

Table 7: List of Facilities and Equipment Provided by JICA for the Implementation of Pilot Projects

| Item | Unit | National level | | Chilaw (Jan-Feb 2003) | | Hagunna (Jan-Feb 2003) | | Gampaha (Jan-Feb 2003) | | Matale (May-Nov 2003) | | Kandy (May-Nov 2003) | | Nuwara Eliya (May-Nov 2003) | | Badulla (May-Nov 2003) | | Total | | |
|---|-------|----------------|-------------|--------------------------|-------------|---------------------------|-------------|---------------------------|-------------|--------------------------|-------------|-------------------------|-------------|--------------------------------|-------------|---------------------------|-------------|------------|-------|-------------|
| | | Qty. | Total (JPY) | Qty. | Total (JPY) | Qty. | Total (JPY) | Qty. | Total (JPY) | Qty. | Total (JPY) | Qty. | Total (JPY) | Qty. | Total (JPY) | Qty. | Total (JPY) | Qty. | Unit | Total (JPY) |
| 1. National level | | | | | | | | | | | | | | | | | | | | |
| 1-1. The first seminar explaining the study findings (7 towns) | LS | 1 | ¥199,400 | | | | | | | | | | | | | | | 1 | LS | ¥199,400 |
| 1-2. The second seminar explaining the study findings (7 towns) | LS | 1 | ¥680,600 | | | | | | | | | | | | | | | 1 | LS | ¥680,600 |
| 1-3. Seminar for officer and council members in local governments (6 towns) | LS | 1 | ¥847,000 | | | | | | | | | | | | | | | 1 | LS | ¥847,000 |
| 1-4. Workshop for teaching manual for the sub-textbook | time | 1 | ¥260,000 | | | | | | | | | | | | | | | 1 | time | ¥260,000 |
| 1-5.6. Seminar for environmental NGOs | time | 1 | ¥136,000 | | | | | | | | | | | | | | | 1 | time | ¥136,000 |
| 1-6. Lecture on solid waste management to PHU | time | 1 | ¥40,000 | | | | | | | | | | | | | | | 1 | time | ¥40,000 |
| 1-7. Seminar at universities | times | 3 | ¥120,000 | | | | | | | | | | | | | | | 3 | times | ¥120,000 |
| 1-8. Employment of a lawyer to assist the model by law | LS | 1 | ¥548,000 | | | | | | | | | | | | | | | 1 | LS | ¥548,000 |
| 1-9. Production of sub-textbook on waste for kids | books | 100,000 | ¥3,348,675 | | | | | | | | | | | | | | | 100,000 | books | ¥3,348,675 |
| 1-10. Production of teaching manual for the sub-textbook. | books | 10,000 | ¥24,354 | | | | | | | | | | | | | | | 10,000 | books | ¥24,354 |
| 2. Procurement of equipment | | | | | | | | | | | | | | | | | | | | |
| 2-1. SWM control board | nos. | | | 1 | ¥1,335 | 1 | ¥1,335 | 1 | ¥1,335 | 1 | ¥16,574 | | | 1 | ¥16,574 | 1 | ¥16,574 | 6 | nos. | ¥53,726 |
| 2-2. Education panel | nos. | | | 10 | ¥7,823 | 10 | ¥96,930 | 10 | ¥7,823 | 10 | ¥96,930 | | | 10 | ¥96,930 | 10 | ¥96,930 | 60 | nos. | ¥403,366 |
| 2-3. Leaflets | nos. | | | 8,000 | ¥52,472 | 30,000 | ¥262,359 | 8,000 | ¥52,472 | 7,000 | ¥94,000 | | | 6,000 | ¥72,000 | 6,000 | ¥72,000 | 61,000 | nos. | ¥595,303 |
| 2-4. Public notice board for waste discharge rule | nos. | | | 50 | ¥1,661 | 50 | ¥83,025 | | | 100 | ¥221,000 | | | 100 | ¥221,000 | 100 | ¥221,000 | 400 | nos. | ¥747,686 |
| 2-5. Motorbike with helmet | nos. | | | 2 | ¥52,470 | 6 | ¥314,820 | | | 4 | ¥184,580 | | | 5 | ¥243,200 | 5 | ¥243,200 | 22 | nos. | ¥1,048,250 |
| 2-6. Modified handcart | nos. | | | 5 | ¥15,070 | 10 | ¥150,700 | | | 6 | ¥93,820 | | | 6 | ¥93,820 | 27 | nos. | ¥333,410 | | |
| 2-7. 100 litre barrel fixed type litter bins | nos. | | | 20 | ¥3,219 | 20 | ¥64,380 | | | 20 | ¥65,880 | | | 20 | ¥65,880 | 80 | nos. | ¥179,359 | | |
| 2-8. 100 litre barrel movable type litter bins | nos. | | | 20 | ¥1,712 | 20 | ¥34,240 | | | 20 | ¥30,740 | | | 20 | ¥30,740 | 80 | nos. | ¥97,432 | | |
| 2-9. 40-50 litre plastic litter bins for school recycling | nos. | | | 50 | ¥678 | | | | | 40 | ¥42,200 | | | 50 | ¥52,750 | 140 | nos. | ¥95,620 | | |
| 2-10. Fabrication of waste transfer platform | nos. | | | 2 | ¥137,000 | 1 | ¥137,000 | | | 1 | ¥39,116 | | | 3 | ¥117,348 | 7 | nos. | ¥430,464 | | |
| 2-11. Closed type trailer for stationary waste transportation | nos. | | | 3 | ¥180,840 | 3 | ¥542,520 | 2 | ¥180,840 | 2 | ¥334,010 | | | 3 | ¥501,015 | 13 | nos. | ¥1,739,225 | | |
| 2-12. Three wheeler for collecting healthcare waste | nos. | | | | | | | | | | | | | 1 | ¥248,555 | 1 | nos. | ¥248,555 | | |
| 2-13. Lap top computer | nos. | | | 1 | ¥319,347 | | | | | 1 | ¥294,196 | | | 1 | ¥294,196 | 4 | nos. | ¥1,201,935 | | |
| 2-14. Projector | nos. | | | 1 | ¥369,900 | | | | | 1 | ¥342,900 | | | 1 | ¥342,900 | 4 | nos. | ¥1,398,600 | | |
| 2-15. Screen | nos. | | | 1 | ¥41,100 | | | | | 1 | ¥14,859 | | | 1 | ¥14,859 | 4 | nos. | ¥58,677 | | |
| 2-16. Digital camera | nos. | | | 1 | ¥38,800 | | | | | 1 | ¥38,830 | | | 1 | ¥38,830 | 4 | nos. | ¥150,290 | | |
| 2-17. Color printer | nos. | | | 1 | ¥11,097 | | | | | 1 | ¥10,287 | | | 1 | ¥10,287 | 4 | nos. | ¥41,958 | | |
| 2-18. Megahorn | nos. | | | 1 | ¥12,700 | | | 1 | ¥12,700 | 1 | ¥12,700 | | | 1 | ¥12,700 | 5 | nos. | ¥63,500 | | |
| 2-19. Amplifier for bell collection system | nos. | | | 7 | ¥94,941 | 16 | ¥217,008 | 10 | ¥135,830 | 6 | ¥81,378 | 19 | ¥257,697 | 5 | ¥67,815 | 5 | ¥67,815 | 68 | nos. | ¥922,284 |
| 2-20. Bulldozer (USD68,873.11 Rate: June 2003 1USD=119.05) | tr | | | | | | | | | | | | | 1 | ¥8,199,344 | | | 1 | no. | ¥8,199,344 |
| 3. Construction, Building and Survey | | | | | | | | | | | | | | | | | | | | |
| 3-1. Construction of a waste transfer station | LS | | | | | | | 1 | ¥452,000 | | | | | | | | | 1 | LS | ¥452,000 |
| 3-2. Refurbishing the office room to the environmental education centre | LS | | | 1 | ¥137,000 | | | | | | | | | | | | | 1 | LS | ¥137,000 |
| 3-3. Promotion of School Recycling | LS | | | | | | | 1 | ¥445,000 | | | | | | | | | 1 | LS | ¥445,000 |
| 3-1. Building the environmental education centre (Matale) | LS | | | | | | | | | 1 | ¥3,273,855 | | | | | | | 1 | LS | ¥3,273,855 |
| 3-2. Establishment of the environmental education center (NE) | LS | | | | | | | | | | | | | 1 | ¥698,572 | | | 1 | LS | ¥698,572 |
| 3-3. Establishment of the environmental education center (Badulla) | LS | | | | | | | | | | | | | | | 1 | ¥419,143 | 1 | LS | ¥419,143 |
| 3-4. Improvement of Gohagoda landfill site | LS | | | | | | | | | | | 1 | ¥12,015,510 | | | | | 1 | LS | ¥12,015,510 |
| 3-5. Improvement of Moon plain landfill site | LS | | | | | | | | | | | | | 1 | ¥18,012,006 | | | 1 | LS | ¥18,012,006 |
| 3-6. Geological survey | LS | | | | | | | | | 1 | ¥381,039 | | | | | 1 | ¥381,039 | 2 | LS | ¥762,078 |
| 3-7. Topographic survey | LS | | | | | | | | | 1 | ¥508,052 | | | | | 1 | ¥508,052 | 2 | LS | ¥1,016,104 |
| Total | | | ¥6,204,029 | | ¥1,480,164 | | ¥1,904,317 | | ¥1,267,799 | 1 | ¥6,154,826 | | ¥12,273,207 | | ¥28,588,788 | 1 | ¥3,579,079 | | | ¥61,472,287 |

Note: The amounts in the above table is based on the budget.

The bulldozer amounting to 8.2 million JY which was procured by the JICA Colombo office for the landfill operation in Nuwara Eliya is excluded in the above table.

4.2 Main Pilot Projects For Model Towns and Their Assessment

4.2.1 Bell Collection System (Waste Collection Improvement)

a. Rationale

The part in which public cooperation can contribute to SWM is mainly before the discharging of waste. The proper practice of the waste discharge by public cooperation make towns clean by eliminating waste scattering and lead to reduce the waste collection cost greatly. However, there have been few public cooperation experiences, while in the public consciousness survey more than 90% of respondents expressed their willingness to cooperate. Examining the possibility of public cooperation was, therefore, targeted.

b. Objective

Examination whether citizens cooperate for the bell collection method which seems the most appropriate waste collection system for the social condition in secondary towns in Sri Lanka.

c. Description

The Study team had initial meetings and consultation with LA staff and Council members;

- LA staff decided the waste discharge rule, waste collection schedule, proposed collection areas.
- LA staff executed the publicity by using leaflets and notice boards.
- LA staff explained waste collection workers and drivers about the bell collection method.
- LA staff equipped an amplifier set onto each trailer.
- LA start of bell collection, ongoing operation and monitoring.

d. Assessment

Bell collection had been conducted in the seven model towns and was functioning very well as of September 2003, especially in Badulla and Negombo. In both towns, the municipal staff expanded the bell collection area step by step by themselves and now most of the waste collection area is covered. One of the reasons for the success in both cases was that the mayors accompanied the bell collection tractor on the first day and were able to see its benefits for themselves.

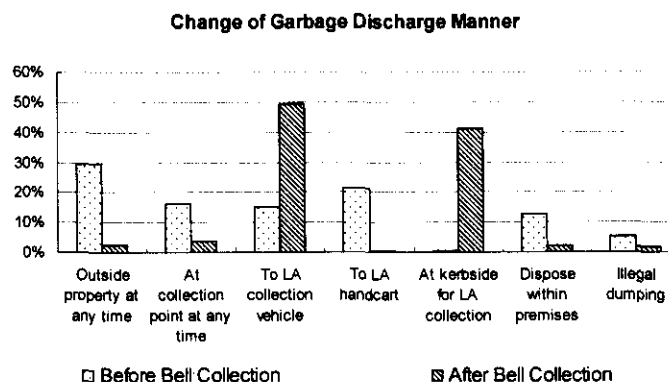
d.1 Result of Post Public Opinion Survey

The post public opinion survey conducted in the bell collection area shows the following results.

- a) 79% of respondents thought that the waste scattering decreased since the start of bell collection.

b) 74% of respondents answered that they can keep their garbage until the collection vehicle comes.

c) Regarding the manner of waste discharge, a dramatic improvement was found. Above all, since the start of bell collection, 90% of people have been using either bell collection or kerb side collection, 50% for bell collection and 40% for kerb side collection. In addition, most people stopped discharging waste in an illegal manner.



d) As for the frequency of garbage collection by LAs, most people have found that it has been improved. It suggests two possibilities. One is that people are now more aware of when the actual collection service is and the other is that LAs' collection has become more regular.

e) If the waste collection vehicle does not come, 65% of respondents answered that they keep their waste until it comes and 18% of respondents answered that they carried their waste to the nearest garbage bins.

d.2 Findings on Bell Collection

a) Although the bell collection system is more inconvenient for people than the conventional method due to the fact that the garbage discharging days are limited, the majority of people were very cooperative in bell collection. The success of this was because:

- LAs clearly told people what they should do.
- The cooperation requested was affordable for people.
- People could fully realize the benefit of the bell collection system, i.e. cleanliness.

b) A few weeks after starting bell collection, however, people began using the system in a different way. People started to place their garbage outside on their own, and came out to collect the empty containers after hearing the collection truck pass (i.e. they used the bell to inform them when to collect their containers rather than when to take out their garbage). In other words, people naturally shifted from the bell collection method to the kerbside collection method.

c) LA's commitment to providing a reliable garbage collection service increased due to the good public response, and the likelihood of complaints about poor performance increased.

d) Public expectations towards SWM were raised and their willingness to complain increased.

d.3 Measures for Further Extension

It is important that as this system becomes well established. LAs should consider how to run the bell collection with minimum resource input from them and maximum public participation, this being one of the key objectives. Practically, this could involve the following steps:

- a) Reducing the collection frequency.
- b) Removing unnecessary public concrete bins.
- c) Reducing the number of labourers per collection vehicle.
- d) Reducing the number of handcarts collecting garbage, using them in essential places only.
- e) Replacing handcart collection with a designated handcart street sweeping and drain cleaning service.
- f) Increasing work performance targets for street sweeping and drain cleaning and/or reduction of street sweeping and drain cleaning frequencies

4.2.2 Landfill Improvement

a. Rationale

There are two main issues concerning the current landfill site conditions in Sri Lanka. One is how to mitigate the environmental pollution that is caused by existing landfill sites and the other is how to establish new sanitary landfill sites.

The first issue, the mitigation of environmental pollution is urgently needed at most of the existing landfills. However, no improvement projects of existing landfills have been implemented because the investment for the improvement of these does not produce any output and furthermore as improvement technologies are not known to the authorities in charge of SWM.

The second issue, the establishment of sanitary landfills, has not been materialized. One reason is that people have a strong prejudice against landfill sites, which results in strong public opposition to new sites. In addition, the relative authorities in charge of SWM are not able to account for the idea of a sanitary landfill site because they have no knowledge based on actual experience. A pilot project which establishes a new sanitary landfill site is very useful in terms of not only the improvement of the existing landfill site run by the local authority but also the introduction of the idea of the sanitary landfill site to the people and relative authorities in Sri Lanka.

b. Objective

In order to mitigate the environmental pollution of the existing landfill site and establish a new sanitary landfill, the two pilot projects, i.e. the improvement of Gohagoda landfill site and the construction of the sanitary landfill site at Nuwara Eliya, were implemented in this study.

The objectives of pilot projects include the following four items:

- a) To introduce the mitigation technology for environmental pollution at the existing landfill site
- b) To introduce the structure of sanitary landfill site facilities
- c) To transfer the appropriate method for sanitary landfill operation
- d) To establish the necessary public consideration and monitoring system for operation of the sanitary landfill site

c. Description

c.1 Improvement of Sanitary Landfill Facilities

The contents of the improvement projects of Gohagoda landfill site and Nuwara Eliya landfill site are shown in the following pages.

c.2 Transfer the Appropriate Sanitary Landfill Operation

To improve the faculties at the landfill site is relatively easy by construction, however to maintain the sustainable maintenance and operation is always very difficult. One of the reasons why sustainable maintenance is difficult is the staffs in charge of landfill operation does not have the knowledge and experiences of the sanitary landfill operation method.

During the pilot projects, the counterparts who belong to Kandy MC and Nuwara Eliya MC were involved to the supervision of construction in order to transfer the method of construction of sanitary landfill site. After the completion of the improvement constructions, technical transfer, such as compaction of discharged waste and covering soil, was conducted with the bulldozers donated by JICA to Nuwara Eliya MC and Kandy MC. Further, the operation manual for sanitary landfill was prepared in order to maintain the sustainable appropriate operation.

c.3 Establishment of the Necessary Public Consideration and Monitoring System for the Sanitary Landfilling

A monitoring committee was established in order to maintain sustainable maintenance and operation at the improved and established landfill sites. The monitoring committee holds meetings periodically and makes the monitoring results available to the public. The members of monitoring committee include representative of neighbours near the landfill site, member of health committee, relative person of religion, staff of Municipal Council in charge of solid waste management, NGO and Central Environmental Authority. The frequency of monitoring committee is as follows. The monitoring committee evaluates the maintenance and operation based on the check list.

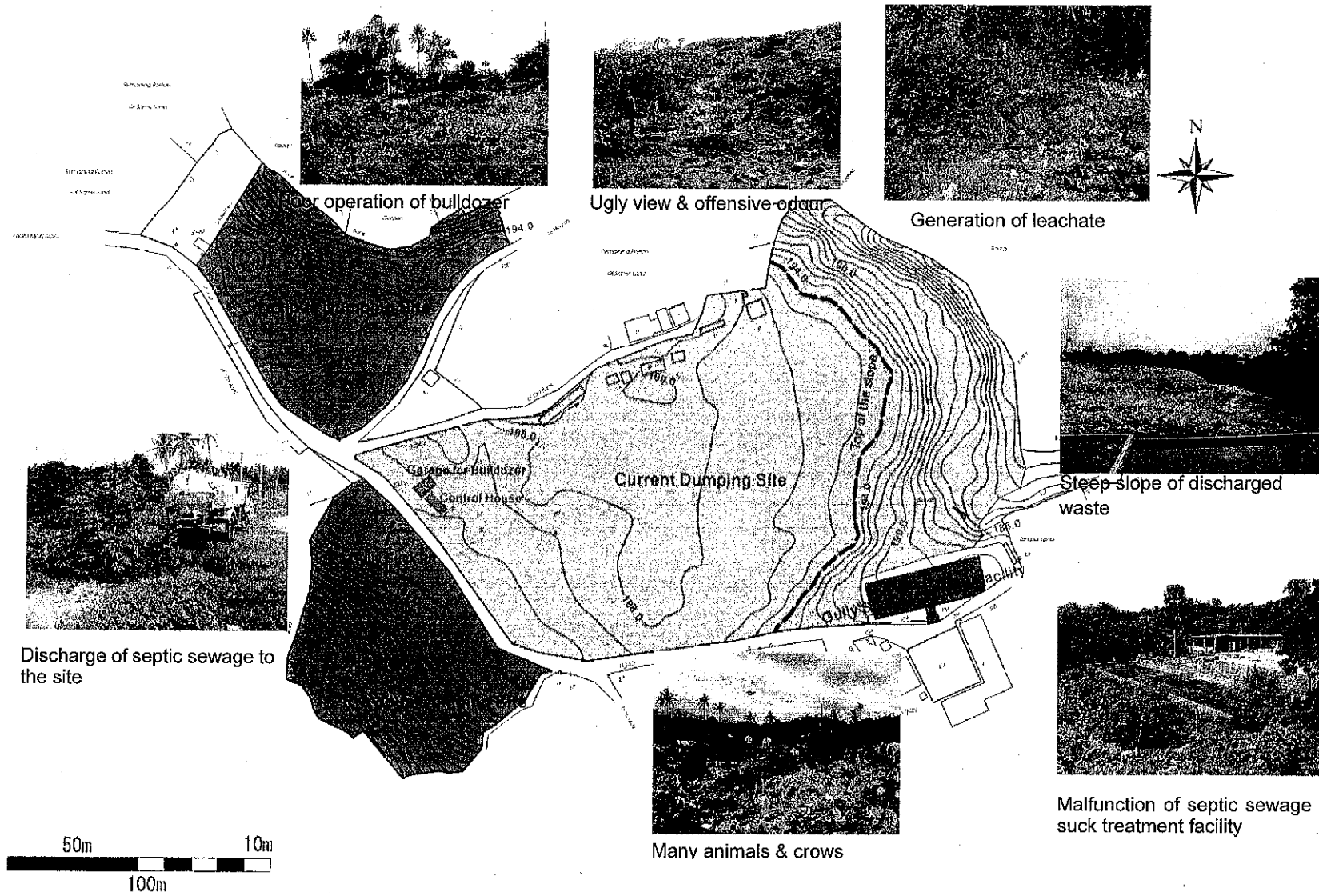


Figure 4: Condition of Gohagoda Landfill Before The Improvement

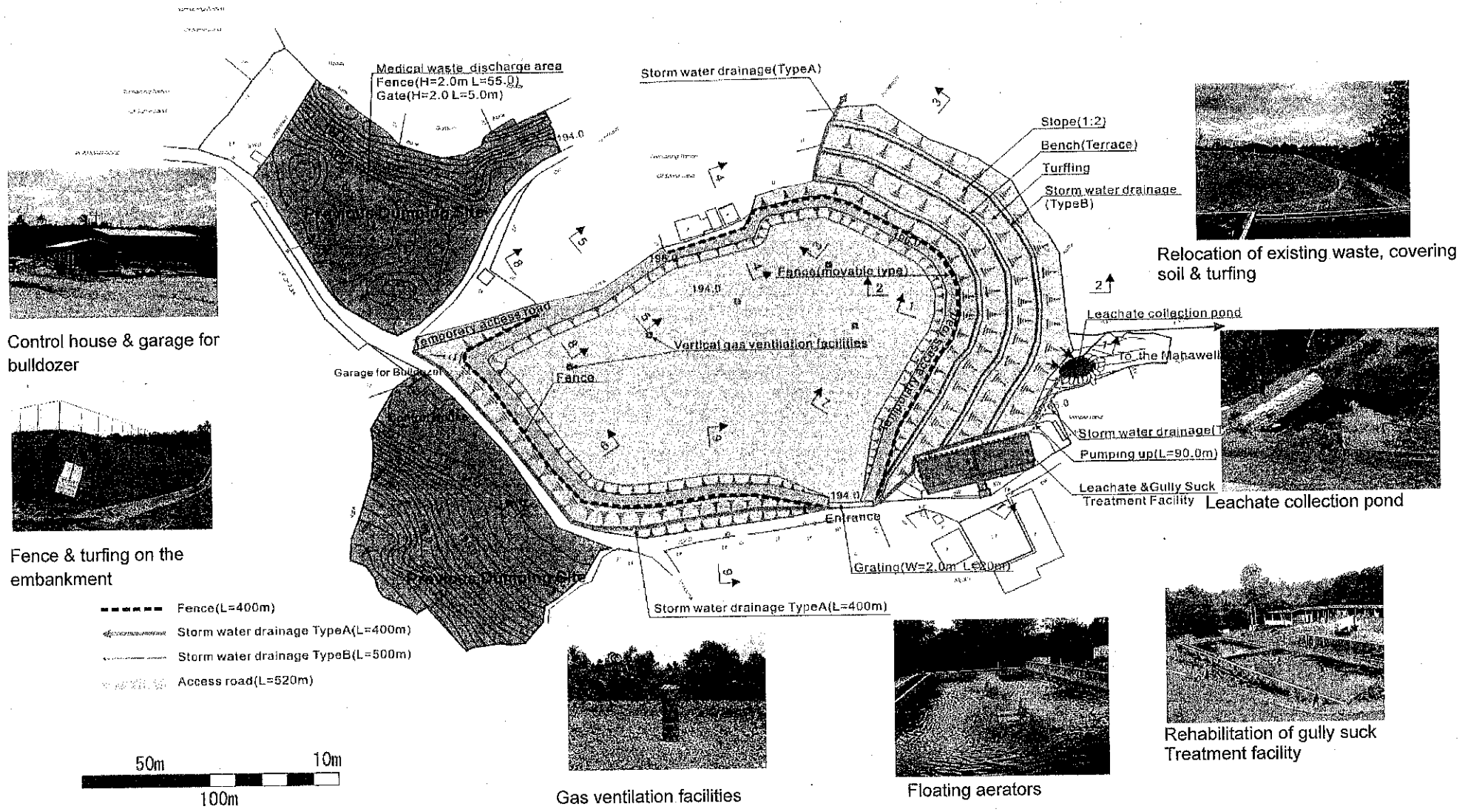


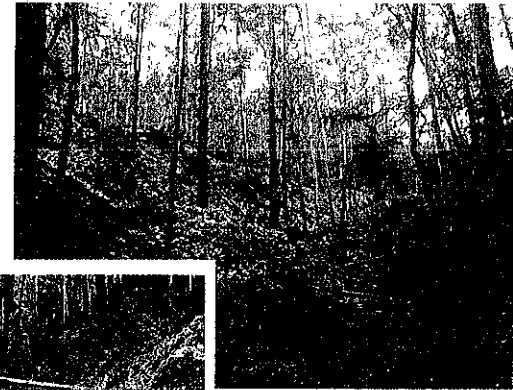
Figure 5: Condition of Gohagoda Landfill After The Improvement



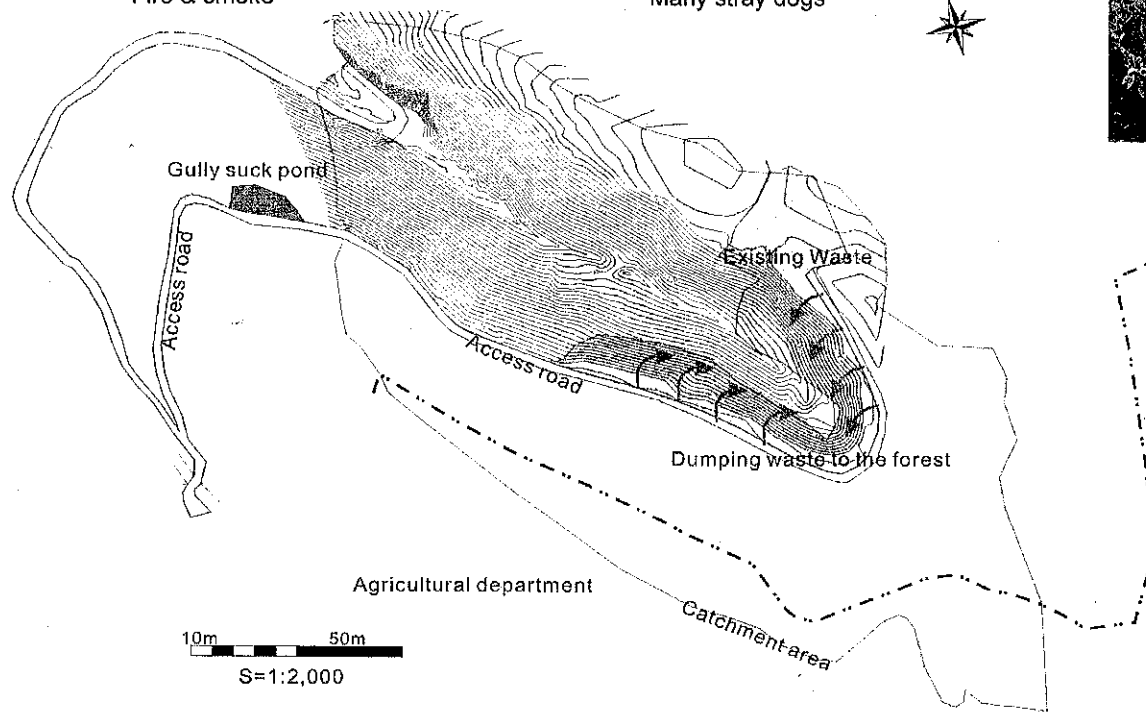
Fire & smoke



Many stray dogs



Many trees dying

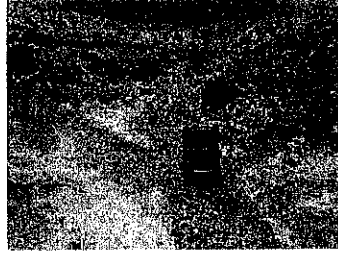


Many flies

Figure 6: Condition of Moon Plains Landfill Before The Improvement



Access road



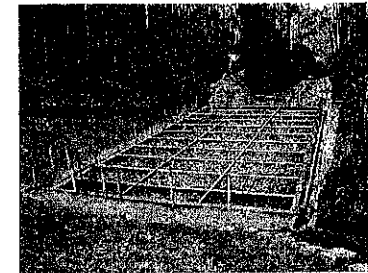
Gas ventilating facility



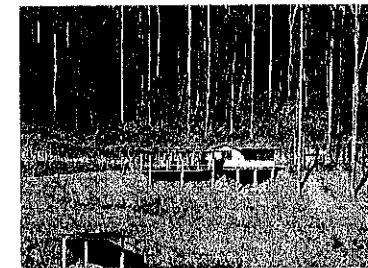
Relocation of existing waste & covering soil



Leachate collection facility



Leachate treatment facility



Control house & education facility

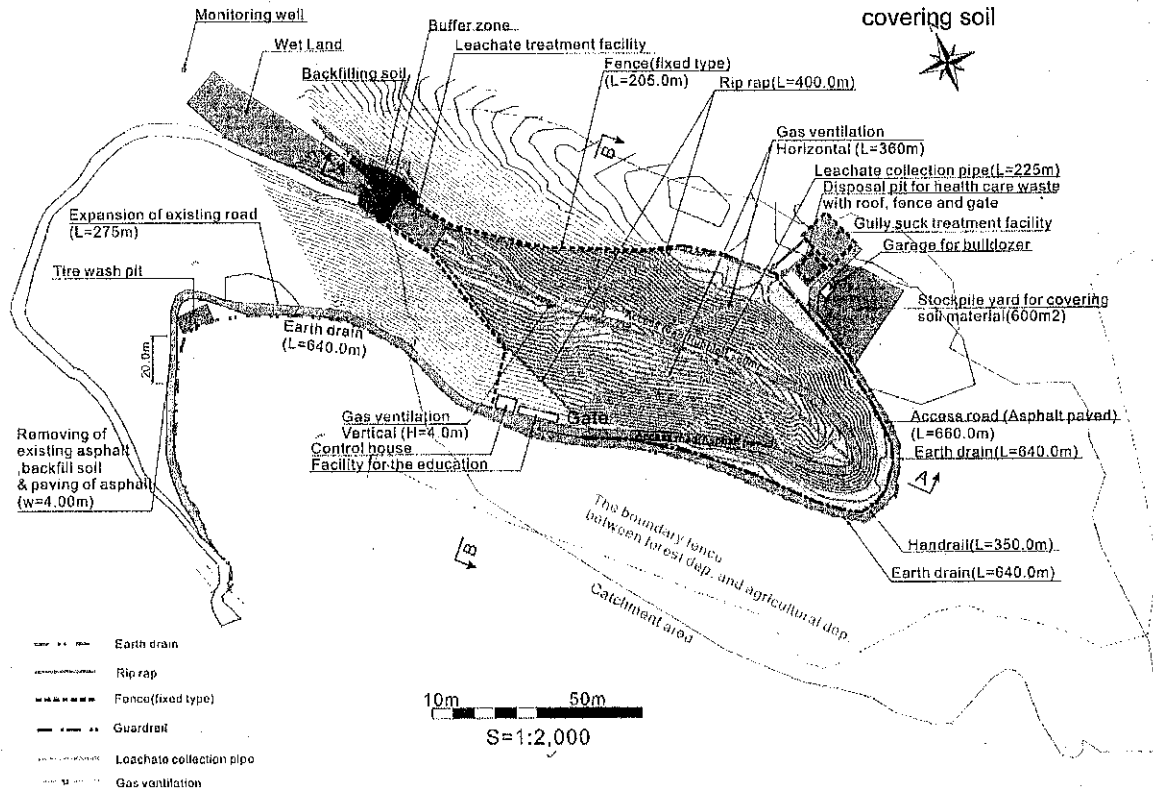


Figure 7: Condition of the Moon Plains Landfill After The Improvement

d. Assessment

d.1 Improvement of Gohagoda landfill site in Kandy

The interview surveys of residents in the area surrounding the Gohagoda landfill was conducted before and after improvement of the landfill. The results of the interview surveys are as follows:

| Question | Percentage of YES replying | | Improve Rate |
|--|----------------------------|-------|--------------|
| | Before | After | |
| 1) Is offensive odour from the landfill site a problem? | 97% | 56% | 31% |
| 2) Has ground water been polluted as a result of the landfill? | 31% | 0% | 31% |
| 3) Has the landfill caused problems due to birds? | 85% | 53% | 32% |
| 4) Has the landfill caused problems due to rats? | 80% | 29% | 51% |
| 5) Has the landfill caused problem due to dogs? | 75% | 56% | 19% |
| 6) Is the dust caused by the landfill a problem? | 72% | 24% | 48% |
| 7) Do waste collection trucks cause any problems? | 64% | 32% | 32% |
| 8) Is waste scattered from the landfill site a problem? | 88% | 21% | 67% |
| 9) Is smoke and fire from the landfill site a problem? | 95% | 0% | 95% |
| 10) Do your washed clothes get dirty because of dust from the landfill site? | 57% | 18% | 39% |
| 11) Are you satisfied with how the operation of the landfill site? | 7% | 97% | 90% |

The results of the interview surveys show that the improvement of Gohagoda landfill and its operation has had a favourable impression on the neighbouring residents. One hundred percent of respondents answered that the smoke problem was eliminated and the ratio of people who are happy with the landfill condition increased from only 7% to 97%. The main improvement works of Gohagoda landfill consisted of the relocation of existing waste, covering soil, turfing and the installation of fence to prevent waste from scattering. Most of the improvement works used only cheap and locally available materials and simple technologies. This proves that simple methods for improvement of the landfill site with cheap, domestic material can easily satisfy the local residents.

d.2 Improvement of Nuwara Eliya Moon Plain landfill site in Nuwara Eliya

The following effects have been observed since improvement of the landfill site:

- a) There is no fire or smoke caused by discharged waste at the landfill site. No plantation trees are damaged by smoke and fire.
- b) There is little offensive odour.
- c) There are few pests such as flies and mosquitoes.
- d) There are few stray dogs, monkeys and crows.
- e) There is little scattered waste.
- f) There has been a decrease in the generation of leachate.

- g) The landscape has improved.
- h) The collection vehicles can easily approach the dumping area due to the paving of the access road.
- i) The citizens take an interest in the operation of the landfill site because of the establishment of the monitoring committee.

The facilities of Moon Plain sanitary landfill site are designed very simply and made from cheap material which is available domestically. Therefore, Nuwara Eliya MC can easily operate and maintain it without any high technology or expensive operational costs.

Many elementary school students have visited Moon Plain landfill site under the program for environmental education since starting operations in November 2003. Moreover, other neighboring local authorities have also visited the site to see the facilities of the sanitary landfill. Moon Plains landfill site is performing most effectively as a model sanitary landfill site in Sri Lanka.

4.2.3 Environmental Education Improvement

a. Rationale

Public cooperation is necessary to improve SWM which has become a big burden that is beyond the capacity of LAs. However, LAs do not understand how important public cooperation is or know how to encourage people to cooperate because LAs have neither enough experience, proper materials, equipment to educate them nor proper guidance.

b. Objective

- Capacity building of LAs, which is needed to carry out environmental education continuously
- Verification of methods and materials which are understandable and effective for citizens
- Preparation of an environmental education manual based on experience obtained through the environmental education improvement to expand environmental education to other LAs.

c. Description

The following points were considered in implementing the environmental education program.

- To produce educational materials with topics familiar to citizens and photographs of their area
- To use audio-visual materials which make clear the important points and problems and

are also easy to understand for anybody

- To train LA counterparts so that they can manage the equipment provided to revise or reproduce the environmental education materials by themselves
- The concepts of the environmental education improvement programme focused on the following points:
 - LAs understand the necessity of public cooperation for improvement of SWM. The citizens, the generators of wastes, understand their responsibilities and participate in SWM in cooperation with LAs.
 - LAs clearly inform the citizens of what actions they have to take to cooperate with LAs.

d. Assessment

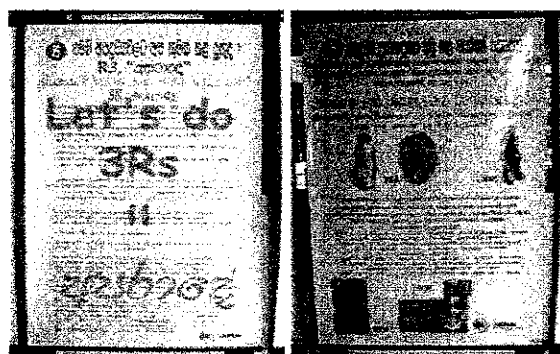
d.1 Establishment of the Environmental Education Centre

The environmental education centre was established in the four selected towns at the places where citizens and school children can visit easily.

| LA | Location | In charge | Opening day |
|--------------|----------------------------------|---------------------|--------------------|
| Chilaw | Upstairs of the council building | DEO | March 6, 2003 |
| Matale | New building near the council | PHI, CDA | September 18, 2003 |
| Nuwara Eliya | Upstairs of the library | CDO, PHI, Librarian | August 22, 2003 |
| Badulla | Upstairs of the library | CDO, PHI | August 21, 2003 |

d.2 Educational Materials

Educational banners and leaflets were produced by the counterparts with support from the Study team. The banners made were portable so that they could be utilised for multi-purposes, education in the environmental education centre and on-site education.



Educational banners in Chilaw: Explanation of the 3Rs (Left) and example actions to reduce waste (Right)
To promote the 3Rs, the Study Team proposed “Aparade” in Sinhala (“Mottainai” in Japanese) as a slogan.

d.3 Environmental Education Action Plan

The environmental education action plan was prepared to ensure that LAs continue to educate people without the Study team’s assistance. The Study team encouraged the counterparts to prepare a practical and sustainable yearly plan for 2004 including a cost estimate to submit to the financial committee for the allocation of the budget.

d.4 Progress

Urban Council of Chilaw (UCC) gave the environmental education to approximately 1,500 people in total between March and September in 2003. Other LAs have been doing more progressively because of more staff involved.

e. Assessment

Urban Council of Chilaw which has limited human resources and a weak organisations could carry out the environmental education program by themselves for 6 months. This shows that the environmental education program can be successful in many other LAs.

Three MCs other than Chilaw could well execute the environmental education with referring to the experience in Chilaw without much support from the Study team. It implies that many LAs will also be able to start environmental education following the manual without any special support.

Each MC has become active in promoting environmental education. They have developed original activities suitable to their areas. Since the counterparts were given educational equipment and trained in its use, they have been willing to do environmental education activities. This is remarkable progress in capacity development.

They prepared an environmental education action plan in accordance with the present condition in their towns and estimated a budget for the next year. This is a significant step towards sustainable environmental education.

4.2.4 School Recycling (Environmental Education)

a. Rationale

In Sri Lanka, several recycling projects which introduce source separation are carried out by NGOs and CBOs, but unfortunately those projects are embedded with a few defects. Those recycling projects are not financially sustainable, import a western style recycling system which does not suit the Sri Lankan situation and discourage the existing recycling activities traditionally rooted in Sri Lankan society. However, this fact does not deny the importance of efforts towards resource recovery through recycling activities. What is needed is to introduce young children to the rather new concept and benefits of recycling and provide them with valuable hands-on experience.

b. Objective

The objective of the project is to impart hands-on experience that introduces students to the new concept and benefits of resource recovery through recycling activities and encourages them to make recycling a part of their lifestyle, with special consideration to the financial sustainability of

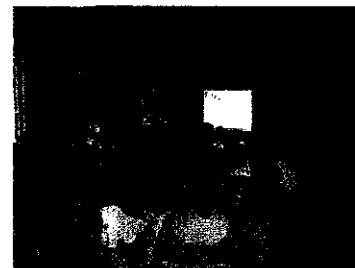
the project.

c. Description

The Study provided the funds for building storages such as in-school collection centres in each of the six schools in the Gampaha Municipal Area. Students collect recyclables such as glass bottles and paper at home and bring them to school on one or more designated days a month. Schools sell them to the local recyclers and the income generated is spent for buying necessary school goods. The aim was for school children to learn through experience that waste is the same as money if it is sorted and recycled.

In order to get started, the following steps were taken by GMC, schools and the JICA study team.

- 1) Planning the project with GMC and selecting the schools according to their capacities, commitments, etc.
 - Bandaranayaka National School
 - Yashodaradevi Balika Maha Vidyalaya
 - Keppetola Maha Vidyalaya
 - Gothami Kanitu Vidyalaya
 - Sri Bodhi Kanitu Vidyalaya
 - Chandrajothi Maha Vidyalaya
- 2) Identifying the middlemen in GMA and selecting the recyclables to be collected by students
- 3) Appointing the teachers in-charge at each school
- 4) Setting up a system for collecting recyclables
- 5) Awareness program for all teachers at each school
- 6) Awareness program for students
- 7) Building of the storerooms by the Study team
- 8) Inauguration ceremony at each school and start of the collection of recyclables
- 9) Establishing a monitoring system



Awareness programs for all the teachers at each school
Not only members of the study team, but also Mayor and an environmental officer from GMC participated and explained about the important feature of the school recycling project.

d. Assessment

According to the school visits in early September 2003, it was found that five of the six schools had sold recyclables twice already and one of them sold them once. Gains from selling recyclables at each school ranges from Rs.400 to Rs.1,200. Although some schools have faced several difficulties such as untidiness of the insides of storerooms, insufficient cooperation from other teachers, etc, the substantial amount of gains from selling recyclables tend to encourage

each school to continue the project. Moreover, the educational meaning of this recycling project is increasing in the present context of rapid urbanization and commercialization, and it is highly plausible that the similar projects will be effectively implemented in other areas.

4.2.5 Strengthening Capacity

a. Rationale

Assessment of the current SWM situation in all seven study towns revealed many SWM problems, with institutional and organisational issues being the most serious. This finding meant that any projects were unlikely to succeed unless this issue was also addressed. However, organisational and institutional change is a difficult, often long term task. Hence, as only short term pilot projects were being undertaken in this study, it was decided to implement a number of “managerial improvement” related pilot projects that would go some way to addressing these issues, either directly or by way of training, whilst at the same time developing the capacity of LA SWM staff.

b. Objectives

- Formulation of SWM by-laws
- Improvement of the managerial capability

c. Description

Table 8: Managerial Capacity Improvement Measures Executed

| Item | Components |
|---|---|
| Assistance in preparing SWM by-laws | Review of draft model by-laws by relevant Council staff and Council members, leading to their adoption by the LA. |
| Assistance in implementing three SWM management tools | <p>Monthly report: comprises a daily report form for each month and a summary report for each year. All relevant SWM information is recorded in this report, with it then being used to monitor SWM performance, assess progress against targets and identify required actions to address issues that arise.</p> <p>Control board: Basically a large white board (up to 5' x 7' in size) with a large scale digitized LA map on it. Relevant SWM information is recorded and updated regularly on the board such as collection zones; collection vehicle routes and frequencies; locations of public garbage bins, stationary trailers, litter bins, large waste generators, problem areas, etc.</p> <p>SWM Manual: The SWM Manual is an Operations tool that outlines necessary SWM works required to be undertaken on a daily, weekly, monthly and annual basis, together with who is responsible for doing such works. It also explains how to use the monthly report and control board, including some suggestions on how to collect the necessary data.</p> |
| PHI/Supervisor training | 3-4 training sessions were conducted in each study town covering a large range of SWM topics including introduction, challenges for change, PHI/supervisors job, public relations, education/awareness, health and safety, rules and regulations and landfills. |
| Provision of transport facilities | Five LAs were provided with a number of small motorcycles by JICA to make it easier for them to supervise SWM works and to do public education/awareness programmes. |
| Preparation of 10 year SWM Action Plan | A rough draft Action plan prepared by the Study team was given to each LA as the basis for discussion. Each LA then revised this plan, via one or more of the following: internal meetings, external meetings, stakeholder workshops, etc. to produce a final Action Plan. This sets out LA SWM objectives, targets, strategies and actions for the next 10 years. |

d. Assessment

d.1 By-laws

The model by-laws have been widely welcomed by LA staff and Council members, being considered timely and giving LA much more power to enforce improved SWM. While most LAs have distributed the model by-laws relatively widely to LA staff and Council members, very few, if any, have proposed any changes or additions to the model by-laws. Instead, most Councils have, or in the process of adopting them, without any changes.

d.2 SWM Management Tools

Progress has been slow in implementing these tools, with most LAs only starting to have used the monthly report and/or control board since August-September. There are a number of reasons for this.

These are considered to be potentially very powerful and useful tools for improving SWM management and accountability, but it may take some time, possibly as long as 1-2 years, for them to be implemented and for LAs to appreciate this.

d.3 PHI/Supervisor Training

Up to 102 LA staff attended each PHI/supervisor training session. Most participants were very appreciative of the training, commenting that the programme was very good - they had gained new ideas, knowledge and a better understanding of SWM.

d.4 Transportation Facilities

The motorcycles supplied by JICA are in widespread use and are proving very useful to LAs. They have made it much easier for supervisors to undertake field work, particularly monitoring labourers' work performance and checking the cleanliness of the city.

d.5 SWM Action Plan

SWM Action plans were prepared for each LA through a relatively extensive consultation process, involving as many LA staff and Council members in the planning process as possible. Efforts were taken to ensure that the Action plan focused on relevant, practical and affordable items and was specific to local conditions. A danger is that there is currently no mechanism to force LAs to implement the Action Plan, while many LAs lack funds to implement it in a comprehensive way, particularly the final disposal issue. It is vital that such a mechanism be created, possibly by significantly strengthening the enforcement capability of the CEA, and increasing the availability of funds for SWM works.

4.3 Pilot Projects for National Level and Their Assessment

4.3.1 Formulation of Model By-laws

a. Rationale

The NSSWM, formulated by the MOENR in 2000, proposed a wide range of policies for improving SWM in Sri Lanka. However, three years later, these policies largely have yet to be implemented. This is mainly due to the fact that LAs do not have by-laws for SWM in compliance with the NSSWM. Therefore, the formulation and the implementation of SWM by-laws can be a solution but there are two issues.

- LAs do not have sufficient capability to prepare new by-laws for SWM in compliance with the NSSWM
- It takes a long time for Provinces to approve by-laws even if an LA formulates one.

b. Objective

The aim is to prepare model by-laws for SWM at the national level based on the policies in the NSSWM.

c. Description

Ministry of Home Affairs, Provincial Councils and Local Government, SLILG and many local authorities participated in the formulation of the model by-laws with assistance from the Study team. The process followed in preparing these by-laws is outlined below.

Table 9: Process Followed for Preparation of Model By-laws

| Date | No of Participants | Description |
|-----------------------------|--------------------|--|
| 10 Feb | 32 | First workshop |
| 24 Feb | 13 | Second workshop |
| 10 April | 50 | Third workshop |
| 1 June | N/a | Completion of draft Sinhala by-laws. |
| 25 June | N/a | Distribution of draft Sinhala by-laws to local authorities and Provincial Councils for review and comment. |
| 31 Jul | N/a | Completion of translation of draft Sinhala by-laws into English |
| 31 Jul – 13 Aug | N/a | Revision of English translation of by-laws by Study Team |
| 5 Sep, 19 Sep, 2 Oct, 6 Oct | 7 | Revision of English translation of SWM by-laws by the Study team (2), MOHAPCLG and SLILG Officers and those who drafted the by-laws (5). Some amendments to both the English and Sinhala versions were made. |
| 24 Sep | N/a | Completion of translation of draft by-laws into Tamil |
| End of Oct | | Review of draft by-laws by legal draughtsmen |
| Mid-Nov | N/a | Enactment of model by-laws |
| End of Nov | N/a | Distribution of approved model by-laws to LAs for adoption |

Note: N/a = not applicable.

They cover four distinct areas, as summarised below:

- a) By-laws relating to Solid Waste Management
- b) By-laws relating to the Regulation and Control of the Construction and Operation of Public Toilets, Drains, Bathing Places and Bathing Wells and Wastewater Discharges
- c) By-laws relating to Decorations and Use of Advertisements in Public Places - their Regulation, Supervision, Control and Recovery of Fees
- d) By-laws relating to control, regulation, supervision and recovery of fees from funeral service supply centres within the Municipal Area

d. Assessment

MOHAPCLG and SLILG staff have taken the main leadership and management role in this project, with the Study team playing a supporting role, as required. They undertook an extensive consultation process involving identifying areas to be included in the model by-laws and then developing the content of the by-laws, as outlined above. The resulting by-laws reflect the real situation in local towns, the thinking of the National Strategy on SWM and the aspirations of those involved in preparing them.

It is important to appreciate that present experience suggests that the by-laws may be in effect for 10 or 20 years or even longer before being updated again. Hence, they contain a mixture of provisions, some of which can easily be enforced now, while others represent a big leap forward from the current situation. In particular, the SWM by-laws enforce source separation of garbage into three categories. This is an ambitious goal, when you consider the present situation where most people do not follow any proper discharge system. However, it is considered appropriate to include this measure, aiming for implementation and enforcement in the medium to long term.

Although the model by-laws has not been enacted by the central government, KMC has approved it and some of councils of other model towns are dealing with it in the council. Once the by-laws are enacted and adopted by LAs, they must be vigorously enforced. Otherwise, nothing will change. The proposed fines represent a significant deterrent to offending, but it is important for these to be updated in line with inflation so that this remains true.

4.3.2 Production of the educational picture book for children

a. Rationale

More people understand the necessity of environmental education as their awareness of environmental issues increases. However, there is a lack of appropriate educational materials focused on waste problems, which is a hot topic regarding the environment. Under such circumstances, MOENR was very keen to improve the capacity of providing environmental education.

b. Objective

The objective of the project is to produce 100,000 copies of an educational picture book for children and 10,000 copies of an education manual for picture books for school teachers jointly with MOENR, and contribute to improving and expanding environmental education on waste issues.

c. Description of the Project

A very unique picture book, which contains no words but only pictures with comprehensive messages on waste issues, was produced. This aimed the followings.

- The book without words can urge readers to get clearer and stronger images.
- It can avoid the language problems always associated with in Sri Lanka¹¹.



Some pages from the picture book

Not only the concepts which are usually well understood such as the health aspect, but also rather new concepts, for example, reduction of polythene bags and cooperation to municipal cleansing works, are also introduced.

The guideline for teachers was separately prepared in three languages.

The workshop, which aimed at training the participants on how to use the picture book, was carried out successfully on August 5th and 6th, 2003. Approximately 500 persons in total, including Divisional Environmental Officers and the Directors of the Zonal Education Offices, participated in the workshop and had the active discussion.



At the technical session, officers from MOE and the JICA study team explained about the unique feature of the books and how to use it effectively.

d. Assessment

Although printing of the picture books completed in April, they were distributed in September. It implies that the distribution method has to be carefully considered because it is a quite difficult task.

Many people expressed their appreciation to the picture book after being delivered. There can be a problem that the number of picture books printed was not sufficient. In addition, MOENR seriously considers to produce cards and calendars by using the pictures on the picture book.

4.3.3 Trial Lectures in PHI Training Course

a. Rationale

PHIs are currently trained via a 18 month diploma course at four different institutes around Sri Lanka. This course allocates a very short time (19h) to SWM as part of the Environmental Sanitation module. This has to be strengthened to improve the current SWM conditions.

b. Objective

The Study team held some trial lectures for PHI trainees using draft material for the SWM Guideline being prepared as part of this study, to determine the suitability of this material, which aspects need to be revised, and the necessity for establishing a new training course for SWM.

c. Description

PHI trainees and PHIs working in nearby LAs participated in the following lectures.

| Location | Date and Time | No of Participants | Lecture Topics |
|--|---------------------------|--------------------|---|
| Kaluthara PHI | 25 July (9:30-12:30) | 80 | Landfilling |
| Training Institute | 4 August (9:30-12:30) | 113 | SWM Garbage Discharge and Collection Waste Minimisation in Sri Lanka Public Relations |
| Kadugannawa PHI Training Institute | 6 August (10:00-13:00) | 90 | Landfilling |
| (PHI trainees from Kurunegala also attended) | 6 August (14:00-17:00) | 90 | SWM Garbage Discharge and Collection Waste Minimisation in Sri Lanka Public Relations |

d. Assessment

The lecture material was based on the actual SWM situation in Sri Lanka as much as possible and covered a broad range of topics, including possible SWM improvement measures for each topic. The trial lectures were well received, the PHI trainees commenting they had gained new ideas, knowledge and a better understanding of SWM. They showed a strong general interest in recycling, but knew less about processing/treatment (composting, biogas, incineration, etc.) and final disposal. Some of the SWM issues discussed (e.g. labourer management, public relations) helped them to appreciate that good SWM service delivery is no easy task.

¹¹ There are people who use Sinhala, Tamil and / or English in Sri Lanka.

4.3.4 Seminar for Interested NGOs on SWM

a. Rationale

Quite a number of environmental NGOs in Sri Lanka are involved in the improvement of SWM. Their role in SWM have become very important because the SWM works has become too large for LAs to execute by themselves due to the increase of waste amount and the change of waste quality. However, they are many cases of failure in their activities because they do not have a scientific understanding of present solid waste management.

b. Objective

The Study team explained to NGOs the scientific findings obtained through the Study and discuss the role of NGOs and their expected policies.

c. Description

Interested NGOs of SWM in the country were invited for the seminar.

- Date and time: from 10 am until 2 pm, on 8th Aug. 2003
- Venue: CETRAC, Colombo
- No. of participants: 40

d. Assessment

There were fewer participants than we expected. NFPO mentioned that there were few NGOs which continued the work in SWM due to their high dependency on donors. This is one of causes why most NGOs have little knowledge on SWM. It implied that the effort of networking NGOs and giving technical assistance to them are important means.

One NGO expressed the opinion against the improvement of waste collection efficiency because it decreases the job opportunities. It is true that public cooperation and job creation don't harmonise. Therefore, in order to harmonize both policies, it is necessary to formulate the action plan from broad aspects.

4.3.5 Seminar on SWM Administration for Decision Making Level Staff in Provinces and LAs

a. Rationale

The status of SWM works is too low in LAs although SWM works generally occupy about 20% of total LAs budget and 30% of total LAs' employees. This is due to the lack of understanding the importance of SWM as local governance by high ranking officers and politicians in LAs who are key persons in local governance due to the dominance of the top-down system in LAs.

b. Objective

To promote the importance of SWM as local governance to high ranking officers and politicians in local governments who are responsible for decision making in order to raise the status and the priority of SWM.

c. Description

The Study team conducted the following seminar with the strong cooperation by SLILG.

| Name of provinces | Place | Venue | Date | Participants |
|------------------------|--------------|-------------------------|---------------------|--------------|
| North-central province | Anuradhapura | Auditorium, Ceylon Bank | 1 st Aug | 43 |
| North-west province | Kurunegala | Blue sky hotel | 8 Sep. | 60 |
| Central province | Kandy | Training institute, PC | 22 Sep | 60 |
| Uva province | Badulla | Riverside hotel | 23 Sep. | 40 |
| South province | Galle | Sri Gamunu Hotel | 16 Sep. | 81 |
| Western province | Colombo | CETRAC | 5 Sep. | 73 |

Titles of Presentation

- Only good governance can overcome waste problems. Study Team
- Public and private partnership SLILG
- Environmental law Former Chairman of CEA

d. Assessment

The seminar was very much welcomed by many participants. They expressed their strong impression by the presentations especially solid waste management because they have lack of information on it. We have found that local people are suffering from lack of information for them on SWM although there are often seminar on SWM held in Colombo.

4.3.6 Seminar for University Students and Staff on the Social Issues

a. Rationale

Most of the SWM experts in Sri Lanka are engineers because only the agriculture department or the mechanical engineering department in universities deals with this new subject. This situation has led to technology-oriented projects and has caused the failure of many SWM projects. To rectify this situation, various approaches from broad aspects are required.

b. Objective

The Study team held a seminar for university students and staff on waste focusing on necessary socio-economic considerations in SWM in the universities.

c. Description

Lectures focusing the social aspect on SWM were given to university students, university teachers and the society for raising their awareness on the subject and to understand its need.

23rd Oct. 2003 at Colombo University

Agenda:

- Social capitals related to SWM in Sri Lanka
- Economics of 3 Rs
- Social acceptability of SWM facilities

d. Assessment

Since the beginning of the Study, the Study team had been trying to make the counterparts understand the importance of the above agendas in SWM but most of them could not grasp this well. The Study team realized that this was a main issue that had to be rectified in order to improve the SWM works.

However, most of the participants of this seminar were sociologists and could understand the items presented very quickly. It was found at the seminar that there are many people in Sri Lanka who can understand the important social issues in SWM and they should be involved in SWM administration.

4.4 Capacity Building of Each Model Town

The objectives of the implementation of pilot projects were not only the visual improvements such as a reduction in waste scattering and upgrading of the poor landfill condition but also to encourage the counterparts to be more enthusiastic and act more independently with regard to developing their capacity. This section reports the progress of their capacities from that point of view.

4.4.1 Chilaw UC (UCC)

The Chilaw Mayor who is devoted to local governance and the richly experienced PHI managed the city well despite a lack of human resources and equipment being the smallest council of the seven model towns. However, when the Study started, they knew that the SWM works were too much for them to manage without public cooperation. Therefore, they strongly requested the Study team to give assistance in raising public awareness at the initial stage of the Study. The Study team held educational activities for citizens at the community meeting which UCC arranged.

Waste collection improvement and environmental education were therefore selected as the main pilot projects. In general, the DEO produced the educational materials and conducted the environmental education successfully after being trained by the Study team, with full cooperation from the Mayor and PHI.

However, when the PHI retired and was replaced in February 2003, the situation changed completely. The new PHI carried out SWM reform independently without understanding the purpose of the pilot project and did not take any interest in the environmental education programme. The DEO therefore continued the environmental education alone. The DEO explained the responsibilities of the council and citizens regarding waste collection and asked people to cooperate in discharging garbage according to the garbage discharge rules for bell collection. However, as UCC did not comply with the rules, many citizens complained UCC. Despite the many complaints, the PHI did not take any remedial actions. Eventually, the PHI realized this was the result of the environmental education conducted by the DEO, and he requested the DEO to stop the programme.

In response, the Mayor removed the new PHI from his position and took charge of the SWM works by himself. The DEO was doing the environmental education as of September 2003. By overcoming this struggle, UCC was empowered and its capacity was enhanced to function as a participatory organization that responds to the needs of its citizens. Although the bell collection and the waste collection improvement projects did not go well due to UCC's weak organisational capability, the environmental education has been stabilizing. It is highly expected that environmental education will be a key factor in improving the conventional SWM system in Chilaw.

4.4.2 Negombo MC (NMC)

The existence of many garbage heaps on main roads discomforted citizens and visitors to Negombo, although it is a famous tourist resort town. This was mainly due to an insufficient SWM budget. However, it was impossible to expect a drastic increase in the budget as the total council budget was very small. Therefore, the pilot project targeted a reduction in waste

scattering without spending much money.

Although NMC was not interested in the Study during Phase 1, NMC became very active in the implementation of the pilot project after it started. NMC decided to introduce bell collection and established a street committee to ensure public cooperation for it. The street committee was expected to strengthen the link between NMC and the citizens. The street committee members selected were in charge of the promotion and supervision of good waste discharge practices and the monitoring of NMC's regular collection work performance. In addition, they were obliged to participate in the meeting concerning the formulation of the action plan as representatives of citizens.

On the first day of bell collection, the Mayor and the council members in the health committee followed the tractor to see bell collection work in action and people's reaction to it. As a result, they realized its effectiveness and people's appreciation of it. However, after a few months, drivers started to forget to play the music, and NMC failed to comply with the garbage collection schedule due to the breakdown of tractors and of speakers for music; NMC's performance of bell collection greatly declined. Finally, it almost collapsed due to the negative attitude of many municipal employees who were very conservative and against the change. At that time, however, many street committee members and citizens made lots of complaints to the Mayor by phone and telegram and strongly requested that NMC resume the bell collection. This moved the Mayor to order its resumption and the bell collection came to be operated much more steadily and widely than before. The street committee system, which was introduced by NMC to promote public participation, prevented the bell collection from collapsing by watching NMC's performance. The effects were as follows:

- Many of the waste heaps and waste scattered on roads disappeared.
- NMC has removed 45 out of 60 concrete communal garbage bins because they are no longer necessary since the introduction of bell collection. In addition, NMC has reduced the frequency of handcart collection, which has led to an actual cost reduction.
- NMC ordered five trailers after realizing the effectiveness of stationary trailers through the implementation of the pilot project.
- A link among all stakeholders such as NMC staff, citizens, the staff of relevant authorities, etc. has been formed and strengthened through the implementation of bell collection and the formulation of Action Plan. Finally, 85 people participated in the 2nd SWM seminar which was very well organised by NMC itself.

Through the introduction of bell collection and preparation of an action plan with the participation of many stakeholders such as politicians, NMC staff, citizens, etc., NMC was able to widen its

viewpoint and develop a better understanding of the public's needs. This is a result worthy of special mention, which only Negombo of the seven model towns achieved this time.

4.4.3 Gampaha MC (GMC)

As Gampaha MC was formed by merging Gampaha UC and Yakkala PS just before the Study in April 2002, GMC's administrative system was very weak and there was a shortage of human resources and equipment. In addition, the Mayor who was a fresh politician was not familiar with local administration although he was very keen for it. Therefore, there was neither proper staff to be in charge of the pilot project nor enough staff to be trained.

For that reason, the pilot project was set up to require minimum participation by GMC staff, which was one of the main reasons the school recycling was selected. Although the Study team was greatly involved in the preparation of the project, the DEO participated in the environmental education for school children and teachers prior to its full implementation, and the Mayor explained the importance of cooperation in SWM works to them at the inauguration speech. The Mayor explained to students and teachers at six schools in his own words what he had learnt at the SWM seminar conducted by the Study team. This led him to deeply understand what SWM works are and its importance.

As a result, under the Mayor's strong leadership, GMC actively worked for the bell collection and the operation of a waste transfer station. Through these practices, the Mayor developed a strong interest in and deep understanding of SWM works and his capability was greatly enhanced.

The following improvements were made in GMC:

- GMC purchased four tractors and four trailers for waste collection work.
- Bell collection is well performed and, as a result, most of the waste heaps and waste scattered on roads has disappeared.
- The new waste transfer station has been well used and has improved the waste transferring work efficiency greatly. In addition, the surroundings of the waste transfer yard have become very clean.
- The mayor's involvement in bell collection and school recycling has changed his attitude not only to SWM works but also to local administration.

At the end of the Study, the final national seminar for exchanging the experiences of the pilot projects was held in Colombo with the participation of LAs from the whole country. Although the Study team gave the presentation without active participation by attendants at the first national seminar, at the final national seminar all representatives from the model towns actively gave presentations and answered questions from participants. Among them, the Mayor of GMC led

others in terms of SWM concepts and theories and fully disseminated the various knowledge obtained from the Study. The fact that the SWM seminar can now be held by the people themselves in LAs without any technical assistance is a worthy achievement. It is expected that people like the Mayor in Gampaha will disseminate what they learned in the Study to many Sri Lankan people in future.

4.4.4 Matale MC (MMC)

MMC, which is relatively rich in human resources and has a well organised administrative system, was very interested in the Study and actively participated in it. Therefore, quite high level pilot projects including strengthening the traditional recycling system were formulated. The achievements are listed below.

- As MMC was strongly opposed for its final disposal site by neighbouring residents, MMC improved it with the introduction of the trench sanitary landfill method.
- MMC actively prepared an action plan and started its implementation in response to the executive order by the court.
- MMC appropriated a budget for environmental education to be spent on O&M of the environmental education centre in the new fiscal year budget, which has never been done before.

Capacity building had little effect in regard to non-technical improvement, although it had some in technical improvement. Overall, the pilot projects were not fully absorbed by MMC and the reasons are as follows:

- As MMC conducted the project under the Sustainable City Programme of HABITAT and the JICA pilot project at the same time, the counterparts were too busy.
- There was a change of commissioner twice during the Study.
- MMC shifted the final disposal site three times during the study period due to opposition by neighbouring residents.
- The competent staff and stable administration system restrained the rapid change.

One significant result of capacity building was that MMC independently conducted public meetings for residents in the area surrounding the landfill after MMC staff realized the importance of social consideration measures through the serious landfill issue. This will be an epoch-making work if it becomes rooted as no LA has ever done that before. Regarding the landfill candidate site located in the next PS, MMC once gave up the idea of its utilisation as a landfill due to strong opposition by that PS council. However, after MMC withdrew all services provided for the town, the PS council reconsidered and asked MMC for further negotiation for

landfill development. As they begin to understand the importance of reciprocal help, inter-municipal cooperation will be developed.

4.4.5 Kandy MC (KMC)

The situation of SWM in KMC is the most serious among the seven model towns. This is not only due to the huge amount of waste generated but also the insufficiency of the administrative capacity. The department in charge of SWM works, in particular, changes from the health department, to the works department, to the mechanical section, and back to the health department almost every year, mainly because nobody takes responsibility of it. This fact is enough to tell that the executing organization is very weak. It is very obvious that there is an urgent need for institutional reform. However, the Study team hardly meet with the Mayor, who is the key to institutional reform, due to his demanding schedule. Furthermore, as Kandy is an old historical town, which is listed as a world heritage site, the council is very conservative. There was often strong opposition to changing the conventional system, and it was projected that the implementation of pilot projects would be very difficult. Therefore, only the following two projects were selected for pilot projects.

- Introduction of bell collection
- Improvement of the Gohagoda landfill

Bell collection started in three collection areas in July 2003 and was functioning in September. Although public cooperation had been obtained in each collection area, actual improvement such as the reduction of cleansing workers and the reduction of waste collection frequency had not achieved. This was because there was not an urgent need to improve work efficiency due to the existence of many workers in KMC. In addition, there was no expansion of the bell collection during the study period although its performance was quite good. Therefore, it was determined that the bell collection had neither taken rooted nor led to a change in KMC staff's attitude to be more active and take more initiative.

The improvement of the Gohagoda landfill is described in Section 4.2. The improvement work was successfully conducted according to schedule, although there were doubts as to whether the works within KMC's scope such as relocation work of electricity cables would be executed. However, KMC was much less interested in the landfill improvement than that Nuwara Eliya MC, despite the fact that a lawsuit had been filed against KMC for its poor landfill condition. KMC has to deal with the operation of the Gohagoa landfill more seriously as its operation is more difficult than that of the Moon Plains landfill.

Although there were more than 300 employees working for SWM works, the only people in KMC who were seriously participating in the SWM works were the MOH and the mechanical engineer who received SWM training in Japan along with a little assistance from politicians. It can be

concluded that any improvement projects will have little effect and will not be sustainable without institutional capacity building.

4.4.6 Nuwara Eliya MC (NEMC)

Nuwara Eliya MC had a shortage of human resources, e.g. spot working of MOH, only one CDO, and no DEO. However, almost all of the present employees such as the Mayor, Council members, PHI, and CDO were excellent and very keen for the implementation of the pilot projects. The financial condition was also slightly better than the other LAs. Therefore, the establishment of the new sanitary landfill project, which is one of the most difficult but important issues in Sri Lanka, was selected as a pilot project. As such a project had never been done in Sri Lanka before, we encountered many problems during its implementation.

The Study team did not think it was necessary to obtain approval for the new landfill as the site had already been approved and used as a landfill. However, a new approval became necessary because the CEA was especially careful in dealing with this site as it was located near an environmentally important place. NMC had no experience with this procedure. In addition, the CEA which is in charge of issuing the approval was not so familiar with it either as this was only the second time in 5 years.

In the Initial Environmental Evaluation (IEE) procedure, NMC staff submitted and explained the technical proposal prepared by the Study team to the CEA, and then the CEA asked questions or requested changes to NMC. NMC, with support from the Study team, responded and proposed an alternative to the CEA. The CEA's requests were often too difficult to be executed in Sri Lanka, although they were theoretically correct. The Study team, therefore, repeatedly explained their difficulty in O&M and the importance of technical sustainability to the CEA, which eventually agreed to adopt the technology appropriate for Sri Lanka. The organisations responsible for the supervision of regulations such as the CEA do not easily compromise and, therefore, tend to select the safer technologies even though they are too difficult for the executing agency to implement. However, this trend is the same all over the world. The fact that the CEA developed a better understanding of the importance of more realistic and sustainable technologies through the discussions and IEE procedure is a significant achievement worthy of mention.

The IEE was finally issued in July 2003, although NMC started the approval procedure with the Study team's assistance in November 2002. During that period, NMC with the Study team met and asked many officers in relevant authorities and even the Environmental Minister for the approval. This tough experience has enabled NMC staff not only to have a deep understanding of the sanitary landfill system to be adopted and its importance but also to develop a great enthusiasm for the project. NMC staff was strongly committed to the success of the sanitary landfill project. They conducted a public meeting for residents in the neighbouring area and

established the public participatory monitoring committee to ensure the good sanitary operation proposed by the Study team. Moreover, NMC also planted trees and painted handrails for further improvement even after the Study team left. Since the commencement of operation, many visitors have been visiting the Moon Plains Landfill, which is equipped with an educational facility for sanitary landfill for learning about the sanitary landfill system. As a result, it is highly expected to contribute to dissemination of the sanitary landfill system in Sri Lanka.

4.4.7 Badulla (MCB)

Badulla was the dirtiest among the seven model towns when the Study started in 2002. Despite that fact, MCB had not even organised the environmental committee as it was supposed to and MCB staff did not work hard. Furthermore, MCB staff did not seem to have a good understanding of the presentation on SWM by the Study team and did not respond well, which led the Study team to believe that MCB was not so interested in the improvement of SWM conditions. After the Study team asked the Commissioner of Local Government and Uva Provincial Health Department to encourage MCB, however, MCB started to change. Observing MCB's improvement efforts for three months, pilot projects were formulated. In addition, the Badulla Commissioner has become very active in the improvement of SWM conditions in Badulla, after more deeply understanding SWM through the JICA SWM group training course in Japan. As a result, MCB procured two new tractors for the bell collection before implementation.

The Study team expected the implementation of the pilot projects in Badulla to be difficult due to the low capacity of MCB. They, therefore, arranged a Japanese supporting staff member, who speaks Shihala and has worked in a local authority in Sri Lanka as a JOCV, to work as a facilitator and dispatched her to MCB twice a week. In addition, the Study team gave MCB staff a visual explanation of what they were to do by showing them a video of bell collection and actual leaflets produced by other LAs. This gave them a clear picture of the pilot projects and motivated them to work very actively in implementing them.

MCB started the bell collection work in the first collection area on July 29, 2003 after educating residents on the garbage discharge rules by various means with the Study team's assistance. The Mayor and the Municipal commissioner followed the collection tractor on the first day and they also asked residents for their cooperation. As the Mayor fully understood the effectiveness of bell collection, he quickly instructed the staff to expand it to all collection areas. MCB mobilized all PHIs and CDOs for the expansion of bell collection and, after gradual expansion, finally achieved coverage of all collection areas on November 1, 2003 without the Study team's assistance.

As for environmental education, MCB prepared the annual education programme for several target groups and steadily carried out the programme with the budget allocated in the new fiscal year. MCB used the doors of small kiosks located along streets where residents often come to

shop as noticeboards. Also, MCB assisted NGOs in Badulla which are promoting the traditional home composting system for garbage, known as “Jeew Kotu” in Sinhala.

In the SWM seminar held in Badulla for all LAs in Uva province, the Badulla Commissioner offered to provide technical assistance to other LAs after explaining the experience of the pilot projects. The Mayor also raised SWM issues on various other occasions and learned how to explain it to the citizens correctly.

After implementation of the pilot projects, Badulla town became much cleaner than before with a great decrease in waste scattered on roads. A more valuable result than that was that NMC staff changed their attitude. They look for problems, consider the causes and countermeasures, and take actions by themselves now. They are working hard with enthusiasm.

The impact achieved in MCB was the largest among the seven model towns in terms actual effects, process improvement, and human resource development. This achievement was not expected in view of the lack of response at the initial stage of the Study. This was probably attributed to miscommunication because their initial capacity was much lower than the Study team had thought even though they had potential for and an interest in the improvement. There are probably many other LAs in a similar situation and, therefore, close communication with such LAs will be necessary.

Although the achievement of the capacity development of MCB was large, only some of the SWM problems were improved and the final disposal problem has yet to be solved. The improvement of final disposal is difficult at this moment because it requires not only technical but also social and financial assistance. However, the experience which MCB gained through the implementation of the pilot projects such as public education can greatly contribute to progress towards final disposal improvement.

4.5 Lessons Learned

The following lessons were learned through the implementation of pilot projects.

- a) Citizens actively cooperate in bell collection in three of the seven model towns and reasonably cooperate in the remaining four towns. This fact implies that Sri Lankan people would like public spaces to be clean and are willing to cooperate in keeping them clean.
- b) Some of the MCs have been expanding bell collection by themselves. In addition, Ratnapura MC, which is not included in the model towns for the Study, has started bell collection. This fact implies that bell collection is technically, financially and socially appropriate for the condition of secondary towns in general.
- c) The introduction of bell collection has the following impacts other than an improvement in

collection efficiency.

- A series of processes required for the implementation of projects such as the establishment of rules, publicity, education, supervision, feedback, etc. is carried out.
 - Bell collection can motivate municipal staff to promote environmental education because the effect of education can be quickly realized.
- d) LAs generally have sufficient human resources, such as PHIs and CDOs, in terms of quantity; however, there is much room for their capacity to be developed for public awareness and supervision works.
- e) LAs' staff tend to oppose any change of the present situation. In order to improve the efficiency of the SWM works, a continuous effort towards raising LAs' awareness and some incentive for them to make improvements is required.
- f) The waste collection cost can be reduced through an improvement in waste collection.
- g) School education on waste is very effective but it requires the training of trainers first.
- h) Through obtaining permission for the construction of the Moon Plain landfill site, the following was determined:
- It is complicated and time consuming work.
 - LAs do not have the capabilities to do such kind of work.
 - There are few consultants which do such work for LAs.
- i) Whilst leaflet distribution and community meetings have been useful, playing the music and arousing curiosity as to what the "new music" is for, has also been an important, informal method of informing the public. "Playing the music" is clearly the cheapest form of publicity and seems to work.
- j) A possibly better approach to noticeboards, may be to display a simple notice at the many "kade" (small shops) present on almost every street. These are an important form of "social capital", visited by many people in the area each day and hence a useful means of communicating with the community. This approach would also be cheaper and more flexible, as the notices can be updated relatively easily.
- k) Public enthusiasm for both the community animator and street committee system in Chilaw and Negombo respectively has been high, resulting in increased public awareness and expectations and increasing LAs' accountability. However, lack of follow-ups and poor or no response to public complaints have discouraged and frustrated many animators and street committee representatives. These issues need to be addressed if these new communication systems are to survive. Alternatively, existing community groups (e.g. Funeral Assistant Societies) could be utilised for this purpose.

Chapter 5 SWM Improvement Plan

5.1 General Improvement Plan for LAs

5.1.1 Resource Allocation Policy

a. Short Term Policy

The quality of SWM work will be improved by changing the allocation of the SWM budget within the present budget amount.

- 1) Reduction of the waste collection cost by promotion of public cooperation and improvement of the waste collection system. (Establishment of garbage discharging rules, education of people on the discharge rules, the execution of bell collection)
- 2) The budget saved by the above means will be spent for the final disposal of waste, waste treatment, environmental education, etc. to improve the SWM quality.

b. Long Term Policy

The fundamental improvement of SWM problems by an increase of the SWM budget, which will be obtained by an increase in revenue.

- 1) The assessment rate and trade license rate, which are regarded as the financial sources for the SWM budget, will be increased.
- 2) As for the waste collection costs, which are regarded as not included in the above financial sources, a special charging system will first be introduced to the waste type which can be most easily charged and then to the less easily chargeable waste type. (Large amount discharger fee, business waste, garden waste, tipping fee, etc.)
- 3) The increased revenue will mainly be spent for the capital investment projects of waste treatment and final disposal.

5.1.2 Strategy For SWM Improvement

- 1) Full utilisation of the existing internal resources (human, equipment, technology).
 - Utilisation of CDOs for promotion of public cooperation and for supervising dischargers on proper waste discharge
 - Establishment of proper garbage discharge rules (e.g. the combination system of bell collection and kerb-side collection)
 - Placing litter bins, the introduction of the stationary trailer system, etc.
- 2) Full utilisation of external resources (citizens, business entities, private waste companies, NGOs, donors)

- Citizens and business entities: Cooperation on waste minimisation and proper waste discharge
- Private waste companies: Utilisation of private sector's financial capability, technologies, management skills, flexibility, etc.
- NGO: Grass root level cooperation
- Donor agencies: Technical cooperation, financial cooperation, etc.

3) Full utilisation of social capitals

Promotion of recyclers (bothal paththara), mentality to save (aparade), public cooperation activities (sramadana), and home composting (Jeewa kotu)

5.1.3 Strengthening the Institutional Capacity

- a) Establishment of an independent SWM department in LAs which have more than 100,000 inhabitants.
- b) Establishment of an independent accounting code system for SWM works
- c) Formulation of a SWM action plan targeting 5 to 10 years and its approval by the council
- d) Formulation of by-laws for SWM in line with the model SWM by-laws
- e) Promotion of environmental education and education on waste issues
- f) Promotion of good governance as SWM administration. Involvement of citizens in the decision process to ensure transparency and accountability.
- g) Promotion of the introduction of the street committee system and community animator system
- h) Promotion of the introduction of the public participation monitoring system for final disposal
- i) Establishment of garbage discharging rules
- j) Increase in revenue

5.1.4 Education on Waste

The important topics to be dealt with in the education on waste are as follows.

1) Understanding the present condition of SWM works

The current situation of SWM works, problems, its necessity and the necessity of public cooperation are taught.

2) Cultivation of the mentality to love public facilities and spaces such as home town, parks,

roads. → Prevention of waste scattering

Caring for public facilities and spaces restrains people from throwing garbage on the ground.

3) Cultivation of the mentality to save (Aparade). → 3Rs

Economic development encourages people to buy more things and dispose of more after using or consuming. Then people lose the mentality to save “Aparade”.

4) Correct understanding and evaluation of social capital

- To remove people’s bias against cleansing workers and recyclers and to correctly evaluate their contributions to the society, e.g. promotion to call bothal paththara “recycler”.
- To make people realize that “aparade” is a virtue not something shameful.

5.2 Improvement Plan for the Central Government

5.2.1 Selection of First Priority Improvement Project

Assistance from the central government to local authorities for waste problems is essential because SWM works have become too large for a local authority to manage by itself. This improvement plan therefore does not target the improvement of a certain local authority nor a certain technical system. It targets improvement measures which should be taken by the central government to tackle existing common problems in local authorities.

In order to solve common issues and problems of SWM in LAs, the Study team presented and discussed with the relevant organisations the actions to be taken by the Central Government for the establishment of stable SWM in LAs. As a result, the Study team and the counterpart identified the following improvement measures to be promptly implemented by the Central Government.

- a) Establishment of a national organisation to continuously support the improvement of SWM in LAs
- b) Strengthening of the local loan system for facilitating SWM projects of LAs
- c) *Strengthening of the Sri Lankan Institute of Local Governance (SLILG) for educating administrative officers on the importance of SWM works*
- d) *Strengthening of PCs’ SWM administrative capability*
- e) Establishment of a training course for SWM in the National Institute of Public Health and Science (NIPHS) to educate SWM officers
- f) Establishment of a qualification system for SWM officers
- g) *Strengthening of CEA’s support and enforcement capabilities for the establishment of*

appropriate municipal SWM in LAs

h) Formulation of standards for SWM facilities

As for the implementation of the above improvement measures, taking into consideration the limited available resources of the Central Government, the counterpart and Team agreed on the following procedures:

- The first priority should be given to the establishment of a national organisation to continuously support the improvement of SWM in LAs in order to secure coordination of each improvement measure.
- The established national organisation shall be a centre for facilitating the implementation of the other improvement measures.
- However, since financial support is indispensable to improving SWM in LAs, strengthening the local loan system for facilitating SWM projects of LAs shall be conducted at the same time.

Based on the above, the following two improvement plans were established as the first priority projects for the national level SWM improvement plan:

- a) Project for the Establishment of a National Support Centre for the Improvement of SWM in LAs
- b) Project for Strengthening the Local Loan System for Facilitating SWM Projects of LAs

5.2.2 Project for the Establishment of a National SWM Support Centre (NSWMSC)

a. Background and Objectives

A National Coordinating Committee, which is co-chaired by the Secretaries of the MOHAPCLG and the MOENR, was established in 2001 to implement the NSSWM. However, the Committee is not functioning well mainly due to lack of permanent staff and office facilities.

On the other hand, since almost all the LAs are suffering from improper SWM practices and have not been able to find proper solutions by themselves, the need for central government assistance to the LAs is increasing day by day. In particular, securing a final disposal site and construction of a sanitary landfill are far beyond the current capability of LAs. Therefore, it is obvious that the establishment of a national facility is necessary to support LAs in improving their SWM.

Taking all these into consideration, it is proposed that NSWMSC shall be established in order:

- To consult with LAs about their problems concerning SWM and advise them on possible solutions; and
- To facilitate improvement of SWM in LAs in accordance with the NSSWM.

b. Proposed Plan

b.1 Tasks of the NSWMSC

The NSWMSC shall conduct the following tasks:

Function 1: Prepare the policy guidelines for implementation in line with NSSWM and recommend them to the National Coordinating Committee through the secretary of MOHAPCLG

Function 2: Provide technical assistance to PCs (provincial councils), LAs and relevant organizations, especially on the planning, IEE/EIA procedures, 3Rs, construction and operation of sanitary landfills

Function 3: Collect and study information on the current SWM practices and their usefulness in LAs as well as those in foreign countries to prepare policy making tools for the National Coordinating Committee, and provide practical improvement methods/measures to LAs

Function 4: Function as a focal point for international cooperation in SWM and a coordinating body for effective cooperation.

Function 5: Strengthen the SWM administrative capability of PCs and LAs

b.2 Organizational Structure

The proposed structure is presented in Figure 8. The Centre will be under the MOHAPCLG. The Secretary of the MOHAPCLG will make decisions and give instructions regarding policy issues of the Centre. Since the Secretary is also the chairman of the National Coordinating Committee for the implementation of NSSWM, the decisions and instructions regarding the policy of the Committee will be directly reflected in the policy of the Centre.

The Centre will be headed by a Director and under him there will be three units and a number of foreign advisors, who will provide necessary technical support for the Centre.

Although this Centre will be established under the MOHAPCLG, it presently does not have the technical or manpower capacity to operate such a centre effectively. Therefore, the necessary assistance should be obtained at the initial stage under a technical cooperation program of foreign funding agencies.

The Centre will aim to be autonomous in the future by charging for the seminars and training. However, at the initial stage, MOHAPCLG will bear the expenses required for the establishment and operation of the Centre together with the assistance by donor agencies because SWM works require urgent improvement.

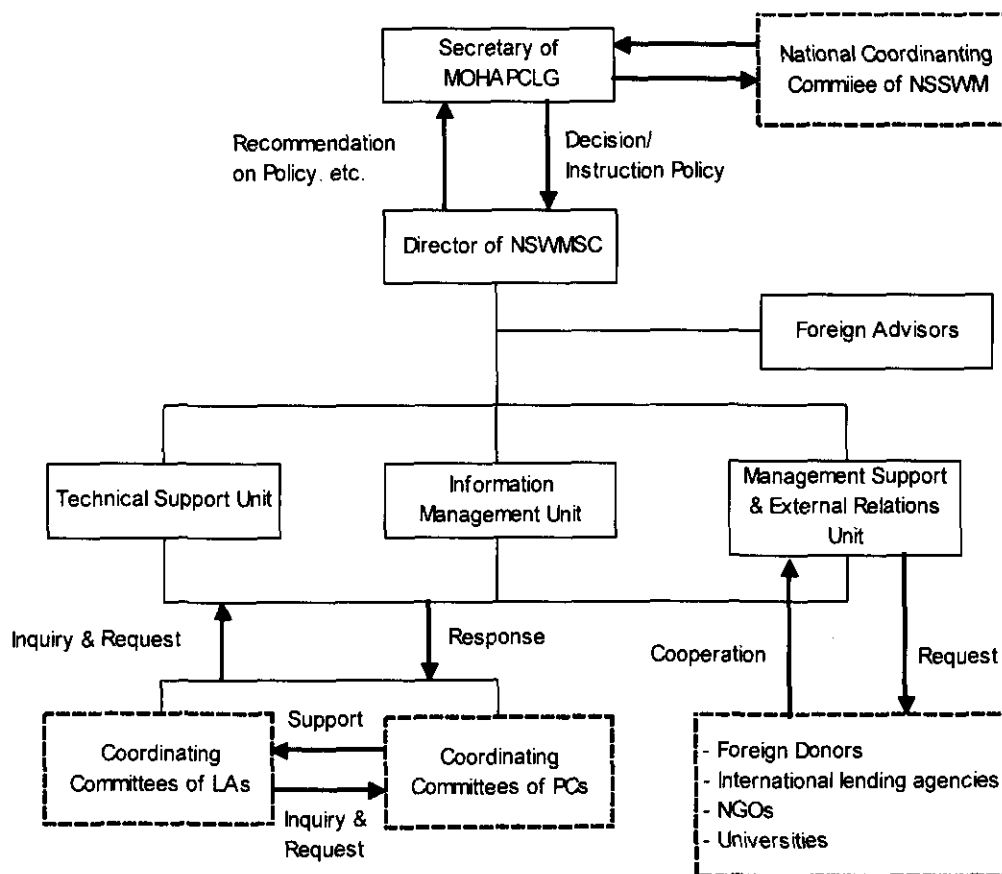


Figure 8: Proposed Organisation of NSWMSC

c. Estimated Project Cost for NSWMSC

c.1 Institutional Building of NSWMSC

| | |
|-------------------|--|
| Background: | A permanent national organisation to provide local authorities with technical assistance is necessary in order for LAs to execute SWM works in line with the national strategy for SWM. |
| Objectives: | Establishment and Operation of the NSWMSC in MOHAPCLG. |
| Executing Agency: | Ministry of Home Affairs, Provincial Councils and Local Government |
| Duration: | 5 years |
| Budget: | Salary: Sri Lankan staff: 13 people, 780 p/m Expatriate staff: 4 experts, 5 years, 180 p/m, SWM expert, institutional expert, SWM facility expert, SWM information expert Equipment and furniture: desks, chairs, cabinets, vehicles, computers, projectors, printers, photocopiers, printers, etc. O&M cost: Rental of office space (170 m ²), electricity, telephone, etc. Cost: Local currency: 30,020,000 Rs, Foreign: 4,600,000 USD |

c.2 SWM Training for Officers in NSWMSC

| | |
|-------------------|---|
| Background: | The assignment of proper experts in NSWMSC will be too difficult as there are few people who are familiar with SWM in Sri Lanka. |
| Objectives: | To give SWM training including the SWM theory and the SWM experiences in foreign countries to SWM officers assigned in NSWMSC. Training duration: 2 months Trainees: 3 people for the first two years, and then one person every year for the next 3 years, 9 trainees in total |
| Executing Agency: | NSWMSC |
| Duration: | 5 years |
| Budget: | Foreign: 180,000 USD for 9 trainees |

c.3 Establishment of Training Course for SWM Officer

| | |
|-------------------|---|
| Background: | NIPHS is operating the 18 months PHI training course. However, the course deals very little with the subject of SWM. In addition, there is no qualification system for a SWM officer despite the existence of PHI qualifications. To improve the SWM, it is necessary to establish a SWM course and a SWM officer qualification system. |
| Objectives: | Preparation of materials for SWM lectures Training of lecturers for SWM lectures Training duration: 2 months Trainees: 3 people for the first 2 years, one person for the next 3 years. |
| Executing Agency: | NIPHS (National Institute of Public Health and Science), Ministry of Health |
| Duration: | 5 years |
| Budget: | Local currency: 2,080,000Rs |

c.4 Seminar on SWM Administration

| | |
|-------------------|---|
| Background: | One of the main reasons why SWM has not been improved is that the people responsible for local governance do not understand the importance of SWM as local governance. |
| Objectives: | A seminar for people responsible for decision making in local government to learn the importance of SWM will be held in every province once a year. Participants: 50 people per seminar, once per province per year, 8 seminars per year, 40 times in 5 years in total |
| Executing Agency: | SLILG |
| Duration: | 5 years |
| Budget: | Local currency: 7,600,000Rs |

c.5 Seminar for SWM practitioners working in LAs

| | |
|-------------------|--|
| Background: | PHIs who studied in the PHI training course in NIPHS are generally in charge of SWM. Most of them have never had SWM lectures. |
| Objectives: | PHI or any other officers who deal with SWM works in local authorities will be given the intensive SWM practitioners training. Duration of training session: 1 month Number of trainees: 25 trainees per training session. 20 training sessions in total. 500 trainees in total will be trained. |
| Executing Agency: | Ministry of Health |
| Duration: | 2 nd and 3 rd year |
| Budget: | Local currency: 30,000,000 Rs (1,500,000 Rs per course, excluding salary for trainees) |

c.6 Seminar for NGOs and Private Companies

| | |
|-------------------|--|
| Background: | SWM projects initiated by NGOs and private consultants often fail due to lack of understanding of SWM although their roles in SWM are very important. |
| Objectives: | NSWMSA will provide them with basic knowledge of SWM and the information of the present SWM condition in Sri Lanka by holding a seminar. Duration: 1 day Participants: 50 people per seminar Frequency: once a year |
| Executing Agency: | NSWMSA |
| Duration: | 5 years |
| Budget: | 1,000,000 Rs for 5 times |

c.7 Technical Assistance to LAs for the Formulation of SWM Project

| | |
|-------------------|--|
| Background: | Quite a number of SWM facilities such as compost plants and biogas plants were constructed; however most of them stopped operation within a few years. The main cause is ignorance of the O&M plan at the planning stage. As for sanitary landfills, no sanitary landfill except Moon Plains in Nuwara Eliya has been materialized mainly due to strong opposition by local residents. This is mainly due to LA's lack of social consideration and poor transaction for approval. This is because neither LAs nor private consultants have proper understanding of SWM. Therefore, it is too difficult for any project to succeed without having proper understanding of SWM. In order to utilize the funds effectively for improvement, the provision of technical assistance to LAs for the project is essential. |
| Objectives: | Consultants employed will assist LAs to do the following works: <ul style="list-style-type: none"> ● Formulation of a SWM action plan ● Formulation of an appropriate SWM project ● Arrangement to satisfy the pre-conditions for financing NSWMSA will be in charge of selection of a consultant, contract, supervision, technical guidance, etc. This programme aims to effectively utilise the funds. |
| Executing Agency: | NSWMSA |
| Duration: | 5 years. 10 towns per year for 5 years. 50 towns in 5 years. |
| Budget: | Foreign currency: 100,000,000 Rs (2,000,000 Rs per town) |

c.8 Acquisition and Dissemination of Basic Data of SWM

| | |
|-------------------|---|
| Background: | The current confusion of SWM in Sri Lanka can be attributed to the lack of existing basic SWM data. The provision of basic data will help LAs to perform better SWM indirectly. |
| Objectives: | <ul style="list-style-type: none">● Compost market survey, once every two years, 1st, 3rd and 5th year● Recycle condition survey, once every two years, 1st, 3rd and 5th year● Waste physical composition survey, once every two years, 1st, 3rd and 5th year● Publication of SWM journal, every season for 5 years |
| Executing Agency: | NSWMS |
| Duration: | 5 years |
| Budget: | Local currency: 13,000,000 Rs |

c.9 Establishment of Quality Check System for Compost

| | |
|-------------------|--|
| Background: | The composting of waste is a very important technology for Sri Lanka as the quality of waste is suitable. However, the problem with composting is the limited market for compost. The establishment of a compost quality certification system will increase the compost demand by removing customers' anxiety. |
| Objectives: | <i>Procurement of necessary equipment for compost analysis</i> Technical assistance to establish the compost quality certification system |
| Executing Agency: | Ministry of Agriculture |
| Duration: | 2 nd year |
| Budget: | Foreign currency: 150,000 USD |

d. Project Cost

Table 10 summarises the NSWMSC project cost. The required total cost for 5 years is as follows.

- Local currency: 183,700,000 Rs
- Foreign currency: 4,930,000 Rs

Table 10: Project Cost Breakdown of NSWMSC

| | Description | Unit | Q'ty | Local Currency | | Foreign Currency | |
|----------|---|--------|------|----------------|--------------------|------------------|------------------|
| | | | | Unit rate | Amount | Unit rate | Amount |
| | | | | Rs | Rs | US\$ | US\$ |
| 1 | Establishment of NSWMSC | | | | 30,020,000 | | 4,600,000 |
| A | Rental fee of office space (170m ²) | Months | 60 | 100,000 | 6,000,000 | | |
| B | Furniture (desks, chairs, cabinet, bookshelf, etc.) | LS | 1 | 500,000 | 500,000 | | |
| C | Equipment for training | LS | 1 | | | 10,000 | 10,000 |
| D | Equipment for office | LS | 1 | | | 10,000 | 10,000 |
| E | Vehicles | Nos | 4 | | | 20,000 | 80,000 |
| F | Salary for drivers (4p/m×60months) | PP | 240 | 8,000 | 1,920,000 | | |
| G | Salary for 13 Sri Lankan staff | Pm | 780 | 20,000 | 15,600,000 | | |
| H | Salary for 4 expatriate | Pm | 180 | | | 25,000 | 4,500,000 |
| | O&M expense | Months | 60 | 100,000 | 6,000,000 | | |
| 2 | SWM training for officers in NSWMSC | | | | | | 180,000 |
| A | Long term SWM training in foreign country | | 9 | | | 20,000 | 180,000 |
| 3 | Establishment of training course for SWM officer | | | | 2,080,000 | | |
| A | Training of lecturers | 人 | 9 | 120,000 | 1,080,000 | | |
| B | Production of lecture materials | LS | 1 | | 1,000,000 | | |
| 4 | Seminar on SWM administration | | | | 7,600,000 | | |
| A | One day seminar | Times | 40 | 150,000 | 6,000,000 | | |
| B | Fee for resource person, transportation, per diem, etc. | Times | 40 | 40,000 | 1,600,000 | | |
| 5 | Seminar for SWM practitioners working in LAs | | | | 30,000,000 | | |
| A | One month intensive SWM training course | Times | 20 | 1,500,000 | 30,000,000 | | |
| 6 | Seminar to NGOs and private companies | | | | 1,000,000 | | |
| A | One day seminar | Times | 5 | 200,000 | 1,000,000 | | |
| 7 | Technical assistance to LAs for the formulation of SWM project | | | | 100,000,000 | | |
| A | SWM Study for LAs | Town | 50 | 2,000,000 | 100,000,000 | | |
| 8 | Acquisition and dissemination of basic SWM data | | | | 13,000,000 | | |
| A | Compost market survey | LS | 3 | 1,000,000 | 3,000,000 | | |
| B | Recycle condition survey | LS | 3 | 1,000,000 | 3,000,000 | | |
| C | Waste composition survey | LS | 5 | 1,000,000 | 5,000,000 | | |
| D | Publishing SWM journal | Times | 10 | 200,000 | 2,000,000 | | |
| 9 | Establishment of quality check system for compost | | | | | | |
| A | Equipment of analysis | LS | 1 | | | 150,000 | 150,000 |
| | Total | | | | 183,700,000 | | 4,930,000 |

5.2.3 Financial Scheme for SWM Improvement

In this section, a financial scheme will be developed that supports LAs in implementing a self-sustainable SWM program with initial financial assistance from the Central Government.

a. The Model Project and Its Cost

Explained below is the Model Project.

- Population of the model city: 50,000
- Volume of solid waste: 40 tons/day (15,000 tons/year)
- Current expenditure for SWM: Rs. 10,000,000/year
- Investment and O&M Cost:

Table 11: Initial Investment Cost for Model Project

| Item | Cost (Rs.) | Lifetime (Yr) | Remarks |
|---------------------------------|-------------------|---------------|---|
| 1. Landfill for Disposal | | | |
| 1.1 Landfill Site Dev. | 13,000,000 | 20 | Capacity: 300,000 tons |
| 1.2 Bulldozer | 7,000,000 | 7 | D4 Class 1 unit |
| 2. Collection | | | |
| 2.1 Tractor/Trailer | 7,500,000 | 7 | Unit cost: Rs. 1,500,000 Requirement: 10 units Existing: 5 units; New: 5 |
| 3. Contingency | | | |
| | 2,500,000 | | |
| TOTAL | 30,000,000 | | |

Note: JICA Study Team Estimates

Table 12: Annual Operation and Maintenance Cost

| Item | Cost (Rs.) | Remarks |
|------------------------------|-------------------|--|
| 1. Disposal at Landfill Site | 3,000,000 | Rs. 200/ton (manpower, material, operation and maintenance) |
| 2. Collection and Transport | 12,000,000 | Rs. 800/ton (collection and sweeping; manpower, material, operation and maintenance) |
| TOTAL | 15,000,000 | |

Note: JICA Study Team Estimates

b. Medium Term Funding Requirement

Out of a total of 311 LAs, about 10%, say 30 LAs, might urgently require the modernized SWM system. In this case, the total investment cost would be around Rs. 1 billion. According to the results of the loan demand survey on LAs conducted in the Study, the required fund is estimated to be about Rs. 0.8 billion for 34 LAs.

It is not necessary to start all projects immediately, but the first 30 LAs should commence the project within the next five years, as the number of cities which require new investment increases with the pace of urbanization in Sri Lanka. Consequently, an estimated Rs. 1 billion is necessary for 50 SWM projects for five years.

c. Financial Scheme

The Financial Scheme proposed in this Chapter, is a system for the LAs to implement a SWM project with their own initiatives and plans, and with financial support from the Central Government.

c.1 The Principles

The Financial Scheme is designed and operated with the following principles:

- The Scheme is to provide financial support from the Central Government to LAs to carry out solid waste management improvement projects.
- The support under the Financial Scheme covers a part of the initial investment costs.
- The mode of financial support is both grant and low-interest loan. The share of grant and loan is determined based on the affordability and financial strength of the LAs.
- The LAs, who apply to the Scheme, have to allocate a part of the initial investment costs, at least for the land acquisition and compensation, and develop and implement the revenue enhancement measures to generate necessary funds for recurrent expenditure and debt service for the loan.

c.2 Management of Financial Scheme

The operating entity of the Financial Scheme is the Central Government. The Ministry of Home Affairs, Provincial Councils and Local Government (MOHAPCLG) assumes control and full responsibility of this Scheme. Under the guidance of the MOHAPCLG, the proposed NSWMSC will be functioning as the secretariat of the Scheme. The relevant authorities' roles and functions are as follows;

- **MOHAPDLG:** The Ministry assumes overall responsibility of the Scheme. The decision on granting assistance to LAs is jointly made with the Ministry of Finance and the Ministry of Policy Development and Implementation. The secretarial work is done at NSWMSC.
- **NSWMSC:** NSWMSC is established in the MOHAPCLG, and provides the comprehensive support to LAs who is planning and implementing the SWM projects. The support in technical and engineering aspects is the main function of NSWMSC. Consultation for revenue enhancement of LAs is also provided in cooperation with the SLILG. For the Financial Scheme, NSWMSC will have the functions for appraising the technical and financial feasibility. The appraisal of financial aspects is done with the financial institutions.

- **Financial Institution(s):** The Financial Institution administers the disbursement and repayment of the loan component. At the appraisal stage of the project, the Financial Institution will prepare the financial appraisal documents. The candidates for the Financial Institution are the Local Loan Development Fund (LLDF), Development Banks, and Commercial Banks.
- **Local Authorities:** The Local Authorities prepare the implementation plan of the project. The implementation plan includes, but not limited to, the Long Term SWM Plan, Project Implementation Plan, and Financial Plan including Revenue Enhancement Program. The LAs may utilize the resources and support of NSWMSC, if required.

c.3 The Financial Scheme

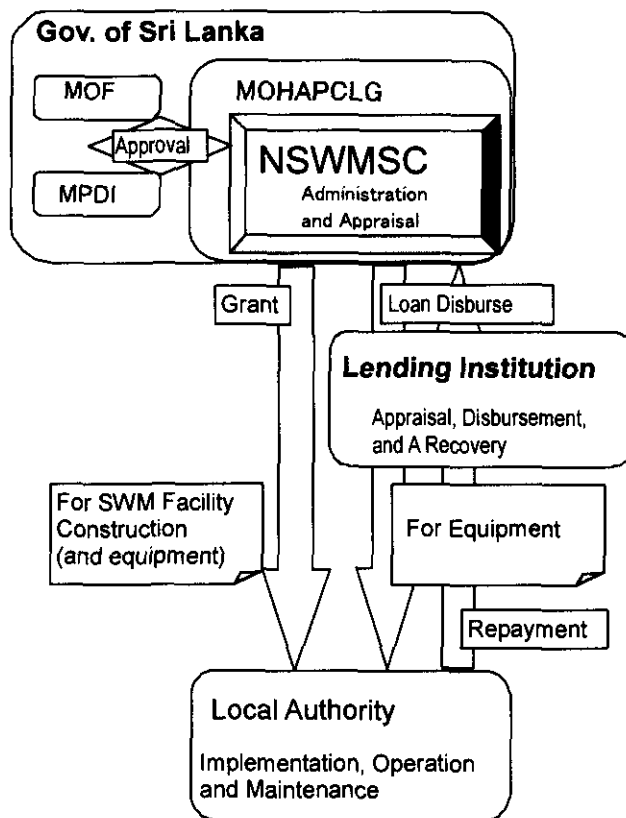


Figure 9: Financial Scheme for SWM Improvement Project

Under the Financial Scheme, the Central Government shares the burden for initial investment in the form of grants and low-interest loans. The true cost for the Central Government depends on the ratio of grant to loan, and the terms of the loan. In order to reduce the burden of the Central Government to the extent possible, and in view of the sustainability of the project undertaken by the LAs, it is recommended that the cost for the equipment which requires re-investment periodically, be provided in the form of a loan. The loan may be extended again for renewal of

equipment, if the repayment is completed. In the Model Project, the ratio of grant to loan is one to one. This ratio may vary depending on the affordability of the LAs. If weakness is observed in affordability, part of the equipment may also be covered with a grant from the Central Government¹². The repayment of the loan is within seven years, taking into account the renewal of equipment. It is recommended that the interest rate of the loan be reduced to 4% per annum, from the current interest rate of 6.5% provided for the same purpose by LLDF, considering the declining trend of interest rates in Sri Lanka.

The projects are implemented with the subsidies from the Central Government. The Central Government is required to appropriate the fund in the Budget. The fiscal condition, however, does not easily allow the addition of Rs. one billion, and may require the issuance of additional Government Bonds. Funding in the local market becomes another heavy burden to the Central Government Budget. On the other hand, the Project objectives are to improve environmental and sanitary conditions, and to strengthening LAs' capacity, on which major donors place a high priority for their assistance. The donors may favourably consider providing assistance to a project of this nature. For the Government, grant assistance may be the best solution. In case the grant assistance is not available, an alternative may be to obtain a concessional loan from donors such as the World Bank, ADB, or JBIC¹³.

c.4 Sustainability of the Project

In this section, a financial calculation is made to estimate the additional expenditure of the project, and to test the financial sustainability. The following assumptions are used for this purpose:

- Landfill Site Construction: Rs. 13,000,000 (Grant)
- Equipment: Rs. 14,500,000 (Loan, 4%p.a., 7 years repayment)
[Annual Debt Service: Rs. 2,400,000]
- Operation and Maintenance: Rs. 15,000,000/year
[Incremental Expenditure: Rs. 5,000,000]

The cash-flow of the Project is shown in Figure 10. The annual expenditure of this Local Authority will be Rs. 17,400,000, consisting of Rs. 15,000,000 for operation and maintenance and Rs. 2,400,000 for debt services. Assuming that this Local Authority has been spending Rs. 10,000,000 annually for on-going solid waste management services, the additional expenditure of improved services would be Rs. 7,400,000.

¹² In case of water supply project in rural areas, 80% of the total investment is covered with the grant of Central Government.

¹³ In case of JBIC ODA loan, the project may be qualified for preferential term; interest rate of 0.75% and 40 years repayment, under the category of Waste Treatment.

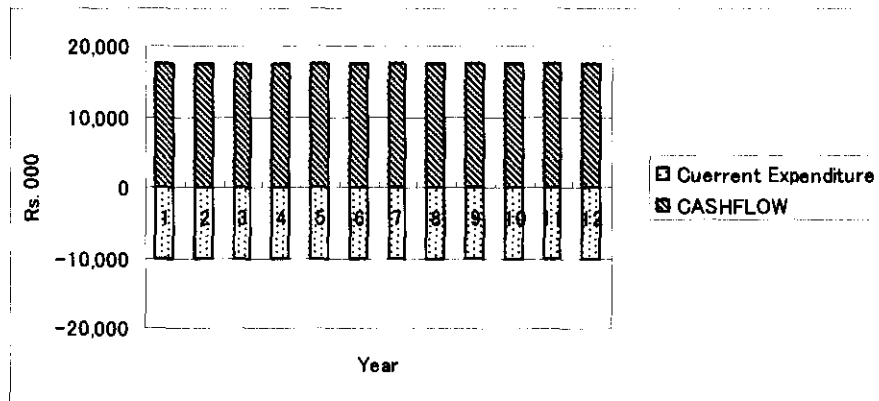


Figure 10: Cash-flow for Local Authority

What would be the impact of this additional expenditure on the fiscal operation of this Local Authority? The revenue collected by the LAs of the seven Pilot Municipalities under this study is around Rs. 1,000 per capita. Supposing the population of this Model Project Municipality is 50,000, the total revenue generated would be in the range of Rs. 50,000,000. The additional cost to be born for the implementation of the Model Project is Rs. 7,400,000, which is about 15% of the total revenue, or equal to Rs. 150 per capita. Since the present level of revenue collected by the LAs is far below the adequate level, revenue enhancement of 15% would be in the quite feasible range. The willingness to pay for improved solid waste management services, which was surveyed in this study, is encouraging. The willingness to pay is about Rs. 1,000 per family per year, which is enough to cover the required Rs. 150 per person. If appropriate revenue enhancement measures are taken, the proposed Financial Scheme would be concluded as a feasible and sustainable option for the LAs.

d. Preconditions for Financial Scheme

In order to maintain the efficiency and sustainability of the project, it is important to seek the commitment to better SWM services from the participating LAs. The following are the conditions for the participating LAs and the Central Government as well.

- 1) The Local Authority prepares a Long Term Solid Waste Management Plan associated with the implementation project of the Project.
- 2) The Local Authority develops revenue enhancement measures, and obtains approval of these measures from the Council in the course of the budget process.
- 3) The Local Authority secures the funding for land acquisition and compensation for the Project in the annual budget, and obtains the Council approval for it.
- 4) The Local Authority prepares the full accounts for SWM services to understand the cost of solid waste management services, and makes them available to the public.
- 5) The Local Authority conducts a study of subcontracting the work to private sector for

c. Impact by Private Sector Participation

c.1 Supervision Against Hardening Working Condition

The introduction of private sector participation policy harden the market competition. It likely to decrease the payment for workers and the cost for safety tools. Stringent supervision is therefore required to supervise private contractors in order to protect workers from deterioration of the *employment and working condition*.

c.2 Prevention of Monopoly and Oligopoly of Contract

The promotion of the private sector participation policy for the waste collection work and the final disposal work tends to lead to monopoly or oligopoly. If it is the case, the client such as LA lose the effective control means because losing alternative means. Therefore, the following measures should be taken as prevention measures.

Waste collection work

To make a collection contract area small so that many micro-enterprises can participate in a tender.

Waste treatment and final disposal

The client shall own these facilities. In this case, if the contractor deviate from the contract conditions and they ignore the client's instruction, the client can keep the alternative even though kicking it out.

c.3 Social Consideration for Neighbourhoods During Planning

Negative impacts to neighbourhoods can't be eliminated, even though the best technology is adopted for a waste treatment plant or the final disposal. Therefore, neighbourhoods response to the project as a form of NIMBY¹⁴. In order to execute the project under such difficult condition, building the consensus of neighbourhoods toward the project is essential. LAs have to answer to the citizens' following questions for that purpose.

- a) Why is such capacity of the facility required?
- b) Why is the facility constructed here?
- c) Assurance of negative environmental impacts to be controlled within permissible limits
- d) Payment of equitable compensation.

¹⁴ Not In My Back Yard. People don't want an undesirable activity or building near their home, even though they understand its necessity.