete because it was missing the level of the project outcome. Therefore, this Ex-Post evaluation complemented "strengthening the department's waste management capabilities" as the project's outcomes.

	International Agencies Projects: "The Study on Djibouti City Sanitation Strategy" (African Development Bank 2005), "Construction of Sanitation Waste Management Site" (European Union 2013)

2. Outline of the Evaluation Study

2.1 External Evaluator

Shima HAYASE, IC Net Limited

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule,

Duration of the Study: August, 2017 - November, 2018

Duration of the Field Survey: December 7 - December 25, 2017, April 14 - May 2, 2018

2.3 Constraints during the Evaluation Study

For this evaluation study, data on effectiveness and sustainability, the most vital information to determine the project's effects, were not provided by the executing agency. Thus the degree of achievement and sustainability of the effects were determined by assumptions based on existing documents such as completion reports and peripheral information. It was not possible to analyse the appearance of project effects by comparing the data throughout the time. Moreover, there is a possibility that the most recent information is not reflected in the evaluation study.

3. Results of the Evaluation (Overall Rating: C)[5]

3.1 Relevance (Rating: ③)[6]

3.1.1 Consistency with the Development Plan of Djibouti

In the national policy at the time of project planning, *National Initiative for Social Development 2008-2012* (Initiative Nationale pour Development Social 2008-2012 enacted in April, 2008,) "making an effort to develop human resources, the generalization of social infrastructure services and harmonious regional development" was one of the four strategies. In order to achieve these, the policy outlined the following design: "the development of the city and its regions and environmental protection."

As a national strategy on environment, *National Environment Action Plan 2001-2010* (Plan d'action National pour l'Environment 2001-2010) was formulated. Based on the theme of the plan "The Improvement of Waste Management," the African Development Bank conducted *The Study on Djibouti City Sanitation Strategy*. Based on the study, plans for the construction of a

[5] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[6] ③ high, ② fair, ① low

waste management site and the procurement of equipment, including for this project were formulated.

The national policy at the time of ex-post evaluation *Vision Djibouti 2035*, a long-term development plan covering the years to 2035, was issued by the Djibouti Government in March 2014. In order to produce this plan, the country's development to 2013 was analyzed. According to the analysis, one of the least developed areas was "health and solid waste management." No measures to respond to obstacles to delayed development in these areas have yet been taken. It regards this situation as a problem.

The Strategy of Accelerated Growth and Promotion of Employment 2015-2019, a five-year plan based on the above long-term plan, raised four principal policies. Among them, the following two policies are related to waste management:

I. Economic Development, Competition and the Revitalization of Private Sector

Sanitation infrastructure is vital in economic development. Waste collection shall take place as part of it. The policy is aimed at ensuring citizens have access to waste collection. In order to realize this, a waste monitoring program, along with training technicians for the program, and sanitary education for residents shall be carried out.

IV. Sustainable Development

The importance of economic development in partnership with natural environment protection shall be demonstrated for sustainable development. Strategies aimed at strengthening environmental policies and monitoring, along with environmental evaluation shall be implemented. Also the environmental management statistics system shall be improved.

Thus from at the time of planning to the ex-post evaluation the improvement of the environment and strengthening waste management capabilities have been important focuses in the development plans of Djibouti. Thus, the consistency with the project is high.

3.1.2 Consistency with the Development Needs of Djibouti

At the time of planning in 2012, the population of Djibouti was approximately 500,000. 74% of the nation's population was concentrated in this city (Table 1.) The influx of nomads from farming villages and refugees from Somalia has contributed to the expansion of the city's residential areas.[7]

At the time of ex-post evaluation, the population of Djibouti had reached approximately

[7] The materials provided by JICA

540,000 (in the year of 2016) (see Table 1.) The nation's population is concentrated in this city and this situation has not changed. Djibouti city had expanded into the southern part of the Balbala District and regional cities. *The Vision Djibouti 2035* predicts in 2020 the population of Djibouti City will increase to 640,000.

Table 1: Population of Djibouti City and Share of the Nation's Population Living in Djibouti City (Actual Population)[8]

(unit: person)

	2012	2013	2014	2015	2016
Population of Djibouti City	503,044	512,356	521,840	528,627	535,469
Share of the Nation's Population Living in Djibouti City	74%	74%	74%	74%	73%

Source：World Bank Development Indicators

In *the Vision Djibouti 2035*, setting the goal of turning Djibouti into a business and tourism hub in Africa, Djibouti has embarked on large-scale infrastructure projects such as port facilities and railways.[9] Also advancing seaside resorts and archeological tourism, it has aimed at increasing visitors to 500,000 annually by 2030.

In addition to residents' domestic waste, with the development of transport infrastructure, the construction of commercial facilities, and the promotion of new business to increase tourists, the volume of office waste is expected to increase the most. At the time of ex-post evaluation, the needs to strengthening waste management capabilities had been continuously high.

3.1.3 Consistency with Japan's ODA Policy

This project aimed to strengthen waste management capabilities. This project falls under the living environment development program, a prioritized development agenda for "Social Infrastructure for Sustainable Development." This agenda is a key area in *Country Assistance Policy for Djibouti* (implemented in July, 2011).

In addition, strengthening waste management capabilities was expected to contribute to the solutions targeted by *The Millennium Development Goals (MDGs)*, "Ensuring Environmental Sustainability" by improving the environment and sanitation. Moreover it contributed to the solutions targeted by the policy, "Responding to Environment and Climate Change Issues," a pillar of The Fourth Tokyo International Conference on African Development.

This project aimed to contribute to the improvement of the environment and sanitation of Djibouti City and to its citizens' basic life. This project was in line with the target of the Djibouti Development Plan, Social Infrastructure Development Plan for Sustainable Development at the time of planning. Also it is in line with the target of MDGs, Ensuring Environmental

[8] World Bank Development Indicators : http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators# (accessed April 17, 2018)

[9] Djibouti Free Zone :http://dpfza.gov.dj/ (accessed April 30, 2018)

Sustainability. Thus the project is highly relevant to Japan's ODA policy.

3.1.4 Relation to the Projects of other Donors

The planning and actual progress of the waste management projects in Djibouti City is shown below in Table 2.

Waste management equipment was utilized at a new waste management site constructed by the funds from European Union (EU). Waste collecting equipment implemented by this project was planned to be stored and maintained in a workshop constructed by the French Development Agency (AFD).[10]

The construction of the waste management site was completed in 2013 and sanitation operation using the waste disposal equipment from this project commenced. The equipment was stored in a roofed parking space. However, at the time of ex-post evaluation in April, 2018, AFD's workshop was not yet completed and the waste collection equipment was stored at a temporary site. Also the maintenance equipment was not used. The workshop was scheduled for completion at the end of 2018. After the completion of this construction, waste collecting equipment is planned to be stored in the workshop, and maintenance equipment is planned to be utilized.

In a series of projects involving other organizations, this project has assumed the central role. It has contributed to strengthening waste management capabilities along with other organizations.

[10] A roofed parking space for waste collecting equipment, spare-parts storage, maintenance office and workshop

Table 2: Waste Management Project Plans and Actual Progress as at the Ex-Post Evaluation

	Plan(2012)		Actual Situation (2018)
	Contents	Donners/ Cooperation Period	
Waste management site	Closure of an old waste management site. The construction of a new waste management site according to international standards	EU 2011 - 2012	A new waste management site was constructed by EU. Completed in 2013. The old site was used as a disposal site of building materials
Sanitation	The construction of a new workshop and the renovation of the existing one. The procurement of a container truck. The construction of a waste segregation factory	AFD 2012 - 2015	Funded by AFD, a new workshop commenced research in 2013. Scheduled to complete the construction at the end of 2018. Other plans were not carried out yet[11]
Equipment	The procurement of waste collection and disposal equipment	Japan 2012 - 2013	Equipment procurement was carried out by the Japanese Government as planned. In addition to these, 6 garbage trucks and waste bins were supplied by Turkey in 2015. These were used for waste collection in regional states
Accounting/ Fee Collection	Building accounting information system and fee collection database	Internal revenue source 2011 - 2012	Commenced in 2014. Ongoing
Design	Building basic data for GIS	To be determined 2012 - 2015	Introduced in February, 2017. Internal revenue source from OVD
Education	Supporting educational activities at school and media publication	EU 2011 - 2015	Funded by USAID, educational activities were carried out at primary schools. Public education was not yet conducted

Sources: Planning from the Preparatory Survey Report (January, 2013). Actual from an interview with the executing agency.

Therefore this project is highly consistent to Djibouti's develop plan and the development needs along with Japan's ODA policy. Thus the project's relevance is high.

[11] A supporting program for waste collection in poor areas was planned. It was planned to conduct primary waste collection by tricycles, to minimize waste by segregating organic waste, and to transport only residual dross to a final disposal site by container trucks. In addition, the segregation process was planned to be conducted by the local residents, aiming to contribute to poverty reduction. Moreover the construction of a waste segregation center and compost factory was examined.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

(1) Waste Management Equipment

As shown in Table 3 below, the equipment was procured as planned.

Table 3: Plan and the Actual of Equipment Procurement

Equipment (main specification)	Plan	Actual
Waste Collection Equipment		
Compactor Truck (15m^3)	8 units	As planned
Compactor Truck (10m^3)	26 units	
Trash Bins (1100 liter)	344 units	
Detachable Container Truck (10m^3 Lifting Type)	6 units	
Container (10m^3 Desorption type)	57 units	
Detachable Container Truck (20m^3 Pulling Type)	4 units	
Container (20m^3 with cover)	20 units	
Container (20m^3 without cover)	6 units	
Road Weeper(5 m^3 or longer)	2 units	
Pick-up Truck	3 units	
Towing Truck (20 t class)	1 unit	
Slide-Floor Transport Truck with Crane (4-ton Class)	1 unit	
Equipment and Tools for Workshop	1 unit	
Waste Disposal Equipment		
Dump Truck (18m^3)	3 units	As planned
Dump Truck (18m^3)	2 units	
Wheel Loader	3 units	
Bulldozer	1 unit	
Landfill Compactor	2 units	
Wheel-Type Excavator	1 unit	
Sprinkler Truck	1 unit	
Trailer Truck	1 unit	

Source: Planning from the Preparatory Survey Report (January, 2013). Actual from the material provided by JICA

Among them, one unit of detachable container truck (10m^3) was burned down in a riot in December, 2015 and became unserviceable. The executing agency reported this to JICA, and was granted permission to dispose of it while reserving some recyclable parts (a container and some other parts). This loss was compensated for by changing the route of a waste collection container truck in the city. Thus it did not affect the volume of waste collection and the collection ratio negatively.

(2) Inputs Made by Djibouti

Inputs made by Djibouti at the time of planning was as below. The equipment from this project was planned to be stored at a workshop from the AFD project. Due to the delay in construction, most equipment was stored on a temporary site without roof. In the site, neglected equipment was left as well. Because of this, land level has not yet been done. On the other hand, sites to

install a container[12] were secured. They were paved and was also repaired. The containers were installed as planned.

(a) Securing a place to store equipment:
Reserve a place to store equipment. Remove equipment disposed on the site. Land levelling will be carried out if necessary.

(b) Securing a site to install containers:
Securing sites to install. Unpaved areas will be paved. Site where has any damage will be repaired the pavement.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The data on the actual cost of Djibouti was not provided. Thus a comparison between the total target project cost and the actual was not able to be made. From the Japanese side, the target project cost funded by Japan was 1,346,000,000 yen, the actual cost was 1,070,000,000 yen. Thus it was within the plan. (79% of the projected target). The quantity and specification of the outputs were as planned. Because bidding took place it was possible to procure equipment at a lower cost than planned.

3.2.2.2 Project Period

While the target period[13] was 19 months from March, 2013 to September, 2014, the actual period was 21 months from December, 2012 to September, 2014. It was two months longer. Thus it was above the plan. (111% above the targeted time). A signing of the Japanese grant took place two months earlier and bidding took place earlier as well. However, the handover-ceremony for this project was delayed since it was decided to be a joint handover-ceremony with the other project[14] which was taking place around the same time.[15] Machine operational guidance was carried out during the waiting period until the ceremony.

As of above, the project cost was within the plan. However, the project period was longer than targeted in the plan. Thus the project's efficiency is fair.

[12] 53 lifting-containers of 57 were installed in 33 locations in the city. (4 units were reserved). Pulling containers were lent to commercial facilities. Borrowers were responsible for securing a site for installation

[13] The duration of the project was set from the E/N singing to handover. A comparison was made between the duration of the planned period and the actual period

[14] The Japanese Grant Aid Project "The Project for Improvement of Fire Fighting and Rescue Equipment of Djibouti City." (E/N March, 2013)

[15] Confirming with the executing agency that equipment was neither handed over nor used before the ceremony.

3.3 Effectiveness and Impacts[16] (Rating: ②)

3.3.1 Effectiveness

This project aimed at strengthening the capabilities of waste management in Djibouti city. At the time of planning, (1) the waste collection ratio was set as the operation indicator. Also as the effect indicators, (1) the fee collection ratio, (2) the numbers of illegal disposal sites, and (3) the serviceable living of the new waste management site were set.

3.3.1.1 Operation Indicators

(1) The Waste Collection Ratio of Djibouti City

At the time of planning, the target areas of this project were all eastern part of Djibouti city (Ras Dikas and Boulas districts), and the western part of the city (Balbala District) except areas where waste was collected by the AFD project. It was aimed to improve the waste collection ratio to 100% in 2015, one year after project completion, from the baseline of 68 % in 2011.[17]

In 2015, one year after project completion, areas where waste was collected by equipment from this project expanded into all Djibouti city areas, including the areas planned to be covered by AFD. Taking actual situations into consideration, a comparison between the target waste collection ratio of all city areas and the actual collection ratio was made. While the target ratio was 85%[18], the actual ratio was 87%[19]. In addition a comparison of waste volumes collected by OVD was as follows: while the target volumes were 295t/day, the actual volumes were 299t/day. Thus it can be said that the intended target, increasing the waste collection volume by provision of equipment from this project was achieved.

Since the series of data was not given, it was not possible to confirm a change in waste collection volumes. According to OVD, waste collection has been continuously carried out in all city areas up until the time of ex-post evaluation in 2018. Thus it is assumed that the project's effectiveness has continued.

[16] Sub-rating for Effectiveness is to be put with consideration of Impacts.
[17] The ratio of "the waste volumes collected by OVD (18 l t/day)" to "the waste volumes generated in the subjected areas for this project (263 t/day)"
[18] Waste volumes collected by OVD (295t), the target volumes as at planning, divined by the estimated waste volumes generated in all Djibouti city areas (344t) makes 85%.
[19] The figure was calculated as follows: the waste volumes collected in 2015 by OVD (299t) divined by the estimate waste volumes generated by all areas of Djibouti city (344t). Since the actual volumes of waste generated was not given by ODA, the estimated volume at the time of planning was alternatively used.

Table 4: Waste Volumes Generated in Djibouti City and the Subject Areas of the Project,[20] Waste Collection Volumes[21] and Waste Collection Ratio

(unit : t/day)

	Baseline	Target	Actual
	2011	2015 1 year after project completion	2015 1 year after project completion
Waste volume generated in Djibouti City (Waste volumes generated in the subject areas of the project)	306 (263)	344 (295)	344 —
Waste volumes collected by OVD	181	295	299
Waste Collection Ratio in Djibouti City (Waste collection ratio of the subject areas of the project)	60 % (68 %)	85 % **(100 %)**	87 % —

Sources: Planning and target figures from the Preparatory Survey Report (January, 2013). Actual figures from material provided by JICA

3.3.1.2 Effect Indicators

(1) The Fee Collection Ratio

Due to the implementation of this project, the collection rate of residents' domestic waste was aimed at 38% or more and the collection rate of office waste was aimed at 95% or more. The data on achievements was not provided. The residents' domestic waste collection services have become free except wealthy residential areas. Thus waste collection services in areas where fee collection had been difficult also became free. It is assumed that although the numbers of subject households for fee collection were reduced, the waste collection ratio has increased. Along with residents' free domestic waste collection services, a measure to provide free waste collection services for small businesses was implemented. In addition the number of public containers ($10m^3$) installed in places such as markets increased. For large-scale businesses, a fixed rate of container rent ($10m^3/20m^3$) and a waste collection fee according to the volumes of waste discharged were imposed. Since waste was collected upon a request, it is estimated that fee was more certainly collected in comparison to the planning time.

[20] The collection rate of the project's subject area of the western side of the city, Balbala District, in addition to the eastern part.

[21] The estimated volume of waste generated was calculated based on the result of a field survey for the Preparatory Survey. Basic unit (kg/ person) of generated waste according to resident type and basic unit (kg/ person) of generated waste according to business type were used for calculation. It was assumed that the basic units would not change because there was little possibility that residents' lifestyle would change rapidly up to the year targeted in planning. The target figures were calculated based on the capability of this project's waste collection equipment.

Table 5: Djibouti City's Waste Collection Fee Ratio

	Baseline	Target	Actual
	2011	2015 One Year After Project Completion	2015 One Year After Project Completion
Residents' domestic waste collection fee ratio	8 %	38 %	N/A
Office waste collection fee ratio	91 %	95% or more	N/A

Sources: The baseline and target from the Preparatory Survey Report (January, 2013). The actual figures from material provided by JICA

(2) The Number of Illegal Disposal Sites

The number of illegal disposal sites was set to assess quantitative outcomes. However, OVD's definition of illegal disposal was unclear, decided accordingly to "their own definition."[22] Compared with the baseline set in 2011, the number of illegal disposal sites had greatly reduced from 70 to 20. However, at the time of ex-post evaluation study in 2018, according to the interviews with executing agency, the number of illegal disposal sites was 48.[23] So the number of illegal disposal sites more than doubled.

Along with OVD's unclear definition, there are other exterior factors such as increase of Djibouti city's population and unofficial expansion of city's boundary. Thus it is difficult to evaluate the project's effect using the number of illegal disposal sites as its direct effect indicator.

Table 6: The Number of Illegal disposal Sites in Djibouti City

	Baseline	Target	Actual
	2011	2015 1 year after project completion	2015 1 year after project completion
The Number of Illegal disposal Sites in Djibouti City	70 locations	Less than 14 locations	20 locations

Sources: The baseline and target are from the Preparatory Survey Report (January, 2013), the actual figures from material provided by JICA

[22] An interview with the consultants (December, 2017). According to OVD, staff conduct monitoring after waste collection. They count the number of illegal disposal sites. However, a counting method was left with the person in charge. There was no consistent definition what situations are the illegal disposal.

[23] This number was counted by OVD staff members in charge of monitoring. They patrolled the city after waste collection.

Collection of Illegally Dumped Waste in the City

Collection of an Illegally Dumped Car

(3) The Serviceable Life of the Waste management site[24]

The project aimed at prolonging the serviceable life of the waste management site due to compressing waste transported to the site using the upgraded equipment from this project.[25] Since the actual data was not provided by OVD, a comparison of figures between before and after the implementation of the project were not able to be made. According to a staff in charge of the site, work was carried out following instructions. Work efficiency has doubled. Moreover at the time the ex-post evaluation the site was still serviceable after three year after project completion. Thus it is assumed that there were some effects due to this project.

Table 7: Serviceable Life of the Landfill

	Baseline	Target	Actual
	2011	2015 1 year after project completion	2015 1 year after project completion
Serviceable Life of the Waste management site	Less than 1year	3 years or more	N/A

Sources: The baseline and target from the Preparatory Survey Report (January, 2013). The actual figures from material provided by JICA

(4) Performance of Each Equipment

The expected performance according to equipment type, and achievements are shown below. It can be said that all vehicles have achieved the expected outcomes.

[24] The target was set, taking the following points into consideration: the volumes of waste transported to the waste management site daily; the capability of equipment at the site; and an improved efficiency of landfill project.

[25] Waste generated daily was 295t/ day; the subject waste volumes for landfill 292t/ day was calculated by deducting recyclable waste from the waste generated daily; and the apparent specific gravity of the waste transported to the site was 0.2 k/m^3. Based on the assumptions, the landfill work load was estimated to be 1460m^3 /day (292/0.2). The waste was planned to be compressed to the apparent specific gravity of 0.8t/m^3. Therefore the compressed landfill volumes were estimated to be 365m^3 /day (292/0.8). Data provided by JICA.

Table 8: Expected Performance and Achievements of Each Equipment

Indicator	Expected Performance	Achievements at the Ex-post Evaluation
Waste is collected effectively by waste collection and transport equipment	The expansion of waste collection areas. An increase in the number of waste collection. More effective waste collection	□ Achieved: An increase in waste collection frequency. The expansion of waste collection areas. More effective waste collection routes. A reduction in fuel
Efficient waste management site using disposal equipment	Sanitation waste management site operation is carried out following procedures (transport, crushing, compacting, covering it with sand, and douse). More efficient operation flow	□ Achieved: Sanitation waste management site operation has been conducted. As at the planning, waste management site operation used to take 2 days. After the implementation, it was shortened to 1day.

Source: The expected outcomes from the Preparatory Survey Report (January, 2013). Achievements from an interview with the executing agency

3.3.1.3 Qualitative Effects (Other Effects)

As qualitative outcomes fall under this project's impact level, they are intergraded into Section "3.4. Impact."

3.3.1.4 Contribution and Inhibitory Factors

The new waste management site was constructed by EU, and the roads between the city and the site were paved. This contributed to strengthening the efficiency of waste collection and disposal operation. On the other hand, since the construction of the workshop from the AFD project was delayed, a roofed and paved parking space for maintenance equipment was not yet secured. Thus it was not able to install the equipment either. The workshop was scheduled for completion at the end of 2018. An early completion is expected in order for improving situation of maintenance and operations of equipment.

At the time of planning, in order to assess the project's efficacy, as the operation indicator, "the waste collection ratio (of the project's subject areas)" was applied. Moreover, as the effect indicators (1) the fee collection ratio, (2) the number of illegal disposal sites, and (3) the serviceable life of the new waste management site were set.

Each indicator mentioned above will be discussed later. In order to assess the effects of the project more appropriately, indicator which covers the following points should have been applied instead.

- An indicator directly reflects the project's outcomes of strengthening waste management capabilities; and
- An indicator to compare its effectiveness in a quantitative way even if there is a change in prerequisites.

Regarding the operation indicator, waste collection ratio, the target was set only for the area covered by the project. However, equipment from this project was now widely used to collect waste in all city areas, and it was impossible to assess the project's outcomes by comparing the

waste collection ratios in the project's subject areas only. Responding to a change in prerequisites, in this ex-post evaluation study, both the waste collection ratio in all city areas and the waste volumes collected by OVD were used to assess its outcomes due to the improvement of equipment.

Regarding an effect indicator, (1) the fee collection ratio, there was a change in its prerequisites in waste collection fee, and fee became free except wealthy areas. Moreover the number of containers installed in public places for free waste collection increased. Thus a comparison using the ratio lost the meanings. In developing countries where a change in prerequisites often happens, the quantitative targets such as waste collection volumes and collection fee should be included in addition to the waste collection ratio and the fee collection ratio. So it will be possible to assess the expected outcomes at the time of planning more accurately.

Because the counting method of (2) the number of illegal disposal sites was left with OVD, and the data was taken without clear definition, thus the date provided by OVD was unusable to assess the project's effects.

The calculation of the (3) The serviceable life of the waste management site was made using figures of the transported waste compressed into one-quarter using equipment from the project; and the waste management site size was calculated from the equipment's operational hours; then based on the waste management site size, the serviceable life of the waste management site was estimated. Thus, the data was calculated via various steps starting with upgrading equipment. Therefore it was difficult for the executing agency to calculate the serviceable life of the waste management site. It is assumed that other data which reflects its outcomes more directly such as "final disposal volumes" would be more suited as an outcome indicator. Among the indicators set as at the time of planning, the quantitative data of the fee collection ratio and the serviceable life of the waste management site were not provided. The data on the waste collection ratio and the number of illegal disposal sites did not serve as the indicators. Thus it was not able to assess the project's effectiveness by making a comparison between the target and actual. On the other hand, the subject areas for waste collection exceeded the plan, and the waste volumes collected in all city areas exceeds the target volumes. The waste management site operation has been carried out as planned. In addition, the performance expected with the improved equipment was achieved. Therefore it is assumed that its effectiveness was appeared to some extent.

3.3.2 Impacts

3.3.2.1 Intended Impacts

"The improvement of the environment and sanitation of Djibouti City" and "the improvement of the basic life of its citizens" were expected as this project's impacts. Because quantitative indicators were not set, a qualitative survey was conducted in order to assess the degree of

achievements.[26]

(1) Status of Waste Collection Services Usage

According to the survey, regarding the frequency of discharging waste, 88% of the respondents (30 answers) answered that they dispose waste every day. The lowest number of waste disposal frequency was once a week (3%: 1 answer). Regarding the method of discharging waste (multiple answers were possible), all the respondents (34 answers) answered that they "throw waste directly in waste collection truck." Besides this, one selected "throw waste in a container" (3%, 1 answer).

According to the interviews with the residents, because there was no collection service before the project, following methods were taken to deal with domestic refuse, such as informal waste collectors (low-income foreigners) collected with fee; residents burned garbage in front of the houses; and the waste was disposed illegally.

Table 9: Frequency of Discharging Residents' Waste

Frequency of discharging waste by residents	Number of Answer	Ratio
Every day	30	88%
2-3 times in a week	3	9%
Once in a week	1	3%
2-3 times in a month	0	0%
Once in a month	0	0%
Never discharge	0	0%
Don't know	0	0%
No response	0	0%

Source: The qualitative survey of residents

Regarding how they would know the arrival of waste collection trucks, 97% (33 answers) answered that they recognize the arrival with "a melody from waste collection trucks," and 3% (1 answer) said with "noise of waste collection trucks." Waste collection trucks have been using a Japanese children's song *Akatonbo (red dragonfly)* to notify residents of their arrival, and the residents who hear the melody appeared from their houses to discharge their domestic waste into the truck.

(2) Change in Local Environment and Basic Life

Regarding changes in the area's environment between five years prior to the implementation

[26] The qualitative survey was conducted to assess the project's effects on beneficiaries (environmental and sanitation improvement along with the improvement in their basic life due to strengthening waste management capabilities.) The survey was conducted to 34 residents of Eastern side of Djibouti City(5 residents from the Ras Dikas District and 16 from the Boulaos District); and Western side of Djibouti City(13 residents from Balbara District.) The researcher visited their households and conducted semi-structured interviews using questionnaires. Since the samples for the survey were not selected in randomly from all the residents, its results only represented the residents' tendency and their opinions.

of the project (2012) and as at the time of the survey (2017), 94% (32 answers) answered that they acknowledged “improvement.” (Table 10)

The reasons of the improvement (multiple answers were possible) were explained as “waste dumped on the street reduced” by 47% (16 answers) of respondents, “garbage burnings reduced” by 29% (10answers), “noxious odours reduced” by 15% (5 answers), and “rats and harmful insects reduced” by 3% (1 answer).

Regarding changes in their basic life, 100% (34 answers) acknowledged improvement (Table 10). The reasons for improvement were explained as that there is “no need to dump the waste on the street” by 38% (13 answers) respondents, “no need to tolerate noxious odors at home” by 32% (11 answers), “no need to accumulate waste at home” by 18% (6 answers), “no need to find waste-collector” by 6% (2 answers), and “a decline in the numbers of rats at home” by 3% (1 answer).

Table 10: Changes in Local Environment and Basic Life

Changes in Environment	Number of Answers	Ratio	Change in Basic Life	Numbers of Answers	Ratio
Significantly Improved	26	76%	Significantly Improved	27	79%
Improved some	6	23%	Improved some	7	21%
No change	0	0%	No change	0	0%
Declined some	1	3%	Declined some	0	0%
Significantly Declined	0	0%	Significantly Declined	0	0%
No Response	1	3%	No Response	0	0%

Source: The qualitative survey of residents

Regarding on the OVD’s services, 76% (26 answers) answered “very satisfied” or “satisfied.” While 21% (7 answers) answered “moderate.” (Table 11)

The reasons for the satisfaction were answered as that “all waste is collected” by 56% (19 answers), “waste collection is carried out at appropriate timing” by 15% (5 answers), and “the frequency of waste collection is appropriate” by 12% (4 answers)On the other hand, regarding the reasons for dissatisfaction, 3% (1 answer) of the respondent answered that “all waste is not collected,” and also there was another answer saying “the frequency of waste collection is not enough” (3%, 1 answer.)

Table 11: Satisfaction Level of OVD's Services

Satisfaction Level of OVD's Services	Numbers of Answers	Ratio
Very Satisfied	1	3%
Satisfied	25	73%
Moderate	7	21%
Not Satisfied	0	0%
Not Satisfied at All	0	0%
No response	1	3%

Source: The qualitative survey of residents

Based on a qualitative survey and interviews, overall impacts were described in Table 12. It can be said that all expected impacts of the project were achieved except infections and soil pollution which had no clear relationship with the project.

Table 12: The Expected Impacts and Achievements

The Expected Impacts	Achievements
Decline in the level of dissatisfaction with OVD	□ Achieved: Residents satisfied with OVD's waste collection services, and appreciated OVD's contribution to a reduction in waste volumes in the city
Reduction in the volumes of waste littered in Djibouti City and environmental and sanitation improvement (decline in infections)	△ Unknown: Unclear relationship between infections and waste volumes
Disappearing noxious odors which give negative impacts on the citizens' lives and health	○ Achieved: Due to waste collection, waste was now left at home for a short period of time
Disappearing the generation of hazardous substances as a result of open waste fires	○ Achieved: Before waste collection had been widely carried out, waste used to be burnt in front of their houses. Due to waste collection, now they did not have to burn waste any more
Disappearing fire outbreak caused by open waste fires	
Disappearing soil contamination caused by illegally dumped waste	△ Unknown: Reduction in illegally dumped waste was recognized. However, a relationship between illegally dumped waste and soil contamination was unclear.
Reduction in the numbers of rats and harmful insects due to illegally dumped waste and waste left behind	○ Achieved: Mentioned as a reason for environmental improvement

Sources: The expected outcomes from the Preparatory Survey Report (January, 2013). Achievements from a qualitative survey and interviews as at the study

3.3.2.2 Other Positive and Negative Impacts

(1) Impacts on the Natural Environment

At the time of planning, according to the "JICA Environment and Social Consideration Guideline (April, 2010)", the negative impacts on the natural environment derived by the project were considered to be the least. Environmental impact assessment was not required by the Djibouti's environmental law.

(2) Resettlement and Land Acquisition

Since this was an equipment provision project, no relocation of residents nor land acquisition has taken place.

(3) Unintended Positive/Negative Impacts

As the cleaners, 300 women were employed by OVD, has been sweeping the city and monitoring the safety of container lifting process. Together with waste collection using equipment from the project, detailed to attention provided by the cleaners in order to promote environmental beautification in the city. At the same time, this was an effort to contribute to poverty reduction and to promoting women employment.

In light of the above, the project's impacts on environmental and sanitation, and the improvement of the basic life were acknowledged. On the other hand, two quantitative data out of four set to assess the project's effectiveness at the time of planning were not provided by the executing agency. The other two were not be able to use. Thus it was not possible to be able to compare its effectiveness with these data. However, it is assumed that there were certain project's effects judging from the status of waste collection and the waste management site. Therefore, the effectiveness and impacts of the project are assumed to be fair.

3.4 Sustainability (Rating:②)

3.4.1 Institutional / Organizational Aspect of Operation and Maintenance

Under the umbrella of Djibouti City, OVD is in charge of waste management, street cleaning, environmental beatification and road facilities management. The organizational structure has not changed at the time of ex-post evaluation.

At the time of planning (2012), there were 97 staff for waste collection and cleaning in the city. As a result of strengthening equipment by this project, additional 161 recruitments were needed. The number of staff at the of the ex-post evaluation study was not provided by OVD. However, according to the interviews with the staff in charge, a sufficient work force to operate waste collection equipment has been secured. Waste collection and cleaning were carried out at the capacity of 3-operating shifts (morning/afternoon/ night). At the time of ex-post evaluation, vehicles were operated by the planned number of staff.

The waste management site was run by 33 staff with an increase from seven at the time of planning. This was a larger number than the proposed of 10 as at the planning time. Moreover at the waste management site's entrance, a measure station was installed with an allocation of 15 surveyors.

Moreover, the number of technical staff was not provided. However, technical personnel specialized in machine, welding, tires, electricity and sheet-metal work were hired. A procurement

and storage officer was in charge of spare parts storage management and procurement. According to the executing agency, a sufficient work force to maintain equipment has been allocated for maintenance and operations. At the time of ex-post evaluation, there was no place to repair because the construction of workshop has not yet completed. Thus repair was commissioned to an agent in the city.

The number of staff at the maintenance Department was not provided by the executing agency. The department did not yet function at full capacity because the construction of workshop has not been completed. However, it was reported that a sufficient work force for operation and maintenance has been secured and the organizational structure of executing agency has not changed. Therefore it is assumed that there is no major problems with institutional and organizational aspect of operational and maintenance.

3.4.2 Technical Aspect of Operation and Maintenance

An operational guidance on equipment from this project was given to a total of 149 people, including 88 operators of waste collection equipment, 60 operators of equipment at the waste management site, and one person in charge of instructions distribution. OVD offered six to seven different kinds of trainings on waste management technique. Technical transfer has been carried out. Each department's status is as follows:

(1) Waste Collection Equipment

A group was formed by each equipment, and the collection routes were pre-determined. Waste collection was carried out systematically. In February 2017, the GPS system was introduced, and the locations of all the vehicles were enabled to obtain. In accordance with the introduction of this system, a review of the routes and personnel distribution took place in order to collect waste more efficiently.

In the field study on waste collection operation, the evaluation team observed some operation assistants collected waste with their bare hands, wearing neither gloves nor boots, and some residents climbed into compactor trucks and leaned out of the trucks' waste tailgates. During the operation of container trucks and wrecker truck, safety surveillance and traffic control were conducted, however some children who climbed into the trucks in operation were also observed.

(2) Waste Disposal Equipment

At the waste management site, operation with the sanitation landfill method was carried out following the instructions. However, waste pickers came and went freely to the site. They came into a waste segregation station to collect waste while dump trucks and wheel loaders were in operation.

It seemed that there is a safety control issue in both waste collection equipment and equipment at the waste management site. In order to prevent unexpected accidents, it is necessary to give safety guidance to the staff and to safety awareness to the residents.

Waste pickers collect wastes at the segregation station

(3) Operation and Maintenance of Equipment

Startup checks (cleaning, oil, tires and radiator), closing checks and cleaning were carried out daily by drivers. In the cases when minor faults were found such as those in tiers and batteries, OVD's maintenance department handled them. Otherwise an agent in the city responded to other issues. Regular check-ups were conducted by the agent as a rule. They were carried out every 5,000 km. Along with mileages, these were recorded in a log book for each vehicle and in a computer.

Changing tiers at a temporary parking space

At the time of the ex-post evaluation (2018), OVD's maintenance department was working at the corner of a temporary storage site because the construction of AFD's workshop has not yet completed. At the work space, there were neither a pit nor crane which were necessary for vehicle maintenance and their equipment and tools were very basic. Manuals and spare parts were stored in a temporary storage on the site of AFD's workshop. Manuals were lent according to request. However, there were drivers who could not read French. Thus an oral explanation was necessary. Some manuals were written only in English. The inventory of spare parts has been controlled by computer. Inventory has taken place twice a year. Most spare parts were available either in the city or neighboring countries such as Dubai, but there is a part of the container belong to container truck is not secured where to obtain from.

In summary, it is assessed that there are some problems with the technical aspect of its operation and maintenance sustainability. There is a safety control issue of equipment in operation. Also equipment maintenance is not conducted in an appropriate environment because the construction of AFD's workshop has not completed. Some problems have been observed in terms of the technical aspect.

3.4.3 Financial Aspect of Operation and Maintenance

At the time of the ex-post evaluation, data on OVD's budget and expenses were not provided. According to an interview with the executing agency, its situation of expense and budget in 2015, consisted of subsidy by the nation treasury and waste collection fee, was sufficient to cover necessary expenses for operations and maintenance such as personnel, fuel and spare parts. On the other hand, in 2015, fee collection was not carried out as planned. Thus a review on fee collection method was conducted.[27]

At the time of the ex-post evaluation (2018), according to interviews to the executing agency, residents' domestic waste collection fee only applied to wealthy and middle-class households in fixed-rate, and the fee for lower-class and the poor households were free. It is assumed that fee collection was carried out more surely since a fee collection method was reformed. In order for fee collection from large businesses was rationalized, and those who requested to collect illegally dumped waste and car needed to pay a fee in advance at the time when they applied.

According to the OVD officer responsible for the Waste Collection, a sufficient budget was secured with fee collection and subsidy from national treasury. There was no shortage of fuel and parts, and operations and maintenance were carried out properly. In a field study, there was no salary delay and regular check-ups of equipment and repair work by an agent were conducted. An outlook of securing its future budget for maintenance and operations was not given by the executing agency.

Information on OVD's budget and expenditure, data on fee collection status, an outlook of securing its future budget for maintenance and operations was not provided by the executing agency. However, the fee collection system was reviewed and in the field study, problems caused by a shortage of its budget were not observed. Therefore there are no issues with the financial aspect of its operations and maintenance sustainability.

3.4.4 The Status of Operation and Maintenance

The status of operations and maintenance of the waste collection and waste disposal equipment provided by the project at the waste management site were confirmed with the filed studies along with interviews with staff at the sites.

(1) Waste Collection Equipment

Since the AFD's workshop has been under construction, the equipment was stored temporally in an unpaved area. They were sitting with neglected equipment. Therefore the maintenance status was not good. Also the equipment and the tools for the workshop provided by the project were neither installed nor used.

Due to accidents in operation, damages on windshields and fenders, and scratches on the bodies were often observed on compactor trucks, container trucks and towing trucks. In the

[27] Material provided by JICA

interviews, the necessity of repairs was acknowledged, but they were used without being repaired unless there were serious problems in operation. According to the officer in charge, damaged parts such as broken windshields were to be repaired when the parts arrived.

Table 13: Status of Waste Collection Equipment

Equipment Name	Status	Explanations
Compactor Truck (15 m^3/10m^3)	△ Some Problems	During extremely hot summer weather, since temperature sensors exceeded a critical limit, it was necessary to replace a compactor truck with other vehicles. Responding to this by early morning waste collection
Trash Bins (1,100 t)	△ Some Problems	While trash bins were installed in public institutions such as schools, broken or unused bins were left behind in temporally storage areas
Detachable Container truck (10 m^3 Lifting Type)	△ Some Problems	Scuff marks and areas scratched by containers' chains corroded. Guidance on gentle usage is needed to be given
Container (10 m^3)	△ Some Problems	Graffiti by residents. Broken sidebars
Detachable Container truck (20 m^3 Pulling Type)	□ No Problem	Being used in a good condition
Container(20 m^3 with /without covers)	□ No Problem	Being rent to large-scale commercial facilities and supermarkets. Used in a good condition.
Road Sweeper (5 m^3 or more)	□ No Problem	Being used in a good condition
Pick-up Truck	□ No Problem	Being used for monitoring the status of waste collection sites after waste collection. One was used for monitoring the waste management site.
Towing truck (Towing Weight 20 t class)	□ No Problem	Being used for collection of dumped cars in the city. Being used in a good condition.
Slide Floor Transport Truck with Crane (4 t class)	△ Some Problems	Although a crane wires were worn out, it was still used, which was hazardous. Areas where chains had scratched corroded
Maintenance Equipment	△ Not used	Since the workshop was under construction, a high-pressure washing machine and compressors were neither installed nor used

Sources: A field study and interview with the executing agency

A trailer truck with a missing rail

A container truck (10 m^3) with broken sidebars

(2) Waste Disposable Equipment

All the waste disposal equipment at the waste management site were used in a good condition.

There were neither faults nor damages. They were stored in a roofed parking space. A trailer truck was stored at the same temporal storage site as waste collection equipment, and it corroded substantially. The vehicle with a sidebar was left, and has not been repaired.

Table 14: Status of Equipment at Waste Management Site

Equipment Name	Status	Explanations
Dump truck ($18\ m^3/5\ m^3$)	□ No Problem	Being used to transport waste collected at illegal disposal sites in the city and waste segregated at the waste management site
Wheel loader	□ No Problem	Being used for managing the waste brought to the waste management site
Bulldozer		
Compactor		
Wheel Type Excavator	□ No Problem	Being used for waste segregation at the waste management site
Sprinkler Truck	□ No Problem	In the morning, being used for watering parks. In the afternoon, being used at the waste management site
Trailer Truck	△ Some issues	Being stored in a temporal storage. The broken rail was not repaired, and the truck was unserviceable. Partial corrosion caused by scratches

Sources: A field study and interview with the executing agency

Summarizing the status confirmed in the field study, almost all the vehicles by this project were maintained to be serviceable, but some faults were not yet addressed. Thus there are some issues with the status of operations and maintenance.

As mentioned above, therefore there are some minor problems with the status of technical, and operations and maintenance aspects. Thus the sustainability of the project is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project, conducted in the capital of Djibouti, aimed to strengthen the capability of waste management capability of the Cleansing Department of Djibouti City through provision of waste collection and disposal equipment, thereby contributing to improve the environment and sanitation of the city, and basic life of the citizens.

The project is in line with the national development plans of Djibouti which aimed at improving the environment by strengthening the capability of waste management, the development needs of Djibouti, and Japan's ODA policies at the time of planning. Thus its relevance is high.

Procurement of the equipment was carried out as planned, and the project cost was within the plan. However, the project period exceeded the plan. Thus its efficiency is fair.

Since quantitative data needed to assess effectiveness was not provided, a comparison between the targets and actual was not able to make. However, it can be said that the project achieved a certain result for the following reasons: he subject areas for domestic refuse collection were wider than the target areas; the amount of waste collected in all city areas was above the estimate; the waste management site operation was carried out as planned; and equipment improved by this project demonstrated the expected capability.

According to a qualitative survey, the result was that almost all the respondent could now dispose of waste on collection every day since collection service was widely carried out. The result also show that dumped waste volumes were declined, noxious odors were reduced, the numbers of open garbage fires were reduced, and the numbers of harmful domestic insects was reduced. Thus, there are project's contribution on environmental and sanitation improvement in the area, and also the impact of the project has appeared. In summary, its effectiveness and impacts are fair.

There were no major issues with the institutional and financial aspects of the executing agency. However, in the field study, there were some problems observed with technical aspect and with status of equipment maintenance. Therefore the project's sustainability is fair.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

It is assumed that OVD has made a significant effort to maintain and to operate equipment in a very challenging natural environment such as heat in summer, sand storms and fresh water containing sodium. However, a question has still remained regarding its status. Many damages were observed on various parts of the equipment such as those due to traffic accidents, graffiti and vandalism along with scratches caused by equipment's chains touching the vehicle bodies during transportation. They were kept being used without being repaired unless there were some

serious issues for operation. However, it is necessary to be washed with water and to be cleaned it after use. Damages and scratches are needed to be retouched for corrosion prevention. OVD needs to review the maintenance system in order to conduct a sustainable operations and maintenance. Its maintenance department needs to work thoroughly.

OVD's safety control measurement needs to be reviewed. Some assistants collected waste with their bare hands, wearing neither gloves nor boots. Also some residents and children climbed into trucks in operation. Waste pickers came and went freely to the waste management site. They came into a waste segregation station to collect waste while dump trucks and wheel loaders were in operation. These risky behaviours may cause unexpected accidents. Thus it is assumed that OVD needs to give safety guidance to waste collection staff, and safety awareness to the residents.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

Setting Appropriate Indicators to Assess the Project's Effect

In order to assess the project's effect, the following four indicators were applied, the waste collection ratio, the fee collection ratio, the number of illegal disposal sites, and the serviceable life of the new waste management site.

From the time of the project planning to the ex-post evaluation, there were changes in prerequisites of the waste collection ratio and the fee collection ratio. Thus a comparison using "the ratios" lost the meanings. In developing countries where a change in prerequisites often occurs, the quantitative targets such as waste collection volumes and amount of fee collected should be included as well in addition to the waste collection ratio and the fee collection ratio. It is assumed that it defines the projects effects at the time of planning clearly, and it makes possible to assess the effects more accurately.

Regarding the number of illegal disposal sites, because the definition on counting method was unclear, its effect was not able to confirm quantitatively. JICA and the executing agency should have jointly decided its definition, and then should have been set it as an indicator.

Regarding the serviceable life of the waste management site, it was difficult for the executing agency to calculate due to the complicated process of the logical structure. The data to compare the project's effects was not provided by the executing agency. It is assumed that other data which reflects its outcome more directly such as "final disposal volumes" would be more suited as an indicator.

Indicators, which directly match to the outcomes of strengthening waste management capabilities, and which are also possible to compare quantitatively even if there are changes in prerequisites, should have been set.