Indonesia

Jakarta Solid Waste Management System Improvement Project

Report Date: January 2003

Field Survey: November 2002

1. Project Profile and Japan's ODA Loan

Project site

Garbage collection in the City of Jakarta

1.1 Background

Jakarta experienced rapid urbanization and population growth from the 1980s to the first half of the 1990s, as the city's socioeconomic and political role became increasingly important. Concurrently, the volume of garbage generated in the city increased sharply. The volume of garbage grew from 19,720 m^3 per day in 1985 to 23,708 m^3 per day by 1991, and it was expected to reach 40,880 m^3 per day by 2005.

Jakarta's superannuated garbage collection vehicles were not sufficiently automated and garbage transportation took a long time due to traffic congestion. These problems indicated that an efficient garbage disposal system had not yet been established in the city. In addition, the lack of garbage disposal capacity due to the delay in the development of final landfill sites had become a problem, and there was concern over the deterioration of the living environment in the city due to the illegal discarding of garbage into vacant lots, rivers and other places.

1.2 Objectives

The objective was to improve the garbage disposal system in Central Jakarta in order to respond to a growing volume of garbage and to improve the environment.

1.3 Project Scope

(1) Improvement of the Garbage Collection System

Procuring a total of 161 container carriers, compactors and other vehicles, as well as a total of 140 containers, so aiming at a more efficient container collection system

(2) Improvement of Road Cleaning

Procuring a total of seven road cleaning vehicles to achieve efficient road cleaning

(3) Construction of a Transfer Station

Constructing a transfer station (with a disposing capacity of 6,000 m^3 per day) whereby garbage

can be reduced to half volume and reloaded into large containers, and also procuring large vehicles in order to efficiently transport garbage to the final disposal site,

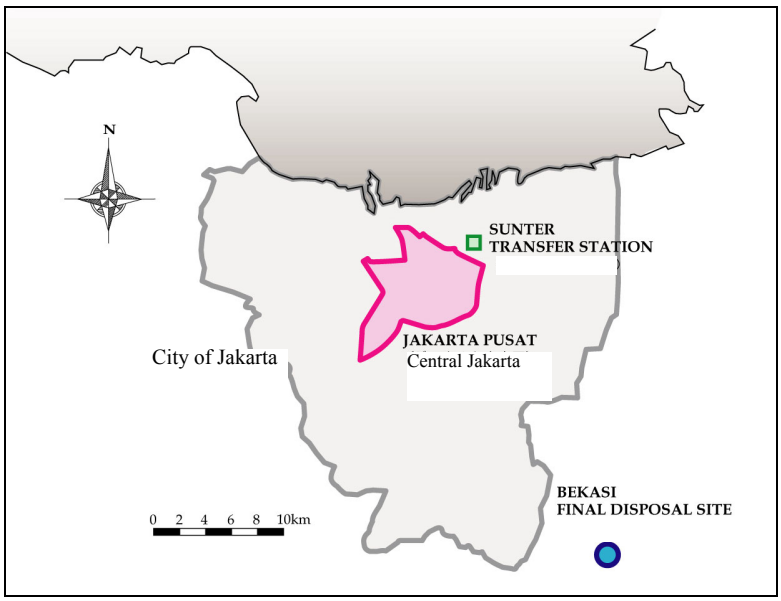
(4) Construction of Vehicle Repair Shops

Constructing new vehicle repair shops and procuring necessary equipment with the aim of strengthening the regular maintenance system so that garbage collection vehicles are efficiently utilized

(5) Improvement of the Final Disposal Site

Implementing an improvement project for Zone I of the Final Disposal Site, which had already been developed by the Indonesian government, by constructing facilities for laying sewage and drainage pipes underground (as part of measures to safeguard the environment) and constructing Zone II of the Final Disposal Site (12.5 ha), as well as procuring 13 work vehicles to make landfill work more efficient

Project site



1.4. Borrower/Executing Agency

The Republic of Indonesia/Directorate General of Urban Development, Ministry of Settlement and Regional Infrastructure (former Directorate General of Human Settlement, Ministry of Public Works)

1.5 Outline of Loan Agreement

Loan Amount Loan Disbursed Amount	3,863 million yen 2,757 million yen
Exchange of Notes Loan Agreement	October 1993 November 1993
Terms and Conditions -Interest Rate -Repayment Period (Grace Period) -Procurement	 2.6% 30 years(10 years) General untied (Consultant service is procured as partially untied aid)
Final Disbursement Date	August 2000

2. Results and Evaluation

2.1 Relevance

In 1987, prior to the planning for the project, the Japan International Cooperation Agency (JICA) conducted a study towards a Jakarta Solid Waste Management System Improvement Project concerning garbage disposal in the City of Jakarta. In the survey, JICA formulated a 15-year long-term plan for the entire city. The current project was targeted at Central Jakarta, which was considered in the master plan to be in more urgent need of improvements, and various plans were implemented, including improving the garbage collection system, constructing a transfer station and improving the final disposal site.

In Jakarta, the population grew at an annual rate of 2.41% during the period from 1980 to 1990, and with this growth, the volume of garbage generated increased sharply from 19,720 m^3 per day in 1985 to 23,708 m^3 per day in 1991[1]. The city's garbage disposal system did not have the sufficient capacity to respond to it, and there was concern over the deterioration of the living environment and hygienic conditions in the city. In view of the situation described above, the project's aim to improve the garbage disposal system was relevant. As described later, the changes to and expansion of the project's scope were designed to take the project's effects to a higher level.

With the stagnation of economic activities due to the effects of the Asian economic crisis and the decline in the population growth rate for the city (0.16% for the period from 1990 to 2000), the growth in the volume of garbage generated in the city was slightly curbed from 1995, but the volume reached 25,600 m^3 per day in 2001. The volume of garbage generated in the city still continues to rise, though at a slower pace than that predicted at the time of appraisal. The objective of the project, which is to improve the city's garbage disposal system, still retains its validity.

2.2 Efficiency

2.2.1 Project Scope

The scope of the project was changed (expanded), according to the site condition, as project budgets increased due to exchange rate fluctuations. Major changes included the procurement of spare parts for the garbage collection vehicles and the final disposal site's heavy machinery; 32

[1] From appraisal materials

garbage collection vehicles assigned to North Jakarta; and materials and equipment for the Sunter Transfer Station. Changes were also made towards improvement of the Bekasi Final Disposal Site Zones II and III. These changes were made to strengthen the city's overall garbage disposal system.

2.2.2 Implementation Schedule

Initial plans called for the implementation schedule to span 48 months from June 1993 to May 1997 (from consultant selection to the completion of consulting services). The actual implementation schedule spanned 74 months from May 1994 to July 2000. The major reasons for the delay were (1) the delay in the bidding procedures for the construction of the Sunter Transfer Station, (2) the rise in commodity prices due to the economic crisis, (3) and the change of the location for assembling compactors and carrying out docking tests(from Singapore to Indonesia). Because of the delayed implementation schedule, particularly the delay in the start of operation for the Sunter Transfer Station, garbage collection vehicles had to transport garbage directly to the Bekasi Final Disposal Site until the transfer station was completed, and this caused the project to come into effect later than initially planned.

2.2.3 Project Cost

It was initially planned that the total project cost would be 4,545 million yen, of which 85% or 3,863 million yen would be covered by Japan's ODA loan. The final project cost totaled 2,980 million yen, of which 2,762 million yen was covered by Japan's ODA loan, so costs were kept within the initially planned scope. The major reasons for the cost underrun were (1) that as a result of competitive bidding, materials and equipment as well as services were procured at prices lower than initially planned (approximately 73% of the planned price for equipment procurement and construction work, and 83% for consulting services) and (2) that the local currency (the rupiah) depreciated against the Japanese yen.

2.3 Effectiveness

2.3.1 Improvement of the Garbage Collection System

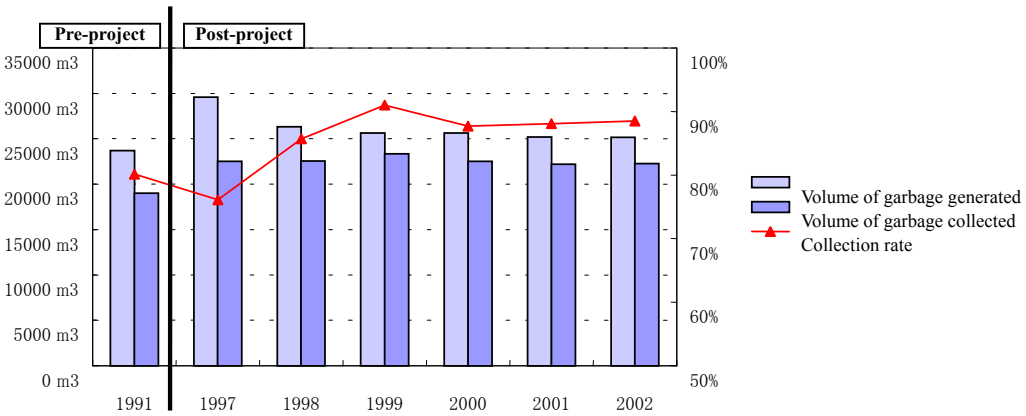
Before the project was implemented, garbage collection vehicles had become outdated and unable to respond efficiently to the growth in the volume of garbage generated. In addition, garbage reloading facilities were underdeveloped, hindering efficient garbage collection. In order to tackle these problems and improve the city's overall garbage collection system, a total of 193 garbage collection vehicles, including compactors, arm rolls and tippers, as well as a total 140 containers, were procured[2].

[2] Initial plans called for all of the garbage collection vehicles to be assigned to Central Jakarta. From the viewpoint of fairness and efficiency, however, they are currently assigned to all of the city's five areas and the headquarters of Jakarta Cleaning Department, in accordance with the decision made by Cleaning Department after their introduction (see Table 2).

In 1991, prior to project implementation, the volume of garbage generated in the City of Jakarta was 23,708 m^3 per day, of which 80% or 18,964 m^3 per day was collected by the Jakarta Cleaning Department. In 2001, after the project was completed, the volume grew to 25,600 m^3 per day, but the volume collected by the Cleaning Department also increased to 22,196 m^3 per day, boosting the collection ratio to 86.7% (see Figure 2). Although the decrease in the garbage volume since 1998 due to the economic crisis needs to be taken into consideration, the collection ratio improved significantly from 76.1% in 1997 to 85.7% in 1998 because the majority of garbage collection vehicles and containers were procured by the end of 1997. This indicates that the procurement of materials and equipment under the project contributed to improving the city's garbage collection system.

Figure 1: Garbage Collection Vehicle

Figure 2: Volume of Garbage Generated and Collected Per Day As Well As the Collection Ratio (1991/1997-2001)



Note: Data for 2002 indicate the average for the period from January to March.
(Source) Jakarta Cleaning Department

2.3.2 Improvement of the Road Cleaning System

Prior to project implementation, the greater part of road cleaning work was performed using manpower, but seven mechanical road cleaning vehicles were introduced to make road cleaning work more efficient. These seven vehicles are used chiefly to clean the trunk roads (Protocol Street). Road cleaning work is performed every morning at the same time that garbage collection work is done. Road cleaning work by the mechanical vehicles target only a limited number of trunk roads, but it is evident that they are making contributions to keeping these highly crowded roads clean and improving their hygienic conditions.

Figure 3: Road Cleaning Vehicle

2.3.3 Construction of the Sunter Transfer Station

Garbage collected from each household and temporary piling site (LPS) is transported to the final disposal site. The Bekasi Final Disposal Site used by the City of Jakarta, however, is located in the City of Bekasi, approximately 40 km away from the center of the capital, and morning garbage transport coincides with traffic congestion, requiring a long time for garbage collection vehicles to go and from the Final Disposal Site and lowering the efficiency of garbage collection. A private transfer station started operation in Cakung of East Jakarta in August 1992, but its disposal capacity was clearly insufficient. Today, owing to the completion of the Sunter Transfer Station, garbage from the four areas (excluding South Jakarta, which is far away from the Transfer Station) goes to the Bekasi Final Disposal Site via either the Sunter or Cakung Transfer Station. At the Sunter Transfer Station, the city's garbage is received from approximately 140 collection vehicles in one day and is reloaded into containers with a capacity of 80-100 m^3 each. 18-25 truckloads of garbage are sent to the Bekasi Final Disposal Site every day. In the precincts of the Sunter Transfer Station, sub-workshops for maintaining equipment, including garbage collection and road cleansing vehicles, have been constructed[3].

After the completion of the Sunter Transfer Station, the number of trips for garbage collection vehicles increased from 1-2 times per day prior to the project to 2.98 times per day after the project, indicating that the construction of the station helped raise efficiency. Furthermore, the number of vehicles used to transport garbage from the city to the Final Disposal Site decreased, reducing transport costs (because garbage is now reloaded into large containers at the transfer station for transport to the Final Disposal Site). Overall, the construction of the Sunter Transfer Station is contributing to greater efficiency in the garbage collection system. The Sunter Transfer Station is designed as a facility that can dispose of a maximum of 6,000 m^3 of garbage per day on a maximum of three 8-hour shifts, but when we recently visited the station for this survey, it was disposing of 1,600-2,400 m^3 of garbage daily on one 8-hour shift with the average for the entire 2001 at 1,660 m^3 of garbage per day (around one-third of the maximum capacity). The number of shifts to be undertaken is determined according to seasonal fluctuations in the volume of garbage and other factors, but the real maximum disposal capacity of the transfer station is considered to be 4,000 m^3

[3] From 1993 to 1998, in parallel with this project, the City of Jakarta implemented a project independently to improve the existing main workshop and sub-workshops in each area as well as to procure equipment.

per day because of limited personnel expenses due to difficulties in securing operation and maintenance budgets, and because of inadequate facility maintenance. The disposal capacity of the station has declined to two-thirds of that initially planned, and requires further improvement.

2.3.4 Construction of the Bekasi Final Disposal Site

The Bekasi Final Disposal Site, the only site of its kind (LPA) operated by the City of Jakarta, has a total area of 108 ha (the effective area, excluding driveways, drain ditches and other facilities, is 88 ha) and consists of five zones from Zone I to Zone V (see Table 1). Each zone is designed so that it can be effectively utilized by piling garbage in two levels, each level being 15 m high, and its maximum effective area is 149.5 ha. Under the project, part of Zone II (7 ha) was built and parts of Zones I, II and III (41 ha) were improved[4].

Figure 4: Condition of Completed Sanitary Landfill at the Final Disposal Site

Sanitary landfill is performed at each zone[5]. In addition, four exudates processing facilities (IPAS) have been built in the Final Disposal Site to treat filthy water discharged from each zone. Thus, consideration is given to the environment[6].

Table 1: Effective Area of the Bekasi Final Disposal Site

Zone	Stage 1 (ha)	Stage 2 (ha)	Total (ha)
I	18.8	15.0	33.8
II	20.0	17.0	37.0
III	25.2	15.5	40.7
IV	15.5	9.0	24.5
V	8.5	5.0	13.5
Total	88.0	61.5	149.5

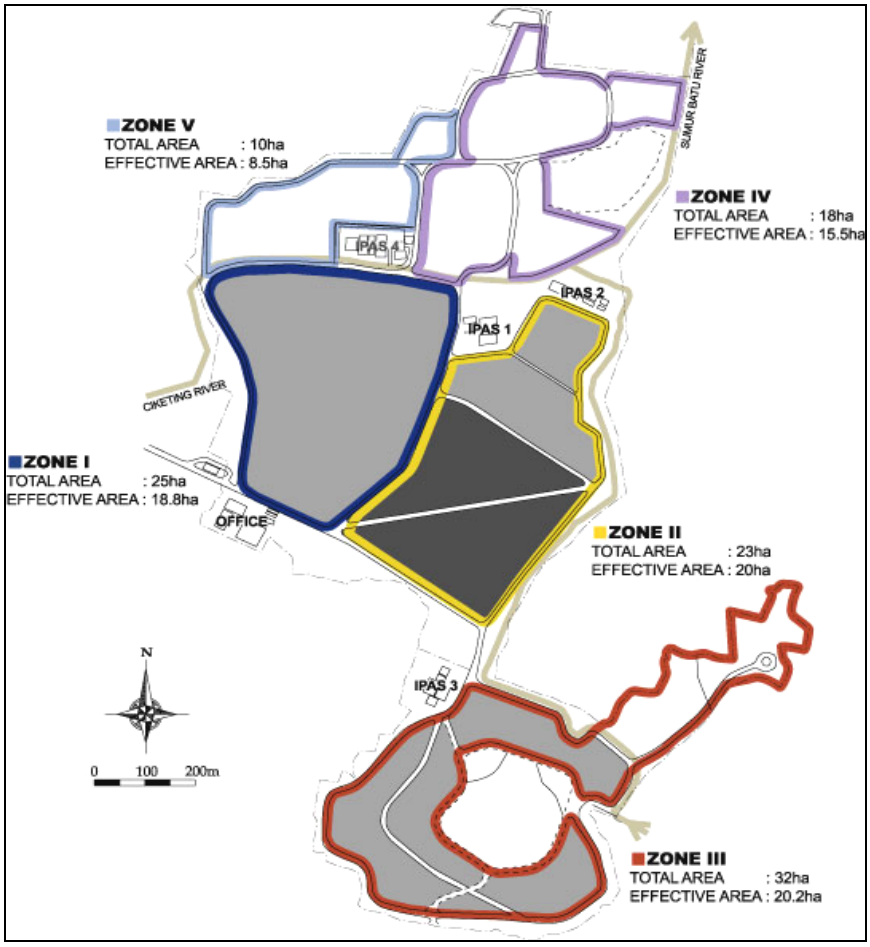
Source: Jakarta Cleaning Department

[4] Specifically, improvements included (1) laying earth on the ground around landfill sites, (2) constructing additional drain pipes for exudates, (3) constructing rainwater drain facilities, (4) constructing work roads, (5) improving exudates processing facilities and (6) improving weighing tables.

[5] Sanitary landfill refers to the method of digging the ground to a certain depth, alternately piling approximately two-meter-thick horizontal layers of garbage and approximately 20-centimeter-thick horizontal layers of earth there, and covering the top of the layers with a 50-centimeter-thick layers of earth. In addition, in order to remove methane from the layers, ventilating holes are made in the layers.

[6] With respect to two of the four facilities, improvements were made mainly on their chemical treatment process in response to a strong request from the City of Bekasi. It is also planned that the remaining two will be improved by the end of 2003. The quality of post-treatment water discharged from the facilities is inspected monthly, and the results of inspections are submitted by the City of Jakarta to the City of Bekasi.

Figure 5: Bekasi Final Disposal Site



Improvements made under the project have made it possible to utilize the landfill capacity of the Bekasi Final Disposal Site, the only site of its kind in the City of Jakarta, to the maximum extent, and in this respect, the project is contributing to strengthening the city's garbage collection system. However, the Bekasi Disposal Site is designed to dispose of 14,000 m^3 of garbage per day, but received an average of 20,154 m^3 of garbage per day from the City of Jakarta in 2001. It is clear that the processing capacity of the site is not sufficient, and as described later, the City of Jakarta is taking various approaches to settle this problem.

2.3.5 Recalculation of Economic Internal Rate of Return (EIRR)

EIRR for the construction of the Sunter Transfer Station, which was calculated at the time of appraisal, was 12.64%. At the time of project completion, in 2000, EIRR was recalculated at 13.61% (as mentioned in the Project Completion Report (PCR)), slightly higher than calculated at appraisal. The real disposal capacity of the Transfer Station, however, is around two-thirds of that estimated in PCR, and the results of recalculation made recently in order to avoid overestimation indicate that EIRR is 4.54%. As at the time of appraisal, this recalculation was based on the assumption that that benefits are reductions in transport costs due to the construction of the Transfer Station and that costs are construction costs for the station, equipment renewal costs and operation/maintenance expenses.

These calculations focus only on reductions in transport costs due to the construction of the Sunter Transfer Station and on the revenues and expenditures for the station, and do not show the

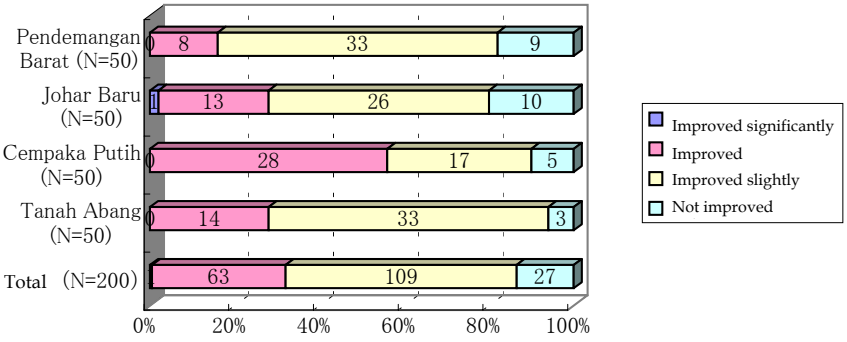
overall economic internal investment efficiency achieved through the implementation of the whole project.

2.3.6 Evaluations by Beneficiaries

A beneficiary awareness survey was conducted to gain an understanding of the present condition of the garbage collection system improved under the project. The principal purpose of the survey was to measure the level of satisfaction of beneficiaries and the effects that have so far been brought about in relation to the improvement of the living environment and hygienic conditions[7].

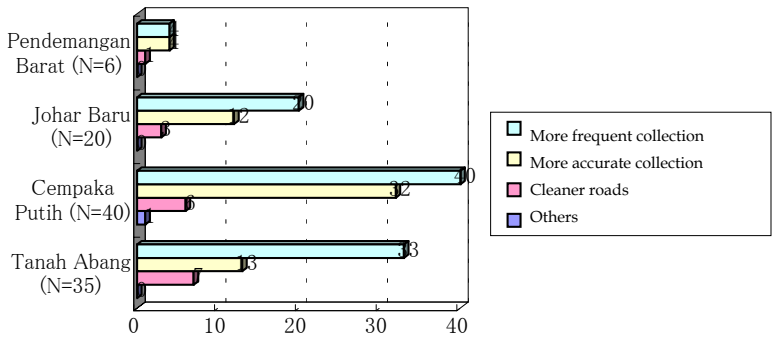
As shown in Figure 6, 80-90% of local residents recognized the direct effects of the improved garbage collection system, though the degree of these effects varied from place to place.

Figure 6: Improvement of the Garbage Collection System under the Project (Single Answer)



Respondents cited the effects specified in Figure 7. Overall, many replied, "The frequency of garbage collection increased," followed by the replies "The accuracy of garbage collection increased," and, "Roads became cleaner," in this order.

Figure 7: Effects Brought by the Project (Multiple Answer)



When those surveyed were asked about their level of their satisfaction with the current garbage collection service, 90% replied, "Highly satisfied," "Satisfied" or "Slightly satisfied". As described above, the results of this survey indicate that the local residents are generally satisfied with the garbage collection system improved under the project, though there are some residents who are still dissatisfied with the frequency and accuracy of collection.

[7] Four parts were chosen from Central Jakarta, the main project target area, and North Jakarta, for the survey (Tanah Abang, Cempaka Putih and Johar Baru in the Central Jakarta, and Pandemangan in the North Jakarta). A total of 200 persons selected at random from among the residents in each part, including public servants, company employees, self-employed persons and other residents, were interviewed and asked to fill in a questionnaire with the cooperation of the Jakarta Cleaning Department.

2.4 Impact

2.4.1 Environmental Impacts

In the beneficiary awareness survey, questions were asked about the impact of the project on the environment. The results indicated that respondents generally recognized that the project had had a positive impact on the environment. Asked whether the illegal discarding of garbage into rivers had decreased, water quality had improved, the number of harmful insects had declined and the incidence of offensive odors had fallen as a result of project implementation, 60-80% of respondents answered in the affirmative for all survey points except "Did water quality improve?", though the degree of environmental impact varied from place to place. In particular, as Figures 8 and 9 show, many gave favorable replies to the points concerning "decrease in the illegal discarding of garbage into rivers" and "fall in the incidence of offensive odors." It could thus be said that the project has had positive impacts on the living environment in the City of Jakarta.

Figure 8: Decrease in the Illegal Discarding of Garbage into Rivers (Single Answer)

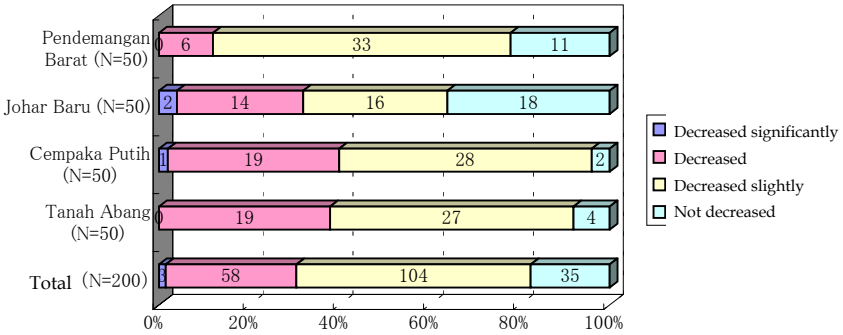
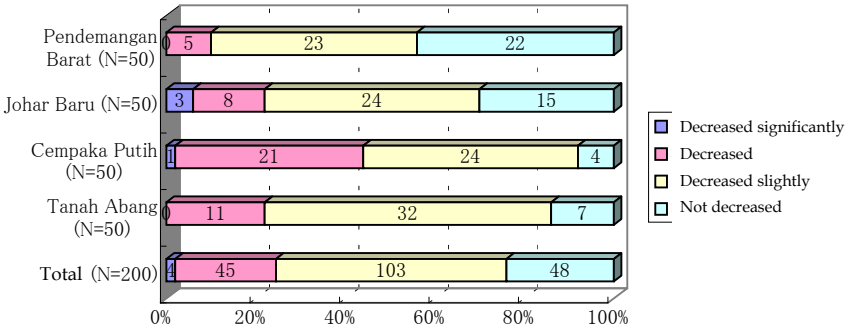


Figure 9: Decrease in Offensive Odors (Single Answer)



As a result of the countermeasures taken, there has so far been no particular report that the Sunter Transfer Station has been responsible for any negative environmental impact such as traffic congestion, filthy water and offensive odors in the surrounding areas (non-residential areas). The Sunter Transfer Station was constructed in an area that was originally non-residential, and involved no relocation of local residents.

At the Bekasi Final Disposal Site, smoke generated from the site and polluted the air in September 1999, when the project was being implemented. It happened since sanitary landfill was inappropriately performed due to lack of budgeted funds for the Special District of Jakarta. . The smoke was stopped, however, by urgently covering the landfills with earth.

We made inquiries to the City of Jakarta about the results of monitoring of the other effects of the project on the environment, but were not able to obtain specific replies.

2.4.2 Impact on Technology

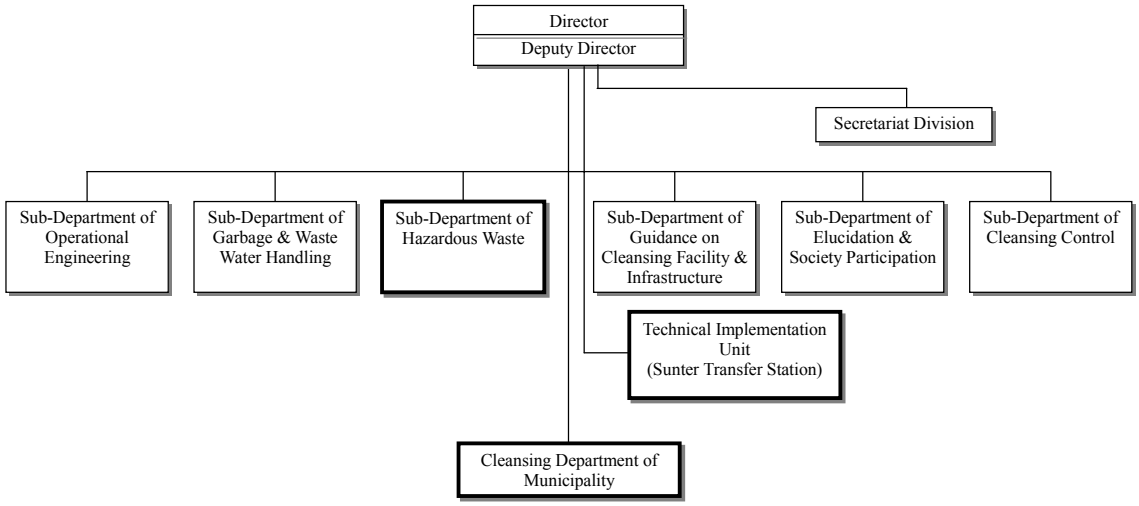
At the time of appraisal, it was expected that technology would be transferred from consultants to personnel at Jakarta Cleaning Department during the course of project implementation. According to the Cleaning Department, various kinds of technologies were transferred, including garbage collection, transportation and final disposal technologies, as well as know-how in the operation of workshops and transfer stations, and this was favorably evaluated.

2.5 Sustainability

2.5.1 Organizational System

The executing agency for the project was the Directorate General of Urban Development, Ministry of Settlement and Regional Infrastructure (the former Directorate General of Human Settlement, Ministry of Public Works), and the project was actually implemented by the Jakarta Cleaning Department. After the completion of the project, operations and maintenance continued to be undertaken by Cleaning Department, which has 3,988 personnel. Specifically, each area is responsible for the maintenance of garbage collection and cleansing vehicles, with the Sub-Department for Hazardous Waste being responsible for the maintenance of the Bekasi Final Disposal Site and the Technical Implementation Unit responsible for the operations and management of the Sunter Transfer Station (see Figure 10).

Figure 10: Organizational Chart of Jakarta Cleaning Department



2.5.2 Operations and Maintenance

[Maintenance of Materials and Equipment]

As Table 2 shows, materials and equipment procured under the project are generally maintained in a favorable condition. As mentioned above, initial plans called for all of the garbage collection vehicles introduced to be assigned to Central Jakarta. After they were introduced, however, they were assigned to all of the five areas in the city according to a decision taken by Jakarta Cleaning Department. According to the personnel of the Cleaning Department who were interviewed, around

75% of the containers procured under the project are currently in operation, though it was not possible to confirm this through records during this survey, and it can be said that these containers are also maintained in a favorable condition.

Table 2: Materials and Equipment in a Favorable Condition in 2001

	Central Jakarta	North Jakarta	East Jakarta	West Jakarta	South Jakarta	Cleaning Dept.	Total	Number of vehicles procured
Arm roll (large)	10	10	6	11	7		44	45
Arm roll (small)	4	5	3	4	4		20	20
Compactor (large)	4	3	9	4	4		24	24
Compactor (small)	2	2	4	3	4	3	18	18
Tipper (large)	8	8	8	8	9	3	44	45
Tipper (small)	5	6	10	7	6	4	38	41
Dump truck/truck						2	2	2
Fuel truck						1	1	2
Cleansing vehicle (large)						4	4	4
Cleansing vehicle (small)						3	3	3

Source: Jakarta Cleaning Department

[Operations and Maintenance Budgets]

A look at the fiscal aspect of Jakarta Cleaning Department indicates that maintenance and repair expenses accounted for more than half of the Department's total ordinary budgets from 1997 to 2001, and that actually allocated maintenance and repair budgets continued to grow. According to the Cleaning Department, however, these budgets are not sufficient to maintain the effects of facilities as well as materials and equipment improved under the project (see Table 3). According to the Cleaning Department, there were problems such as the inability of the Sunter Transfer Station to fully utilize its designed disposal capacity because a sufficient amount of fuel could not be purchased for removers, and the inability of the Bekasi Final Disposal Site to thoroughly cover landfills with earth on the same day because a sufficient amount of earth could not be bought. These problems lower the overall efficiency of the garbage collection system.

Table 3: Ordinary Budgets for Jakarta Cleaning Department (1997-2001) (by Purpose of Use)

		1997		1998		1999		2000		2001	
		(Amount)	(%)	(Amount)	(%)	(Amount)	(%)	(Amount)	(%)	(Amount)	(%)
Personnel expenses	Requested amount	11,140	27.3%	37,670	43.9%	28,248	33.4%	49,613	31.1%	79,843	30.4%
	Budget	11,359	31.1%	36,516	48.4%	16,697	28.4%	47,527	37.0%	76,675	31.2%
Property expenses	Requested amount	3,337	8.2%	3,390	3.9%	4,078	4.8%	7,378	4.6%	13,950	5.3%
	Budget	3,029	8.3%	3,959	5.3%	3,355	5.7%	5,586	4.4%	9,926	4.0%
Operation and maintenance expenses	Requested amount	**22,284**	**54.7%**	**44,585**	**51.9%**	**52,072**	**61.6%**	**98,769**	**61.9%**	**166,374**	**63.3%**
	Budget	**18,768**	**51.4%**	**35,675**	**47.3%**	**38,560**	**65.7%**	**71,459**	**55.7%**	**156,356**	**63.7%**
Other	Requested amount	3,982	9.8%	176	0.2%	107	0.1%	3,733	2.3%	2,487	0.9%
	Budget	3,356	9.2%	254	0.3%	105	0.2%	3,733	2.9%	2,491	1.0%
Total	Requested amount	40,745	100.0%	85,823	100.0%	143,201	100.0%	159,495	100.0%	262,656	100.0%
	Budget	36,513	100.0%	75,405	100.0%	58,718	100.0%	128,307	100.0%	245,448	100.0%

(Unit: One million rupiah) Source: Jakarta Cleaning Department

[Payment of Fees and Participation by Local Residents in Cleansing Activities]

Meanwhile, in the beneficiary awareness survey mentioned above, in response to the question as to whether they paid garbage collection fees, 98% of respondents relied that they did, indicating that

the situation with payment for garbage collection fees was favorable. The majority of local residents (54.5%), however, did not participate in road cleaning activities, and only 7.5% made efforts towards recycling, thus it cannot be said that the local residents are highly willing to participate in these activities. The percentage of local residents who had received education in the importance of garbage disposal from the municipal authorities was only 25%. The understanding of local residents and their participation are important to maintain the sustainability of the garbage disposal system of Jakarta, but at moment, educational activities by Jakarta Cleaning Department are considered insufficient.

2.5.3 Sustainability of the Effect

As described in the preceding paragraphs, the project brought certain effects in improving the city's garbage collection system, the garbage collection ratio for Jakarta Cleaning Department improved, and the living environment and hygienic conditions in the city also improved. As mentioned earlier, however, the volume of garbage generated in the city exceeds the disposal capacity of the Bekasi Final Disposal Site, necessitating reconstruction of a sufficient garbage collection and disposal system. In the future, it will be necessary to develop wide-area policies that involve the entire capital area in the solution of garbage problems and also make further efforts to educate local residents about the importance of garbage disposal and sorted collection, with the aim of reducing the volume of garbage generated.

[Restructuring of the Garbage Collection and Disposal System]

In order to complement the insufficient disposal capacity of the Bekasi Final Disposal Site, the City of Jakarta is considering and implementing the following measures:

- Project for changing garbage into compost through an Australian-Indonesian joint venture
  The project will enable biochemical disposal of approximately 4,000 m^3 of garbage per day. The City of Jakarta has signed a memorandum with the joint-venture firm. The project site will be Duri Kosambi in the West Jakarta.
- Incinerator and power generation facilities construction project by a Chinese-Indonesian joint venture
  A plan for constructing power generation facilities using combustible garbage as fuel at Marunda in North Jakarta is under way. The facilities will be able to dispose of 6,000 m^3 of garbage per day. A memorandum has already been signed, and the start of operations is scheduled for 2004.
- Roll-press-packing (RPP) project by a private Indonesian business
  A plant capable of disposing of 6,000 m^3 of garbage per day is being constructed in the city of Bogor, south of Jakarta. Its operations are planned to start in April 2003. The City of Jakarta is required to pay 13,375 rupiah per cubic meter of garbage for disposal.

Even if these three private services are realized, however, the total garbage disposal capacity will be only 16,000 m^3 per day, and, for the purposes of disposing of the current volume of garbage generated, the total disposal capacity is still 5,000-6,000 m^3/day short. In this regard, the City of Jakarta has signified its intention of continuing to use the Bekasi Final Disposal Site for disposal, but this is becoming a political issue between the Cities of Jakarta and Bekashi, making it difficult for the City of Jakarta to realize its plan. At the end of 2001, the conflict between the two cities became serious, and the City of Bekasi unilaterally closed the site, but the two cities subsequently agreed after consultation that the City of Jakarta should (1) pay a total of 22,750 million rupiah (14,000

million rupiah in 2002 and 8,750 million rupiah in 2003) in compensation to the City of Bekasi, (2) build public health centers around the site and (3) install water supply facilities around the site. With this agreement, it became possible for the City of Jakarta to continue using the site until the end of 2003. During the current survey, however, there was a report[8] saying that the City of Bekasi was considering closing the site again because the City of Jakarta was not fully carrying out the agreements specified above. Thus, it is uncertain whether the City of Jakarta can continue to use the site in the years to come.

An estimated 8,000 to 10,000 "scavengers" live around the Bekasi Final Disposal Site, and they attempt to make a living by picking up recyclable garbage, such as plastics and glass bottles, from the garbage brought into the site. The fact is that the City of Jakarta has not been able to take specific countermeasures against these acts. The scavengers are currently needed to help dispose of garbage through sorted collection and recycling, but hinder safe garbage disposal operations, and the City of Jakarta wishes to find a way of coexisting with them in its garbage disposal operations.

[Development of Educational Activities for Local Residents]

In order to reduce the volume of garbage generated, the City of Jakarta has started to make all-out efforts to help its citizens understand the importance of garbage disposal and implement sorted collection. In 2000, under the slogan "The 3Rs (Reduce, Reuse and Recycle)," the City conducted educational activities centering on direct explanations for its citizens about sorted collection. However, the results of these educational activities have not been satisfactory, and sorted collection is not implemented appropriately. The City of Jakarta has been preparing to conduct educational activities for sorted collection in the seven parts of the city as part of the school curriculum, starting 2002.

Figure:11 Pamphlet published by Jakarta Cleaning Department

[Efforts for Wide-area Policy Discussion]

Due to the effects of the policy for decentralization of power that has been promoted by the Indonesian government since 1999, the local autonomous bodies have had a greater voice. With respect to garbage disposal centered on final disposal sites, however, it is important that the Ministry of Settlement and Regional Infrastructure and autonomous bodies in the Jabotabek area, which include Jakarta and Bekasi, discuss and coordinate the matter in a constructive manner rather than responding to it separately. In this regard, the Western Java Environment Management Project, a World Bank technical assistance (TA) project, has been implemented since 2001, and its progress is attracting public attention.

[8] The Jakarta Post (November 1, 2002)

3. Feedback

3.1 Lessons Learned

Under the project, the City of Jakarta's garbage disposal system was improved to a certain extent, mainly through the procurement of garbage collection and road cleaning vehicles, as well as the construction of the transfer station and the final disposal site. As the conflict between the Cities of Jakarta and Bekasi over the final disposal site shows, however, a fundamental solution has not been found. Garbage disposal issues for large-city areas, particularly the final disposal site issue, are not simply the issues of beneficiary bodies but involve the interests of the neighboring cities as a whole. Therefore, in organizing similar projects related to waste disposal in the future, it will be important to develop comprehensive policies that give consideration to coordinating the interests of neighboring local autonomous bodies from an early stage of planning, and important not to let this task be sidelined by technical measures for waste disposal.

3.2 Recommendations

No particular recommendations.

Comparison of Original and Actual Scope

Item	Plan	Actual
1. Project Scope		
1. Improvement of the garbage collection system		
1.1 Procurement of garbage collection vehicles	161 units	193 units
1.2 Procurement of containers	140 units	As left
1.3 Procurement of related materials and equipment	6 units	7 units
2. Improvement of the road cleansing system		
2.1 Procurement of road cleaning vehicles	7	As left
3. Construction of the Sunter Transfer Station	Daily disposal capacity: 1,500 tons	As left
4. Construction of sub-workshops		
4.1 Construction of sub-workshops	1 site	As left
4.2 Procurement of related materials and equipment	1 set	As left
5. Construction of the Bekasi Final Disposal Site		
5.1 Improvement of the Zone 1	1 zone	3 zones
5.2 Construction of the Zone 2	12.5 ha	7 ha
5.3 Procurement of work vehicles	13 units	11 units
6. Consulting services	Foreign consultant: 96M/M Local consultant: 243M/M	Foreign consultant: 123 M/M Local consultant: 440 M/M
2. Implementation Schedule		
1. L/A conclusion	Nov. 1993	As left
2. Consultant selection	Jun. 1993 – May 1994	Apr. 1994 – Feb. 1995
3. Consulting services	Jun. 1994 – May 1997	Mar. 1995 – Jul. 2000
4. Procurement	Jan. 1995 – Mar. 1997	Jul. 1996 – Jul. 2000
5. Bidding and civil engineering works	Sep. 1993 – May 1997	Dec. 1995 – Jul. 2000
(Of which civil engineering works)	(Apr. 1995 – May 1997)	(Jul. 1996 – Jul. 2000)
3. Project Cost		
Foreign currency	890 million yen	1,076 million yen
Local currency	3,655 million yen (Local currency 61,946 million Rp.)	1,904 million yen (Local currency 89,576 million Rp.)
Total	4,545 million yen	2,980 million yen
ODA loan portion	3,863 million yen	2,757 million yen
Exchange rate	1Rp. = 0.059 yen (Apr. 1993)	1Rp. = 0.021 yen (Weighted average for the project period)

Third Party Evaluator's Opinion on
Jakarta Solid Waste Management System Improvement Project

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Relevance

As the volume of solid waste continue to rise, before the implementation of the Jakarta Solid Waste Management System Improvement Project the capacity of Jakarta's Solid Waste Management System (JSWMS) had been responding very poorly to the demand. Efficiency and level of services of the solid waste collection and disposal had been very short due to lack of equipments, maintenance facilities, budget, discipline and skill of operators. Therefore, every effort to improve the solid waste management system in Jakarta is strongly needed.

For Jakarta Metropolitan City, prior to project implementation in 1991, the total volume of solid waste collected by Jakarta Department of Sanitation or Dinas Kebersihan (DK) was 19,964 m^3/day (80%). After procuring of the garbage collection vehicles and containers by the end of 1997, the total volume of solid waste collected in 1998 was 22,196 m^3/day (86,7%). Meanwhile, in the Indonesia's Sixth Five-Year National Development Plan (1995-1999) the target for the solid waste collection and disposal coverage for Metropolitan City like Jakarta was 80-90% of the total waste generated. The significant increased of the solid waste collected occurred during implementation of the project, therefore overall objective of the project was in line with the goal set in the National Development Planning agenda.

Procuring a total of 140 units of container and 193 units (25.6% of the total owned by DK) of solid waste collection vehicles, completion of the Sunter Transfer Station (STS) Facility toward capacity of handling up to 6,000 m^3/day and construction of the Bantar Gebang (BG) Facility were a significant contribution of the project in improving the Jakarta solid waste collection and disposal system. Based on the achievements made by the project in improving JSWMS after project implementation, it can be concluded that the project objectives are still in line with the Jakarta Development Plan and Strategy especially with the current situation facing by the city authority.

Impact

The project has been successful in increasing the capacity of waste collection and transportation to the final disposal facility, which increased the service level of solid waste management in Jakarta City. It is very clear that the achievement was caused by the project. The project has also brought some positive environmental impacts around the surrounding facilities by improving the street cleaning services from manual to mechanical system using seven new mechanical road cleaning vehicles, increasing the solid waste collection capacity by procuring some new collection solid waste vehicles and containers and optimizing the disposal capacity by constructing the STS Facility and the improvement of zone I, II, and III of Bantar Gebang Facility.

However, technical and financial supports from foreign donors will not bring a significant improvement without public participation in practicing sorted collection, implementing the 3Rs (Reduce, Reuse, and Recycle) strategy as well as paying garbage fee collection and disposal. In order to increase the positive impacts of the project, a series of campaign to educate people to participate in the 3Rs program in order to reduce the volume of waste generated has to be implemented. In addition, a significant budget allocation and city ordinances to support an integrated solid waste management system (ISWMS) for Jakarta City have to be pass by the city legislative.